

**Arborist Report**

TO: David Yeh  
SITE: 7239 SE 27<sup>th</sup> Street, Mercer Island, WA  
RE: Inventory report  
DATE: August 31, 2016  
PROJECT ARBORIST: Katherine Taylor,  
ISA Certified Arborist #PN-8022A  
ISA Qualified Tree Risk Assessor  
  
Jake Dancer, Arborist Technician  
  
REVIEWED BY: Holly Iosso, ASCA Registered Consulting Arborist #567  
ISA Certified Arborist PN-6298A  
ISA Qualified Tree Risk Assessor

---

**Summary**

There are thirty (30) large trees at the above addressed property, none of which are designated Landmark trees by the City of Mercer Island. Six (6) trees are located inside an Environmentally Sensitive Area (ESA) for erosion hazard along the eastern edge of the property according to King County iMap.

There are four (4) trees, lettered A to D, on adjacent properties with overhanging canopies. These trees should be retained and protected throughout the project.

The Tree Preservation Plan drawn by Core Design dated May 2016 proposed eight (8) trees for removal. Three (3) additional trees are in poor condition and are not viable long term trees for the site.

This tree preservation plan is preliminary and may be adjusted later when the owner applies for a Short Plat Improvements Permit. Construction of two homes may require that additional trees be removed.

**Assignment & Scope of Report**

This report outlines the site inspection by Katherine Taylor and Jake Dancer of Tree Solutions Inc, on August 17, 2016. Included are observations and data collected at the above address site. David Yeh, the owner of the property, requested these services to acquire information for project planning.

We were asked to inventory all large trees at the above address, and provide a formal report including findings and management recommendations.

The tree size, species, health and structural condition, and related notes can be found in the attached Table of Trees. A Site Map with tree locations is also attached. Photographs, Glossary, and References are below the written report. Limits of assignment can be found in Appendix A. Methods can be found

in [Appendix B](#). Additional assumptions and limiting conditions can be found in [Appendix C](#). Details of the risk assessment process can be found in [Appendix D](#).

## Observations and Discussion

### The Site

The 27,655 square foot site is located on Mercer Island and includes a small side road that leads from SE 27<sup>th</sup> street, along the house numbered 7237, to the bulk of the property. There is one two story building and a carport located onsite (see [Photo 1](#)).

According to the King County iMap, the eastern margin of the property is an Environmentally Sensitive Area for erosion hazard (see [Figure 1](#)). There are 6 significant trees in this area.

On the southeastern end of the property there is a thick cover of invasive Himalayan blackberry (*Rubus bifrons*) growing around and into surrounding trees. On the western side of the property there is mature invasive ivy (*Hedera* sp.) growing up the trunks of trees.

### The Trees

Mercer Island classifies any conifer that is 6 feet or higher, and any deciduous tree that is 6 inches or greater diameter at standard height (DSH) as a “large tree.” They also identify any tree that is 36 inches or greater DSH can be nominated as a landmark tree by the landowner, but it is not required to do so. The city maintains a register of landmark trees and landmark groves. The city arborist, John Kenney, confirmed that no landmark trees or groves are on this property.

There are 30 trees total onsite located throughout the property. Tree health and structure condition ranged from good to poor. Tree species found onsite include: western redcedar (*Thuja plicata*), common hawthorn (*Crataegus monogyna*), Oregon ash (*Fraxinous latifolia*), Frasier photinia (*Photinia x fraseri*), apple (*Malus domestica*), willow (*Salix* sp.), Arizona cypress (*Cupressus glabra*), ponderosa pine (*Pinus ponderosa*), plum (*Prunus domestica*), privet (*Ligustrum* sp.), big leaf maple (*Acer macrophyllum*), rocky mountain juniper (*Juniperus scopulorum*), European mountain ash (*Sorbus aucuparia*), Douglas-fir (*Pseudotsuga menziesii*), and cherry plum (*Prunus cerasifera*).

The ESA for erosion hazard on the east side of the property includes trees 16, 17, 19, 20, 29, and 30. This area is designated by King County to define areas where soils may experience severe soil erosion (see [Figure 1](#)).

Along the west side of the property, trees 3 through 11 have invasive ivy growing at the base or into the canopy. If these trees are to be retained it would be advisable to remove the ivy for long term health of the trees. In this group, tree 5, an Oregon ash is in fair health and poor structural condition. This tree has a significant lean which appears to be from a previous partial failure. This tree is not a viable long term tree for the site.

Trees 19 and 22 are both European mountain ash trees in poor health and structural condition. Both trees have multiple stems and extensive decay at the base. These are not good long term trees for the site.

The Tree Preservation Plan drawn by Core Design dated May 2016 proposed eight (8) trees for removal. These include trees tagged 1, 4, 6, 7, 8, and 29.

There are several large coniferous trees in good health and structural condition onsite, including trees 13, 20, and 23 through 29. The DSH of these trees range from 18.4 inches to 35.8 inches and species include western redcedar, Douglas-fir, and ponderosa pine (see [Photo 1](#)). These trees should be prioritized for retention as possible.

Tree 20 appears to fall on the property line meaning that the tree is shared with the adjacent property owner. If removal of this tree is planned permission will be required from the adjacent property owner as well as from the city of Mercer Island.

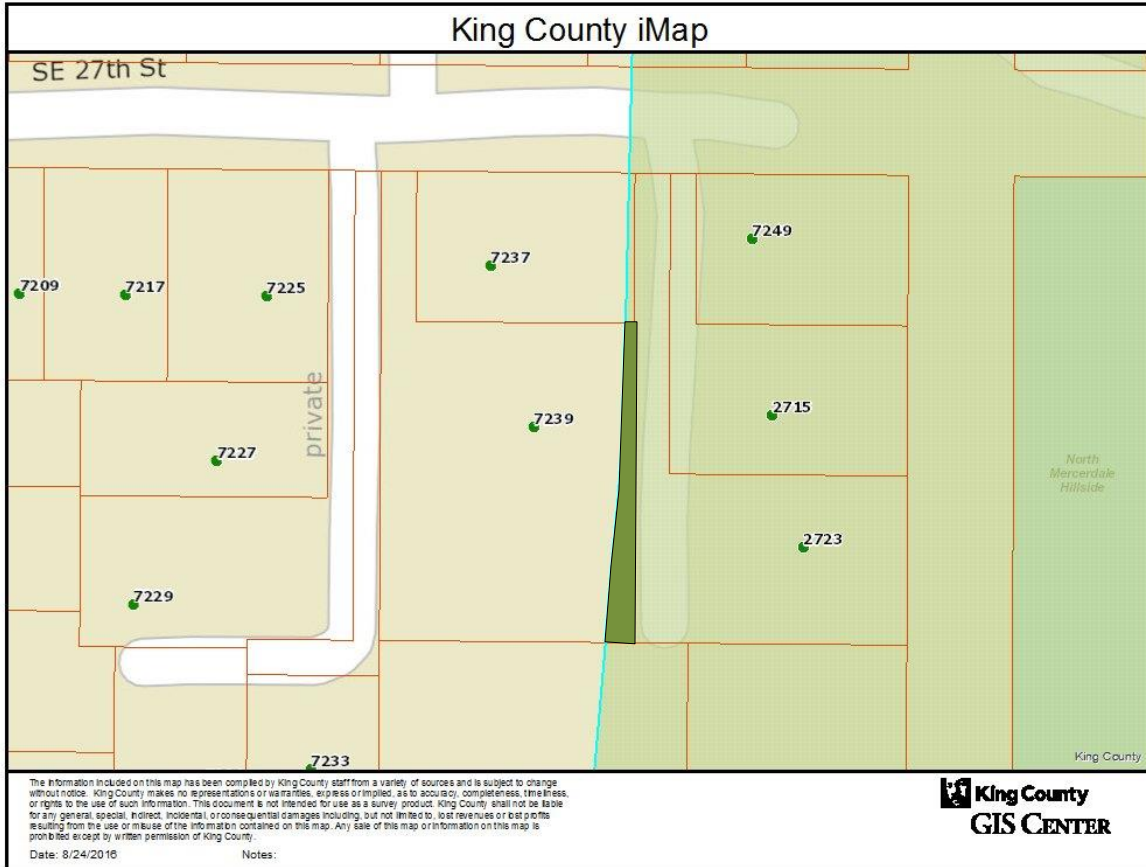
There are 4 trees, lettered A through D, on adjacent properties with canopies overhanging the site. Trees A and B are located adjacent the entry driveway and with DSHs respectively of 15.8 inches and 16.8 inches. Trees C and D are on the adjacent property to the south and are a scarlet oak (*Quercus coccinea*) with a DSH greater than 25 inches, and a western redcedar with a DSH of approximately 20 inches. The trees are in good condition and should be retained and protected throughout development.

#### **Recommendations**

- When available, provide preliminary site plans with proposed structures for further comment on tree retention and impacts.
- Retain and protect trees on adjacent properties that overhang the site throughout the duration of the construction project.
- Consider removal of trees 5, 19, and 22 due to poor health and structural condition.
- Obtain all necessary permits prior to any tree removal and commencement of any construction activities.

## Site Map and Plans

Figure 1: Site Map with erosion hazard area outlined (The dark green shaded area shows property that is inside the erosion hazard area).



## Photographs



**Photo 1:** A view of some of the large coniferous trees and the two structures found onsite

## Glossary

- advanced assessment:** an assessment performed to provide detailed information about specific tree parts, defects, targets, or site conditions. Specialized equipment, data collection and analysis, and/or expertise are usually required (ISA 2013)
- ANSI A300:** American National Standards Institute (ANSI) standards for tree care
- basic assessment:** detailed visual inspection of a tree and surrounding site that may include the use of simple tools. It requires that a tree risk assessor walk completely around the tree trunk looking at the site, aboveground roots, trunk, and branches (ISA 2013)
- bending moment:** a turning, bending or twisting force exerted by a lever, defined as the force (acting perpendicular to the lever) multiplied by the length of the lever (see *moment*) (ISA 2013)
- cabling:** installation of hardware in a tree to help support weak branches or crotches (Lilly 2001)
- chlorotic:** foliage with whitish or yellowish discoloration caused by lack of chlorophyll
- codominant stems:** stems or branches of nearly equal diameter, often weakly attached (Matheny *et al.* 1998)
- cracks:** defects in trees that, if severe, may pose a risk of tree or branch failure (Lilly 2001)
- crown:** the aboveground portions of a tree (Lilly 2001)
- crown cleaning:** selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches (ANSI A300)
- DBH or DSH:** diameter at breast or standard height; the diameter of the trunk measured 54 inches (4.5 feet) above grade (Matheny *et al.* 1998)
- deciduous:** tree or other plant that loses its leaves sometime during the year and stays leafless generally during the cold season (Lilly 2001)
- drive-by (assessment):** limited visual inspection from only one side of the tree, performed from a slow-moving vehicle; also may be called a windshield assessment (ISA 2013)
- epicormic:** arising from latent or adventitious buds (Lilly 2001)
- evergreen:** tree or plant that keeps its needles or leaves year round; this means for more than one growing season (Lilly 2001)
- force:** any action or influence causing an object to accelerate/decelerate. Calculated as mass multiplied by acceleration. Is a vector quantity (ISA 2013)
- increment:** the amount of new wood fiber added to a tree in a given period, normally one year. (Dunster 1996)
- ISA:** International Society of Arboriculture
- included bark:** bark that becomes embedded in a crotch between branch and trunk or between codominant stems and causes a weak structure (Lilly 2001)
- landscape function:** the environmental, aesthetic, or architectural functions that a plant can have (Lilly 2001)
- lateral:** secondary or subordinate branch (Lilly 2001)
- level(s) of assessment:** categorization of the breadth and depth of analysis used in an assessment (ISA 2013)
- lever arm:** the distance between the applied force (or center of force) and the point where the object will bend or rotate (ISA 2013)
- limited visual assessment:** a visual assessment from a specified perspective such as foot, vehicle, or aerial (airborne) patrol of an individual tree or a population of trees near specified targets to identify specified conditions or obvious defects (ISA 2013)
- mitigation:** process of reducing damages or risk (Lilly 2001)

- moment:** a turning, bending, or twisting force exerted by a lever, defined as the force (acting perpendicular to the lever) multiplied by the length of the lever (ISA 2013)
- monitoring:** keeping a close watch; performing regular checks or inspections (Lilly 2001)
- owner/manager:** the person or entity responsible for tree management or the controlling authority that regulates tree management (ISA 2013)
- pathogen:** causal agent of disease (Lilly 2001)
- phototropic growth:** growth toward light source or stimulant (Harris *et al.* 1999)
- micro-resistance drill:** a drilling instrument used to determine the density of wood by measuring the amount of resistance presented to the drilling needle as it is driven into the wood. The drilling resistance profiles show clearly where compression wood, annual rings, rot in various stages and other defects have been encountered by the drilling needle
- retain and monitor:** the recommendation to keep a tree and conduct follow-up assessments after a stated inspection interval (ISA 2013)
- significant size:** a tree measuring 6" DSH or greater
- snag:** a tree left partially standing for the primary purpose of providing habitat for wildlife
- soil structure:** the arrangement of soil particles (Lilly 2001)
- sounding:** process of striking a tree with a mallet or other appropriate tool and listening for tones that indicate dead bark, a thin layer of wood outside a cavity, or cracks in wood (ISA 2013)
- structural defects:** flaws, decay, or other faults in the trunk, branches, or root collar of a tree, which may lead to failure (Lilly 2001)
- tomography:** a technique for obtaining 2-D cross sections or 3-D pictures of the interior of an object by passing sound waves through the object and measuring the travel times of the acoustic signals as the object absorbs or scatters them on ray paths between source and receiver.
- Visual Tree Assessment (VTA):** method of evaluating structural defects and stability in trees by noting the pattern of growth. Developed by Claus Mattheck (Harris, *et al.* 1999)
- walk-by (assessment):** a limited visual inspection, usually from one side of the tree, performed as the tree risk assessor walks by the tree(s) (ISA 2013)

## References

ANSI A300 (Part 1) – 2008 American National Standards Institute. American National Standard for Tree Care Operations: Tree, Shrub, and Other Woody Plant Maintenance: Standard Practices (Pruning). New York: Tree Care Industry Association, 2008.

Dunster & Associates Environmental Consultants Ltd. Assessing Trees in Urban Areas and the Urban-Rural Interface, US Release 1.0. Silverton: Pacific Northwest Chapter ISA, 2006.

Dunster, Julian A., E. Thomas Smiley, Nelda Matheny, and Sharon Lilly. Tree Risk Assessment Manual. Champaign, Illinois: International Society of Arboriculture, 2013.

E. Smiley, N. Matheny, S. Lilly. Best Management Practices: TREE RISK ASSESSMENT. ISA 2011.

Lilly, Sharon. Arborists' Certification Study Guide. Champaign, IL: The International Society of Arboriculture, 2001.

Matheny, Nelda and James R. Clark. Trees and Development: A Technical Guide to Preservation of Trees During Land Development. Champaign, IL: International Society of Arboriculture, 1998.

Mattheck, Claus and Helge Breloer, The Body Language of Trees.: A Handbook for Failure Analysis. London: HMSO, 1994.



## **Appendix A - Limits of Assignment**

Unless stated otherwise: 1) information contained in this report covers only those trees that were examined and reflects the condition of those trees at the time of inspection; and 2) the inspection is limited to visual examination of the subject trees without dissection, excavation, probing, climbing, or coring unless explicitly specified. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

Tree Solutions did not review any reports or perform any tests related to the soil located on the subject property unless outlined in the scope of services. Tree Solutions staff are not and do not claim to be soils experts. An independent inventory and evaluation of the soils on site should be obtained by a qualified professional if an additional understanding of site characteristics is needed to make an informed decision.

## Appendix B - Methods

I evaluated tree health and structure utilizing **visual tree assessment (VTA)** methods. The basis behind VTA is the identification of symptoms, which trees produce in reaction to weak spots or areas of mechanical stress. Trees react to mechanical and physiological stresses by growing more vigorously to re-enforce weak areas, while depriving less stressed parts (Mattheck & Breloer 1994). Understanding uniform stress allows me to make informed judgments about the condition of a tree.

I measured the diameter of each tree at 54 inches above grade, **diameter at standard height (DSH)**. Where a tree had multiple stems, I measured each stem individually at standard height and determined a single-stem equivalent diameter by using the method outlined in the Guide for Plant Appraisal, 9<sup>th</sup> Edition, published by the Council of Tree and Landscape Appraisers.

I used a steel soil probe to test soil depths.

I used binoculars to inspect the upper parts of the trees.

I used a micro-resistance drill to test for decay in the trees. The micro-resistance recording drill systems measure the amount of resistance presented to the drilling needle as it is driven into the wood, perpendicular to the annual rings. The drilling needle is driven into the wood, at a constant rate, up to one half meter deep, and can detect the most minute changes in wood density. The data is recorded as a graphic resistance profile using a vertical scale that represents wood density, which is then printed and analyzed. Resistograph test results graphs are attached.

I used a Fakkop 2-D sonic tomograph to test for internal decay or other defects. This instrument is a non-destructive evaluation tool that works by using sound velocity measurements between several sensors placed around the trunk. Because sound velocity decreases in decayed areas, internal defects can be detected and the stability of the tree can be estimated. The data from the instrument is recorded and results display the cross-section of the trunk along the plane where the sensors were placed.

Tree health considers crown indicators including foliar density, size, color, stem shoot extensions, decay, and damage. We have adapted our ratings based on the Purdue University Extension Formula Values for health condition. These values are a general representation used to assist in arborists in assigning ratings. Tree health needs to be evaluated on an individual basis and may not always fall entirely into a single category, however, a single condition rating must be assigned.

Excellent - Perfect specimen with excellent form and vigor, well-balanced crown. Normal to exceeding shoot length on new growth. Leaf size and color normal. Trunk is sound and solid. Root zone undisturbed. No apparent pest problems. Long safe useful life expectancy for the species.

Good - Imperfect canopy density in few parts of the tree, up to 10% of the canopy. Normal to less than  $\frac{3}{4}$  typical growth rate of shoots and minor deficiency in typical leaf development. Few pest issues or damage, and if they exist they are controllable or tree is reacting appropriately. Normal branch and stem development with healthy growth. Safe useful life expectancy typical for the species.

Fair - Crown decline and dieback up to 30% of the canopy. Leaf color is somewhat chlorotic/necrotic with smaller leaves and “off” coloration. Shoot extensions indicate some stunting and stressed growing conditions. Stress cone crop clearly visible. Obvious signs of pest problems contributing to lesser condition, control might be possible. Some decay areas found in main stem and branches. Below average safe useful life expectancy

Poor - Lacking full crown, more than 50% decline and dieback, especially affecting larger branches. Stunting of shoots is obvious with little evidence of growth on smaller stems. Leaf size and color reveals overall stress in the plant. Insect or disease infestation may be severe and uncontrollable. Extensive decay or hollows in branches and trunk. Short safe useful life expectancy.

*Tree health condition ratings have been adapted from the Purdue University Extension bulletin FNR-473-W - Tree Appraisal.*

## **Appendix C - Assumptions & Limiting Conditions**

1. Consultant assumes that any legal description provided to Consultant is correct and that title to property is good and marketable. Consultant assumes no responsibility for legal matters. Consultant assumes all property appraised or evaluated is free and clear, and is under responsible ownership and competent management.
2. Consultant assumes that the property and its use do not violate applicable codes, ordinances, statutes or regulations.
3. Although Consultant has taken care to obtain all information from reliable sources and to verify the data insofar as possible, Consultant does not guarantee and is not responsible for the accuracy of information provided by others.
4. Client may not require Consultant to testify or attend court by reason of any report unless mutually satisfactory contractual arrangements are made, including payment of an additional fee for such Services as described in the Consulting Arborist Agreement.
5. Unless otherwise required by law, possession of this report does not imply right of publication or use for any purpose by any person other than the person to whom it is addressed, without the prior express written consent of the Consultant.
6. Unless otherwise required by law, no part of this report shall be conveyed by any person, including the Client, the public through advertising, public relations, news, sales or other media without the Consultant's prior express written consent.
7. This report and any values expressed herein represent the opinion of the Consultant, and the Consultant's fee is in no way contingent upon the reporting of a specific value, a stipulated result, the occurrence of a subsequent event or upon any finding to be reported.
8. All photographs included in this report were taken by Tree Solutions Inc. during the documented site visit, unless otherwise noted.
9. Sketches, drawings and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys. The reproduction of any information generated by architects, engineers or other consultants and any sketches, drawings or photographs is for the express purpose of coordination and ease of reference only. Inclusion of such information on any drawings or other documents does not constitute a representation by Consultant as to the sufficiency or accuracy of the information.
10. Unless otherwise agreed, (1) information contained in this report covers only the items examined and reflects the condition of the those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, climbing, or coring. Consultant makes no warranty or guarantee, express or implied, that the problems or deficiencies of the plans or property in question may not arise in the future.
11. Loss or alteration of any part of this Agreement invalidates the entire report.

Tree ID	Scientific Name	Common Name	DSH (inches)	Multistem Diameter	Health Condition	Structural Condition	Dripline Radius (feet)	Proposed Action	Notes
1	<i>Malus domestica</i>	Apple	13		Good	Fair	13	Remove for utilities/access	A lot of pruning wounds, reduction and heading cuts
2	<i>Photinia x fraseri</i>	Fraser photinia	17.5	17.5	Poor	Fair	12		Canopy decline, leaf spots, contorted leaves, powdery mildew
3	<i>Fraxinus latifolia</i>	Oregon ash	10.8	10.8	Fair	Fair	15		Ivy on stem, symptoms of anthracnose in canopy
4	<i>Fraxinus latifolia</i>	Oregon ash	8		Fair	Fair	12	Remove for utilities/access	Diameter estimated, heavy lean, similar to tree 3
5	<i>Fraxinus latifolia</i>	Oregon ash	8.7		Fair	Poor	15	Remove due to health and structure	Partially failed, heavy ivy, heavy lean
6	<i>Thuja plicata</i>	Western redcedar	14		Good	Fair	10	Remove for utilities/access	Ivy at base, phototropic, swept base
7	<i>Crataegus monogyna</i>	Common hawthorn	9.8		Fair	Fair	15	Remove for utilities/access	Measured at narrowest point below codominant union, eastward lean, heavy ivy
8	<i>Crataegus monogyna</i>	Common hawthorn	7		Fair	Fair	10	Remove for utilities/access	Heavy ivy, phototropic lean
9	<i>Thuja plicata</i>	Western redcedar	5.7		Good	Good	9		Suppressed, canopy asymmetrical, ivy
10	<i>Thuja plicata</i>	Western redcedar	13.8		Good	Fair	10		Mature ivy up trunk
11	<i>Salix sp.</i>	Willow	7.4, 6.7, 6.7	12	Good	Fair	20		3 codominant stems, wound at base. English laurel at base girdling stem

Tree ID	Scientific Name	Common Name	DSH (inches)	Multistem Diameter	Health Condition	Structural Condition	Dripline Radius (feet)	Proposed Action	Notes
12	<i>Cupressus glabra</i>	Arizona cypress	10.6		Good	Fair	9		Codominant leaders, some dieback
13	<i>Pinus ponderosa</i>	Ponderosa pine	35.8		Good	Good	25		Blackberry at base
14	<i>Prunus domestica</i>	Common plum	11.5		Good	Good	14		Ivy on stem, leaning
15	<i>Ligustrum sp.</i>	Privet	5.1, 2.5, 2.5, 3, 3.5	7.7	Good	Good	15		
16	<i>Acer macrophyllum</i>	Bigleaf maple	3.5, 3, 3, 2, 2, 3, 4, 7	10.6	Good	Good	18		Stump sprout
17	<i>Crataegus monogyna</i>	Common hawthorn	13.3		Good	Good	15		
18	<i>Juniperus scopulorum</i>	Rocky Mountain juniper	3, 3, 1, 4	5.9	Good	Fair	6		
19	<i>Sorbus aucuparia</i>	European mountain ash	8.3, 9, 7.8, 7, 7	17.5	Poor	Poor	14	Remove due to health and structure	Extensive decay at base, tearouts, thin crown
20	<i>Pseudotsuga menziesii</i>	Douglas-fir	31		Good	Good	24		Heavy ivy on trunk - remove,
21	<i>Pseudotsuga menziesii</i>	Douglas-fir	3.7		Good	Good	9		One sided to south
22	<i>Sorbus aucuparia</i>	European mountain ash	26.4		Fair	Poor	16	Remove due to health and structure	Several stems, extensive decay at base, measured at narrowest point below codominant stems, poor attachments
23	<i>Thuja plicata</i>	Western redcedar	23.4		Good	Good	19		Shared canopy with 24
24	<i>Thuja plicata</i>	Western redcedar	25.5		Good	Good	19		Directly adjacent to 23
25	<i>Thuja plicata</i>	Western redcedar	21.5		Good	Good	16		2 ft from 24
26	<i>Thuja plicata</i>	Western redcedar	29.4		Good	Good	24		Ivy up trunk
27	<i>Pseudotsuga menziesii</i>	Douglas-fir	18.4		Good	Good	23		Small hangers in tree



**Table of Trees**  
7239 SE 27th Street, Mercer Island  
Seattle, WA 98040

Date of Inventory: 8/17/2016

Table Prepared: 8/18/2016

Tree ID	Scientific Name	Common Name	DSH (inches)	Multistem Diameter	Health Condition	Structural Condition	Dripline Radius (feet)	Proposed Action	Notes
28	<i>Pseudotsuga menziesii</i>	Douglas-fir	24.5		Good	Good	23		Surface roots
29	<i>Pinus ponderosa</i>	Ponderosa pine	28.5		Good	Good	15	Remove for utilities/access	
30	<i>Prunus cerasifera</i>	Cherry plum	3.5, 3.5, 2, 2, 2, 4.4, 4.7, 4, 2, 2, 3.6, 6.3, 2, 5.4, 6.2,	15	Good	Fair	15		Stump sprout
<b>Off-site Trees with Canopy Overhanging Property</b>									
A	<i>Pinus parviflora</i>	Japanese red pine	15.8		Good	Fair	22		Mailbox, codominant leaders, pruned for utilities, nails in trunk, pitch flow around base, roots lifting pavement
B	<i>Thuja plicata</i>	Western redcedar	16.8		Good	Fair	10		Codominant stems at 7 ft, long seam of included bark, narrowly attached stems
C	<i>Thuja plicata</i>	Western redcedar	20		Good	Good	15		DSH estimated
D	<i>Quercus coccinea</i>	Scarlet oak	25		Good	Good	25		DSH estimated

Additional notes:

*DSH (Diameter at Standard Height) is measured 4.5 feet above grade.*

*Multi-stem trees are noted, and a single stem equivalent is calculated using the method defined in the Director's Rule 16-2008.*

*Drip line is measured from the center of the tree to the outermost extent of the canopy*



