

Tree Inventory Report

Prepared For:

Central Erin Property Management

Site Address:

2228 Marine Drive
Oakville, ON
L6L 1C1

August 11, 2022

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Summary

The following Tree Inventory Report is with respect to the trees located within the HCC 78 Reflection Bay property at 2228 Marine Drive in Oakville. The request was for a complete inventory and health of existing trees.

This property was found to have 67 trees, this includes ornamental trees with stems above 5cm in diameter, and tall-growing hedges. 59 trees were found to be in good condition and 8 in fair condition. No trees were in poor condition or dead. 34 trees are recommended for maintenance, this included fertilizer, regular pruning, remove dead, leaning and small leader.

Introduction

Davey Resource Group (DRG) was retained by the client, Central Erin Property Management, to develop a complete inventory on a per tree basis covering: Assessed value, assessed age and remaining life span, and a multiyear removal and maintenance schedule for HCC 78 Reflection Bay - 2228 Marine Drive, Oakville, ON. This inventory is in response to concerns about any potential risks and health of existing trees. The proposed inventory was conducted by a qualified arborist who visited the site and collected the information on a per tree basis. All accessible trees located within the property boundaries were inventoried, trees behind locked fences were not inventoried if estimates could not be made. All trees within the scope of the survey were included in an inventory and assessed for maintenance or removal needs.

Recommendations for tree preservation or removal are to be provided and follow the Town of Oakville a by-law.

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 Inventory Report is based on the project scope and details for tree preservation as discussed with the client. 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. Trees behind locked fences that could not be easily estimated were not inventoried. Multiple conifers in rows were assessed as hedges and not individually.

Methods

- Tools used to assess the trees included a metric DBH measuring tape, Biltmore stick, metric measuring tape, and camera.
- Photographs included in this report are copies of their originals and may have been labelled and/or cropped for formatting.
- All trees marked on the original site plan 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 August 3, 2022 ISA Certified Arborist Joseph Steinfeld and Arborist Pawan Paudyal at 9:00am.
- Weather conditions were 27°C and sunny.
- During the inventory 67 trees were inventoried on the property, 59 were found in good condition and 21 in fair condition.
- Trees were tagged with 3-digit numerical tags corresponding to their inventory number and starting with the number 4: Trees were therefore numbered #401-467 on each tag accordingly.
- A large proportion of the trees were in good condition but requiring routine maintenance such as fertilizer, crown cleaning, removing deadwood and correcting structural defects.
- Powdery mildew was found on the leaves of Tree #401, a Serviceberry. This is mostly cosmetic and caused by overly moist conditions, likely due to frequent watering of garden beds.
- Trees #404, 405, and 406, Blue spruces, are affected by Cytospora canker. This disease has no direct treatment, but the health of the tree can be prolonged through application of fertilizer.
- Tree#413 is a hedge row made up of white cedar which have started out growing their rooting space, this will require pruning for clearance away from the sidewalk.
- Trees #419, 449, 457, 458 and 459 have upper limbs supported by cables and it is recommended to check the cables for tension and condition of the equipment.
- Tree #432, white poplar, has two main stems (44 and 17 cm). The smaller leader exhibits significant dieback and is recommended to be removed.
- Tree #433, silver maple, has roots showing significant damage due to continued lawn mower impact which has resulted in some crown dieback. It is recommended that the crown be cleaned of deadwood and monitored, and extra care is taken when mowing over its roots.
- Tree #448, Austrian pine, is leaning and has an unbalanced crown. The tree is in good condition, so it is recommended to be monitored for any increase in lean.
- Tree #464, Flowering pear, has nutrient deficiency and it is recommended to add fertilizer and mulch.

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

Discussion

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

Regulatory context

The Oakville Private Tree Protection By-law 2017-03 states that a permit is required to injure or remove any privately owned tree that measures 15 cm or more in diameter at breast height (DBH). Fees are exempt for trees that are dead, high risk, ash trees, or buckthorn trees.

The Oakville Town Tree Protection By-law 2009-025 states that a permit is required to injure or remove any Town tree.

Critical Root Zones and growth habits

Critical Root Zones surrounding each Distinctive Tree are defined by the tree’s diameter under the Tree Protection Bylaw and must be kept free of all construction activity above and below ground. 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. This serves to prevent any incidental contact or harm to a protected tree that would constitute a contravention of a by-law and may result in fines or a stop-work order. Below is a table of the Town of Oakville a by-law Critical Root Zone distances.

Trunk Diameter (DBH)	<10cm	10-30cm	31-50cm	51-60cm	61-70cm	71-80cm	81-90cm	91-100cm	>100cm
Critical Root Zone Distance	1.8m	2.4m	3.0m	3.6m	4.2m	4.8m	5.4	6.0m	10cm for each 1cm of diameter

For the scope of this inventory no construction is planned for the property, so CRZ were not calculated. The Tree Inventory Plan depicts a green ring around each tree showing the crown width or drip line. This can help put into perspective the size of the tree and its range if branches or limbs were to fail. If the tree uprooted, it could fall farther than the green circle, no trees were found to be in poor condition, so this is unlikely. The trees on the property over all are in good condition with dense crowns. It is therefore more likely the trees are going to start to drop upper dead limbs or small branches in the coming years.

There are two main types of growth patterns that trees can adopt based on their habitat: open grown and forest grown. This property primarily exhibits open-grown tree habits. Typically, in woodlot trees grow straight and fast to gain height so that they are not shaded out by neighboring trees. Once a max height is reached, they start to put on diameter growth. These trees will typically be very tall with a small crown with few lower branches.

The other main growth pattern of trees are open grown trees. These are planted or naturally grown in wide open areas with few other trees compete with it and not overshadowing it. This type of growth is typical in farm fields and cities where individual trees are planted. These trees likely to

put on diameter growth with wide crowns leaning away from one another resulting in a shorter tree than if it grew in a forest and more trees that grow with a leaning trunk. These tree will focus more energy on growing a wide trunk and large crown than putting on height, this results in very dense tree canopy and lots of low branches. With regards to the Condos urban forest, this is the main type of tree present. When the structures were built multiple trees were planted on the boulevards and front and back lawns creating ideal habitat for open grown tree structures. These kinds of trees are structurally more stable than woodlot trees because they are less likely to uproot or completely fair in windstorms but are more likely to drop small mid-sized branches due to overgrown crowns. The main three trees planted at this site are Honey Locusts, Spruces, and Norway Maples. These trees are similar mature size, and growth patterns. Spruces tend to grow more narrow crowns with more branches and are valued for providing privacy.

Pruning

Branch pruning is fundamental tree care practices and is typically the most important management activity when caring for trees. There are two main reasons to prune a tree: number 1) is to remove damaged or sick limbs that would otherwise kill a tree. 2) is to change the structure of a tree. This can be to reduce the weight of a trees crown or improve the overall structure. It is not uncommon to see open grown trees grow very dense crowns when resources are abundant. This can result in the tree shedding limbs later in its life or large branch failures if the tree develops a poor structure. Pruning helps to improve the structure and form of a tree as well as improve the visual aesthetics of a tree.

It is normally in the client's best interest to hire a qualified arborist to Prune trees as this maintenance activities takes extensive experience to know when and where to prune a tree and how to do this task safely and efficiently. Poor pruning practices can result in tree injury or death as well as potential Structural damage or public safety risks if a tree is pruned improperly.

For the scope of this inventory a number of trees have been recommended for crown thinning and structural pruning. The portion of these trees are the tall naturally grown trees in the park as well as the honey locusts out front of the condos. Honey locusts typically grown very dense grown and drop branches as they age and mature. Pruning can help improve their form and health. All maintenance activities are listed in the Inventory attached in Appendix 1

Monitoring

Trees are living organisms and continually grow and change over time. It is not uncommon to see a tree grow multiple feet in heigh or width in a single year. With this in mind it is also not uncommon to see a tree degrade from a good condition healthy individual to a poor or dead tree in a matter of months to a single year. It is also not uncommon to see a health tree that appears to be in optimal health and structure on the outside but have internal rot on the inside slowly destabilizing. For these reasons it is important to monitor the urban forest regularly looking for signs of decay, structural problems, or other stress factors. We recommend having an arborist

inspect the trees on the property yearly looking for signs of stress.

Conclusion

An extensive inventory was completed for the HCC 78 Reflection Bay - 2228 Marine Drive, Oakville including 67 trees. This was broken down into 59 trees in good condition and 8 in fair condition. Although the majority of these trees are in good condition significant work is recommended to keep these trees from declining. As stated above in this report most of the trees on this site are open grown trees that were planted after the construction of the condos, this lends themselves to having large overgrown crowns which eventually start to shed branches as they grow. 34 trees are recommended for maintenance, this included fertilizer, regular pruning, remove dead, leaning and small leader.

This site has a combination of newly planted trees and mature trees. This creates a very healthy urban forest with multiple ecological and social benefits but also requires a lot of work to maintain. Trees are living organisms and can be unpredictable, large storms or internal stressors can cause branch failures that are unexpected. For this reason, we recommend having a qualified arborist monitor the trees yearly looking for signs of decline or stress that could pose a safety risk to the residents. Most of the time if caught early enough regular maintenance can prevent structural failures or health decline in trees.

Recommendations

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

- Tree #401: Recommended the client selectively prune overcrowded areas to increase air circulation around tree this helps to reduce relative humidity. Watering away from the basal area of tree can help.
- Trees #404, 405 and 406: Recommended to apply fertilizer and monitor for increased dieback, pruning dead branches..
- Trees# 419,449,457, 458 and 459: Check cable tension and equipment condition, monitor for any new structural defects
- Tree #432: Recommend to prune and remove smaller leader which exhibits dieback
- Tree#433: Crown clean to remove deadwood, monitor condition for decline in health, raise mower height when mowing around root system to prevent further damage.
- Tree#448: Monitor tree for any increase in lean.
- Tree#464: Add fertilizer and mulch, increase waterings in summer.
- Tree#413: Recommend pruning for clearance over the sidewalk.

Appendix 1 – Tree Protection Action Key (TPAK)

Tree Map Number	Species	Botanical	DBH (cm) @ 1.4 m	Health	Structure	Overall Condition	Live Crown Ratio (%)	Deadwood (%)	Crown Width (m)	Tree Height (m)	Notes	Recommended Maintenance	Priority (High/Medium/Low)
401	Serviceberry, spp.	<i>Amelanchier spp.</i>	9	Good	Good	Good	85	5	7	5	Multistems(9,7,6,6, and 9): presence of powdery mildew on leaves	None	Low
402	Honey locust	<i>Gleditsia triacanthos</i>	50	Good	Good	Good	65	0	12	15	None	None	Low
403	Freeman maple	<i>Acer x Freemanii</i>	15	Good	Good	Good	80	0	6	8	None	None	Low
404	Blue spruce	<i>Picea pungens</i>	29	Fair	Good	Fair	85	10	5	8	Excess sap, Minor dieback, cytospora canker	fertilizer	Medium
405	Blue spruce	<i>Picea pungens</i>	35	Fair	Good	Fair	90	10	6	8	cytospora canker	fertilizer	Medium
406	Blue spruce	<i>Picea pungens</i>	47	Fair	Good	Fair	90	10	6	10	cytospora canker	fertilizer	Medium
407	Blue spruce	<i>Picea pungens</i>	40	Good	Good	Good	100	0	8	12	not tagged, healthy	Crown raise for clearance	Low
408	Silver maple	<i>Acer saccharinum</i>	61	Good	Good	Good	70	5	15	16	small dead wood <5cm	Crown clean within 3 years	Low
409	Flowering pear	<i>Pyrus calleryana</i>	22	Good	Fair	Good	90	10	4	8	small dead wood <5cm	Crown clean within 3 years	Low
410	Honey locust	<i>Gleditsia triacanthos</i>	45	Good	Good	Good	70	10	16	14	small dead wood <5cm	Crown clean within 1 year	Medium
411	Blue spruce	<i>Picea pungens</i>	15	Good	Good	Good	90	0	4	6	co-dominant stems: not tagged	Prune branches 2m from house	Medium
412	Norway spruce	<i>Picea abies</i>	36	Good	Good	Good	85	0	7	15	branches growing to house	remove dead/leaning stems	Low
413	White Cedar (hedgerow)	<i>Thuja occidentalis</i>	26	Good	Fair	Good	75	5	3	6	40 Stems, some leaning	None	Low
414	Norway maple	<i>Acer platanoides</i>	38	Good	Good	Good	85	0	8	15	None	None	Low
415	Norway maple	<i>Acer platanoides</i>	20	Good	Good	Good	65	0	5	10	Suppressed	Crown clean within 3 years	Low
416	Norway maple	<i>Acer platanoides</i>	30	Good	Good	Good	70	5	9	14	small dead wood <5cm	Crown clean within 3 years	Low
417	Norway maple	<i>Acer platanoides</i>	32	Good	Good	Good	85	5	9	15	basal wound,good healing	None	Low
418	White fir	<i>Abies concolor</i>	9	Good	Good	Good	100	0	2	3	None	None	Low
419	Norway maple	<i>Acer platanoides</i>	39	Good	Fair	Good	85	0	8	16	Large frost Crack, cabled	Check cabling	Medium
420	Norway maple	<i>Acer platanoides</i>	42	Good	Good	Good	80	10	10	16	Steam hanger in canopy	crown clear	High
421	White fir	<i>Abies concolor</i>	16	Good	Good	Good	100	0	3	4	None	None	Low
422	Dawn redwood	<i>Metasequoia glyptostroboides</i>	14	Good	Good	Good	80	0	4	6	None	None	Low

Tree Map Number	Species	Botanical	DBH (cm) @ 1.4 m	Health	Structure	Overall Condition	Live Crown Ratio (%)	Deadwood (%)	Crown Width (m)	Tree Height (m)	Notes	Recommended Maintenance	Priority (High/Medium/Low)
423	Dawn redwood	<i>Metasequoia glyptostroboides</i>	18	Good	Good	Good	85	0	4	5	None	None	Low
424	White fir	<i>Abies concolor</i>	11	Good	Good	Good	100	0	2	5	None	None	Low
425	White fir	<i>Abies concolor</i>	11	Good	Good	Good	100	0	3	5	None	None	Low
426	Norway maple	<i>Acer platanoides</i>	35	Good	Good	Good	80	0	10	16	In barck yard by fence	None	Low
427	Norway maple	<i>Acer platanoides</i>	57	Good	Fair	Good	85	0	11	17	Included bark	Prune included leader within 3 years	Low
428	White poplar	<i>Populus alba</i>	46	Good	Good	Good	70	10	8	10	Dead limb over parking lot	Crown clean within 1 year	Medium
429	Norway maple	<i>Acer platanoides</i>	30	Good	Fair	Fair	80	5	10	10	Suppressed, trunk cavity	None	Low
430	White poplar	<i>Populus alba</i>	42	Good	Fair	Fair	70	0	11	9	significant lean	monitor	Low
431	White poplar (B)	<i>Populus alba</i>	54	Good	Good	Good	60	10	8	12	None	None	Low
432	White poplar(B)	<i>Populus alba</i>	44	Fair	Good	Good	75	15	10	14	Multistems(44,17): smaller leader dieback	Remove small leader	Medium
434	Honey locust	<i>Gleditsia triacanthos</i>	47	Good	Good	Good	70	0	13	17	None	None	Low
435	White pine	<i>Pinus strobus</i>	30	Fair	Good	Fair	80	15	6	9	Crown dieback on side	crown clean and monitor	Medium
436	Redbud	<i>Cercis canadensis</i>	19	Good	Good	Good	60	5	6	5	small dead wood <5cm	Crown clean within 3 years	low
437	Columnar copper beech	<i>Fagus sylvatica</i>	8	Good	Good	Good	90	0	2	6	None	None	low
438	Cherry	<i>Prunus spp.</i>	12	Good	Good	Good	50	10	3	2	None	None	low
439	Japanese tree lilac	<i>Syringa reticulata</i>	21	Good	Good	Good	70	0	6	6	None	None	low
440	Flowering pear	<i>Pyrus calleryana</i>	27	Good	Good	Good	60	10	3	2	small dead wood <5cm	Crown clean within 3 years	low
441	Japanese tree lilac	<i>Syringa reticulata</i>	18	Good	Good	Good	90	0	4	5	None	None	Low
442	Norway spruce	<i>Picea abies</i>	43	Good	Good	Good	90	0	8	15	None	None	Low
443	Honey locust	<i>Gleditsia triacanthos</i>	33	Good	Good	Good	60	0	10	12	None	None	Low
444	Norway maple	<i>Acer platanoides</i>	45	Good	Fair	Good	65	10	11	15	dead limb in crown	Crown clean within 3 years	Low
445	Norway maple	<i>Acer platanoides</i>	29	Good	Good	Good	50	0	8	11	None	None	Low

Tree Map Number	Species	Botanical	DBH (cm) @ 1.4 m	Health	Structure	Overall Condition	Live Crown Ratio (%)	Deadwood (%)	Crown Width (m)	Tree Height (m)	Notes	Recommended Maintenance	Priority (High/Medium/Low)
446	Norway maple	<i>Acer platanoides</i>	39	Good	Good	Good	60	0	9	12	None	None	Low
447	Honey locust	<i>Gleditsia triacanthos</i>	45	Good	Good	Good	60	0	10	16	None	None	Low
448	Austrian pine	<i>Pinus nigra</i>	43	Good	Fair	Fair	70	0	9	13	leaning, unblanced crown	Monitor	Low
449	Norway maple	<i>Acer platanoides</i>	58	Good	Good	Good	60	0	12	16	cabled	Check cabling	Low
450	Honey locust	<i>Gleditsia triacanthos</i>	46	Good	Good	Good	50	5	12	17	small dead wood <5cm	Crown clean within 3 years	Low
451	Blue spruce	<i>Picea pungens</i>	27	Good	Good	Good	85	0	5	10	None	None	Low
452	White spruce	<i>Picea glauca</i>	13	Good	Good	Good	100	0	5	7	None	None	Low
453	White cedar	<i>Thuja occidentalis</i>	13	Good	Good	Good	90	0	3	4	Multistems (13,9, 8)	None	Low
454	White cedar	<i>Thuja occidentalis</i>	11	Good	Good	Good	90	0	2	4	None	None	Low
455	White cedar	<i>Thuja occidentalis</i>	9	Good	Good	Good	90	0	2	3	None	None	Low
456	White cedar	<i>Thuja occidentalis</i>	8	Good	Good	Good	90	0	2	3	None	None	Low
457	Norway maple	<i>Acer platanoides</i>	53	Good	Good	Good	70	0	9	15	cabled	Check cable	Low
458	Norway maple	<i>Acer platanoides</i>	59	Good	Good	Good	60	0	14	18	cabled	Check cable	Low
459	Blue spruce	<i>Picea pungens</i>	22	Good	Fair	Good	80	0	3	7	Cabled to tree #58	Check cable	Low
460	White cedar	<i>Thuja occidentalis</i>	11	Good	Good	Good	95	0	4	4	cluster of 3 tree 11,11,7	None	Low
461	Norway spruce	<i>Acer platanoides</i>	43	Good	Good	Good	80	5	9		None	None	Low
462	Norway spruce	<i>Acer platanoides</i>	45	Good	Good	Good	85	0	8	17	None	None	Low
463	Japanese tree lilac	<i>Syringa reticulata</i>	13	Good	Good	Good	70	0	4	4	None	None	Low
464	Flowering pear	<i>Pyrus calleryana</i>	20	Fair	Good	Fair	60	10	4	8	Nutrient deficiency	Fertilizer, mulch	Medium
465	Flowering pear	<i>Pyrus calleryana</i>	22	Good	Good	Good	70	5	5	8	Small dead wood <5cm	Crown clean within 3 years	Low
466	Honey locust	<i>Gleditsia triacanthos</i>	46	Good	Good	Good	60	0	12	16	None	None	Low
467	Columnar copper beech	<i>Fagus sylvatica</i>	5	Good	Good	Good	90	0	1	5	Not tagged	None	Low

Appendix 2 – Tree Inventory Plan (Preview – Plan to be provided separately in PDF Format)



Appendix 3 – References

1. ISA, 2001-2011. Best Management Practices, Books 1-9, Companion publications to ANSI A300 Standards for Tree Care
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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. Todd Hurt & Bob Westerfield, 2005. Tree Protection During Construction and Landscaping Activities

Appendix 4 – 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: <ul style="list-style-type: none"> • 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 or 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. <ul style="list-style-type: none"> ● 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 5 – 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)

Pawan Paudyal is Consulting Arborist with Davey Resource Group. His formal education includes a Bachelor of Science in forestry from Hemwati Nandan Bahuguna Garhwal University, India and a Master in forest Ecology and Management from Helsinki University. Mr. Paudyal has 10 years of varied work experience in forestry, climate change and environment assessment fields. Mr. Paudyal has worked with DRG as Consulting Arborist.

Appendix 6 – Photographs



Tree #401



Tree #402



Tree #403



Trees #404, 405



Tree #405



Trees #406, 407



Tree #408



Trees #409, 410



Tree #411



Tree #412



Tree #413



Trees #414-417



Trees #443-447



Tree #442



Tree #418



Trees #419, 420



Tree #421



Tree #422



Tree #423



Tree #424



Trees #426, 427



Trees #428-430



Trees #430-432



Tree #433



Tree #434



Tree #435



Trees #436-439



Trees #446-447



Trees #440-442



Tree #460-462



Tree #448



Trees #449-456



Tree #460



Trees #451-452



Trees #463-467

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 stresses 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: _____