

Arborist Report

TO: Gary Upper, JayMarc Homes
SITE: 4150 78th Ave SE, Mercer Island, WA 98040
RE: Site Assessment and Tree Inventory
DATE: February 1, 2016
PROJECT ARBORIST: J. Casey Clapp
ISA Certified Arborist #PN-7475A
ISA Qualified Tree Risk Assessor

REVIEWED BY: Katie Hogan , ISA Certified Arborist #PN-8078A

Summary

Thirty-three (33) trees were tagged and assessed at the above-addressed property. According to current site plans, fifteen (15) trees will likely require removal due to conflicts with proposed structures. Most of the trees that are being retained are located on the steep slope/riparian area in the southeast section of the site.

The City of Mercer Island defines a significant tree as any coniferous tree equal to or greater than 6 feet tall and any deciduous trees greater than 6 inches diameter at standard height (DSH).

Assignment & Scope of Report

This report outlines the site inspection by Katie Hogan and Casey Clapp of Tree Solutions Inc, on January 19, 2016. We were asked to visit the job site and provide a formal report including findings and management recommendations. Gary Upper, of JayMarc Homes, requested these services for project planning purposes.

The tree size, species, health and structural condition, and related notes and recommendations for each tree can be found in the attached [Tree Inventory](#). A site map with tree locations can be found in [Figure 1: Site Map](#). Photographs, Glossary, and References follow the site map. 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](#).

Observations

The Site and History

This 18,618 square foot site is located on the western side of Mercer Island. The site slopes towards the west and south, and has a stream running along the southeastern border. One single-family home currently exists on the site. According to King County iMap, the northern portion of the site is an Environmentally Critical Area (ECA) due to erosion hazard.

The Trees

There were thirty-three significant trees tagged and assessed on site. Most of the trees were in fair to good health and structural condition. Tree species on site were mostly native species including Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), and bigleaf maple (*Acer macrophyllum*). There were several ornamental species found on site as well, including flowering dogwood (*Cornus florida*), hawthorn (*Crataegus* sp.), and cherry plum (*Prunus cerasifera*).

Several invasive species were also found on site. Many of the invasive species found were located in the natural area to the south of the developed section of the site. Invasive species found on site include English holly (*Ilex aquifolium*), cherry laurel (*Prunus laurocerasus*), invasive ivy (*Hedera* spp.), and Himalayan blackberry (*Rubus bifrons*).

Tree 8 is a bigleaf maple that was previously removed down to approximately 15 feet and is now re-sprouting from the previous cuts. This tree had decay in its stem and at the base, and is essentially a sprouting stump.

Discussion

Due to proposed grading and development, many trees on the north and northwestern sides of the property will require removal. Trees 1 through 4, 7, 11, and 13 are all located in this area but are either small enough or far enough away such that they have a good chance of survival if protected during construction.

Tree 33 is a Douglas-fir tree located along 78th Ave SE. The tree could potentially be retained if the majority of the critical root zone is protected. Roots from this tree are established under the existing concrete driveway in the northeast section of the site. Retaining this tree would require careful removal of the existing driveway and excavation for the proposed garage. The removal of adjacent trees 30 through 32 will also expose this tree to new weather conditions. The tree will likely remain sheltered from the eastern trees but it is possible that these new conditions may result in increased branch failure. More specific recommendations regarding tree protection measures for this tree can be provided if retention is desired for this project.

Most of the trees that are located in the natural area to the southeast will be retained as no construction activities are proposed for that area. There is, however, a high concentration of invasive species in this area that should be removed.

Tree 20 is a large bigleaf maple that has basal decay and a large vertical trunk wound with a central column of decay. We recommend that this tree receive a more thorough risk assessment as the proposed structure may be within striking distance of the tree should it fail near the base. Advanced testing would show how much of the central area is decayed and will help determine the level of risk that the tree presents to the proposed structure.

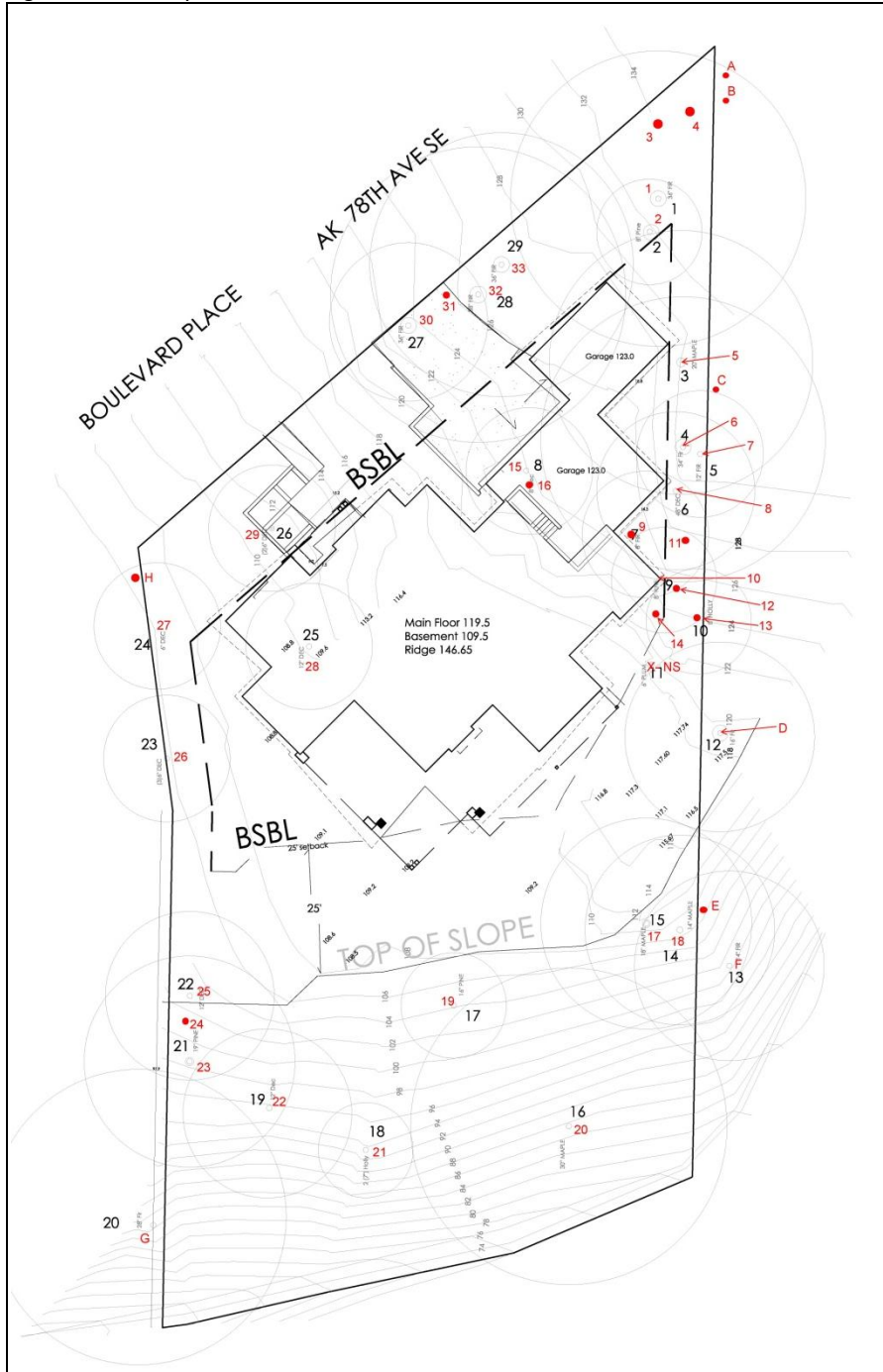
There were several trees on adjacent properties that had canopies that overhung the subject site. None of these trees should be negatively impacted by the proposed site work so long as proper tree protection measures are put in place prior to the commencement of site work.

Recommendations

- Install tree protection measures at the drip line of the trees that are scheduled for retention, or at the limits of disturbance, whichever is the greatest distance from the tree.
- Obtain all the necessary permits prior to commencing site work.
- Consider restoring the steep slope/riparian section by removing invasive species.

Site Map and Plans

Figure 1. Site Map



Source: Gary Upper, JayMarc Homes

Photographs



Photo 1: A view looking south over the site. Tree 8 is pointed out.



Photo 2: A view of the site looking south. The trees to the east (left) of the driveway are good candidates for retention, but some may require removal based on proposed grading. Tree 33 is shown, which may be possible to retain depending on plans for existing driveway.

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)
- 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)
- 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)
- 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)
- 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)
- 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)
- 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)
- phototropic growth:** growth toward light source or stimulant (Harris *et al.*1999)
- retain and monitor:** the recommendation to keep a tree and conduct follow-up assessments after a stated inspection interval (ISA 2013)
- significant size:** a deciduous tree measuring 6” DSH or greater, or a coniferous tree over 6 feet in height.
- snag:** a tree left partially standing for the primary purpose of providing habitat for wildlife
- structural defects:** flaws, decay, or other faults in the trunk, branches, or root collar of a tree, which may lead to failure (Lilly 2001)
- 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)

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

We 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.

We measured the diameter of each tree at 54 inches above grade, **diameter at standard height (DSH)**.

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)	Health Condition	Structural Condition	Drip Line (feet)	Recommended Action	Notes
1	<i>Pseudotsuga menziesii</i>	Douglas-fir	34.7	Fair	Fair	15	Retain	Many burls and cankers up the stem; lost top with two new re-iterations
2	<i>Pinus nigra</i>	Austrian pine	8.8	Good	Fair	7	Retain	Slightly suppressed
3	<i>Arbutus menziesii</i>	Pacific madrone	9.8	Good	Good	N - 19, E - 8	Retain	Cankers on stem; phototropic lean to west
4	<i>Acer macrophyllum</i>	Bigleaf maple	18.5	Good	Fair	12	Retain	Broken top; suppressed; phototropic lean to the west
5	<i>Acer macrophyllum</i>	Bigleaf maple	20.2	Good	Fair	16	Remove	Lost top
6	<i>Pseudotsuga menziesii</i>	Douglas-fir	30.3	Good	Good	14	Remove	Low vigor, wood pecker activities in bark near base
7	<i>Pseudotsuga menziesii</i>	Douglas-fir	14.8	Fair	Poor	5	Retain	Heavily suppressed, lost top
8	<i>Acer macrophyllum</i>	Bigleaf maple	52.7	Poor	Poor	10	Remove	Decay at base; topped at 15 feet and left as snag; many sprouts
9	<i>Pseudotsuga menziesii</i>	Douglas-fir	7.6	Good	Good	10	Remove	
10	<i>Pinus nigra</i>	Austrian pine	8.2	Good	Good	9	Remove	
11	<i>Thuja plicata</i>	Western redcedar	4.0	Good	Good	10	Retain	
12	<i>Sequoiadendron giganteum</i>	Giant sequoia	5.2	Poor	Good	6	Remove	Heavily suppressed
13	<i>Ilex aquifolium</i>	English holly	8.7	Good	Fair	10	Retain	Two main leaders are dead; co-dominant
14	<i>Pseudotsuga menziesii</i>	Douglas-fir	4.6	Good	Good	8	Remove	
15	<i>Prunus emarginata</i>	Bitter cherry	8.2	Good	Good	8	Remove	
16	<i>Rhododendron</i> spp.	Rhododendron	6.2	Good	Good	13	Remove	
17	<i>Acer macrophyllum</i>	Bigleaf maple	18.0	Fair	Fair	21	Retain	Stem decay with good response growth
18	<i>Acer macrophyllum</i>	Bigleaf maple	13.0	Fair	Fair	17	Retain	Stem decay with good response growth; lost top; many epicormic sprouts
19	<i>Pinus nigra</i>	Austrian pine	17.1	Good	Good	15	Retain	Invasive ivy (<i>Hedera</i> spp.) on stem

Tree ID	Scientific Name	Common Name	DSH (inches)	Health Condition	Structural Condition	Drip Line (feet)	Recommended Action	Notes
20	<i>Acer macrophyllum</i>	Bigleaf maple	43.0	Fair	Fair	32	Retain	<i>Kretzschmaria deusta</i> on stem; long wound on stem; invasive ivy on stem; dead bark sloughing off
21	<i>Ilex aquifolium</i>	English holly	9.4, 6.6	Good	Good	11	Retain	
22	<i>Prunus cerasifera</i>	Cherry plum	9.9, 8.0	Good	Fair	14	Retain	Old stem cut
23	<i>Pinus sylvestris</i>	Scots pine	21.3	Good	Fair	19	Retain	Broken top
24	<i>Prunus laurocerasus</i>	English laurel	6.1	Good	Fair	11	Retain	
25	<i>Prunus cerasifera</i>	Cherry plum	8.5, 7.8	Good	Poor	12	Retain	
26	<i>Photinia x fraseri</i>	Red tip photinia	7.0, 6.6	Fair	Good	10	Retain	Leaf spot infection
27	<i>Photinia x fraseri</i>	Red tip photinia	5.5, 4.7	Fair	Good	7	Retain	Leaf spot infection
28	<i>Crataegus</i> spp.	Hawthorn		Good	Good	13	Remove	Growing at house foundation
29	<i>Cornus florida</i>	Flowering dogwood	5.6, 5.8	Good	Good	12	Remove	
30	<i>Pseudotsuga menziesii</i>	Douglas-fir	38.2	Good	Good	22	Remove	
31	<i>Thuja plicata</i>	Western redcedar	19.3	Good	Good	17	Remove	
32	<i>Pseudotsuga menziesii</i>	Douglas-fir	34.9	Good	Fair	25	Remove	Lost top; old crack in stem at 40 feet; roots to south in proposed site area
33	<i>Pseudotsuga menziesii</i>	Douglas-fir	30.8	Good	Good	21	Remove	Large roots in driveway area to north
Adjacent Site Trees								
A	<i>Acer macrophyllum</i>	Bigleaf maple	19.0	Good	Fair	17	Retain	Co-dominant stem
B	<i>Pseudotsuga menziesii</i>	Douglas-fir	18.0	Good	Fair	12	Retain	Lost top
C	<i>Acer macrophyllum</i>	Bigleaf maple	18.0	Good	Good	0	Retain	No canopy over site but likely many roots on site
D	<i>Pseudotsuga menziesii</i>	Douglas-fir	12.0	Good	Good	15	Retain	Over-extended limbs over property.
E	<i>Acer macrophyllum</i>	Bigleaf maple	8.0	Fair	Fair	12	Retain	Some dead wood in stem
F	<i>Pseudotsuga menziesii</i>	Douglas-fir	13.0	Good	Fair	7	Retain	

Tree ID	Scientific Name	Common Name	DSH (inches)	Health Condition	Structural Condition	Drip Line (feet)	Recommended Action	Notes
G	<i>Pseudotsuga menziesii</i>	Douglas-fir	18.0	Good	Good	17	Retain	
H	<i>Photinia x fraseri</i>	Red tip photinia	6.0	Fair	Fair	5	Retain	

Additional notes:

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

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



January 3, 2019

Project: Pre-construction assessment for lot re-development at 4150 Boulevard Place SE, Mercer Island, WA. Parcel number 3623500174.

Contact: Stuart Silk – Stuart Silk Architects
2400 N 45th Street, Suite 200, Seattle, WA 98103
Phone – 206 728 9500 Email – stuart@stUARTSILK.COM

Objectives: Addendum to Tree Solutions report dated 2/1/2016 exploring the limits of impact on three fir trees numbered 30, 32, and 33 and a cedar numbered 31 in that report. The firs will be assessed for their risk pre- and post-construction.

Description: The original home was demolished in 2018 but the driveway was left intact along with some of the hardscaping. The 2016 proposed home would have removed the driveway and the walls. The property was purchased at the end of 2017 and the new owners and architectural firm have some thought as to leaving the existing driveway in place.

Superior NW Enterprise was contacted and asked to assess the trees next to the driveway and main road as to their health, stability, and overall suitability for retention.

The #33 tree stands 3.5' west of the existing driveway and 9' south of the main drive as shown in Figures 1 and 2. Its roots protrude from the asphalt of the driveway in a multiple spots (Figures 3 and 4). The tree has cankers along its lower column (Figure 5) and its top appears to have been damaged more than fifteen years ago. It is in fair health with average new growth and color. The majority of its canopy is above the halfway mark. No decay was found in a core test but it did reveal less than average amounts of new wood being laid down.

The #32 tree stands just west of the #33 and 12' south of the main drive. This tree has large cankers along the lower column (Figure 6) and evidence of a fracture plane on either side of the stem (Figures 7 and 8). Its top was significantly damaged and grew back malformed. Its entire canopy is in the upper half of the column. It is in fair health with average new growth and color. As with its neighbor no decay was found in a core test but less than average amounts of new wood was seen.

The #31 cedar is 14' south of the main drive and more than 20' west of the driveway. It is in great condition with abundant new growth, vibrant color, and a low full canopy. No core test was deemed necessary for this tree.

The #30 fir stands 14' south of the main drive and 16' east of the construction driveway on the west side of the property. This tree also has a damaged top with adverse response growth clearly visible. The majority of the canopy is in the upper third of the column and shows average color and new growth. No decay was found in its core test and the tree appeared to be laying down average amounts of new wood.

Methods: Tree assessment is both an art and a science. To properly perform, an arborist must have an extensive background in biology, tree mechanics, and tree structure that is equal parts academic and field knowledge. It takes years of study to recognize and correctly diagnose the subtle signs trees exhibit before their failure, whether it be partial or total. The process begins with a visual inspection (visual tree assessment, VTA) which is followed up as necessary with soundings, core testing, and/or other detection means. Each tree is examined and evaluated according to several factors including species type, size, vigor, injuries present, root and grade disturbance, deadwood, location and extent of decay, stem taper, exposure, and targets that are at risk.

The International Society of Arboriculture (ISA) has recently published a Best Management Practices bulletin to aid in their tree risk assessment program. This methodology for risk matter assessment will take the place of the standard ISA model currently in use. While focusing on a qualitative analysis the program is still based on three aspects of tree risk; failure potential, size of part failing (potential of damage from impact), and target rating. The aspects are scaled as follows. Failure potential (FP) can be imminent, probable, possible, or improbable. Target rating (T) is based on frequency of occupancy and is listed as very low, low, medium, or high. Selections are made in each of the first two categories and a likelihood of target impact found. It can be rated as unlikely, somewhat likely, likely, or very likely (see Figure 9). Obviously a level of null risk does not exist if a tree is present. For practical purposes however, arborists assume that if there is no target, the tree poses little or no risk.

The consequences of the failure, usually a function of size of the failed part, are listed as negligible, minor, significant, or severe. Combining the likelihood of a tree failure event with the consequences of that event allows a trained arborist to assign a level of risk to a given tree's situation. There are four acceptable categories within the model; Low, Moderate, High, or Extreme. The highest level, extreme, can only be assigned when the likelihood of failure and impact is high (very likely) and the consequences are severe (see Figure 10).

Discussion: The four trees in this study grew up in place and the firs are old enough to have been present when the driveways were first constructed. This means that the firs' roots have been constrained along their north side since at least 1960 and perhaps as far back as the 50s. The subject property's driveway would have acted as a constraint to the east over the same time frame.

Typically intrusion within the Critical Root Zone (CRZ), the radial area extending out from the tree a distance equal to one foot per inch of diameter, is strongly discouraged by the tree care industry. For example, the #33 fir, with a 31" DSH, has a 31' radial CRZ. However, excavation that will occur along only one sector of a tree's CRZ, can reach significantly into the root growth area without having a detrimental long term effect. What does have to be absolutely protected is a tree's Structural Root Plate (SRP). This radial area is again related to the diameter inches of the tree in question but not quite in a direct proportion as in the CRZ. Figure 11 below illustrates the relationship.

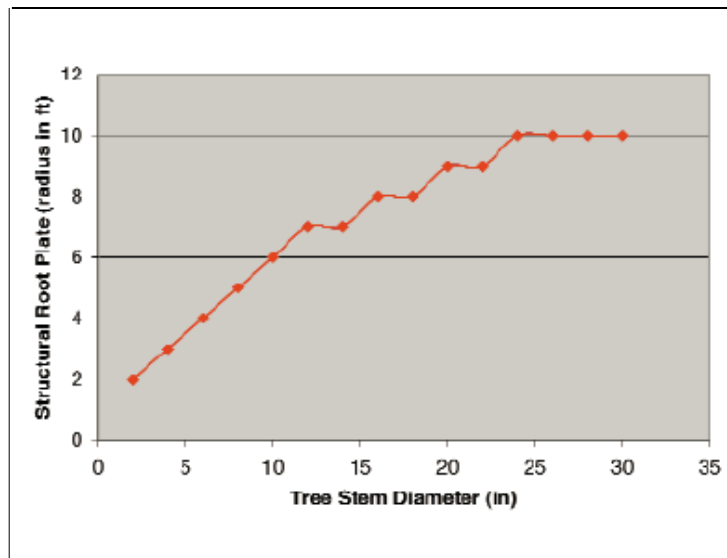


Figure 11. Size of the Structural Root Plate in relation to tree stem diameter. Note that the SRP levels off at 10' for any tree over 24" in diameter.

In this case all three firs exceed the 24" threshold and would have 10' SRPs. The cedar, having a 19" diameter, has an 8' SRP. The #33 tree is the only one of the four which has a compromised Structural Root Plate as the driveway and main drive are less than 10' away from the base of the tree.

The chart shown in Figure 12 below is used to determine what percentage of a tree's Critical Root Zone will be affected by singled sided incursions. In general trees can sustain losses of up to 30% of the overall area within their CRZ without having long term detrimental results.

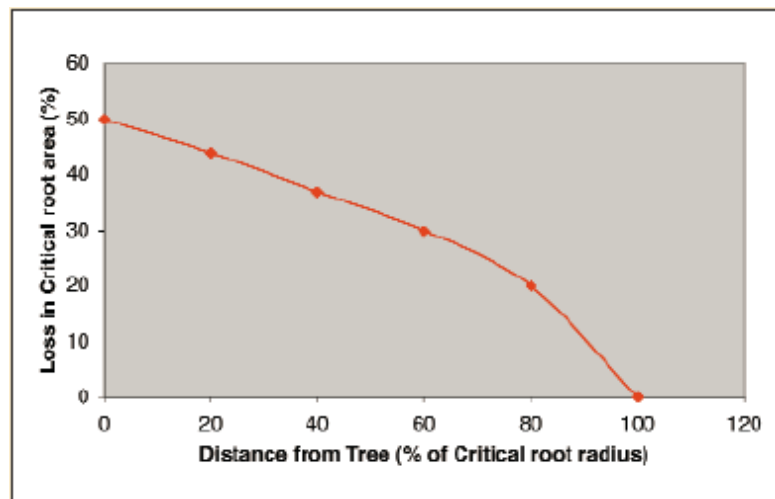


Figure 12. Chart giving the loss in critical root area as a function of the radial distance to the CRZ disturbance.

Using the #33 fir again as the example, with the existing driveway being 3.5' from the tree's base and it having a 31" DSH, there will be impact at a linear distance equal to 11% of the fir's CRZ (3.5'/31'). The chart shows that this roughly equates to a 45% loss of the fir's Critical Root Area (CRA) putting it well beyond the maximum recommended impact guideline. The main drive creates significant further limitations on the tree's CRA.

For the #32 tree, the main drive creates a 34% limiting factor and the driveway proper cuts off more potential rooting space. The # 31 cedar is only interfered with to the north and only for a potential loss of 23% of its area. The #30 fir experienced excavating work which came within 16' of its west side for a loss of nearly 35% of its CRA. The main road's interference with the #30 tree created a further loss of space, probably in the neighborhood of 12%.

Risk Assessments: Wind throw is the primary failure mechanism for trees in the Puget Sound region. Large evergreens dissipate wind loads by rotating on their center axis and allowing the energy to travel down and out through their structural roots. When the roots of these trees have been compromised, either naturally via decay, or abiotically via mechanical damage, they lose their ability to dissipate the energy loads and become destabilized.

The #33 fir in this case, with a significantly compromised Structural Root Plate, complete exposure to winter storm winds, and limited means of response growth due to the extensive loss in Critical Root Area, has a **probable likelihood of catastrophic failure**. Because of its size and placement has a **high likelihood of striking** the neighboring home to the north. Thus the tree is **likely to fail and impact** and, as the results would be **severe**, the tree is rated as being **high risk**.

The #32 tree has less constraint to its rooting space but shows signs of having a beam fracture. With an over heavy top and full exposure to storm winds this tree also has a **probable likelihood of catastrophic failure**. It rates out as a **high risk** for the same reasons as the #33.

The #31 tree is fine and has a **low risk** rating.

The #30 tree has had a more recent impact on its west side and still has the main road root constraint issues. Because of the rooting concerns it is listed as having a **probable likelihood of catastrophic failure** and rates as a **high risk** for the same reasons as the other two firs.

It should be mentioned here that there are a number of other firs on and near this property which have adverse response growth in their upper reaches. A formal assessment of these trees may become necessary depending on the scope of the future project.

Also a maple (which might be the #20 tree from the report) failed in one of the latest storms as shown in Figures 13 and 14.

Recommendations: The #31 cedar should be able to be preserved no matter the layout of the new home. While core tests taken did not show advanced center decay they did reveal quite limited new wood formation in two of the firs. The additional stress of any degree of construction impact will most likely result in the fir trees going into a rapid degeneration.

If there will be NO further construction impact to the firs of any kind they could be retained. If the decision is made to keep them then all three will have to have their tops pruned down and back to correct the adverse growth issues.

All the trees which are to be retained will have to be protected by laying down layers of mulch to cushion any impact to their roots and to prevent soil compaction. A rough rule of thumb would be 8-12" of mulch laid down out to 3' past the existing driplines as possible. Typically 6' chain link fencing is installed to designate no impact zones and is placed at the distance proscribed by the City of Mercer Island for non-incursion which is one linear foot per linear inch of tree diameter.

It is also highly recommended that the other large firs be more closely inspected and a climbing arborist be employed to correct structural faults in the upper canopies.

There is a large maple stub, numbered 8 in the Tree Solutions report, which should be removed sooner than later during the project. It has advanced decay and little to no viable growth.

Waiver of Liability Because the science of tree risk assessment is constantly broadening its understanding, it cannot be said to be an exact science. Every tree is different and performing tree risk assessment is a continual learning process. Many variables beyond the control, or immediate knowledge, of the arborist involved may adversely affect a tree and cause its premature failure. Internal cracks and faults, undetectable root rot, unexposed construction damage, interior decay, and even nutrient deficiencies can be debilitating factors. Changes in circumstance and condition can also lead to a tree's rapid deterioration and resulting instability. All trees have a risk of failure. As they increase in stature and mass their risk of breakdown also increases, eventual failure is inevitable.

While every effort has been taken to provide the most thorough and accurate snapshot of the trees' health, it is just that, a snapshot, a frozen moment in time. These findings do not guarantee future safety nor are they predictions of imminent events. It is the responsibility of the property owner to adequately care for the tree(s) in question by utilizing the proper professionals and to schedule future assessments in a timely fashion.

This report and all attachments, enclosures, and references, are confidential and are for the use of the Stuart Sild, Stuart Silk Architects, and their representatives only. It may not be reproduced, used in any way, or disseminated in any form without the prior consent of the clients concerned.

Anthony Moran, BS
ISA Certified Arborist
Qualified Tree Risk Assessor
#PN-5847A



Figure 1. Photo showing the base of the #33 fir looking north.



Figure 2. Photo looking at base of #33 fir (behind shrub) looking west.



Figure 3. Photo of large root knotting up under driveway



Figure 4. Another root photo.



Figure 5. Cankers on lower stem of #33 fir.



Figure 6. Cankers on lower stem of #32 fir.



Figure 7. Photo of fracture on east face of #32 fir.



Figure 8. Photo of fracture plane on west face of tree #32.

Figure 9. The matrix used to estimate the likelihood of a tree failure impacting a specific target.

Likelihood of Failure	Likelihood of Impacting Target			
	Very Low	Low	Medium	High
<i>Imminent</i>	Unlikely	Somewhat Likely	Likely	Very likely
<i>Probable</i>	Unlikely	Unlikely	Somewhat Likely	Likely
<i>Possible</i>	Unlikely	Unlikely	Unlikely	Somewhat Likely
<i>Improbable</i>	Unlikely	Unlikely	Unlikely	Unlikely

Figure 10. Risk rating matrix showing the level of risk as the combination of likelihood of a tree failing and impacting a specific target, and severity of the associated consequences.

Likelihood of Failure and Impact	Consequences			
	Negligible	Minor	Significant	Severe
<i>Very likely</i>	Low	Moderate	High	Extreme
<i>Likely</i>	Low	Moderate	High	High
<i>Somewhat likely</i>	Low	Low	Moderate	Moderate
<i>Unlikely</i>	Low	Low	Low	Low



Figure 13. Photo of stem of the failed maple.



Figure 14. Photo of upper section of failed maple.



Superior NW Enterprises

February 5, 2019

RE: Tree Solutions Arborist Report

To Whom It May Concern:

I read through the arborist report created by Tree Solutions in February of 2016 and walked the entire property to review the trees present as to their species and conditions. The report was comprehensive and, as it was written under the old Mercer Island tree code, included all the vegetation 6" DSH and greater. The attached, revised inventory accounts for these but makes note of those which are currently rated as significant.

The original report is still valid and should be filed with the permit sets.

The only significant change on the site is that the #17 maple failed in the December 2018 storms.

As of this date the mitigation pruning recommended in the January 2019 report has been completed. I reviewed the pruning with the crew completing the work and it was well done.

Please feel free to contact me with any questions.

Anthony Moran
ISA Certified Arborist
Qualified Tree Risk Assessor
PN-5847A



Superior NW Enterprises

February 20, 2019

RE: Impact analysis for the #30 Douglas Fir

The latest plan set, dated 2/20/2019, shows the north end of the proposed house foundation situated such that it is 20' back from the base of the #30 tree. The plans show that there will be a set of pylons installed 2' north of the foundation wall. The dripline for the tree extends 20' so the new foundation work will impact the tree only in a narrow swath in the outer 10% of dripline radius.

Currently there is a path/landscaping element that come to within 10' of the south side of the tree, angling to 13' away as it moves to the west. The path is lined with stones and has a loose rock base. It is likely that this landscape feature has limited root extension to the south to some degree. This means that the foundation work impact should be less than expected to some degree.

There is an excavation cut 16' to the west of the tree where the demolition access road was established during the removal of the original house. The proposed plans show the new driveway will be 20' to the west of the #30 tree so no new impact will occur to that quadrant of the tree.

There is a proposed path leading from the main drive to the front door of the new house. The path will run between the #30 tree and the #31 tree. It will be designed as a floating, permeable structure and the layout will be hand set to minimize impact to either tree.

Because the proposed work will be occurring within the root zone for the #30 tree a Certified Arborist should be onsite to oversee the initial excavation. If any roots are contacted they should be cut cleanly rather than ripped out by the machinery.

No other regulated trees on the site appear to be affected by the proposed construction work. All of them have driplines which fall short of the impact zones.

Please feel free to contact me with any questions.

Anthony Moran
ISA Certified Arborist
Qualified Tree Risk Assessor
PN-5847A

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Tree list for Stuart Silk Boulevard Place Project

Starting at SE corner of the lot and running roughly clockwise.

Number	Species	DSH (in)	Condition	Dripline extent	SSA#	Rating
1	Douglas Fir	35	weak	18' radial	14	Except
2	Austrian Pine	9	fair	6' radial	13	reg
3	Madrone	10	fair	5' radial	12	Except
4	Big Leaf Maple	18.5	fair	14' radial	Not listed	reg
5	Big Leaf Maple	20	fair	16' radial	15	reg
6	Douglas Fir	30	fair	14' radial	17	Except
7	Douglas Fir	14	fair	8' radial	19	reg
8	Big Leaf Maple	48	dead	habitat spar	18	N/A
9	Douglas Fir	8	fair	N/A	20	N/A
10	Austrian Pine	8	fair	N/A	21	N/A
11	Cedar	4	fair	N/A	Not listed	N/A
12	Sequoia	5	fair	N/A	Not listed	N/A
13	Holly	0	gone	N/A		N/A
14	Douglas Fir	5	fair	N/A	Not listed	N/A
15	Mountain Ash	8	weak	N/A	25	N/A
16	Rhododendron	5	fair	N/A	26	N/A
17	Big Leaf Maple	18	failed	N/A	27	failed
18	Big Leaf Maple	13	fair	10' radial	28	reg
19	Austrian Pine	17	good	12' radial	31	reg
20	Big Leaf Maple	43	fair	30' radial	30	Except
21	Holly	9,6	dead	N/A	32 and 33	N/A
22	Flowering Plum	8,10	weak	N/A	34	N/A
23	Scots Pine	21	good	14' radial	36	reg
24	English Laurel	6	fair	N/A	Not listed	N/A
25	Flowering Plum	9,8	fair	N/A	35	N/A
26	Photenia	7,7,4	weak	N/A	2,3,4	N/A
H	Photenia	6,7	weak	N/A	Not listed	N/A
27	Photenia	6	weak	N/A	1	N/A
28	Hawthorne	8	poor	N/A	7	N/A
29	Dogwood	6,6	weak	N/A	5,6	N/A
30	Douglas Fir	38	fair	20' radial	8	Except
31	Cedar	20	good	7' radial	9	Reg
32	Douglas Fir	35	fair	18' radial	10	Except
33	Douglas Fir	31	fair	16' radial	11	Except
A	Big Leaf Maple	19	fair	15' radial	not listed	Reg
B	Douglas Fir	18	fair	21' radial	not listed	Reg
C	Big Leaf Maple	20	fair	16' radial	16	Reg
D	Douglas Fir	12	fair	7' radial	24	Reg
E	Big Leaf Maple	8	fair	N/A	not listed	N/A
F	Douglas Fir	14	fair	9' radial	29	Reg
G	Douglas Fir	26	fair	12' radial	37	Reg

