

Arborist Inventory & Tree Retention Plan at:

5236 West Mercer Way
Mercer Island, WA 98040

Prepared For:

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Table of Contents

Summary.....	3
Assignment.....	5
Limits of Assignment.....	5
Methodology.....	6
Observations/ Recommendations.....	6
Site Description.....	6
Tree Inventory.....	7
Proposed Construction Activities.....	26
Tree Protection Plan.....	26
Minimum Tree Density Table/ Planting Plan.....	28
Glossary.....	31
Bibliography.....	32
Appendix A – Tree Inventory/ Protection Summary Table.	33
Appendix B – Tree Location Map/ Site Plan	36
Appendix C – Tree Protection Fencing Detail Graphic	37
Appendix D – Assumptions and Limiting Conditions.....	38
Appendix E – Waiver of Liability.....	39

Summary

Site Address: 5236 West Mercer Way Mercer Island, WA 98040

of Significant Trees on Subject Property: 68

of Significant R.O.W. (Right-Of-Way) Trees: 3

of Significant Encroaching Adjacent Property Trees: 7

of Subject Property Trees to be Retained: 35

R.O.W. Trees to be Retained: 0

Architect Joseph Greif contacted me to inventory and evaluate the trees located on the property at 5236 W Mercer Way in Mercer Island, WA for a Tree Inventory and Tree Retention Plan to be submitted for review to the City of Mercer Island for construction of a single-family residence.

I created an *Arborist* Evaluation Report containing a Tree Inventory and a Tree Retention Plan addressing the delineation of trees to be retained as well as *Tree Protection Zones* (TPZ's) and tree protection guidelines and techniques.

A Tree Inventory/ Protection Summary Table with summarized data can be found in Appendix-A on pg. 33.

A Tree Location Map/ Site Plan with all tree #'s and locations can be found in Appendix-B on pg. 36.

Of the 68 significant subject property trees on the subject property, 35 significant trees are being retained and protected. All three R.O.W. (Right-Of-Way) trees are being removed. All 7 encroaching adjacent property trees are being retained and protected. No significant subject property trees located in the wetlands are being removed.

Subject Property Trees #1158, 1400, 1429, 1354, 1353, 1415, and ROW Tree #1084 are either in poor condition with limited life spans or are hazard trees and removal or conversion into wildlife snags is recommended.

Retained Trees #1426 & 1415 should be monitored every 5 years by a certified arborist to ensure that decay from old stem has not affected the structural integrity of tree

For all tree removals that are not in the development/ disturbance zone, I recommend snagging them into wildlife trees instead of complete removal. This will lessen the amount of wood removal, help with hillside erosion control, and provide wildlife habitat.

Tree Protection Summary Notes

- 1. Retained Tree #1439 (41.1" Bigleaf Maple, Non-Wetlands tree) has a large dead stem that should be removed or shortened before commencement of construction activities. Retained Tree #1156 (23.1" Bigleaf Maple, 35' Wetlands Buffer tree) has a large dead interior stem that should be removed before building occupancy. All retained trees with ivy growing up the trunk should have the ivy cut at the base of the tree.*
- 2. Retained Trees #1426 (48.9" Bigleaf Maple, Non-Wetlands tree) and #1415 (11.6" Bigleaf Maple, Non-Wetlands tree) have conditions or defects warranting future arborist inspections. They should be inspected at 5-year minimum intervals to ensure that the structural integrity of the trees is still intact.*
- 3. Subject Property Trees #1158, 1400, 1429, 1354, 1353, 1415, and ROW Tree #1084 are either in poor condition with limited life spans or are hazard trees and removal or conversion into wildlife snags is recommended.*
- 4. Consider converting required tree removals into wildlife snags instead of complete removal of all wood.*
- 5. Arborist Supervision by a certified arborist is required for all excavation that takes place within the drip lines of Tree #'s 1406, 1161, 1156, 1337, 1345*
- 6. Tree #1244 and 1357 (35' Wetlands Buffer Trees) are too close to proposed development (driveway) but we will attempt to retain through arborist supervision/ root pruning. If the arborist determines in the field during excavation activities that the trees may be retained, they will be retained and protected.*
- 7. Trees #06-27 are all part of a Leyland Cypress hedge that meanders between the north adjacent property and the subject property. The trees are located near the northwest corner of the subject property and are numbered from west to east (Tree #6 westernmost tree and Tree #27 easternmost tree).*

Probable locations of Leyland Cypress Hedge Trees #6-27 are Trees #6-8, 15-19, and 24-27 located on the subject property, and Trees #9-14 & 20-23 located on the north adjacent property. All adjacent property Cypress trees will be retained and protected, and all subject property Cypress trees will be removed.

If the construction staging area is located closer than 6 ft. to the adjacent property Cypress trees, a 1/2" minimum thickness steel plate is to be placed on the ground to avoid compaction, and the TPZ protection fence may be temporarily reduced to less than 6 ft.

Assignment

After discussing the scenario with Joseph, we agreed that my assignment was to provide an Arborist Inventory/ Evaluation & Tree Retention Plan with the following components that comply with the City of Mercer Island Code Chapter 19.10; Trees.

1. Inventory and evaluate all existing significant trees (deciduous = more than 6” DBH and conifer = 6’ tall or more) on the site, as well as those located on adjacent properties that are affected by development, and R.O.W. (Right-to-Way) trees. The inventory and evaluation shall include, but not be limited to the following information:
 - A. Tree species
 - B. Tree size in DBH and *canopy (drip line)* spread
 - C. Tree condition or observed defects
 - D. Tree numbers that are included in an inventory table
2. Submit a Tree Retention Plan that includes the following information:
 - A. Location of and description all significant trees that will remain on the project site.
 - B. Illustration of the Tree Protection Zone (TPZ) for each tree that equals the tree’s drip line radius.
 - C. Description of expected tree protection techniques that will be used on the project.

Limits of Assignment

Unless stated otherwise, 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 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. Additional Assumptions and limiting conditions can be found in Appendix D & E.

Methodology

To evaluate the trees and to prepare the report, I drew upon my 15+ years of experience in the field of forestry, site management, and arboriculture and my formal education in plant biology, plant identification, and plant physiology. I also followed the protocol of the International Society of Arboriculture (ISA) for Visual Tree Assessment (VTA) that includes looking at the overall health of the tree as well as the site conditions. This is a scientifically based process to look at the entire site, surrounding landscape and soil, as well as a complete look at the trees themselves.

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

Measurement of Tree Diameter

Diameter at breast height (DBH), which means the diameter of a tree trunk measured at 4.5 feet above average grade is used in determining the diameter of existing trees. When a tree has a branch(es) or swelling that interferes with measurement at 4.5 feet above average grade or where a tree tapers below this point, I measure the diameter at the narrowest point below 4.5 feet. For trees located on a slope, the 4.5 feet is measured from the average of the highest and lowest ground points or, on very steep slopes where this is not possible, the lowest practical point on the uphill side. Where a tree trunk splits into two or more stems above ground level, I calculate the tree DBH by measuring the smallest stem diameter below the attachment point. Where a tree splits into several trunks close to ground level, the DBH for the tree is the square root of the sum of the DBH for each individual stem squared (example with 3 stems: $DBH = \sqrt{(\text{stem}1)^2 + (\text{stem}2)^2 + (\text{stem}3)^2}$).

Observations/ Recommendations

Site Description

The subject property at 5236 W Mercer Way in Mercer Island consists of an empty lot with a wetland located on the south side of the property.

Tree Inventory/ Recommendations

After visiting the site and taking data, I consulted with Greif Architects and reviewed all of the proposed plans and drawings to result in the following recommendations:

Subject Property Significant Trees								
Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
(Non-Wetlands) Subject Property Significant Trees								
1080	Bigleaf Maple	<i>Acer macrophyllum</i>	11.9	50	Good	18	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has a 2-degree natural lean to the north, has ivy into mid-canopy.</p> <p><u>Tree Protection:</u> Remove tree; it is located within the proposed driveway footprint.</p>								
1157	Bigleaf Maple	<i>Acer macrophyllum</i>	19.1	50	Fair	22	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has 2 stems of 16.2” and 10.2” DBH attached at ground level with poor attachment and tight stem spacing. It has a very sparse canopy and the larger stem has extensive branch die-back. There are numerous fungal fruiting bodies (<i>Kretzschmaria deusta</i>, Brittle Cinder fungus) on the base of both stems. This fungus can lead to parts failure in some cases if the decay is extensive.</p> <p><u>Tree Protection:</u> Remove tree; it is located within the proposed driveway footprint.</p>								
1245	Bigleaf Maple	<i>Acer macrophyllum</i>	47.3	90	Good/ Fair	32	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has 8 stems of 12.4”, 9.8”, 12.6”, 23.0”, 24.9”, 14.0”, 22.0”, and 16.1” DBH at ground to 3 ft. height with moderate to poor attachment and tight stem spacing.</p> <p><u>Tree Protection:</u> Remove tree; it is located 5 ft. from the proposed driveway retaining wall, which is too close for tree retainage.</p>								
1363	Bigleaf Maple	<i>Acer macrophyllum</i>	23.1	80	Good/ Fair	34	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has extensive Ivy growing into the upper canopy and has no other apparent physical defects.</p> <p><u>Tree Protection:</u> Remove tree; it is located within the proposed driveway footprint.</p>								
1365	Western Red Cedar	<i>Thuja plicata</i>	6.6	20	Good/ Fair	8	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has a “pistol-butt” shaped stump with a bow towards the west growing horizontally for 2-3 ft., then grows vertically. It has severe exposed buttress roots.</p>								

<u>Tree Protection:</u> Remove tree; it is located within the proposed driveway footprint.								
Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1364	Western Red Cedar	<i>Thuja plicata</i>	10.1	40	Good	17	N/A	No
<u>Tree Info/ Defects:</u> The tree has no apparent physical defects.								
<u>Tree Protection:</u> Remove tree; it is located within the proposed driveway footprint.								
1361	Douglas Fir	<i>Pseudotsuga menziesii</i>	20.7	70	Good/ Fair	23	N/A	No
<u>Tree Info/ Defects:</u> The tree has very sparse vegetation with limited foliage and has a small live crown ratio (ratio of live foliage relative to the height of the tree) of 20%.								
<u>Tree Protection:</u> Remove tree; it is located within the proposed building foundation footprint.								
1360	Bigleaf Maple	<i>Acer macrophyllum</i>	43.4	90	Good/ Fair	34	N/A	No
<u>Tree Info/ Defects:</u> The tree has 3 stems of 10.2", 18.2", and 38.1" attached at 2 ft. height with good attachment. The attachment point has a failed stem of 6" diameter with 2" depth of decay.								
<u>Tree Protection:</u> Remove tree; it is located within the proposed building foundation footprint.								
1359	Bigleaf Maple	<i>Acer macrophyllum</i>	12.8	70	Fair	17	N/A	No
<u>Tree Info/ Defects:</u> The tree has an extensive amount of large Ivy growing into the upper canopy, and as a result has limited/ suppressed foliage.								
<u>Tree Protection:</u> Remove tree; it is located within the proposed building foundation footprint.								
1362	Bigleaf Maple	<i>Acer macrophyllum</i>	12.1	60	Good/ Fair	25	N/A	No
<u>Tree Info/ Defects:</u> The tree has 2 stems of 11.0" and 5.0" attached at a 3.5 ft. height with moderate included bark. It has several dead/ stubbed scaffold branches.								
<u>Tree Protection:</u> Remove tree; it is located within the proposed building foundation footprint.								
1400	Western Hemlock	<i>Tsuga heterophylla</i>	10.5	40	Poor	13	N/A	No
<u>Tree Info/ Defects:</u> The tree has multiple oozing cankers on the trunk up to 2/3 tree height. The base of the trunk has a severe bow, growing horizontally for 6 ft. before growing vertically. There is extensive Ivy growing into mid-canopy. The top of the tree is dead, and the canopy has extensive branch die-back (approx. 70% of foliage is dead).								

<i>Tree Protection:</i> Remove tree; it is in poor condition and has a limited life span. It is also located within the proposed building foundation footprint, which is too close for tree retention.								
Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1399	Western Hemlock	<i>Tsuga heterophylla</i>	10.0	40	Good/ Fair	13	N/A	No
<i>Tree Info/ Defects:</i> The stump-sprout tree has good foliage with no apparent physical defects.								
<i>Tree Protection:</i> Remove tree, it is located 1 ft. from the proposed north gabion wall excavation, which is too close for tree retention.								
1401	Bigleaf Maple	<i>Acer macrophyllum</i>	10.8	50	Good/ Fair	19	N/A	No
<i>Tree Info/ Defects:</i> The tree has extensive Ivy growing into the upper canopy, which is suppressing the foliage. The tree has a 2-degree natural lean to the west.								
<i>Tree Protection:</i> Remove tree; it is located within the proposed building foundation footprint.								
1402	Bigleaf Maple	<i>Acer macrophyllum</i>	37.4	75	Fair	30	N/A	No
<i>Tree Info/ Defects:</i> The tree has co-dominant stems attached at a 7 ft. height and the western stem is dead/ broken at ½ tree height with peeling bark at the attachment point. The remaining stem has limited foliage (30% live-crown ratio) and several dead scaffold branches in the canopy.								
<i>Tree Protection:</i> Remove tree; it is located within the proposed building foundation footprint.								
1403	Bigleaf Maple	<i>Acer macrophyllum</i>	39.4	85	Good/ Fair	29	N/A	No
<i>Tree Info/ Defects:</i> The tree has 2 stems of 18.0” and 35.1” DBH attached at a 3 ft. height with good attachment. It has severely exposed roots and Ivy is growing into the mid-canopy.								
<i>Tree Protection:</i> Remove tree; it is located 3.5 ft. from the proposed east building foundation footprint (located within foundation excavation).								
1404	Western Hemlock	<i>Tsuga heterophylla</i>	8.0	40	Good/ Fair	15	N/A	No
<i>Tree Info/ Defects:</i> The tree has a slight bow in the lower trunk at ground level and has moderately exposed roots.								
<i>Tree Protection:</i> Remove tree; it is located 2 ft. from the proposed east building foundation footprint (located within foundation excavation).								

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1405	Bigleaf Maple	<i>Acer macrophyllum</i>	23.3	80	Good/ Fair	30	N/A	No
<p><u>Tree Info/ Defects:</u> The upper 2/3 of the trunk is curved to the northwest at a 30-degree angle (natural phototropic, or light-seeking, lean). Ivy vines have been recently cut at the base of the tree, but the Ivy has suppressed the canopy growth. The trunk has a 4” wide open cavity at 1 ft. height on the NE side with 1 in. depth of decay, but the tree is structurally sound and in fairly good condition. The majority of the foliage grows to the northwest.</p> <p><u>Tree Protection:</u> Remove tree, it is located within the proposed east gabion wall excavation.</p>								
1406	Bigleaf Maple	<i>Acer macrophyllum</i>	38.6	90	Good/ Fair	33	*33/17	Yes
<p><u>Tree Info/ Defects:</u> The tree has 3 stems of 20.0”, 24.5”, and 22.1” DBH attached at 3-4 ft. height, with multiple stems in the upper canopy. The stems have tight spacing with poor attachment, and the majority of stems have a 30-40 degree lean to the northwest. Ivy vines have been cut recently at the base of the tree but have suppressed the canopy growth (only 30% live crown ratio). Large buttress roots extend to the east and southeast.</p> <p><u>Tree Protection: Retain and Protect; Tree Protection Zone radius = *33 ft. (drip line radius) except where the east gabion wall excavation intersects with the dripline 17 ft. southwest of the tree.</u></p> <p>The tree is located 17.5 ft. east of the east gabion wall excavation. The amount of proposed excavation within Tree #1406’s dripline radius of 33 ft. is approx. 237 square ft., or 7% of the tree’s dripline area of 3420 square ft.</p> <p>The proposed design allows for adequate protection for the tree, as long as certain mitigations are followed.</p> <p><i>Arborist supervision during any excavation within the drip line of Tree #1406 is required.</i></p> <p>A Certified Arborist will ensure that the tree’s roots are manually uncovered and properly root pruned, ensuring that the tree roots are not torn or damaged. If the roots are severed cleanly without damage and kept moist until back-fill then any disturbed roots have a very good probability of re- growing and the tree can remain healthy.</p>								
1415	Bigleaf Maple	<i>Acer macrophyllum</i>	11.6	20	Fair/ Poor	12	12	Yes
<p><u>Tree Info/ Defects:</u> The tree has 3 stems of 10.5”, 3.9”, and 2.9” DBH attached at ground-1 ft. height. Extensive Ivy is growing into the upper canopy, which has either been topped or lost its top previously (not able to view tree top because of ivy). The main stem has a 3” open cavity with some decay from 2-3 ft. height (25% stem decay), and the smaller 3.9” stem has 50% decay at the attachment point. The tree is not currently a hazard tree because its relatively short stature and small amount of load, but most likely will be in the future as the tree grows.</p>								

Tree Protection: Retain and Protect; Tree Protection Zone radius = 12 ft. (drip line radius)

The tree is located 18 ft. from east gabion wall (16 ft. from excavation).

Note: Retained Tree #1415 has conditions or defects warranting future arborist inspections. It should be inspected at 5-year minimum intervals to ensure that the structural integrity of the trees is still intact.

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1414	Bigleaf Maple	<i>Acer macrophyllum</i>	28.9	90	Fair	30	24	Yes

Tree Info/ Defects: The stump-sprout tree has 2 stems of 16.9" and 23.5" attached at 2 ft. height with good attachment. There are several open/ hollow areas below the base of the tree, but upon inspection I found no cavities/ decay (due to growth around stump-sprout).

Tree Protection: Retain and Protect; Tree Protection Zone radius = 24 ft.

The tree is located 26 ft. from east gabion wall (24 ft. from excavation).

05	Bigleaf Maple	<i>Acer macrophyllum</i>	7.6	30	Good/ Fair	17	N/A	No
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Tree Info/ Defects: The tree has co-dominant stems attached at a 5.5 ft. height, and there is extensive Ivy growing into the upper canopy.

Tree Protection: Remove tree; it is located within the east gabion wall excavation.

1429	Western Hemlock	<i>Tsuga heterophylla</i>	16.0	55	Fair/ Poor	16	N/A	No
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Tree Info/ Defects: The tree has a 5" wide open cavity with decay located on the stem from 12-17 ft. height with at least 4 in. depth of decay (from visual inspection). I was not able to probe the depth of the wound, so it could be deeper than 4 in. depth. The wound has good reaction growth around the margins. A large scaffold branch at 20 ft. height is assuming apical dominance (growing into top of canopy). The tree has a limited life span due to condition.

Tree Protection: Remove tree; it is located 5.5 ft. from the east gabion wall excavation, which is too close for tree retainage. It also is in poor condition with a limited life span.

1354	Bigleaf Maple	<i>Acer macrophyllum</i>	47.3	50	Poor	35	N/A	No
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Tree Info/ Defects: The tree has 2 stems of 44.1" and 17.0" attached at ground level. The large stem has been topped at 25 ft. height and has a wound/ open cavity at ground level 24" wide (80% stem decay) up to 1" wide at a height of 15 ft. The smaller stem has a 30-degree natural lean to the south for approx. 15 ft., then leans at a 45-degree angle to the southwest. It has a 20" x 4" open wound/ cavity at 2 ft. height with 12" depth of decay (70% stem decay). The tree is a hazard tree and should be removed.

Tree Protection: Remove tree; it is located 15 ft. from the east gabion wall excavation, which is too close for tree retention. It is also a hazard tree requiring removal before the commencement of construction activities.

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1353	Bigleaf Maple	<i>Acer macrophyllum</i>	34.7	75	Fair/ Poor	10/20	N/A	No

Tree Info/ Defects: The tree has extensive Ivy growing into the upper canopy that is severely suppressing foliage growth in the canopy (15% live crown ratio). It has several large exposed buttress roots on the downhill side of the tree that are completely rotten/ decayed (approx. 30-40% of buttress roots decayed), and several other exposed roots have some mechanical damage. A depression/ hole was dug next to the tree in the past that resulted in many roots being cut. The tree is structurally instable due to root loss and is a hazard tree.

Tree Protection: Remove tree; it is a hazard tree that requires removal before commencement of construction activities.

1426	Bigleaf Maple	<i>Acer macrophyllum</i>	48.9	90	Fair	32	32	Yes
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Tree Info/ Defects: The tree has 2 stems of 47.7" and 10.8" DBH attached at ground level; the 47.7" diameter was measured at a height of 3 ft. (narrowest diameter beneath swelling from branch attachment at 4.5 ft.). The larger stem grows into 4 stems at a height of 5-7 ft. with moderate to severe included bark and tight stem spacing at the attachment point. An old 5" diameter failed stem on the south side of the tree at 3 ft. height has decay that is present vertically down the stem to ground level. A large buttress root is exposed on the west side. The east stem has approx. 25% crown dieback.

Tree Protection: Retain and Protect; Tree Protection Zone radius = 32 ft. (drip line radius)

All proposed disturbances are located outside of the tree's dripline radius.

Tree Maintenance: Monitor tree every 5 years by a certified arborist to ensure that decay from old stem has not affected the structural integrity of tree.

1425	Western Hemlock	<i>Tsuga heterophylla</i>	14.6	60	Fair	20	20	Yes
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Tree Info/ Defects: The tree has sparse foliage and has areas of weeping sap on the north side of the tree below 12 ft. height. It has a 2-degree natural lean to the southwest.

Tree Protection: Retain and Protect; Tree Protection Zone radius = 20 ft. (drip line radius)

All proposed disturbances are located outside of the tree's dripline radius.

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1435	Bigleaf Maple	<i>Acer macrophyllum</i>	26.2	90	Good/ Fair	28	28	Yes
<p><u>Tree Info/ Defects:</u> The tree has co-dominant stems attached at ½ tree height. A third stem failed previously at the same attachment point but has limited decay (from visual inspection). The two remaining stems have good attachment, and the attachment point is structurally sound.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 28 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
1437	Bigleaf Maple	<i>Acer macrophyllum</i>	34.7	90	Good	29	29	Yes
<p><u>Tree Info/ Defects:</u> The tree has a large dead scaffold branch on the southeast side of the tree at ½ tree height. It has several exposed buttress roots on the south side of the tree for a distance of 10 ft. from the trunk.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 29 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
1438	Bigleaf Maple	<i>Acer macrophyllum</i>	28.5	90	Good/ Fair	31	31	Yes
<p><u>Tree Info/ Defects:</u> The stump-sprout tree has several holes/ openings under the base of the tree, but upon inspection they appear to be intact with no open cavities or decay (openings due to growth over stump). It has extensive Ivy growing into mid-canopy that was recently cut at the base of tree, resulting in a slightly suppressed canopy with asymmetrical crown shape. The top ½ of the tree leans to the southwest (natural).</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 31 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
1436	Bigleaf Maple	<i>Acer macrophyllum</i>	10.2	30	Good/ Fair	22	22	Yes
<p><u>Tree Info/ Defects:</u> The stump-sprout tree has a large opening at the base of the tree (3 ft. tall x 14" wide), but upon inspection the tree trunk appears to be intact with no open cavities or decay (opening due to growth over stump).</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 22 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1439	Bigleaf Maple	<i>Acer macrophyllum</i>	41.1	90	Good/ Fair	32	32	Yes
<p><u>Tree Info/ Defects:</u> The tree has 4 stems of 20.5", 17.0", 22.2", and 22.0" DBH attached from ground to 3 ft. height. The east 20.5" diameter stem is dead and broken off at 1/2 stem height.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 32 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p> <p><u>Tree Maintenance:</u> Remove or shorten large dead stem.</p>								
1440	Bigleaf Maple	<i>Acer macrophyllum</i>	41.5	90	Good/ Fair	32	32	Yes
<p><u>Tree Info/ Defects:</u> The tree has 4 stems of 11.7", 24.5", 18.9", and 25.1" DBH attached from ground to 3 ft. height. The middle 18.9" diameter stem is dead (broken off at 15 ft. height). The tree has extensive Ivy growing into mid-canopy.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 32 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p> <p><u>Tree Maintenance:</u> Remove or cut Ivy at base of tree.</p>								
1444	Western Red Cedar	<i>Thuja plicata</i>	19.1	50	Good	18	18	Yes
<p><u>Tree Info/ Defects:</u> The stump-sprout tree has no apparent physical defects.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 18 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
06-27	Leyland Cypress	<i>Cupressus</i> × <i>leylandii</i>	4-7	15	Good/ Fair	4-7	6	*Yes/ No
<p><i>Note: Trees #06-27 are all part of a Leyland Cypress hedge that meanders between the north adjacent property and the subject property. The trees are located near the northwest corner of the subject property and are numbered from west to east (Tree #6 westernmost tree and Tree #27 easternmost tree). Probable locations of Trees #6-27 are: Trees #6-8, 15-19, and 24-27 located on the subject property, and Trees #9-14 & 20-23 located on the north adjacent property.</i></p> <p><i>*All Leyland Cypress trees located on the subject property are located too close to the proposed driveway or proposed construction area and must be removed. All Leyland Cypress trees located on the north adjacent property are located more than 6 ft. (LOD) from the proposed driveway, but some might be located within 6 ft. of the proposed construction area.</i></p>								

Determination will be made in the field regarding the location of each individual tree in the Cypress hedge. All adjacent property Cypress trees will be retained and protected, and all subject property Cypress trees will be removed.

Tree Info/ Defects: All hedge trees have tight spacing but have no apparent physical defects.

*Tree Protection: **Adjacent Property Trees: Retain and Protect; Tree Protection Zone radius = 6 ft.**

Subject Property Trees: Remove trees; they are located too close to the proposed driveway/ construction staging area.

Note: *If the construction staging area is located closer than 6 ft. to the adjacent property Cypress trees, a 1/2" minimum thickness steel plate is to be placed on the ground to avoid compaction, and the TPZ protection fence may be temporarily reduced to less than 6 ft.*

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
28	Western Red Cedar	<i>Thuja plicata</i>	5.2	25	Good/ Fair	12	N/A	No

Tree Info/ Defects: The tree is a sapling with suppressed growth due to overhead vegetation.

Tree Protection: Remove tree; it is located within the proposed driveway footprint.

29	Western Red Cedar	<i>Thuja plicata</i>	2.8	20	Good/ Fair	7	N/A	No
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Tree Info/ Defects: The tree is a sapling with suppressed growth due to overhead vegetation.

Tree Protection: Remove tree; it is located within the proposed driveway footprint.

30	Western Red Cedar	<i>Thuja plicata</i>	1.9	15	Good/ Fair	7	N/A	No
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Tree Info/ Defects: The tree is a sapling with suppressed growth due to overhead vegetation.

Tree Protection: Remove tree; it is located within the proposed driveway footprint.

31	Western Red Cedar	<i>Thuja plicata</i>	2.1	12	Good/ Fair	6	N/A	No
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Tree Info/ Defects: The tree is a sapling with suppressed growth due to overhead vegetation.

Tree Protection: Remove tree; it is located within the proposed driveway footprint.

(35' Wetlands Buffer) Subject Property Significant Trees								
Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1081	Bigleaf Maple	<i>Acer macrophyllum</i>	21.7	60	Fair/ Poor	18	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has 2 stems of 21.0” and 5.4” DBH attached at a 1 ft height with a 3-degree natural lean to the east. It has a 6-8” wide open cavity located from the ground to 15 ft. height that is approx. 7” deep with some decay. Ivy is growing into mid-canopy.</p> <p><u>Tree Protection:</u> Remove tree; it is located within the proposed driveway footprint</p>								
1161	Bigleaf Maple	<i>Acer macrophyllum</i>	33.2	85	Good	30	18	Yes
<p><u>Tree Info/ Defects:</u> The tree has 2 stems of 27.1” and 19.1” DBH attached at ground level. The smaller stem has an 8-degree natural lean to the north.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 18 ft.</p> <p>The tree is located 18 ft. south of the proposed south driveway retaining wall excavation, and 24 ft. at its closest point from the proposed storm drain trench to the northwest.</p> <p>The amount of proposed excavation within Tree #1161’s dripline radius of 30 ft. is approx. 400 square ft., or 14.2% of the tree’s dripline area of 2826 square ft.</p> <p>The proposed design allows for adequate protection for the tree, as long as certain mitigations are followed.</p> <p>Arborist supervision during any excavation within the drip line of Tree #1406 is required.</p> <p>A Certified Arborist will ensure that the tree’s roots are manually uncovered and properly root pruned, ensuring that the tree roots are not torn or damaged. If the roots are severed cleanly without damage and kept moist until back-fill then any disturbed roots have a very good probability of re- growing and the tree can remain healthy.</p>								
1160	Bigleaf Maple	<i>Acer macrophyllum</i>	13.7	60	Good	26	14	Yes
<p><u>Tree Info/ Defects:</u> The tree has a lower dead large scaffold branch.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 14 ft.</p> <p>The tree is located 19 ft. south of the proposed south driveway retaining wall excavation. The TPZ of 14 ft. radius is acceptable and is 1 ft. for every inch of tree DBH.</p>								

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1163	Bigleaf Maple	<i>Acer macrophyllum</i>	6.4	25	Fair/ Poor	14	14	Yes
<p><u>Tree Info/ Defects:</u> The tree has a large exposed buttress root grafted to the roots of Tree #1161. The top 2/3 of the tree has a 30-degree natural lean to west, extensive ivy is growing into the entire canopy, and it has some dead scaffold branches in the upper canopy.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 14 ft.</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p> <p><u>Tree Maintenance:</u> Remove ivy/ cut ivy at base of tree. The entire canopy is suppressed by ivy, but vigor should return to the tree after ivy is removed.</p>								
1164	Bigleaf Maple	<i>Acer macrophyllum</i>	20.9	70	Good/ Fair	26	21	Yes
<p><u>Tree Info/ Defects:</u> The tree has 2 stems of 12.0" and 17.1" attached at ground level with poor attachment. Both stems have a 5-degree natural lean to the southwest, and there is extensive ivy growing into the upper canopy.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 21 ft.</p> <p>The tree is located 22 ft. south of the proposed south driveway retaining wall excavation. The TPZ of 21 ft. radius is acceptable and is 1 ft. for every inch of tree DBH.</p> <p><u>Tree Maintenance:</u> Remove ivy/ cut ivy at base of tree.</p>								
1158	Red Alder	<i>Alnus rubra</i>	20.0	25	Very Poor	21	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has a large open cavity with decay in the trunk at 4 ft. height that is up to 18" deep (90% stem decay). The tree's top has broken off, and tree is leaning at a 30-degree angle to the west. The tree is in imminent danger of stem failure and should be removed.</p> <p><u>Tree Protection:</u> Remove tree; it is a hazard tree in very poor condition, requiring removal before the commencement of construction activities.</p>								
01	Bigleaf Maple	<i>Acer macrophyllum</i>	6.2	40	Good	18	6	Yes
<p><u>Tree Info/ Defects:</u> The tree has no apparent physical defects.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 6 ft.</p> <p>The tree is located 14 ft. south of the proposed south driveway retaining wall excavation. The TPZ of 6 ft. radius is acceptable, and is 1 ft. for every inch of tree DBH.</p>								

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1156	Bigleaf Maple	<i>Acer macrophyllum</i>	23.1	70	Fair	22	18	Yes

Tree Info/ Defects: The tree has 3 stems of 15.5", 10.7", and 19.7" attached at ground level. A fourth interior stem is completely dead (12" diameter). It has exposed buttress roots and the larger 19.7" stem has lost its top (previous stem top failure).

Tree Protection: **Retain and Protect; Tree Protection Zone radius = 18 ft.**

The tree is located 18.5 ft. south of the proposed south driveway retaining wall excavation.

The proposed design allows for adequate protection for the tree, as long as certain mitigations are followed.

Arborist supervision during any excavation within the drip line of Tree #1156 is required.

A Certified Arborist will ensure that the tree's roots are manually uncovered and properly root pruned, ensuring that the tree roots are not torn or damaged. If the roots are severed cleanly without damage and kept moist until back-fill then any disturbed roots have a very good probability of re- growing and the tree can remain healthy.

Tree Maintenance: Remove dead stem from interior of tree.

1155	Bigleaf Maple	<i>Acer macrophyllum</i>	7.6	40	Fair	21	8	Yes
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Tree Info/ Defects: The top 6 ft. of the tree is dead, with an open wound near the remaining top. Ivy is growing into mid-canopy.

Tree Protection: **Retain and Protect; Tree Protection Zone radius = 8 ft.**

The tree is located 21 ft. south of the south driveway retaining wall excavation. The TPZ of 8 ft. radius is acceptable, and is 1 ft. for every inch of tree DBH.

Tree Maintenance: Remove/ cut ivy at base of tree.

1246	Bigleaf Maple	<i>Acer macrophyllum</i>	9.0	50	Good/ Fair	20	N/A	No
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Tree Info/ Defects: The tree has a 2-degree natural lean to the west, has limited/ suppressed foliage, and has ivy growing into mid-canopy.

Tree Protection: Remove tree; it is located within the proposed driveway footprint.

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1244	Red Alder	<i>Alnus rubra</i>	19.7	70	Good	16	9	*Yes/ No
<p><u>Tree Info/ Defects:</u> The tree has an 8-degree natural lean to the north, and no other apparent physical defects. It has extensive ivy growing into mid-canopy.</p> <p><u>Tree Protection:</u> Remove tree; it is located 9.5 ft. from the proposed south driveway retaining wall excavation, which is too close for tree retainage.</p> <p>*Note: Tree #1244 is too close to proposed development (driveway), but we will attempt to retain through arborist supervision/ root pruning. If the arborist determines in the field during excavation activities that the tree may be retained, it will be retained and protected.</p>								
1337	Red Alder	<i>Alnus rubra</i>	23.0	75	Good/ Fair	26	17	Yes
<p><u>Tree Info/ Defects:</u> The tree has extensive ivy growing into the upper canopy, and no other apparent physical defects.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 17 ft.</p> <p>The tree is located 18 ft. south of the proposed south driveway retaining wall excavation.</p> <p>The proposed design allows for adequate protection for the tree, as long as certain mitigations are followed.</p> <p>Arborist supervision during any excavation within the drip line of Tree #1337 is required.</p> <p>A Certified Arborist will ensure that the tree's roots are manually uncovered and properly root pruned, ensuring that the tree roots are not torn or damaged. If the roots are severed cleanly without damage and kept moist until back-fill then any disturbed roots have a very good probability of re- growing and the tree can remain healthy.</p> <p><u>Tree Maintenance:</u> Remove ivy/ cut ivy at base of tree.</p>								
1367	Bigleaf Maple	<i>Acer macrophyllum</i>	10.1	55	Fair	21	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has 2 stems of 5.3" and 8.6" DBH attached at ground level. It has extensive Ivy growing into the upper canopy with suppressed/ limited foliage due to the extensive ivy. Another stem failed in the upper canopy, and the tree has a large exposed buttress root extending southeast. The larger stem has a "pistol butt" shaped lower trunk with a major bow in the trunk in the lower 4 ft. before growing vertically.</p> <p><u>Tree Protection:</u> Remove tree; it is located 2.5 ft. south of the proposed south driveway retaining wall, which is too close for tree retention.</p>								

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1358	Bigleaf Maple	<i>Acer macrophyllum</i>	36.8	100	Good/ Fair	36	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has 2 stems of 36.2” and 6.8” attached at a 1 ft. height with poor attachment and tight stem spacing. There are some large dead scaffold branches in the upper canopy and several large scaffold branches have failed/ torn in the canopy.</p> <p><u>Tree Protection:</u> Remove tree; it is located 8 ft. from the proposed south building foundation and is located within the proposed south lawn area of significant grading.</p>								
1357	Bigleaf Maple	<i>Acer macrophyllum</i>	18.4	70	Good/ Fair	30	10	*Yes/ No
<p><u>Tree Info/ Defects:</u> The tree has 5 stems of 11.9”, 7.9”, 5.4”, 9.6”, and 3.7” DBH attached at ground-3 ft. height. The majority of stems have a 3-10-degree natural lean to the west, and Ivy is growing into the upper canopy. The tree is a stump sprout with several spaces under the tree/ between stump & trunk, but there is no evidence of decay or open wounds in the area.</p> <p><u>Tree Protection:</u> Remove tree; it is located 10.5 ft. from the proposed south yard retaining wall, which is too close for tree retention.</p> <p>*Note: Tree #1357 is too close to proposed development, but we will attempt to retain through arborist supervision/ root pruning. If the arborist determines in the field during excavation activities that the tree may retained, it will be retained and protected.</p>								
1345	Bigleaf Maple	<i>Acer macrophyllum</i>	44.3	100	Good/ Fair	39	24	Yes
<p><u>Tree Info/ Defects:</u> The tree has large co-dominant stems attached at a 20 ft. height with moderate included bark. The tree has some large dead stubs/ scaffold branches in the upper canopy but has good foliage. There are several large fully exposed buttress roots 2-3 ft. above ground (up to 15” diameter) extending up to 15 ft. west.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 24 ft.</p> <p>The tree is located 25 ft. south of the proposed south yard retaining wall but is located 4-8 ft. lower than average grade downhill from the proposed development, so major structural roots are not highly probable for location in the area of excavation.</p> <p>The proposed design allows for adequate protection for the tree, as long as certain mitigations are followed.</p> <p>Arborist supervision during any excavation within the drip line of Tree #1345 is required.</p> <p>A Certified Arborist will ensure that the tree’s roots are manually uncovered and properly root pruned, ensuring that the tree roots are not torn or damaged. If the roots are severed cleanly without damage and</p>								

kept moist until back-fill then any disturbed roots have a very good probability of re- growing and the tree can remain healthy.

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1346	Western Hemlock	<i>Tsuga heterophylla</i>	18.1	60	Good/ Fair	18	18	Yes

Tree Info/ Defects: The stump-sprout tree has severe exposed roots and a 15-degree natural lean to the north.

Tree Protection: **Retain and Protect; Tree Protection Zone radius = 18 ft. (drip line radius)**

All proposed disturbances are located outside of the tree's dripline radius.

02	Bigleaf Maple	<i>Acer macrophyllum</i>	7.1	20	Fair	14	14	Yes
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Tree Info/ Defects: The tree has a broken top with horizontal scaffold growing branches forming a new top. The scaffold branches are larger than normal (larger than 1/2 size of parent stem).

Tree Protection: **Retain and Protect; Tree Protection Zone radius = 14 ft. (drip line radius)**

All proposed disturbances are located outside of the tree's dripline radius.

1356	Pacific Dogwood	<i>Cornus nuttallii</i>	10.6	40	Fair	19	N/A	No
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Tree Info/ Defects: The tree has 2 stems of 8.9" and 5.8" DBH attached at ground level; the 8.9" stem had a co-dominant stem failure at ground level previously. The lower stem has a 16" high x 5" wide open wound with approx. 50% stem decay. The stem is still structurally sound at present time but will continue to decay.

Tree Protection: Retain tree; it is located 9 ft. from the proposed yard retaining wall (7 ft. from excavation), which is too close for tree retention.

1351	Bigleaf Maple	<i>Acer macrophyllum</i>	9.3	40	Good/ Fair	22	22	Yes
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Tree Info/ Defects: The tree has 2 stems of 7.0" and 6.1" DBH attached at ground level and both stems have a 3-degree natural lean to the southwest. The canopy is suppressed from surrounding vegetation and most of the foliage grows toward the southwest.

Tree Protection: **Retain and Protect; Tree Protection Zone radius = 20 ft. (drip line radius)**

All proposed disturbances are located outside of the tree's dripline radius.

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
03	Bigleaf Maple	<i>Acer macrophyllum</i>	6.7	35	Good	16	16	Yes
<p><u>Tree Info/ Defects:</u> The tree has some Ivy growing into the mid-canopy and has no apparent physical defects.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 16 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
1447	Bigleaf Maple	<i>Acer macrophyllum</i>	10.0	40	Good	17	17	Yes
<p><u>Tree Info/ Defects:</u> The tree has some Ivy growing into the mid-canopy and has one dead hanging scaffold branch (widow-maker) in the mid-canopy.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 17 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
(Wetlands) Subject Property Significant Trees								
1241	Red Alder	<i>Alnus rubra</i>	20.5	60	Fair/ Poor	17	17	Yes
<p><u>Tree Info/ Defects:</u> The tree is in poor condition with some decay but is leaning away from the development area and is not a hazard to proposed development.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 17 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
04	Bigleaf Maple	<i>Acer macrophyllum</i>	18.1	65	Good/ Fair	26	18	Yes
<p><u>Tree Info/ Defects:</u> The tree has 2 stems of 12.0" and 13.6" attached at ground level with moderate included bark.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 18 ft.</p> <p>The tree is located 22 ft. south of the south driveway retaining wall excavation. The TPZ of 18 ft. radius is acceptable and is 1 ft. for every inch of tree DBH.</p>								
1242	Red Alder	<i>Alnus rubra</i>	13.8	65	Fair/ Poor	11	11	Yes
<p><u>Tree Info/ Defects:</u> The tree is in poor condition with some decay but is leaning away from the development area and is not a hazard to proposed development.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 11 ft. (drip line radius)</p>								

All proposed disturbances are located outside of the tree's dripline radius.								
Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1243	Western Hemlock	<i>Tsuga heterophylla</i>	15.7	70	Fair	11	11	Yes
<p><u>Tree Info/ Defects:</u> The tree has sparse foliage in the canopy.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 11 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
1338	Red Alder	<i>Alnus rubra</i>	20.2	70	Good/ Fair	26	26	Yes
<p><u>Tree Info/ Defects:</u> The tree has 3 stems of 9.6", 8.3", and 15.7" DBH attached at ground level, and is located away from the proposed development area.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 17 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
1339	Bigleaf Maple	<i>Acer macrophyllum</i>	12.0	65	Good/ Fair	22	22	Yes
<p><u>Tree Info/ Defects:</u> The tree is located away from the proposed development area.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 22 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
1340	Red Alder	<i>Alnus rubra</i>	21.4	70	Fair	24	24	Yes
<p><u>Tree Info/ Defects:</u> The tree is located away from the proposed development area.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 24 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
1341	Bigleaf Maple	<i>Acer macrophyllum</i>	13.0	60	Good/ Fair	22	22	Yes
<p><u>Tree Info/ Defects:</u> The tree is located away from the proposed development area.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 22 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1344	Red Alder	<i>Alnus rubra</i>	17.2	65	Good/ Fair	28	28	Yes
<p><u>Tree Info/ Defects:</u> The tree has 2 stems of 13.1" and 11.2" DBH and is located away from the proposed development area.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 28 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
Encroaching Adjacent Property Significant Trees								
<p>Note: The following adjacent property trees' DBH and condition are close approximations to avoid trespass.</p>								
A	Western Red Cedar	<i>Thuja plicata</i>	26	70	Good	20	20	Yes
<p><u>Tree Info/ Defects:</u> The tree has no apparent physical defects.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 20 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
B	Western Hemlock	<i>Tsuga heterophylla</i>	22	80	Good/ Fair	26	26	Yes
<p><u>Tree Info/ Defects:</u> The tree has a somewhat sparse canopy.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 26 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
C	Bigleaf Maple	<i>Acer macrophyllum</i>	16	50	Fair	24	24	Yes
<p><u>Tree Info/ Defects:</u> The tree top previously broke off and is still minimally attached. It has co-dominant stems attached at 1/2 tree height.</p> <p><u>Tree Protection:</u> Retain and Protect; Tree Protection Zone radius = 24 ft. (drip line radius)</p> <p>All proposed disturbances are located outside of the tree's dripline radius.</p>								
D	Bigleaf Maple	<i>Acer macrophyllum</i>	17	70	Good/ Fair	24	24	Yes
<p><u>Tree Info/ Defects:</u> The tree has some dead small/ scaffold branches.</p>								

Tree Protection: Retain and Protect; Tree Protection Zone radius = 24 ft. (drip line radius)

All proposed disturbances are located outside of the tree's dripline radius.

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
E	Bigleaf Maple	<i>Acer macrophyllum</i>	40	80	Good/ Fair	30	30	Yes

Tree Info/ Defects: The tree is a multi-stemmed and over-mature with some dead scaffold branches. It is located well away from development activities.

Tree Protection: Retain and Protect; Tree Protection Zone radius = 30 ft. (drip line radius)

All proposed disturbances are located outside of the tree's dripline radius.

1413	Bigleaf Maple	<i>Acer macrophyllum</i>	42	100	Good	34	34	Yes
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Tree Info/ Defects: The tree has 5 stems of approx. 22", 22", 24", 26", and 14" attached at ground level. It has some dead small/ scaffold branches and a large exposed buttress root to the north.

Tree Protection: Retain and Protect; Tree Protection Zone radius = 34 ft. (drip line radius)

All proposed disturbances are located outside of the tree's dripline radius.

1159	Red Alder	<i>Alnus rubra</i>	20	40	Fair	20	20	Yes
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Tree Info/ Defects: The tree is located well away from all proposed development activities.

Tree Protection: Retain and Protect; Tree Protection Zone radius = 20 ft. (drip line radius)

All proposed disturbances are located outside of the tree's dripline radius.

R.O.W. Significant Trees

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1079	Bigleaf Maple	<i>Acer macrophyllum</i>	20.1	60	Good/ Fair	36	N/A	No

Tree Info/ Defects: The Right-Of-Way stump-sprout tree has 4 stems of 6.0", 9.1", 11.1", and 12.7" DBH attached at ground to 2 ft. height.

Tree Protection: Remove tree; it is located within the proposed driveway footprint.

Tree #	Species	Latin Name	DBH (in.)	Ht. (ft.)	Condition	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No
1082	Black Cottonwood	<i>Populus trichocarpa</i>	41.9	110	Good	29	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has 2 stems of 9.5” and 40.8” DBH attached at ground level with no apparent physical defects.</p> <p><u>Tree Protection:</u> Remove tree; it is located 5 ft. from the proposed storm drainage trench, which is too close for tree retention.</p>								
1084	Bigleaf Maple	<i>Acer macrophyllum</i>	29.5	70	Poor	25	N/A	No
<p><u>Tree Info/ Defects:</u> The tree has co-dominant stems attached at a 10 ft. height with moderate included bark. The top of the east stem has failed previously (torn off at ¾ stem height with 12” diameter remaining). The west stem has an open cavity from the ground to 5 ft. height that is 10” wide with significant decay. Both stems/ base of tree have numerous areas with extensive fungal fruiting bodies (<i>Kretzschmaria deusta</i>, Brittle Cinder fungus) present. In my opinion, based on the amount of Brittle Cinder fungus present as well as the amount of decay in the stems, the tree presently has a moderate probability of failure, which will increase with time.</p> <p><u>Tree Protection:</u> Remove tree; it is in poor condition and is a possible hazard tree. It is also located 2 ft. from the storm drainage trench, which is too close for tree retention.</p>								

Proposed Construction Activities

A single-family residence will be constructed on the northeast portion of the property with attached garage, with all associated infrastructure (driveway/ sidewalks/ utilities/ landscape).

Tree Protection Plan

Refer to Appendix C, Tree Protection Fencing Detail Graphic, for general Tree Protection Guidelines.

Tree Protection Summary Notes

- Retained Tree #1439 (41.1” Bigleaf Maple, Non-Wetlands tree) has a large dead stem that should be removed or shortened before commencement of construction activities. Retained Tree #1156 (23.1” Bigleaf Maple, 35’ Wetlands Buffer tree) has a large dead interior stem that should be removed before building occupancy. All retained trees with ivy growing up the trunk should have the ivy cut at the base of the tree.*
- Retained Trees #1426 (48.9” Bigleaf Maple, Non-Wetlands tree) and #1415 (11.6” Bigleaf Maple, Non-Wetlands tree) have conditions or defects warranting future arborist inspections.*

They should be inspected at 5-year minimum intervals to ensure that the structural integrity of the trees is still intact.

3. *Subject Property Trees #1158, 1400, 1429, 1354, 1353, 1415, and ROW Tree #1084 are either in poor condition with limited life spans or are hazard trees and removal or conversion into wildlife snags is recommended.*
4. *Consider converting required tree removals into wildlife snags instead of complete removal of all wood.*
5. *Arborist Supervision by a certified arborist is required for all excavation that takes place within the drip lines of Tree #'s 1406, 1161, 1156, 1337, 1345*
6. *Tree #1244 and 1357 (35' Wetlands Buffer Trees) are too close to proposed development (driveway) but we will attempt to retain through arborist supervision/ root pruning. If the arborist determines in the field during excavation activities that the trees may be retained, they will be retained and protected.*
7. *Trees #06-27 are all part of a Leyland Cypress hedge that meanders between the north adjacent property and the subject property. The trees are located near the northwest corner of the subject property and are numbered from west to east (Tree #6 westernmost tree and Tree #27 easternmost tree).*

Probable locations of Leyland Cypress Hedge Trees #6-27 are Trees #6-8, 15-19, and 24-27 located on the subject property, and Trees #9-14 & 20-23 located on the north adjacent property. All adjacent property Cypress trees will be retained and protected, and all subject property Cypress trees will be removed.

If the construction staging area is located closer than 6 ft. to the adjacent property Cypress trees, a 1/2" minimum thickness steel plate is to be placed on the ground to avoid compaction, and the TPZ protection fence may be temporarily reduced to less than 6 ft.

The **Tree Protection Guidelines** below are to be followed during all construction and delivery activities. Prior to development activity or initiating tree removal on the site, vegetated areas and individual trees to be preserved shall be protected from potentially damaging activities pursuant to the following standards:

- “Keep out” signs shall be posted on all sides of the TPZ fencing, and construction Materials and equipment are not to be stored within TPZ.
- Assess crew and contractor penalties, if necessary, to keep the TPZ’s intact.
- Check the integrity of TPZ fences weekly, and repair or replace as needed.
- Wood chips or other mulch must be used to spread above root zones within the drip line at a depth of 4-6 inches for temporary protection from soil compaction.

- Avoid grade changes near the TPZ if possible.
- If Trenching is needed, trenchless methods are preferred, or the trenches can be dug by hand to preserve larger roots. Minimize root damage by excavating a 2-foot-deep trench, at edge of critical root zone, to cleanly sever the roots of trees to be retained. For roots over one inch in diameter damaged during construction, make a clean straight cut to remove damaged portion of root. Leave roots larger than two inches in diameter intact and undamaged if possible. During the time of root exposure; keep roots moist with moist soil, wet mulch, or wet burlap. Roots may be uncovered with a low-pressure water flow or air spade if needed.
- If roots need to be pruned, they should be cut with pruning saws, made flush with the side of the trench.
- Corrective pruning may be performed on protected trees in order to avoid damage from machinery or building activity.
- Trees should be watered twice a week if construction is to take place during hot summer months.
- Control soil moisture within the protected area. Prevent flooding of the soil, and protect root areas from leachate, cement, oil, fuel, and all other contaminants.
- Do not store materials potentially harmful to tree roots within 20 feet of protected areas. These include, but are not limited to: petroleum products, cement and concrete materials, cement additives, lime, paint coatings, waterproofing agents, form coatings, detergents, acids, and cleaning agents.
- The grade shall not be elevated or reduced within the critical root zone of trees to be preserved recommendations from a qualified professional. If the grade adjacent to a preserved tree is raised such that it could slough or erode into the tree's critical root zone, it should be permanently stabilized to prevent suffocation of the roots. Aeration devices may help to ensure the tree's survival.
- Mycorrhizal treatments may be added to the soil to increase the tree root's ability to uptake water and nutrients, improving its chances of withstanding environmental stress.

Minimum Tree Density Requirements

35 trees are being retained on the subject property. KCZ 95.33 states that the minimum required tree density is 30 tree credits per acre for single family homes. The total acreage of the subject property is .36 acres, so the minimum tree density requirement is 11 tree credits (10.8 rounded up to 11). The retained Tree Credits are sufficient and no (0) trees must be planted to meet the minimum tree density requirements pursuant to KZC 95.5 and 95.51.

Minimum Tree Density Table

Retained Tree #	DBH (in. diameter)	Retained Tree Credits
<i>(Non-Wetlands trees)</i>		
1406	38.6	15
1415	11.6	1
1414	28.9	10
1426	48.9	20
1425	14.6	3
1435	26.2	9
1437	34.7	13
1438	28.5	10
1436	10.2	1
1439	41.1	16
1440	41.5	16
1444	19.1	5
<i>(35' Wetlands Buffer trees)</i>		
1161	18	5
1160	14	3
1163	14	3
1164	21	6
01	6	1
1156	18	5
1155	8	1
1337	23.0	7
1345	44.3	18
1346	18.1	5
02	7.1	1
1351	9.3	1
03	6.7	1
1447	10.0	1
<i>(Wetlands trees)</i>		
1241	20.5	6
04	18.1	5
1242	13.8	2
1243	15.7	3
1338	20.2	6
1339	12.0	2
1340	21.4	6
1341	13.0	2
1344	17.2	4
	Total Retained Tree Credits =	213
	Required Tree Credits = [.36 acres x 30 tree credits per acre = 10.8 (11 Tree Credits)]	11
		(Tree Density NOT exceeded)

Supplemental Tree Planting Plan

No trees are required for supplemental planting, as the minimum tree density has been met.

Thank you,
Ryan Ringe



Arbor Options Tree Consulting
7/11/18

Glossary

Arborist.....	Professional who possesses the technical competence gained through experience and related training to provide for or supervise the management of trees and other woody plants in residential, commercial, and public landscapes.
Canopy.....	The part of the crown composed of leaves and small twigs.
Co-dominant stem	Stems arising from the same junction/ attachment point.
Conk.....	Fruiting body of a fungus, often associated with decay.
Critical Root Zone.....	The circular area around the base of a tree calculated as the distance to the furthest extent to the tree's drip line.
Crown.....	The upper mass or head of a tree
D.B.H..... (Diameter At Breast Height)	This is the standard diameter measurement of trees taken at 4.5 feet above the average ground level of the tree base.
Drip line.....	The area on the ground underneath the farthest-reaching branch in the tree canopy.
Included Bark.....	Pattern of development at branch junctions where bark is turned inward rather than pushed out (embedded bark between attachments).
Live Crown Ratio.	Ratio of live canopy in a tree relative to height.
Root Collar.....	Area where the main roots join the plant stem, above and below the ground level.
Scaffold Branch...	The large branches that form the main structure of the crown
Significant Tree...	A healthy deciduous tree, six inches in diameter or greater at four feet above existing grade, or a six feet tall or greater evergreen trees.
Tree Protection Zone (TPZ)	The circular area around a tree protected with a fenced enclosure at the tree's drip line radius.

Bibliography

Harris, Richard W. et al. *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines* (4th ed). Upper Saddle River. Prentice Hall. 2004.

Matheny and Clark. *Trees and Development; A Technical Guide to Preservation of Trees During Land Development*. Champaign, IL. International Society of Arboriculture. 1998

City of Mercer Island Code Chapter 19.10. *Trees*.

Appendix A – Tree Inventory/ Protection Summary Table

Subject Property Significant Trees						
Tree #	Species	DBH (in.)	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No	Arborist Supervision Required During Excavation?
(Non-Wetlands)						
1080	Bigleaf Maple	11.9	18	N/A	No	
1157	Bigleaf Maple	19.1	22	N/A	No	
1245	Bigleaf Maple	47.3	32	N/A	No	
1363	Bigleaf Maple	23.1	34	N/A	No	
1365	Western Red Cedar	6.6	8	N/A	No	
1364	Western Red Cedar	10.1	17	N/A	No	
1361	Douglas Fir	20.7	23	N/A	No	
1360	Bigleaf Maple	43.4	34	N/A	No	
1359	Bigleaf Maple	12.8	17	N/A	No	
1362	Bigleaf Maple	12.1	25	N/A	No	
1400	Western Hemlock	10.5	13	N/A	No	
1399	Western Hemlock	10.0	13	N/A	No	
1401	Bigleaf Maple	10.8	19	N/A	No	
1402	Bigleaf Maple	37.4	30	N/A	No	
1403	Bigleaf Maple	39.4	29	N/A	No	
1404	Western Hemlock	8.0	15	N/A	No	
1405	Bigleaf Maple	23.3	30	N/A	No	
1406	Bigleaf Maple	38.6	33	*33/17	Yes	Yes
<i>*Note: Tree Protection Zone radius = *33 ft. (drip line radius) except where the east gabion wall excavation intersects with the dripline 17 ft. southwest of the tree.</i>						
1415	Bigleaf Maple	11.6	12	12	Yes	
1414	Bigleaf Maple	28.9	30	24	Yes	
05	Bigleaf Maple	7.6	17	N/A	No	
1429	Western Hemlock	16.0	16	N/A	No	
1354	Bigleaf Maple	47.3	35	N/A	No	
1353	Bigleaf Maple	34.7	10/20	N/A	No	
1426	Bigleaf Maple	48.9	32	32	Yes	
1425	Western Hemlock	14.6	20	20	Yes	
1435	Bigleaf Maple	26.2	28	28	Yes	
1437	Bigleaf Maple	34.7	29	29	Yes	
1438	Bigleaf Maple	28.5	31	31	Yes	
1436	Bigleaf Maple	10.2	22	22	Yes	
1439	Bigleaf Maple	41.1	32	32	Yes	
1440	Bigleaf Maple	41.5	32	32	Yes	

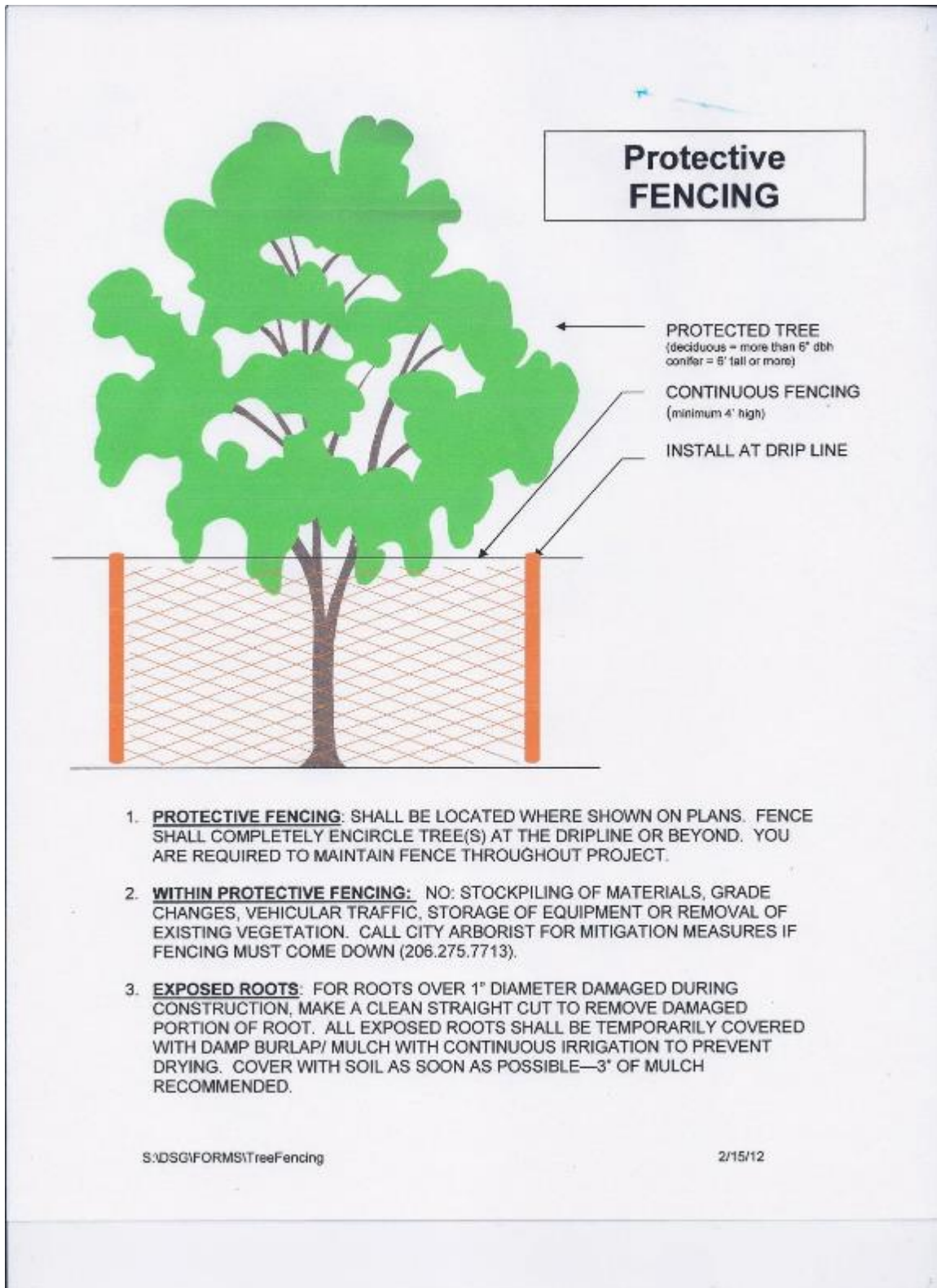
Appendix A – Tree Inventory/ Protection Summary Table (Continued)

Tree #	Species	DBH (in.)	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No	Arborist Supervision Required During Excavation?
1444	Western Red Cedar	19.1	18	18	Yes	
06-27	Leyland Cypress	3.5-5	4-7	6	*Yes/ No	
<p><i>*Note:</i> Probable locations of Trees #6-27 are Trees #6-8, 15-19, and 24-27 located on the subject property, and Trees #9-14 & 20-23 located on the north adjacent property. All adjacent property Cypress trees will be retained and protected, and all subject property Cypress trees will be removed.</p> <p><i>If the construction staging area is located closer than 6 ft. to the adjacent property Cypress trees, a 1/2" minimum thickness steel plate is to be placed on the ground to avoid compaction, and the TPZ protection fence may be temporarily reduced to less than 6 ft.</i></p>						
28	Western Red Cedar	5.2	12	N/A	No	
29	Western Red Cedar	2.8	7	N/A	No	
30	Western Red Cedar	1.9	7	N/A	No	
31	Western Red Cedar	2.1	6	N/A	No	
(35' Wetlands Buffer Trees)						
1081	Bigleaf Maple	21.7	18	N/A	No	
1161	Bigleaf Maple	33.2	30	18	Yes	Yes
1160	Bigleaf Maple	13.7	26	14	Yes	
1163	Bigleaf Maple	6.4	14	14	Yes	
1164	Bigleaf Maple	20.9	26	21	Yes	
1158	Red Alder	20.0	21	N/A	No	
01	Bigleaf Maple	6.2	18	6	Yes	
1156	Bigleaf Maple	23.1	22	18	Yes	Yes
1155	Bigleaf Maple	7.6	21	8	Yes	
1246	Bigleaf Maple	9.0	20	N/A	No	
1244	Red Alder	19.7	16	10	Yes/No	*Yes
<p><i>*Tree #1244 is too close to proposed development (driveway), but we will attempt to retain through arborist supervision/ root pruning. If the arborist determines in the field during excavation activities that the tree may be retained, it will be retained and protected.</i></p>						
1337	Red Alder	23.0	26	17	Yes	Yes
1367	Bigleaf Maple	10.1	21	N/A	No	
1358	Bigleaf Maple	36.8	36	N/A	No	
1357	Bigleaf Maple	18.4	30	N/A	Yes/ No	*Yes
<p><i>*Tree #1357 is too close to proposed development (driveway), but we will attempt to retain through arborist supervision/ root pruning. If the arborist determines in the field during excavation activities that the tree may be retained, it will be retained and protected.</i></p>						
1345	Bigleaf Maple	44.3	39	24	Yes	Yes

Appendix A – Tree Inventory/ Protection Summary Table (Continued)

Tree #	Species	DBH (in.)	Drip line Radius (ft.)	TPZ Radius (ft.)	Retain Yes/ No	Arborist Supervision Required During Excavation?
1346	Western Hemlock	18.1	18	18	Yes	
02	Bigleaf Maple	7.1	14	14	Yes	
1356	Pacific Dogwood	10.6	19	N/A	No	
1351	Bigleaf Maple	9.3	22	22	Yes	
03	Bigleaf Maple	6.7	16	16	Yes	
1447	Bigleaf Maple	10.0	17	17	Yes	
(Wetlands Trees)						
1241	Red Alder	20.5	17	17	Yes	
04	Bigleaf Maple	18.1	26	18	Yes	
1242	Red Alder	13.8	11	11	Yes	
1243	Western Hemlock	15.7	11	11	Yes	
1338	Red Alder	20.2	26	26	Yes	
1339	Bigleaf Maple	12.0	22	22	Yes	
1340	Red Alder	21.4	24	24	Yes	
1341	Bigleaf Maple	13.0	22	22	Yes	
1344	Red Alder	17.2	28	28	Yes	
Encroaching Adjacent Property Significant Trees						
A	Western Red Cedar	26	20	20	Yes	
B	Western Hemlock	22	26	26	Yes	
C	Bigleaf Maple	16	24	24	Yes	
D	Bigleaf Maple	17	24	24	Yes	
E	Bigleaf Maple	40	30	30	Yes	
1413	Bigleaf Maple	42	34	34	Yes	
1159	Red Alder	20	20	20	Yes	
R.O.W. (Right-Of-Way) Trees						
1079	Bigleaf Maple	20.1	36	N/A	No	
1082	Black Cottonwood	41.9	29	N/A	No	
1084	Bigleaf Maple	29.5	25	N/A	No	

Appendix C – Tree Protection Fencing Detail Graphic



Appendix D - Assumptions and 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. Consultant assumes that the property and its use do not violate applicable codes, ordinances, statutes or regulations.
2. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.
3. Unless otherwise required by law, possession of any report by the consultant 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 expressed written consent of the consultant.
4. This report and any values or opinions expressed herein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event or upon any finding to be reported.
5. 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 unless expressed otherwise. The reproduction of any information generated by architects, engineers or other consultants and any sketches, drawings or photographs is for the expressed purpose of coordination and ease of reference only. Inclusion of said information on any drawings or other documents does not constitute a representation by the consultant as to the sufficiency or accuracy of said information.
6. 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 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.
7. Loss or alteration of any part of this Agreement invalidates the entire report.

Appendix E – 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 homeowner's 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 tree examined fails for any reason or 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.