Tree Conservation Report

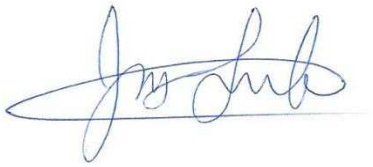
Pre-Construction Assessment

Prepared For:

Forest and Field Landscape Architects Inc.
c/o Matthew Sweig
720 Bathurst St, Toronto, ON M5S 2R4

Site Address:

473 Albert Street
Ottawa, ON K1R 7X3
Site Plan Application number (D07-12-19-0203)
Plan number (#18100)
December 5th, 2019



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Contents

Summary

The following Arborist Report is with respect to the proposed re-paving of asphalt surfaces and expansion of an underground garage access driveway at 473 Albert Street in Ottawa, ON

The property is located on the north side of Albert Street and is mostly occupied by an 11-story commercial office building. Paving work is planned to replace all asphalt surfaces on the property, which extend throughout the front and back. The driveway entrance to an underground parking garage beneath the building is planned to be expanded, which directly conflicts with one city-owned Amur Maple Tree.

Five trees were surveyed for this report, and four have been determined to require removal to complete the construction and provide access to the rear of the property. One other tree on a private neighbouring property near to the work does not require any injury or removal and may be protected behind tree protection fencing. Due to the lack of planting space elsewhere on-site, no replacement planting is suitable, and compensation payments to the city are recommended.

It is imperative for all crew contracted to perform this construction to thoroughly understand this report and the recommendations stated within.

Introduction

Davey Resource Group (DRG) was retained by the client, Matthew Sweig of Forest and Field Landscape Architects Inc., to develop a Tree Conservation Arborist Report and Tree Protection/Removal Plan (TPP) for the proposed re-paving and driveway expansion at 473 Albert Street in Ottawa, ON.

An inventory and assessment of all the trees within the scope of the assignment was conducted. The Arborist was to document the current condition, size, and location of the trees as they relate to the proposed work. To account for the spatial scope of work within the site, the location of the proposed construction and all trees within 6 meters of it were surveyed. All trees over 5cm in diameter within the scope of the survey were included in an inventory and assessed for protection or removal needs. Small ornamental trees and shrubs were not surveyed for this report.

Recommendations for tree preservation or removal are to be provided and follow City of Ottawa Urban Tree Conservation by-law #2009-200.

This report must be accompanied by the following additional documents:

1. A full printing of the tree inventory performed by Davey Resource Group (DRG), otherwise known as the Tree Protection Action Key (TPAK). (Appendix 1)
2. The construction maps with the Arborist Comments, otherwise known as the Tree Protection Plan (TPP). (Appendix 2)

Limitations of the Assignment

It must be understood that DRG is the assessor of the trees in relation to tree preservation practices. The construction supervisors should incorporate the information and recommendations provided within this report into their construction methodology to complete their project in a reasonable manner.

This Arborist Report is based on the project scope and details for tree preservation as discussed. All proposed construction methods are limited to what was provided in the site plans and in discussions with the Project Leader. Estimates, measurements and comments regarding tree preservation were based on the proposed construction plans and field observations.

This Arborist Report was compiled from field data collected from the ground. A basic visual assessment of the tree was performed. No level of ISA Tree Risk Assessment was performed. More data on risk may be obtained through a basic or advanced ISA Tree Risk Assessment.

Methods

- Tools used to assess the trees included a Biltmore stick, metric DBH measuring tape, metric measuring tape, and camera.
- Photographs included in this report are labeled copies of their originals and may have been cropped for formatting.
- All trees over 5cm within 6 meters planned paving work were included in the inventory.
- Trees were studied for their proximity to existing and planned structures to determine recommendations or precautions for trees requiring removal or injury.

Observations

- The site was inspected on November 24th, 2019 by ISA Certified Arborist Kyle Gibson (ON-2141A) at 3:00 P.M. local time.
- Weather conditions were clear, no precipitation or snow cover was present.
- During the assessment, no evidence of construction was present, and work had not yet started.
- The property consists of an 11-story commercial office building located on a four-lane city street. Most of the property is paved or occupied by the building, with the exception of a small planting bed at the southwest corner where trees were assessed for this report. The surrounding properties are similarly developed with high-rise buildings.
- 5 trees were assessed for this report and labeled #1-#5 in the inventory and Tree Protection Plan included within Appendices 1-2. No injuries to any trees, nor any material storage or soil compaction within Tree Protection Zones was noted during the assessment.
- No other trees were present on or immediately surrounding the property.
- **Trees #1-4** consist of 4 small Amur Maple (*Acer ginnala*) trees planted in a row along an interlocking paver path at the southwest corner of the property. The trees are in fair to good condition overall.
    - The planting medium wherein these trees are planted consists of packed rock gravel with little apparent organic material. Their growth space measures approximately 1.2m wide leaving little room for additional growth. Though the species is well-suited for stressful urban environments, there is little available light or soil volume, therefore these trees are not expected to thrive.
- **Tree #1** is in direct conflict with the proposed expanded driveway entrance and will require removal.
- **Trees #2-4** are located behind an exterior wall of the building and are planned to be removed by the client to allow for access to the rear of the property.
- **Tree #5** is a small Flowering Crabapple (*Malus sylvestris*) in a raised planting bed on the neighbouring property to the west addressed to 95 Bronson Ave. It is not within the area to be paved but warrants protection due to its proximity to the work site.

For further details and observations, refer to the Tree Protection Action Key (Appendix 1).

Discussion

To preserve and protect these trees, proper recommendations must be followed and abided by the client for the duration of the project.

Regulatory context

Trees in Ottawa are protected by City Bylaw #2009-200, which establishes permit requirements for work surrounding all trees planted on city-owned property, and all trees over 50cm in diameter on private property. Under the by-law, Critical Root Zones surrounding each tree are defined by the tree's diameter and must be kept free of all construction activity above and below ground. Were any work to be required within the CRZ of a tree protected by the by-law a permit to injure the tree is required by the City of Ottawa. Any tree protected by the by-law that must be removed to accommodate construction also requires permit approval to proceed. If work is proposed within 6 meters of a tree but not within its CRZ, it is in the best interest of the client to protect it using a Tree Protection Fence built to city standards (depicted in Appendix 3). This serves to prevent any incidental contact or harm to a protected tree that would constitute a contravention of the by-law.

Within the scope of the project at 473 Albert Street, one city-owned tree will require removal, and as such a permit will be required. Under permit conditions, replacement trees are requested by the City of Ottawa. However, due to the narrow planting bed in which the trees are located, and the lack of planting space elsewhere on the property, replacement planting following completion of the work is not feasible. The client may satisfy city requirements for replacement planting by providing compensation payment to the City.

Scope of Work

The proposed work on-site consists of re-paving of asphalt surfaces throughout the front, rear, and underpass entryway to the underground garage below the building. Under the scope of the proposed work, the asphalt driveway at the front of the property near its southwest corner will be expanded. This expansion covers the location of Tree #1, which is city owned. The expanded pavement will connect to the existing paver path on the neighbouring property to the west. North of this area, Trees #2-4 are planned to be removed to allow for access to the rear of the property. No other trees are threatened by the work and may be fully conserved. As the Amur Maple trees are small in stature and not a native species to the area, the expected environmental impact of its removal is not substantial.

Tree Protection Hoarding (Appendix 3)

It is in the best interest of the client to take every precaution possible to minimize damage to trees where work is taking place, and to avoid any unnecessary injury to trees outside of work areas. To accomplish this, hoarding (Tree Protection Fencing (TPF)) is to be used on this construction site. The distance from trees that hoarding is installed is typically defined by the dripline pursuant to the city by-law. However, it must be understood that sometimes this distance is not achievable

due to infrastructure being too close. In most situations, hoarding does not need to be installed beyond the closest extent of impermeable and/or paved surfaces. It must be further understood the hoarding distance sometimes must accommodate a larger CRZ (than the typical MTPZ distance) due to a limited root growing area/volume (this area is typically defined by the project arborist.)

On most landscapes within a private property, solid plywood hoarding best serves to protect tree trunks from inadvertent damage. However, along city streets and at driveway entrances, it is recommended that high-visibility snow fence be affixed to a wooden beam frame, which allows for proper tree protection while allowing vehicle and pedestrian traffic to maintain visibility through the tree protection zone.

Hoarding locations will be indicated on the Tree Protection Plan (Appendix 2) which has been included in this report but will be printed to-scale for use on-site and in permit applications. Within the scope of this project, hoarding is recommended to be established around Tree #5.

Problems will arise for tree preservation efforts when anyone removes the hoarding, even temporarily. It takes one instance of soil compaction from a heavy machine for roots to suffer from air and water deprivation and for the tree to become stressed. It is imperative to install and maintain in good condition the hoarding to prevent this from happening by utilizing horizontal hoarding whenever necessary.

Root Pruning

Similar to pruning the upper canopy of the tree, roots are best removed (if needed) via target pruning practices and not by being torn off. Using mechanical tools or excavation equipment to remove or prune roots often leaves ragged edges, stripped bark, or splintered tissue. These surfaces are difficult for a tree to heal over and provide a high surface area for potential decay pathogens (bacteria, fungus, insects), to enter a tree. Minimizing the cross section of pruned roots allows for the most efficient recovery for the tree. Roots that are larger in diameter than 20% of its parent trunk's DBH are structurally integral to a tree and must be pruned with discretion. Root pruning is recommended to be carried out by a licensed professional, such as an ISA Certified Arborist.

Tree Protection Signage

It is recommended for the client to create Tree Protection Signs to affix to tree protection hoarding. A sign should be displayed on the tree protection fencing.

Staging Areas

All staging areas are understood to be outside the TPZ. At no time are materials, vehicles, traffic or debris to be stacked, staged, or piled inside the hoarding (Tree Protection Fencing).

Conclusion

The planned paving work and expansion of the front driveway into the parking garage at 473 Albert Street will require the removal of 1 city-owned Amur Maple tree (#1) and three more privately owned Amur Maple trees (#2-4). 1 other tree assessed at the site may be conserved without injury or removal so long as proper tree protection fencing is built and maintained throughout the duration of the paving work.

Recommendations

In accordance with the numbering of trees in the inventory listed on the Tree Protection Action Key (Appendix 1), we have provided the following recommendations.

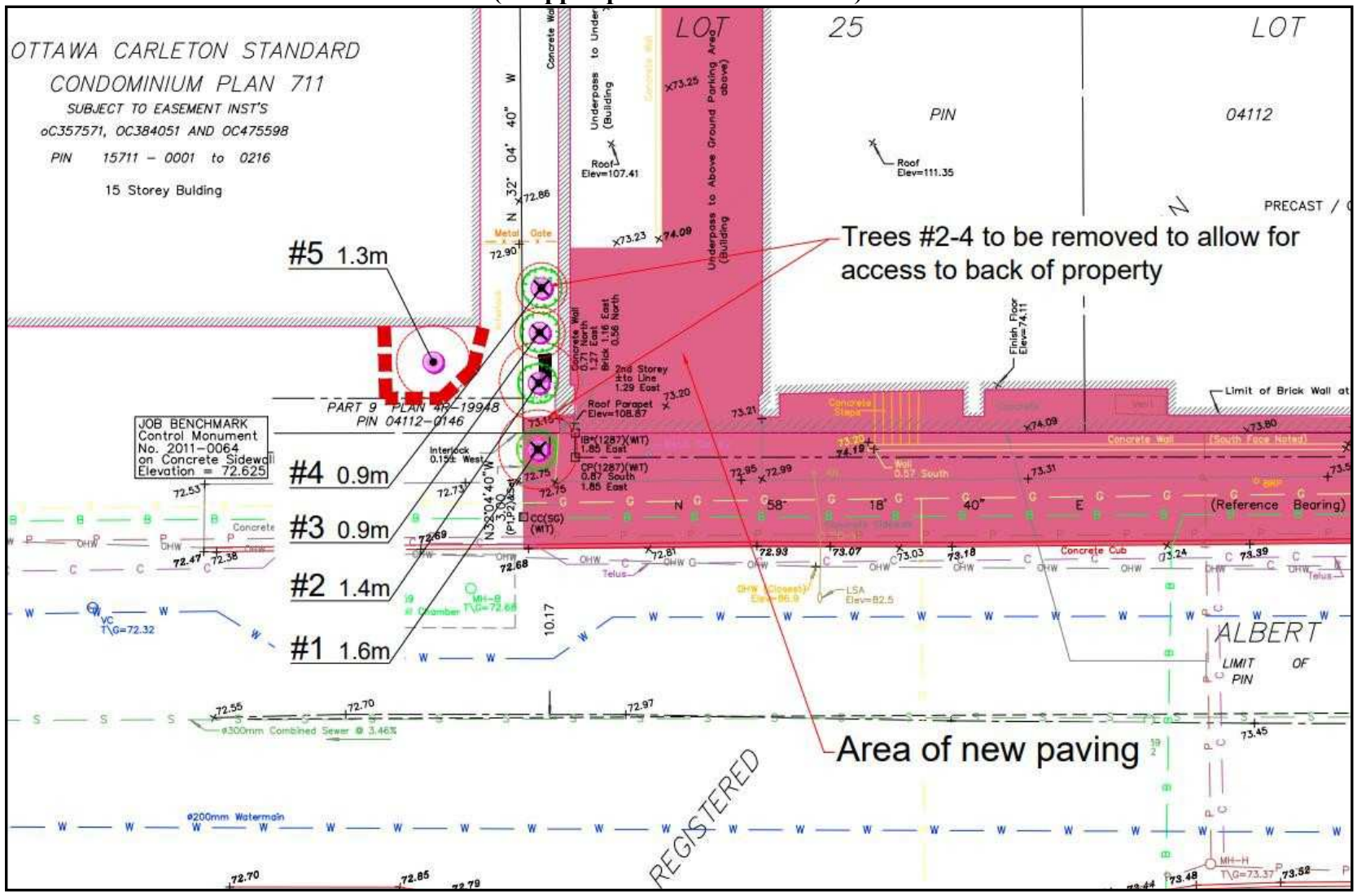
- We recommend the client remove Trees #1-4 prior to the start of the work.
    - Prior to the removal of Tree #1, permission must be obtained from City of Ottawa Forestry Services, as this tree is on public property.
    - As no suitable planting space exists elsewhere on the property, we recommend that compensation be paid to the city in lieu of replacement planting.
- We recommend the client install and properly maintain tree protection fencing (Appendix 3) around Tree #5 prior to and during paving work.
    - We recommend the fencing be built of wooden or steel frames wrapped in high-visibility orange snow-fencing, to maintain visibility.
    - The hoarding is specified in the TPP to be built in order to maintain access along the interlocking paver pathway at 95 Bronson Ave.
    - It must be ensured that all equipment exhaust be pointed away from the trees to be protected.
    - Proper Tree Protection Signage is to be affixed to all Tree Protection Fences.
- We recommend all materials storage be kept outside of TPZs at all times during construction.

Appendix 1 – Tree Protection Action Key (TPAK)

Tree Map Number	Species	Botanical	DBH (cm) @ 1.4 m	Tree Category	Critical Root Zone - Ottawa Specifcations	Health	Structure	Overall Condition	Live Crown Ratio (%)	Deadwood (%)	Crown Width (m)	Tree Height (m)	Construction inside Min TPZ	Construction Impact (None, Low, Medium, High)	Hoarding Required (Y/N)	Removal (Y/N)	Observations and Recommendations
1	Amur Maple	*Acer ginnala*	16	City Owned	1.6	Good	Fair	Good	50	5	4	5	Y	H	N	Y	Located within area to be paved; removal required under scope of work
2	Amur Maple	*Acer ginnala*	14	Private	1.4	Good	Fair	Good	50	5	4	5	Y	H	N	Y	Removal required for access to rear of property
3	Amur Maple	*Acer ginnala*	9	Private	0.9	Good	Fair	Good	50	0	3	5	Y	H	N	Y	Removal required for access to rear of property
4	Amur Maple	*Acer ginnala*	9	Private	0.9	Good	Fair	Good	50	5	3	5	Y	H	N	Y	Removal required for access to rear of property
5	Flowering Crabapple	*Malus sylvestris*	13	Neighbour	1.3	Good	Good	Good	60	10	4	5	N	N	Y	N	Full protection behind fencing recommended

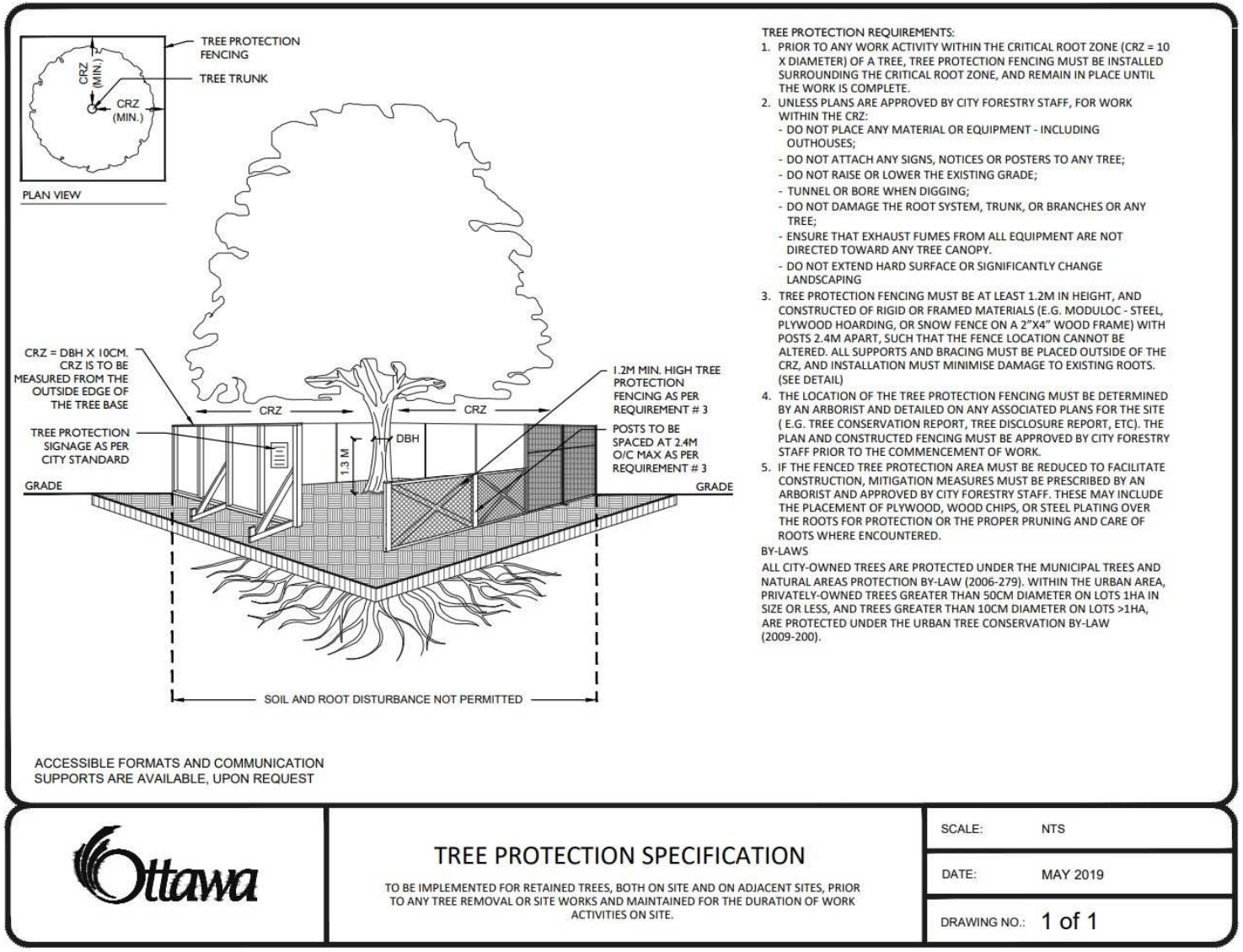
Appendix 2 – Tree Protection Plan

(Cropped preview to show detail)



Full Tree Protection Plan to accompany this report

Appendix 3 – Hoarding (TPF) Detail



Appendix 4 – References

1. ISA, 2001-2011. Best Management Practices, Books 1-9, Companion publications to ANSI A300 Standards for Tree Care
2. Dujesiefken, Dr. Dirk, 2012. Director of the Institute for Tree Care in Germany, The CODIT Principle, research presented on cambial regrowth on trees after injury at the Annual ISA Conference in Kingston Ontario
3. Sinclair and Lyon, 2005. Diseases of Trees and Shrubs, Second Edition
4. ISA, 2010. Glossary of Arboricultural Terms
5. Neely and Watson, ISA, 1994 and 1998. The Landscape Below Ground 1 and 2
6. Matheny and Clark, ISA, 1994. A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas, 2nd Edition
7. Matheny and Clark, ISA 1998. Trees and Development, A Technical Guide to Preservation of Tree During Land Development
8. PNW-ISA, 2011. Tree Risk Assessment in Rural Areas and Urban/Rural Interface, Version 1-5
9. City of Ottawa, 2009. Urban Tree Conservation By-law.
10. Todd Hurt & Bob Westerfield, 2005.Tree Protection During Construction and Landscaping Activities

Appendix 5 – Glossary of Common Arboricultural Terms

Arborist	A professional who possesses the technical competence gained through experience and related training to provide for or supervise the management of trees and other woody plants in residential, commercial, and public landscapes.
ANSI A300	Acronym for American National Standards Institute. In the United States, industry-developed, national consensus standards of practice for tree care.
Bark Tracing	Cutting away torn or injured bark to leave a smooth edge.
Branch Bark Ridge	Raised strip of bark at the top of a branch union, where the growth and expansion of the trunk or parent stem and adjoining branch push the bark into a ridge.
Callus wood	Undifferentiated tissue formed by the cambium, usually as the result of wounding.
Clinometer	A device used to calculate the height of trees.
Consulting Arborist	An Arboricultural consultant is one of the following: • American Society of Consulting Arborists, Registered Consulting Arborist (ASCA RCA#___) • International Society of Arboriculture, Board Certified Master Arborist (ISA BCMA #_____B) • ISA Certified Arborist/Municipal Specialist in good standing for a minimum of 6 years with 6 years of proven experience in a management role related to arboriculture, and has attested and signed to a code of ethics related to arboriculture (ISA#_____)
Compartmentalization	Natural defense process in trees by which chemical and physical boundaries are created that act to limit the spread of disease and decay organisms
Critical Root Zone – (CRZ)	Area of soil around a tree where the minimum amounts of roots considered critical to the structural stability or health of the tree are located. CRZ determination is sometimes based on the drip line or a multiple of dbh (12:1, 12cm of ground distance from the trunk for every cm of dbh) but because root growth is often asymmetric due to site conditions, on-site investigation is preferred.
Daylighting	Also known as Hydro-vac, this is the process by which soil is vacuumed up. In the context of tree care this allows workers to access the soil below the roots without mortal damage to significant roots.
DBH	Acronym for tree diameter at breast height. Measured at 1.4m above ground.
Decurrent	Rounded or spreading growth habit of the tree crown.
Directional Pruning	Providing clearance by pruning branches that could significantly affect the integrity of utility facilities or other structures, and leaving in place branches that could have little or no effect.
Dripline	Imaginary line defined by the branch spread of a single parent or group of plants

Excurrent	Tree growth habit characterized by a central leader and a pyramidal crown.
Included bark	Bark that becomes embedded in a crotch (union) between branch and trunk or between codominant stems. Causes a weak structure.
Lion's Tailing	Poor pruning practice in which an excessive number of branches are thinned from the inside and lower part of specific limbs or a tree crown, leaving mostly terminal foliage. Results in poor branch taper, poor wind load distribution, and higher risk of branch failure.
MTPZ	Acronym for Minimum Tree Protection Zone, also known as the Structural Root Zone (SRZ), which is the distance from the tree equal to 6 times the dbh, within which the likelihood of encountering roots that are structural supports for the tree.
Moment	Rotational force that is created by any line force on a body. The magnitude of a moment is defined as the product of the force magnitude and perpendicular distance from the line of action of the force to the axis of which the moment is being calculated.
Mortality Spiral	A sequence of stressful events or conditions causing the decline and eventual death of a tree.
Mulch	Material that is spread of sometimes sprayed on the soil surface to reduce weed growth, to retain soil moisture and moderate temperature extremes, to reduce compaction from pedestrian traffic or to prevent damage from lawn-maintenance equipment, to reduce erosion or soil spattering onto adjacent surfaces, to improve soil quality through its eventual decomposition, and/or to improve aesthetic appearance of the landscape. Mulch can be composed of chipped, ground, or shredded organic material such as bark, wood, or recycled paper; unmodified organic material such as seed hulls; organic fiber blankets or mats; or inorganic material such as plastic sheeting.
Organic Matter	Material derived from the growth (and death) of living organisms. The organic components of the soil.
CRZ	Acronym for Critical Root Zone, also known as the Critical Root Zone (see definition above), within which there is a high likelihood of encountering roots that are necessary for the survival for the tree.
Project Arborist	The consulting arborist retained to provide all tree preservation recommendations to the project manager or contractors on a given construction project.
Qualified Arborist	An arborist who has documented related training (i.e. ISA, MTCU, or equivalent) and on-the-job experience (minimum of 5 years)
Radial trenching	Technique for aerating the soil or alleviating compaction around a tree by removing and replacing soil (which may be amended) in trenches (typically 300mm deep and 150mm wide) made in a spoke like pattern (radially from the trunk) in the root zone to

	improve conditions for root growth.
Reaction Wood	Wood formed in leaning or crooked stems or on lower or upper sides of branches as a means of counteracting the effects of gravity.
Removal Cut	A cut that removes a branch at its point of origin. Collar cut.
Reduction Cut	A pruning cut that reduces the length of a branch or stem back to a lateral branch large enough to assume apical dominance.
Resistograph®	A brand name of a device consisting of a specialized micro-drill bit that drills into trees and graphs density differences that are used to detect decay.
Soft-Scaped	Landscaping practices that do not involved solid or deeply-dug foundations. Patios consisting of slab rocks laid on-top of the soil with minimal excavation and base (less than 10cm) and causing minimal damage to existing tree roots.
Static Support System	Cabling system that utilizes rigid materials such as rods and steel cables to limit movement and provide constant support of limbs.
Structural cells	Modular system consisting of units of soil and integrated support structures that serve both as a foundation for paved surfaces and a hospitable environment for tree root growth,
Structural pruning	Pruning to establish a strong arrangement or system of scaffold branches.
Structural Soil™	Pavement substrate that can be compacted to meet engineering specifications yet remains penetrable be tree roots in the urban environment. Composed of angular crushed stone, clay loam, and hydrogel mixed in a weight ratio of 100:20:0.03. Developed at the Urban Horticulture Institute, Cornell University, Ithaca, NY.
Supersonic Air Excavation Techniques (SSAT)	A methodology using a device that directs a jet of highly compressed air to excavate soil. Used within the root zone of trees to avoid or minimizing damage to the roots, or near underground structures such as pipes and wires to avoid or minimize damage to them.
Tree Protection Zone (TPZ)	Defined area within which certain activities are prohibited or restricted to prevent or minimize potential injury to designated trees, especially during construction. TPZ is sometimes based on a minimum multiple of dbh (e.g. 6:1, 6cm of ground distance from the trunk for 1cm of dbh)
Walls	Trees have 4 walls in a process known as compartmentalization. ● Wall 1 prevents decay moving up and down in a tree ● Wall 2 prevents decay moving inward in a tree ● Wall 3 prevents decay moving laterally in a tree ● Wall 4 is the new growth formed on the outside of the tree, callus growth.
Woundwood	Lignified, differentiated tissues produced on woody plants after wounding.

Appendix 6 – Arborist Qualifications

Joseph Steinfeld is a Consulting Arborist with Davey Resource Group. His formal education includes a Bachelor of Science in Ecology, Evolution, and Natural Resources with a focus in Forest and Landscape Ecology from Rutgers, the State University of New Jersey. Mr Steinfeld has ten years of varied work experience in the forestry, arboriculture, and ecological assessment fields. Mr. Steinfeld has worked with DRG for over four years as an Inventory Arborist, Asian Longhorned Beetle Damage Surveyor, Urban Forester, Site Manager, and Consulting Arborist.

Certifications
International Society of Arboriculture Certified Arborist (OH-6403A)
ISA Tree Risk Assessment Qualification (TRAQ)

Kyle Gibson is an ISA Certified Consulting Arborist for the Davey Resource Group (DRG). He has completed his Urban Arboriculture Diploma from Humber College in 2011. Since graduating from Humber College he has gained experience working for a private tree company as a climbing arborist and foreman. His work with the DRG has included inventories for the Cities of Ottawa, Niagara Falls, Mississauga, and York Region. As well he has conducted HydroVac work and consulting for Bell Canada and industry related surveys for the City of Hamilton and Canada Food Inspection Agency.

Certifications
· Received a diploma in Urban Arboriculture studies from Humber College in 2011.
· Completed training and received designation of Certified Arborist from the International Society of Arboriculture. ISA# 2141A
· Completed training and became Tree Risk Assessment Qualified from the International Society of Arboriculture.

Appendix 7 – Photographs

Figure 1 – View of the front of 473 Albert Street at its southwest corner. Trees #1-4 pictured. Tree #1 is within the open sidewalk right-of-way wherein new paving will be extended to the interlocking paver path visible at left foreground.

Figure 2 – View of tree #5 along the side of 95 Bronson Ave, to the west. Protection fencing is recommended to surround this tree to prevent materials or equipment from encroaching its critical root zone.

Conditions of Assessment Agreement

This Conditions of Assessment Agreement is made pursuant to and as a provision of Davey Resource Group, a division of The Davey Tree Expert Co. of Canada, Limited ("Davey"), providing tree assessment services as agreed to between the parties, the terms and substance of which are incorporated in and made a part of this Agreement (collectively the "Services").

Trees are living organisms that are subject to stress and conditions and which inherently impose some degree or level of risk. Unless a tree is removed, the risk cannot be eliminated entirely. Tree conditions may also change over time even if there is no external evidence or manifestation. In that Davey provides the Services at a point in time utilizing applicable standard industry practices, any conclusions and recommendations provided are relevant only to the facts and conditions at the time the Services are performed. Given that Davey cannot predict or otherwise determine subsequent developments, Davey will not be liable for any such developments, acts, or conditions that occur including, but not limited to, decay, deterioration, or damage from any cause, insect infestation, acts of god or nature or otherwise.

Unless otherwise stated in writing, assessments are performed visually from the ground on the above-ground portions of the tree(s). However, the outward appearance of trees may conceal defects. **Therefore, to the extent permitted by law, Davey does not make and expressly disclaims any warranties or representations of any kind, express or implied, with respect to completeness or accuracy of the information contained in the reports or findings resulting from the Services beyond that expressly contracted for by Davey in writing, including, but not limited to, performing diagnosis or identifying hazards or conditions not within the scope of the Services or not readily discoverable using the methods applied pursuant to applicable standard industry practices.** Further, Davey's liability for any claim, damage or loss caused by or related to the Services shall be limited to the work expressly contracted for.

In performing the Services, Davey may have reviewed publicly available or other third- party records or conducted interviews, and has assumed the genuineness of such documents and statements. Davey disclaims any liability for errors, omissions, or inaccuracies resulting from or contained in any information obtained from any third- party or publicly available source.

Except as agreed to between the parties prior to the Services being performed, the reports and recommendations resulting from the Services may not be used by any other party or for any other purpose. The undersigned also agrees, to the extent permitted by law, to protect, indemnify, defend and hold Davey harmless from and against any and all claims, demands, actions, rights and causes of action of every kind and nature, including actions for contribution or indemnity, that may hereafter at any time be asserted against Davey or another party, including, but not limited to, bodily injury or death or property damage arising in any manner from or in any way related to any disclaimers or limitations in this Agreement.

By accepting or using the Services, the customer will be deemed to have agreed to the terms of this Agreement, even if it is not signed.

Acknowledged by:

Name of Customer: _____

Authorized Signature: _____

Date: _____