

Gilles Consulting

— Brian K. Gilles —

4 2 5 - 8 2 2 - 4 9 9 4

ARBORIST REPORT FOR THE NGUYEN PROPERTY AT 8937 SE 56th Street Mercer Island, WA 98040

June 8, 2022

PREPARED FOR:

**Dmitry Lebed
Emerald City Build
P.O. Box 1925
Bellevue, WA 98009**

PREPARED BY:

GILLES CONSULTING
Brian K. Gilles, Consulting Arborist

International Society of Arboriculture:

- *ISA Certified Arborist # PN-0260A,*
- *ISA TRAQ Qualified*
- *ISA TRAQ Certified Instructor*

American Society of Consulting Arborists

- *ASCA Registered Consulting Arborist # RCA-418*
- *ASCA Tree & Plant Appraisal Qualified*
- *ASCA Tree & Plant Appraisal Certified Instructor*



fax: 425-822-6314

email: bkgilles@comcast.net

P.O. Box 2366 Kirkland, WA 98083

CONTENTS

ASSIGNMENT.....	3
METHODOLOGY	3
Additional Testing	4
Tree Tags	4
OBSERVATIONS.....	4
DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS	4
Right-of-Way Trees	4
Trees on Adjacent Properties	4
Trees on the Subject Property	6
Tree Protection Measures	8
WAIVER OF LIABILITY	9
ATTACHMENTS	11

EXECUTIVE SUMMARY

A total of 6 trees were evaluated and documented on and around 8937 SE 54th Street on Mercer Island, Washington. They can be summarized as follows:

Ownership:

- Three trees are on the subject property.
- Three trees are on two adjacent properties.

Current Health Rating:

- Poor: 2 trees
- Fair: 1 tree
- Good: 1 tree
- Very Good: 1 tree
- Excellent: 1 Tree.

Current Status Rating:

- Non-Significant: 1 tree
- Significant: 5 trees.

ASSIGNMENT

Dmitry Lebed of Emerald City Build, contracted with Gilles Consulting to evaluate the trees at the Nguyen residence at 8937 SE 54th Street on Mercer Island, Washington. The property is being considered for redevelopment and the City of Mercer Island requires an analysis of trees as part of the permitting process. This report provides the evaluation. Information from this report *must* be converted into a *Tree Retention/Protection Plan* as required by the City of Mercer Island.

METHODOLOGY

To evaluate the trees, as well as to prepare this report, I drew upon my 30+ years of experience in the field of arboriculture and my formal education in natural resources management, dendrology, forest ecology, plant identification, and plant physiology. I followed the protocol of the International Society of Arboriculture (ISA) for visual tree assessment. This is a scientifically-based process ensuring an examination of the entire site, surrounding land and soil, as well as a complete look at the tree itself.

In examining each tree, I looked at such factors as: size, vigor, canopy and foliage condition, density of needles, injury, insect activity, root damage and root collar health, crown health, evidence of disease-causing bacteria, fungi or virus, dead wood and hanging limbs.

Additional Testing

The trees all presented signs and/or symptoms that were readily discernible using the TRAQ Level Two evaluation system. These signs and/or symptoms indicate extensive internal decay and/or structural defects in some trees and solid trunks and lack of disease in others. Therefore, no additional tests were performed during this site visit.

Tree Tags

The trees were tagged and numbered 244 through 249. The tags are made of shiny aluminum approximately one inch by three inches in size and are attached to the tree with staples and a one-foot strip of brightly colored survey tape. The tags were placed as high as possible to minimize their removal and were generally placed on the backsides of the trees as inconspicuously as possible. Please refer to *Attachment 1, Aerial Photo from the King County Assessor's Website* for an orientation to the site and the approximate location of the trees.

In an effort to present the information and conclusions for each tree in a manner that is clear and easy to understand, as well as to save paper, I have included a detailed spreadsheet, *Attachment 2, Tree Inventory/Condition Spreadsheet*. All the same information from the ISA Tree Hazard Form is included in this spreadsheet and the attached glossary. The descriptions on the spreadsheet were left brief in order to include as much pertinent information as possible and to make the report manageable. The attached glossary provides a detailed description of the terms used in the spreadsheet and in this report. It can be found in *Attachment 3, Glossary*. A brief review of these terms and descriptions will enable the reader to rapidly move through the spreadsheet and better understand the information.

OBSERVATIONS

The subject property is on the south side of SE 54th Street approximately in the middle of the long block. It is accessed off Island Crest Way and SE 54th Street. The property is essentially flat and is currently improved with a 1961 rambler single family home, driveway, sidewalks, lawns, a rotting deck in back. There are three trees on the property that represent three species.

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Right-of-Way Trees

There are no right-of-way trees impacted by the proposed project.

Trees on Adjacent Properties

There are three trees on two adjacent properties with canopies or root systems that encroach onto the subject property. Therefore, tree protection measures outlined below will include these three trees.

Specifically:

- Tree # 247:
 - Is a Bradford Pear on the adjacent property to the east at 8945 SE 56th Street.
 - It is estimated to measure 4.5 inches in diameter.
 - It is in Very Good Condition.
 - It is Viable.
 - Recommendation:
 - *Potential to retain with tree protection measures.*



Photo # 1: Tree # 247 the Bradford Pear on the adjacent property to the east at 8945 SE 56th Street.

- Tree # 248:
 - Is a group of European Weeping Birch.
 - They are located on the adjacent property to the south at 5602 90th Avenue SE.
 - They are estimated to measure 14 to 18 inches in diameter.
 - They are all infested with Bronze Birch Borer as evidenced by the dying crowns
 - They are in Poor Condition.
 - They may not be viable. If left untreated they will eventually die.
 - Recommendation:
 - Potential to retain with tree protection measures.

- It may be worthy to inform the neighbor and recommend that the owner have the trees evaluated and treated.
- Tree # 249:
 - Is a Western Red Cedar on the adjacent property to the east at 5602 90th Avenue SE.
 - The tree is in Excellent Condition.
 - It is Viable.
 - Recommendation:
 - *Potential to retain with tree protection measures.*

Trees on the Subject Property

There are three trees on the subject property.

- Tree # 244 is a 35.7-inch diameter Flowering Cherry.
 - It is located at the top of the driveway on the west side near the northwest corner of the garage.
 - The tree is a combination of three different species of Cherry trees grafted together at the top and bottom of the trunk.
 - There are the early stages of decay in the center of the trunk.
 - The tree was topped at approximately 14 feet.
 - The roots are uplifting and damaging the driveway and adjacent sidewalk.
 - The species is subject to two major disease elements:
 - The foliage is attacked by an infection from a pathogen what causes the disease known as “Brown Rot,” *Monilinia fructicola*.
 - The disease is treatable but requires multiple applications of one of the strongest pesticides licensed in the State of Washington. The pesticide applications need to begin prior to flowering of the tree and must continue for up to 10 weeks after flowering.
 - The vascular cambium is being attacked by an Asian bark beetle known as Cherry Bark Tortrix, *Enarmonia formosana*.
 - Currently there are no treatments to control this devastating pest.
 - Recommendation:
 - *Consider removing this tree.*
- Tree # 245 is a multi-trunked Japanese Maple.
 - It is located at the top of the driveway on the east side near the northeast corner of the garage.
 - The roots are uplifting and damaging the driveway and adjacent sidewalk.
 - The trunk is forked at the base and two feet with included bark.
 - This means that the root collar is structurally weak.
 - The tree was previously topped at approximately 16 feet.
 - Scaffold branches extend over the driveway and over the sidewalk leading to the front door.

- These branches will need to be severely pruned back to allow for the demolition of the existing house and the construction of the new house.
- The tree is in Poor Condition but will not likely survive the severe pruning needed nor the stresses of demolition and construction.
- Recommendation:
 - *Consider removing this tree.*



Photo # 2: Looking south from SE 56th Street at trees # 244, Cherry, and # 245 Japanese Maple.

Photo # 3:
Looking at the base of tree # 244 on the far side of the driveway and the damage being done to the driveway and sidewalks.

Note also the surface roots of the Maple tree and the advanced decay in the buttress roots.

Both trees are recommended for removal.



- Tree # 246 is a 5.5-inch diameter Colorado Blue Spruce located in the front yard.
 - The foliage of the tree is infested with a Spider Mite infestation.
 - In spite of this infestation, the tree is in Good Condition.
 - The tree is below the 6-inch threshold but is worthy of retention and provides great aesthetic and environmental benefits.
 - Recommendation:
 - *Potential to retain with tree protection measures.*
 - *Consider treating for Spider Mites and fertilization.*



Photo # 4: Tree # 246 the Colorado Blue Spruce in the front yard.

Tree Protection Measures

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and possibly die—even after thousands of dollars were spent trying to save them. With proper preparation, often costing little or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The minimum Tree Protection Measures in *Attachment 4, Tree Protection Measures* are on three separate sheets that can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific

circumstances of your site that takes into account the location of improvements and the locations of the trees.

WAIVER OF LIABILITY

There are many conditions affecting a tree's health and stability, which may be present and cannot be ascertained, such as, root rot, previous or unexposed construction damage, internal cracks, stem rot and more which may be hidden. Changes in circumstances and conditions can also cause a rapid deterioration of a tree's health and stability. Adverse weather conditions can dramatically affect the health and safety of a tree in a very short amount of time. While I have used every reasonable means to examine these trees, this evaluation represents my opinion of the tree health at this point in time. These findings do not guarantee future safety nor are they predictions of future events.

The tree evaluation consists of an external visual inspection of an individual tree's root flare, trunk, and canopy from the ground only unless otherwise specified. The inspection may also consist of taking trunk or root soundings for sound comparisons to aid the evaluator in determining the possible extent of decay within a tree. Soundings are only an aid to the evaluation process and do not replace the use of other more sophisticated diagnostic tools for determining the extent of decay within a tree.

As conditions change, it is the responsibility of the property owners to schedule additional site visits by the necessary professionals to ensure that the long-term success of the project is ensured. It is the responsibility of the property owner to obtain all required permits from city, county, state, or federal agencies. It is the responsibility of the property owner to comply with all applicable laws, regulations, and permit conditions. If there is a homeowners association, it is the responsibility of the property owner to comply with all Codes, Covenants, and Restrictions (CC&R's) that apply to tree pruning and tree removal.

This tree evaluation is to be used to inform and guide the client in the management of their trees. This in no way implies that the evaluator is responsible for performing recommended actions or using other methods or tools to further determine the extent of internal tree problems without written authorization from the client. Furthermore, the evaluator in no way holds that the opinions and recommendations are the only actions required to ensure that the tree will not fail. A second opinion is recommended. The client shall hold the evaluator harmless for any and all injuries or damages incurred if the evaluator's recommendations are not followed or for acts of nature beyond the evaluator's reasonable expectations, such as severe winds, excessive rains, heavy snow loads, etc.

This report and all attachments, enclosures, and references, are confidential and are for the use of the client concerned. They may not be reproduced, used in any way, or disseminated in any form without the prior consent of the client concerned and Gilles Consulting.

Thank you for calling Gilles Consulting for your arboricultural needs.

Sincerely,



Brian K. Gilles, Consulting Arborist
International Society of Arboriculture:

- *ISA Certified Arborist # PN-0260A*
- *ISA TRAQ Qualified*
- *ISA TRAQ Certified Instructor*

American Society of Consulting Arborists

- *ASCA Registered Consulting Arborist # RCA-418*
- *ASCA Tree & Plant Appraisal Qualified*
- *ASCA Tree & Plant Appraisal Certified Instructor*

ATTACHMENTS

ATTACHMENT 1 - AERIAL PHOTO.....	12
ATTACHMENT 2 - TREE INVENTORY/CONDITIONS SPREADSHEET	13
ATTACHMENT 3 - GLOSSARY.....	15
ATTACHMENT 4 - TREE PROTECTION MEASURES	21
ATTACHMENT 5 - BIBLIOGRAPHY.....	25

ATTACHMENT 1 - AERIAL PHOTO

A 2021 aerial photo taken from the King County Assessor's website.



ATTACHMENT 2 - TREE INVENTORY/CONDITIONS SPREADSHEET

ABBREVIATED LEGEND--SEE GLOSSARY IN REPORT ATTACHMENTS FOR GREATER DETAIL					
#1	Property:	Whether the tree is on or off the Subject Property, or a Right-of-Way tree.	#11	Foliage:	General description of foliage density that indicates tree health and vigor.
#2	Tree Location:	Relative placement of the tree on the Subject Property.	#12	Crown Condition:	The most important external indication of tree health and vigor.
#3	Tree #:	The unique tag number of each tree.	#13	Trunk:	Description of trunk condition or abnormalities if any.
#4	Species:	Listed below*	#14	Root Collar:	The base of the tree where the trunk flares into the roots--deformities or problems are noted here.
#5	DBH:	Trunk diameter @ 4.5' above average ground level.	#15	Roots:	Root problems are noted here.
#6	Tree Credit:	This is based upon Table 95.35.1, Page 12, Chapter 95 of the Kirkland Municipal Code.	#16	Comments:	Additional observations about the tree's condition.
#7	Drip Line:	The radius, the distance from the center of the trunk to the furthest branch tips.	#17	Status:	A "Significant" tree is at least 6" in diameter measured at 4.5' above the average ground level.
#8	Limits of Disturbance:	The boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a qualified professional.	#18	Current Health Rating:	A description of general health ranging from dead, dying, poor, fair, good, very good, to excellent.
#9	LCR:	Live Crown Ratio - the amount of live canopy expressed as a % of the entire tree height.	#19	Viability:	A Significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.
#10	Symmetry:	General shape of canopy and weight distribution of the tree around the trunk.	#20	Recommendation:	This is an estimate of whether or not the tree is of sufficient health, vigor, and structure to consider retaining.
		*Species List			
247	BP/Pc 'B'	Bradford Pear, <i>Pyrus calleryana</i> 'Bradford'			
246	CBS/Pp	Colorado Blue Spruce, <i>Picea pungens</i>			
248	EWgBr/Bpe	European Weeping Birch, <i>Betula pendula</i>			
244	FICh/Psp	Flowering Cherry, <i>Prunus sp.</i>			
245	JM/Ap	Japanese Maple, <i>Acer palmatum</i>			
249	WRC/Tp	Western Red Cedar, <i>Thuja plicata</i>			

1	2	3	4	5	6	7-- LIMITS OF DISTURBANCE				8	9	10	11	12	13	14	15	16	17	18	19
PROPERTY	TREE LOCATION	TREE #	SPECIES	DBH	DRIP LINE	North	South	East	West	LCR	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	STATUS	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	Front Yard	244	FlCh/Psp	35.7"	14'	14'	to side walk	to drive way	to west prop. Line	85%	Gen. sym.	Dense	Regen. - Average	Typical	Grafted	Restricted	Grafted at base and at 4.5 feet. Growing next to driveway and sidewalk. Previously topped at 14 feet. Roots uplifting driveway and sidewalk.	Significant	Fair	Viable	Potential to retain with Tree Protection Measures
Subject property	Front Yard	245	Map/Ap	17.4"	16'	16'	to side walk	16'	16'	60%	Gen. sym.	Dense	Regen. - Average	Fork at Base & 2'	Internal structural weakness	Restricted, Surface, Advanced Root Rot	Growing next to the driveway and sidewalk. Previously topped at 16 feet. Roots uplifting driveway and sidewalk.	Significant	Poor	Non-viable	Potential to retain with Tree Protection Measures
Subject property	Front Yard	246	CBS/Pp	5.5"	9'	9'	9'	9'	9'	98%	Gen. sym.	Dense	Regen. - Average	Straight	Not Observed	-	Tag tied to canopy on east side. Base is app. 6 feet SW of the water meter and app. 13.5 feet from the curb. Spider Mite infestation.	Significant	Good	Viable	Potential to retain with Tree Protection Measures
Off property	Front Yard	247	BP/Pc 'B'	4.5"	12'	to curb	12'	to east prop. Line	8' west of east prop. Line	85%	Gen. sym.	Dense	Healthy	Typical	NAD	-	Tag tied to adjacent Rhododendron on west side.	Significant	Very good	Viable	Potential to retain with Tree Protection Measures
Off property	South of South Prop. line.	248	EWgBr/Bpe	21.3"	20'	10' N. of S. Prop. Line	to S. prop. Line	20'	20'	85%	Min. asym.	Average	Dead	Typical	Not Observed	Not Observed	Bronze Birch Borer infestation. Tag tied to English Laurel. Canopy overhangs the subject property by 12 feet.	Not Significant	Poor	Non-viable	Potential to retain with Tree Protection Measures
Off property		249	WRC/Tp	20.0"	22'	10' N. of S. Prop. Line	to S. prop. Line	22'	22'	90%	Gen. sym.	Dense	Healthy	Straight	Not Observed	Not Observed	Canopy overhangs subject property by 12 feet. Tag tied to English Laurel.	Significant	Excellent	Viable	Potential to retain with Tree Protection Measures

ATTACHMENT 3 - GLOSSARY

Terms Used in This Report, on the Tree Condition / Inventory Spreadsheet, and Their Significance

In an effort to clearly present the information for each tree in a manner that facilitates the reader's ability to understand the conclusions I have drawn for each tree, I have collected the information in a spreadsheet format. This spreadsheet was developed by Gilles Consulting based upon the *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface* course manual and the *Tree Risk Assessment Form*, both sponsored by the Pacific Northwest Chapter of the International Society of Arboriculture, and the *Hazard Tree Evaluation Form* from the book, *The Evaluation of Hazard Trees in Urban Areas*, by Matheny and Clarke. The descriptions were left brief on the spreadsheet in an effort to include as much pertinent information as possible, to make the report manageable, and to avoid boring the reader with infinite levels of detail. However, a review of these terms and descriptions will allow the reader to rapidly move through the report and understand the information.

- 1) **PROPERTY**—whether the tree is on or off the Subject Property, or a Right-of-Way tree.
- 2) **TREE LOCATION**—relative placement of the tree.
- 3) **TREE #**—the unique tag number of each tree.
- 4) **SPECIES**—this describes the species of each tree with both most readily accepted common name and the officially accepted scientific name.
- 5) **DBH**—Diameter Breast Height. This is the standard measurement of trees taken at 4.5 feet above the average ground level of the tree base.
 - i) Occasionally it is not practical to measure a tree at 4.5 feet above the ground. The most representative area of the trunk near 4.5 feet is then measured and noted on the spreadsheet. For instance, a tree that forks at 4.5 feet can have an unusually large swelling at that point. The measurement is taken below the swelling and noted, e.g., ‘28.4” at 36”’.
 - ii) Trees with multiple stems are listed as a “clump of x,” with x being the number of trunks in the clump. Measurements may be given as an average of all the trunks, or individual measurements for each trunk may be listed.
 - (1) Every effort is made to distinguish between a single tree with multiple stems and several trees growing close together at the bases.
- 6) **DRIP LINE**— the radius, the distance from the center of the trunk to the furthest branch tips.
- 7) **LIMITS OF DISTURBANCE**— the boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a qualified professional. Distances from the center of the trunk were derived on a case-by-case basis looking at the unique circumstances of each property and each tree on that property.

- 8) **% LCR**—Percentage of Live Crown Ratio. The relative proportion of green crown to overall tree height. This is an important indication of a tree's health. If a tree has a high percentage of Live Crown Ratio, it is likely producing enough photosynthetic activity to support the tree. If a tree has less than 30% to 40% LCR, it can create a shortage of needed energy and can indicate poor health and vigor.
- 9) **SYMMETRY**—is the description of the form of the canopy, i.e., the balance or overall shape of the canopy and crown. This is the place I list any major defects in the canopy shape, e.g., does the tree have all its foliage on one side or in one unusual area? Symmetry can be important if there are additional defects in the tree such as rot pockets, cracks, loose roots, weak crown, etc. Symmetry is generally categorized as Generally Symmetrical, Minor Asymmetry or Major Asymmetry:
- i) Gen. Sym.—Generally Symmetrical. The canopy/foliage is generally even on all sides with spacing of scaffold branches typical for the species, both vertically and radially.
 - ii) Min. Asym.—Minor Asymmetry. The canopy/foliage has a slightly irregular shape with more weight on one side, but appears to be no problem for the tree.
 - iii) Maj. Asym.—Major Asymmetry. The canopy/foliage has a highly irregular shape for the species with the majority of the weight on one side of the tree. This can have a significant impact on the tree's stability, health and hazard potential—especially if other defects are noted such as cracks, rot, or root defects.
- 10) **FOLIAGE**—describes the foliage of the tree in relation to a perfect specimen of that particular species. First the branch growth and foliage density are described, and then any signs or symptoms of stress and/or disease are noted. The condition of the foliage, or the branches and buds for deciduous trees in the dormant season, are important indications of a tree's health and vigor.
- i) For Deciduous trees in the dormant season:
 - (1) The structure of the deciduous tree is visible.
 - (2) The quantity and quality of buds indicates health, and is described as good bud set, average bud set, or poor bud set. These are abbreviated in the spreadsheet as: gbs, abs, or pbs.
 - (3) The amount of annual shoot elongation is visible and is another major indication of tree health and vigor. This is described as:
 - a) Excellent, Good, Average, or Short Shoot Elongation. These are abbreviated in the spreadsheet as ESE, GSE, ASE, or SSE.
 - ii) For evergreen trees year-round and deciduous trees in leaf, the color and density of the foliage indicates if the tree is healthy or stressed, or if an insect infestation, a bacterial, fungal, or viral infection is present. Foliage is categorized on a scale from:
 - (1) Dense—extremely thick foliage, an indication of healthy vigorous growth,
 - (2) Good—thick foliage, thicker than average for the species,

- (3) Normal/Average—thick foliage, average for the species, an indication of healthy growth,
- (4) Thin or Thinning—needles and leaves becoming less dense so that sunlight readily passes through; an indication that the tree is under serious stress that could impact the long-term survivability and safety of the tree,
- (5) Sparse—few leaves or needles on the twigs, an indication that the tree is under extreme stress and could indicate the future death of the tree,
- (6) Necrosis—the presence of dead twigs and branchlets. This is another significant indication of tree health. A few dead twigs and branches are reasonably typical in most trees of size. However, if there are dead twigs and branchlets all over a certain portion of the tree, or all over the tree, these are indications of stress or attack that can have an impact on the tree's long-term health.
- (7) Hangers—a term to describe a large branch or limb that has broken off but is still hanging up in the tree. These can be particularly dangerous in adverse weather conditions.

- 11) **CROWN CONDITION**—the crown is uppermost portion of the tree, generally considered the top 10 to 20% of the canopy or that part of the canopy above the main trunk in deciduous trees and above the secondary bark in evergreen trees.
- i) The condition of the tree's crown is a reflection of the overall health and vigor of the entire tree. The crown is one of the first places a tree will demonstrate stress and pathogenic attack such as root rot.
 - ii) If the **Crown Condition** is healthy and strong, this is a good sign. If the crown condition is weak, broken out, or shows other signs of decline, it is an indication that the tree is under stress. It is such an important indication of health and vigor that this is the first place a trained forester or arborist looks to begin the evaluation of a tree. Current research reveals that, by the time trees with root rot show significant signs of decline in the crown, fully 50% or more of the roots have already rotted away. **Crown Condition** can be described as:
 - (1) Healthy Crown—exceptional growth for the species.
 - (2) Average Crown—typical for the species.
 - (3) Weak Crown—thin spindly growth with thin or sparse needles.
 - (4) Flagging Crown—describes a tree crown that is weak and unable to grow straight up.
 - (5) Dying Crown—describes obvious decline that is nearing death.
 - (6) Dead Crown—the crown has died due to pathological or physical injury. The tree is considered to have significant stress and/or weakness if the crown is dead.
 - (7) Broken out—a formerly weak crown condition that has been broken off by adverse weather conditions or other mechanical means.

- (8) Regenerated or Regenerating—formerly broken out crowns that are now growing back. Regenerating crowns may appear healthy, average, or weak and indicate current health of the tree.
 - (9) Suppressed—a term used to describe poor condition of an entire tree or just the crown. Suppressed crowns are those that are entirely below the general level of the canopy of surrounding trees which receive no direct sunlight. They are generally in poor health and vigor. Suppressed trees are generally trees that are smaller and growing in the shade of larger trees around them. They generally have thin or sparse needles, weak or missing crowns, and are prone to insect attack as well as bacterial and fungal infections.
- 12) **TRUNK**—this is the area to note any defects that can have an impact on the tree’s stability or hazard potential. Typical things noted are:
- i) Forked—bifurcation of branches or trunks that often occur at a narrow angle.
 - ii) Included Bark—a pattern of development at branch or trunk junctions where bark is turned inward rather than pushed out. This can be a serious structural defect in a tree that can and often does lead to failure of one or more of the branches or trunks, especially during severe, adverse weather conditions.
 - iii) Epicormic Growth—this is generally seen as dense thick growth near the trunk of a tree. Although this looks like a healthy condition, it is, in fact the opposite. Trees with Epicormic Growth have used their reserve stores of energy in a last-ditch effort to produce enough additional photosynthetic surface area to produce more sugars, starches and carbohydrates to support the continued growth of the tree. Generally speaking, when conifers in the Pacific Northwest exhibit heavy amounts of Epicormic Growth, they are not producing enough food to support their current mass and are already in serious decline.
 - iv) Internal Structural Weakness—a physical characteristic of the tree trunk, such as a **kink, crack, rot pocket, or rot column** that predisposes the tree trunk to failure at the point of greatest weakness.
 - v) Bowed—a gradual curve of the trunk. This can indicate an Internal Structural Weakness or an overall weak tree. It can also indicate slow movement of soils or historic damage of the tree that has been corrected by the curved growth.
 - vi) Kinked—a sharp angle in the tree trunk that indicates that the normal growth pattern is disrupted. Generally, this means that the internal fibers and annual rings are weaker than straight trunks and prone to failure, especially in adverse weather conditions.
 - vii) Ground Flower—an area of deformed bark near the base of a tree trunk that indicates long-term root rot.
- 13) **ROOT COLLAR**—this is the area where the trunk enters the soil and the buttress roots flare out away from the trunk into the soil. It is here that signs of rot, decay,

insect infestation, or fungal or bacterial infection are noted. **NAD** stands for **No Apparent Defects**.

- 14) **ROOTS**—any abnormalities such as girdling roots, roots that wrap around the tree itself that strangle the cambium layer and kill the tree, are noted here.
- 15) **COMMENTS**—this is the area to note any additional information that would not fit in the previous boxes or attributes about the tree that have bearing on the health and structure of the tree.
- 16) **STATUS**—a "Large - Regulated" tree is at least 10" in diameter, an "Exceptional" tree is over 36" or as designated in Mercer Island Municipal Code Section '19.16.010 Exceptional Tree Table' measured at 4.5' above the average ground level.
- 17) **CURRENT HEALTH RATING**— a description of general health ranging from dead, dying, poor, senescent, suppressed, fair, good, very good, to excellent.
- 18) **VIABILITY**— a Large – Regulated or Exceptional tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.
 - i) Please note that many trees may be listed as “Non-Viable” due to poor health, poor structure, or the tree may be below the size threshold for a “Viable Tree.” However, it is worth examining the Non-Viable Trees to determine if any or all of them can be left on the property. They can add significant benefit to the landscape and contribute to wildlife habitat.
- 19) **RECOMMENDATION**— this is an estimate of whether or not the tree is of sufficient health, vigor, and structure that it is worth retaining. Specific recommendations for each tree are included in this column. They may include anything from pruning dead wood, mulching, aerating, injecting tree-based fertilizer into the root system, shortening into a habitat tree or wildlife snag, or to completely removing the tree.
 - i) Potential to retain with tree protection measures: means that the tree appears to have the internal resources, the health and vigor, structural stability, and the wind firmness to be able to withstand the stresses of construction if development requirements and construction requirements allow.
 - ii) Remove or Remove for Safety: means that the tree has a high potential to fail and has the potential to cause either personal injury or property damage. If it is at all possible the recommendation is to leave some of the trunk standing for wildlife habitat, some of the trunk on the ground as a nurse log, and some of the canopy in a brush pile. These are three key elements in the retention of desirable urban/suburban wildlife such as songbirds.
 - (1) The height of the standing habitat tree depends upon the size of the tree, the condition of the tree, and the distance to a probable target. It should be short enough so that when it does fail years in the future it will not cause personal injury or property damage.
 - (2) Nurse logs can be laid horizontally across the slope to aid with erosion control and to provide microenvironments for new plantings. The nurse logs may need to be staked in place to prevent their movement

and potential harm to people. If for some reason this is not possible that should be removed for safety.

- (3) Brush piles can be complex or simple. They provide important sites for cover from predators, nesting, and many other benefits.

iii) Please refer to the attachment below for more details.

NOTE: TREES WITH THE SAME DESCRIPTION AND DIFFERENT RATINGS:

Two trees may have what appear to be the same descriptions in the matrix boxes, one may be marked “Significant,” while another may be marked “Non-Significant; one may be marked Viable one Non-Viable.” The difference is in the degree of the description, i.e., “early necrosis” versus “advanced necrosis” for instance. Another example is “center rot” or “base rot”. In a Western Red Cedar tree, the presence of low or even moderate rot is not significant and does not diminish the strength of the tree. However, low levels of rot in the base of a Douglas Fir tree, in an area known to have virulent pathogens present, is highly significant and predisposes that tree to windthrow.

ATTACHMENT 4 - TREE PROTECTION MEASURES

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and will possibly die. With proper preparation, often costing little, or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The following minimum Tree Protection Measures are included on three separate sheets so that they can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

TREE PROTECTION MEASURES:

1. Tree Protection Fences will need to be placed around each tree or group of trees to be retained.
 - a. Tree Protection Fences are to be placed according to the attached drawing or at a distance of not less than 5 feet outside the dripline of the tree or group of trees to be saved, whichever is greater.
 - b. Tree Protection Fences must be inspected prior to the beginning of any demolition or construction work activities.
 - c. Nothing must be parked or stored within the Tree Protection Fences—no equipment, vehicles, soil, debris, or construction supplies of any sorts.
 - d. The area inside the Tree Protection Fences is the *Tree/Root Protection Zone*.
 - e. The area outside the Tree Protection Fences is the *Work/Development Zone*.
2. Cement trucks must not be allowed to deposit waste or wash out materials from their trucks within the Tree Protection Fences.
3. The Tree Protection Fences need to be clearly marked with the following or similar text in four inch or larger letters:

“TREE PROTECTION FENCE

**DO NOT ENTER THIS AREA
DO NOT PARK OR STORE MATERIALS
WITHIN THE PROTECTION AREA**

**Any questions or concerns, contact Mercer Island Code
Enforcement at 206-507-2064 or
David.Henderson@mercercisland.gov**

4. The area within the Tree Protection Fencing must be covered with wood chips, hog fuel, or similar materials to a depth of 8 to 10 inches. The materials should be placed prior to beginning construction and remain until the Tree Protection Fencing is taken down.
5. Excavation
 - a. When excavation occurs within 5 feet of the dripline of trees that are scheduled for retention, the following procedure must be followed to protect the long-term survivability of the tree:

- i. The excavation contractor must provide a laborer outfitted with a shovel a garden rake, a pair of hand shears, loppers, hand saw and a power saw, a “saws-all” reciprocating saw is recommended.
- ii. The site superintendent and the excavation contractor shall paint a line on the ground delineating the furthest limits—that is the closest excavation to the tree.
- iii. The hoe must be placed to “comb” the material directly away from the trunk as opposed to cutting across the roots.
 1. Combing is the gradual excavation of the ground cover plants and soil in depths that only extend as deep as the tines of the hoe.
- iv. When any roots of one inch diameter or greater, of the tree to be retained, is struck by the equipment, the operator will stop and the laborer will cut the root cleanly at the furthest reach of the excavation with the appropriate tool.
- v. The process will continue until the required depth of excavation is achieved.

6. Putting Utilities Under the Root Zone:

- a. Boring under the root systems of trees (and other vegetation) shall be done under the supervision of an ISA Certified Arborist. This is to be accomplished by excavating a limited trench or pit on each side of the critical root zone of the tree and then hand digging or pushing the pipe through the soil under the tree. The closest pit walls shall be a minimum of 7 feet from the center of the tree and shall be sufficient depth to lay the pipe at the grade as shown on the plan and profile.
- b. Tunneling under the roots of trees shall be done under the supervision of an ISA Certified Arborist in an open trench by carefully excavating and hand digging around areas where large roots are exposed. No roots 1 inch in diameter or larger shall be cut.
- c. The contractor shall verify the vertical and horizontal location of existing utilities to avoid conflicts and maintain minimum clearances; adjustment shall be made to the grade of the new utility as required.

Approximate Tree Protection Fence Locations: ■■■■■■



ATTACHMENT 5 - BIBLIOGRAPHY

1. Dirr, Michael A. *Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses*. Champaign: Stipes Publishing Company, 1990.
2. Eric Allen, et al. *Common Tree Diseases of British Columbia*. Victoria: Canadian Forest Service, 1996.
3. Harris, Richard W, James Clark, and Nelda Matheny. *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines*. 4th ed. Upper Saddle River: Prentice Hall, 2004.
4. Jacobson, Arthur Lee. *Trees of Seattle*. 2nd ed. Seattle, Washington: Arthur Lee Jacobson, 2006.
5. Johnson, Warren T. and Lyon, Howard H. *Insects That Feed on Trees and Shrubs*. Ithaca: Comstock Publishing Associates, 1991.
6. Matheny, Nelda P. and Clark, James R. *Trees & Development, A Technical Guide to Preservation of Trees During Land Development*. Savoy: The International Society of Arboriculture Press, 1998.
7. Petrides, George A. and Wehr, Janet. *A Field Guide to Eastern Trees, Eastern United States and Canada including the Midwest*. New York: Houghton Mifflin Company, 1998.
8. Sinclair, Wayne A., Lyon, Howard H., and Johnson, Warren T. *Diseases of Trees and Shrubs*. Ithaca, New York: Cornell University Press, 1987.
9. Watson, Gary W., and Neely, Dan, eds. *Trees & Building Sites*. Savoy: The International Society of Arboriculture Press, 1995.