

July 7, 2020

Nathan Anderson, PE
Associate
KPFF Consulting Engineers
206-926-0573
Via email: Nathan.anderson@kpff.com

Re: Arborist Assessment

The Watershed Company Reference Number: 191008.1

Dear Nathan:

We are pleased to present with the findings of the inventory and assessment for the trees located within the right-of-way (ROW) and on private parcels along 5th Ave NE in Shoreline, WA between NE 175th Street and 182nd Court. Jake Robertson and Roen Hohlfeld, ISA Certified Arborists® with The Watershed Company, visited the subject property on June 1, 2020 to assess the trees that may be impacted by the new sidewalk replacement project

This letter summarizes the findings of the study. The following documents are enclosed:

- Annotated Tree Map
- Tree Inventory Table

Study Area

The study area is located along 5th Avenue NE between NE 182nd Court and NE 175th Street. The area spans approximately 550 meters and includes trees rooted within the ROW as well as trees on private property that are within proximity of the proposed sidewalk development. Single family homes and parcels border the public ROW along with utilities, street signs, and fences. See Figure 1 for site vicinity and project site overview maps.

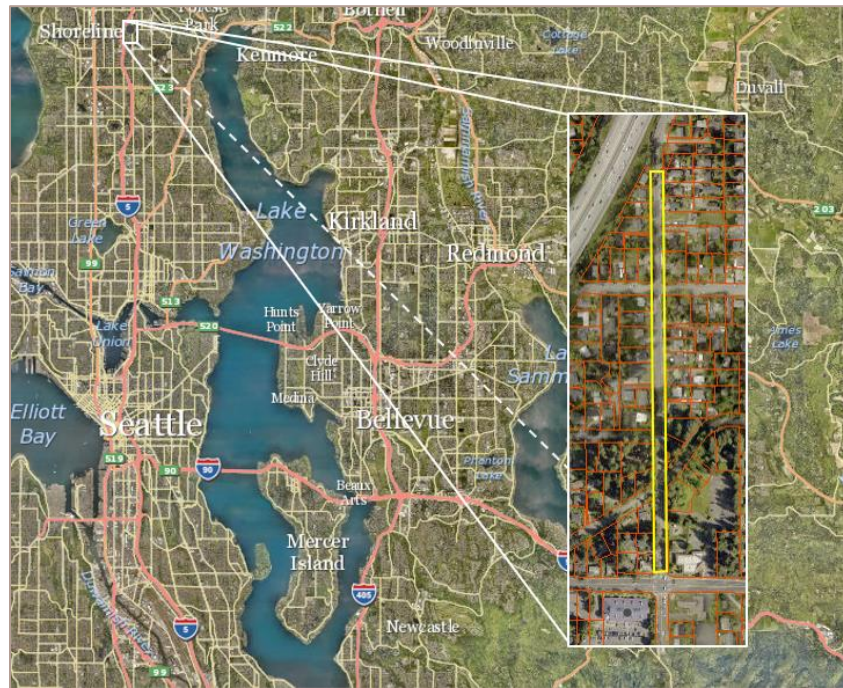


Figure 1. Vicinity map showing the approximate location of the project site and study area (outlined in yellow). (Image courtesy of King County iMap, 2019)

Methods

All trees over four inches in diameter when measured at four-and-a-half feet above ground level were assessed and inventoried. Assessed trees were located along the ROW or on private property that would be impacted by new sidewalk development. Each assessed tree along the ROW was tagged with a 1.25-inch aluminum tag that was affixed to the side of the tree at eye level with an orange ribbon. These tree tag numbers range from 101-131. Trees on private property were not physically tagged but were inventoried and given a unique identification number ranging from 200-263. Both sets of trees are shown on the attached Annotated Tree Map.

Diameter: The diameter at breast height (DBH) of all subject trees was measured at four-and-a-half feet above the ground surface using a graduated metal logger's DBH tape. Methodology for measuring and calculating the diameter of trees with multiple trunks, major leans, or on steep slopes was done by taking the average of each stem. This followed the outline in the *Guide for Plant Appraisal, 10th Edition*, written by the Council of Tree and Landscape Appraisers (CTLA) and published by International Society of Arboriculture (ISA) (CTLA 2018).

Canopy Radius: Canopy radius, also known as dripline, was measured from the trunk to the outermost branch tips by estimating a vertical line to the ground. For trees with uneven crowns, the average of two opposite radii was estimated.

Critical Root Zone: Critical root zone, also known as CRZ, is the area in which any loss of roots would have a significant impact on tree survival. CRZ is calculated at a rate of one (1) foot per one (1) inch DBH.

Height: Tree height was visually estimated.

Condition: A basic Level 1 visual assessment was used to evaluate the health and condition of significant trees within the study area in accordance with ISA and CTLA standards. Each tree was given a rating from one through six (Excellent – Dead) as summarized below in Table 1.

Table 1. Assessment of plant condition considers health, structure, and form. Each may be described in rating categories that will be translated into a percent rating. (CTLA 2018)

Rating Category	Condition Components			Percent Rating
	Health	Structure	Form	
Excellent - 1	High vigor and nearly perfect health with little or no twig dieback, discoloration, or defoliation.	Nearly ideal and free of defects.	Nearly ideal for the species. Generally symmetric. Consistent with the intended use.	81% to 100%
Good - 2	Vigor is normal for species. No significant damage due to diseases or pests. Any twig dieback, defoliation, or discoloration is minor.	Well-developed structure. Defects are minor and can be corrected.	Minor asymmetries/deviations from species norm. Mostly consistent with the intended use. Function and aesthetics are not compromised.	61% to 80%
Fair - 3	Reduced vigor. Damage due to insects or diseases may be significant and associated with defoliation but is not likely to be fatal. Twig dieback, defoliation, discoloration, and/or dead branches may compromise up to 50% of the crown.	A single defect of a significant nature or multiple moderate defect. Defects are not practical to correct or would require multiple treatments over several years.	Major asymmetries/deviations from species norm and/or intended use. Function and/or aesthetics are compromised.	41% to 60%
Poor - 4	Unhealthy and declining in appearance. Poor vigor.	A single serious defect or multiple significant	Largely asymmetric/abnormal.	21% to 40%

	Low foliage density and poor foliage color are present. Potentially fatal pest infestation. Extensive twig and/or branch dieback.	defects. Recent change in tree orientation. Observed structural problems cannot be corrected. Failure may occur at any time.	Detracts from intended use and/or aesthetics to a significant degree.	
Severe - 5	Poor vigor. Appears dying and in the last stages of life. Little live foliage.	Single or multiple severe defects. Failure is probable or imminent.	Visually unappealing. Provides little or no function in the landscape.	6% to 20%
Dead - 6				0% to 5%

Results

Public Right-of-Way

A total of 31 trees were inventoried within the ROW (see enclosed annotated tree survey). Significant trees within the ROW have an average DBH of 15.7 inches, an average height of 37 feet, and an overall health condition rating of “Fair.” Douglas-fir is the most common species with 11 individuals, followed by Western red cedar (*Thuja plicata*) with seven individuals. The largest inventoried significant tree located within the ROW is a Western red cedar (*Thuja plicata*) (Tree #114) with a DBH of 45.8 inches, followed by a Western white pine (*Pinus monticola*) (Tree #131) with a DBH of 40 inches. A brief summary of the inventoried trees on the ROW can be found in Table 2 below.

Table 2. Summary of inventoried tree species within the ROW.

Scientific Name / Common Name	Number of Trees Inventoried	Avg. Trunk DBH (inches)	Smallest DBH (inches)	Largest DBH (inches)	Avg. Height (feet)
<i>Acer circinatum</i> (Vine maple)	1	6.0	6.0	6.0	30
<i>Chamaecyparis lawsoniana</i> (Lawson false cypress)	2	19.3	18.8	19.8	30
<i>Gleditsia triacanthos</i> (Honey locust)	2	11.3	10.6	12.0	30
<i>Malus sp.</i> (Crabapple)	1	10.9	10.9	10.9	20
<i>Pinus monticola</i> (Western white pine)	3	21.9	6.6	40.0	46.7
<i>Pinus nigra</i> (Austrian pine)	1	15.4	15.4	15.4	40
<i>Pseudotsuga menziesii</i> (Douglas-fir)	11	17.2	7.3	23.3	54
<i>Sorbus aucuparia</i> (European mountain ash)	1	21.1	21.1	21.1	30
<i>Thuja plicata</i> (Western red cedar)	7	18.1	4.7	45.8	50
<i>Tsuga heterophylla</i> (Western hemlock)	1	22.8	22.8	22.8	45

x <i>Cuprocyparis leylandii</i> (Leyland false cypress)	1	9.0	9.0	9.0	30
Grand Total	31				

Private Property

A total of 64 trees were inventoried on private properties located adjacent to the proposed sidewalk improvements (see enclosed annotated tree survey). The trees on private parcels have an average DBH of 14.5 inches, an average height of 40.8 feet, and an overall health condition rating of “Fair.” Douglas-fir is the dominant species with 40 individuals. The largest inventoried trees rooted on private property are four Douglas-fir (*Pseudotsuga menziesii*) trees (Tree #226, #229, #230, #237) and a Western white pine (*Pinus monticola*) (Tree #258), each with an estimated DBH of 35 inches. A complete table of tree attribute data for both sets of trees can be found in the attached Tree Inventory Table. A brief summary of all inventoried trees can be found in Table 3 below.

Table 3. Summary of inventoried tree species on private parcels.

Scientific Name / Common Name	Number of Trees Inventoried	Avg. Trunk DBH (inches)	Smallest DBH (inches)	Largest DBH (inches)	Avg. Height (feet)
<i>Acer saccharinum</i> (Silver maple)	1	18	18	18	25
<i>Betula pendula</i> (European white birch)	1	12	12	12	40
<i>Cercidiphyllum japonicum</i> (Katsura tree)	1	15	15	15	20
<i>Cornus florida</i> (Flowering dogwood)	1	9	9	9	40
<i>Crataegus douglasii</i> (Black hawthorn)	1	6	6	6	25
<i>Fagus sylvatica</i> (European beech)	1	12	12	12	30
<i>Ginkgo biloba</i> (Maidenhair tree)	1	10	10	10	40
<i>Gleditsia triacanthos</i> (Honeylocust)	2	24.5	19	30	52.5
<i>Picea abies</i> (Norway spruce)	6	15.3	7	22	90
<i>Pinus contorta</i> (Shore pine)	1	15	15	15	20
<i>Pinus monticola</i> (Western white pine)	2	23	11	35	75
<i>Prunus serrulata</i> (Japanese flowering cherry)	1	15	15	15	40
<i>Pseudotsuga menziesii</i> (Douglas-fir)	40	15.3	6	35	59
<i>Thuja plicata</i> (Western red cedar)	4	15	12	18	30.5
<i>Thuja plicata</i> ‘Excelsa’ (Excelsa Western red cedar)	1	12	12	12	25
Grand Total	64				

Assessment

Trees in the ROW

Tree #101

This is an Austrian pine tree that has been pruned in the past for sidewalk clearance. The tree has a DBH of 15 inches and CRZ of 15 feet. It is rooted approximately 2 feet from the existing sidewalk. The tree is in Fair condition but given its close proximity to the sidewalk, it will be severely impacted by the development if excavation were to take place within the CRZ. It is recommended that this tree be removed prior to construction.

Tree #102

This is a Douglas-fir with a DBH of 14 inches and a CRZ of 14 feet. It is rooted approximately one foot from the existing sidewalk. While it does have an existing health condition of Fair, any excavation on the existing sidewalk would disturb more critical roots. This tree is recommended for removal prior to construction.

Tree #103

Tree #103 is a Douglas-fir with a DBH of 20 inches and a CRZ of 20 feet. It is rooted on a retaining wall that has evidence of being previously pruned. With a health condition of Good and its position on a retaining wall, this tree has a high chance of survival following construction and the protection measures identified below should be followed to retain it.

Tree #104

This is a Western hemlock in Fair condition. There is no sidewalk in front of this tree, and it is rooted approximately 5 feet from the edge of the street. With a Critical Root Zone of approximately 23 feet, many of the critical roots have been impacted. If a new sidewalk were to be built in front of this tree, then removal is recommended because even more soil and root space would be taken away.

Tree #105 - #107

These trees are all Douglas-firs. With a health condition ranging from Good to Fair. There is no sidewalk in front of these trees, but they are rooted approximately 2 feet from the curb of the road. If any excavation for the sidewalk were to take place near these trees, they would lose too much of their critical roots and decline to eventual death. It is recommended that these trees be removed if the existing parking lane were to be torn up and excavated for the new sidewalk.

Tree #108

This is a Western red cedar rooted on the corner of 5th Ave NE and NE Serpentine Pl. This tree is in Good condition and is rooted far enough so that it will be minimally impacted by construction. Efforts should be made to retain the tree following the Tree Protection Measures listed in the section below.

Tree #109 - 110

Trees 109 and 110 are Lawson false cypress trees rooted approximately 1 foot from the concrete bus station. They have been topped and pruned in the past because there are overhead utility wires, but they are still in a good enough health condition to survive construction. Efforts should be made to retain the trees following the Tree Protection Measures listed in the section below.

Tree #111 - 113

These trees are all Douglas-firs rooted on the west side of 5th Ave NE. Tree #111 is rooted approximately 5 feet from the curb of the street and has a DBH of 11 inches. Trees #112 and #113 are rooted approximately 20 feet from the edge of the road and have diameters ranging from 15 and 27 inches. Given the size and location of these trees relative to the edge of the road, they should be marked for retention.

Tree #114 – 117

Tree #114 is the largest tree in the ROW to be impacted by the new sidewalk with 2 dominant stems that make an average DBH of 46 inches and a CRZ of 46 feet. This Western red cedar is rooted approximately 5 feet from the edge of the road and many roots would need to be severed for the new sidewalk. Given the size of this tree and the ecological importance of mature trees, efforts should be made to retain it. Trees #115 – #117 are all Western red cedars with diameters measuring at 5, 6, and 36 inches. These trees are rooted approximately 10 feet from the side of the road and should be marked for retention.

Tree #118

This is a Crabapple in Poor condition with a DBH of 11 inches and CRZ of 11 feet. This tree is in Poor health and has a sprawling, poor branching structure. There is no existing sidewalk in front of this tree, and it is rooted approximately 10 – 15 feet from the edge of the street on a bank. Due to its current condition it should be removed prior to construction.

Tree #119

This tree is a small Western red cedar with a diameter of 5 inches in Fair condition. It is rooted approximately 10 feet from the edge of the road and would most likely survive the construction of the new sidewalk if the outlined Tree Protection Measures are followed.

Tree #120

Tree #120 is a medium sized Western white pine with a DBH of 19 inches and is rooted 10 feet from the road. With a health rating of Poor, it is unlikely that this tree would survive construction and is recommended for removal.

Tree #121

This is a medium sized Douglas-fir with a DBH of 22 inches and an estimated height of 30 feet. It has been previously topped, has an uncorrected lean, and is conflicting with overhead utility wires. Set back approximately 15 feet from the edge of the road, this tree would likely survive if the mitigation efforts listed the following Tree Protection Measures are followed.

Tree #122 – 123

These two trees are medium sized Honey locusts that are 11- and 12-inches in diameter and are an estimated 30 feet in height. Although covered in invasive ivy and rooted within a dense laurel shrub, they are in Good health. Set back approximately 10 feet from the edge of the road with no existing sidewalk, new construction would result in the loss of critical roots but they would likely survive following construction.

Tree #124

A medium sized Western red cedar with three dominant stems and a combined DBH of 15.8 inches and an estimated height of 50 feet. This tree is set back from the edge of the road with no sidewalk approximately 11 feet and has a CRZ of 15 feet. There is a drainage ditch between the edge of the road and this tree, and it is rooted on a sloped bank. If a new sidewalk were to be built in front of this tree, then the ditch would need to be filled a small number of critical roots would be disturbed. This tree would likely survive construction.

Tree #125

Tree #125 is a medium sized Douglas-fir with a DBH of 20 inches and an estimated height of 75 feet. Set back approximately 15 feet from the edge of the road without a sidewalk and CRZ of 20 feet, any construction would result in the loss of critical roots. This tree should be removed prior to construction.

Tree #126

Tree #126 is small Western white pine tree rooted together with Tree #127 on an elevated slope and retaining wall. Currently, it is in Poor health and is setback approximately 5 feet from the edge of the road with no sidewalk. With a DBH of 7 inches and CRZ of 7 feet, any development will sever critical roots and result in the further decline of the tree. This tree should be removed.

Tree #127

This is a large Douglas-fir with a DBH of 27 inches and height of 60 feet. It is crowded by Tree #126 and is rooted in the same elevated slope and retaining wall. This tree has a CRZ of 27 feet and would have a large number of critical roots disturbed by construction of a new sidewalk. This tree should be removed.

Tree #128

This is a two-stemmed European mountain ash tree with a DBH of 21 inches and an estimated height of 30 feet. It is setback approximately 20 feet from the edge of the road with no existing sidewalk in front of it and has a CRZ of 21 feet. It is in Fair condition currently and would likely survive the construction of the new sidewalk. Tree Protection Measures should be followed to retain this tree.

Tree #129

Tree #129 is a three-stemmed Vine maple tree with a combined DBH of 10.87 inches. It is setback approximately 20 feet from the edge of the road and is in Poor health with fruiting bodies of *Trametes versicolor* (Turkey tail), an indicator of substantial deadwood. The tree is setback far enough that new sidewalk should not lead to the death of the tree. Tree Protection Measures should be followed to retain this tree.

Tree #130

This is a Leyland false cypress tree with two stems and a combined DBH of 10.4 inches and estimated height of 30 feet. Setback is approximately 20 feet from the edge of the road. With a CRZ of 10 feet and a Good current health condition, this tree would survive the construction with minimal root impact. Tree Protection Measures should be followed to retain this tree.

Tree #131

This is the second largest tree inventoried in the right-of-way with a DBH of 40 inches. This Western white pine was measured below the split where it then diverged into multiple stems, however, the divergence of the stems causes it to have poor and weak structure. It is due to this structure and sparse canopy that it has been classified in Poor health. Setback 20-25 feet from

the edge of the road, it is approximately 2 feet from a compacted gravel parking lane. Due to the size of this tree, a plan should be developed to retain this tree following the outlined Tree Protection Measures.

Tag #	Scientific Name / Common Name	DBH (inches)	Condition	Reason for Removal
101	<i>Pinus nigra</i> (Austrian pine)	15	Fair	Sidewalk is already impeding the CRZ, construction would further damage critical roots likely leading to death.
102	<i>Pseudotsuga menziesii</i> (Douglas-fir)	14	Fair	Sidewalk is already impeding the CRZ, construction would further damage critical roots likely leading to death.
104	<i>Tsuga heterophylla</i> (Western hemlock)	23	Fair	Large CRZ of 23 feet with no existing sidewalk. New sidewalk would require reduction more critical roots likely leading to death.
105 - 107	<i>Pseudotsuga menziesii</i> (Douglas-fir)	7.3 - 17	Fair - Good	No existing sidewalk and rooted two feet from existing street. New construction would further reduce critical roots and lead to death.
118	<i>Malus sp.</i> (Crabapple)	11	Poor	No existing sidewalk and rooted on a slope 10-15 from edge of the street. Already in poor health, mitigation would probably not save the tree.
120	<i>Pinus monticola</i> (Western white pine)	19	Poor	Already in poor health and no existing sidewalk is in front of the tree. Mitigation efforts would likely not save the tree.
125	<i>Pseudotsuga menziesii</i> (Douglas-fir)	20	Fair	Setback 15 feet from the edge of the road with no existing sidewalk and a CRZ of 20 feet, a new sidewalk may lead to the loss of 50% of the critical roots.
126	<i>Pinus monticola</i> (Western white pine)	7	Poor	In Poor health and setback 5 feet from the edge of the road with no existing sidewalk. Development would disturb whatever healthy critical roots are left leading to death.
127	<i>Pseudotsuga menziesii</i> (Douglas-fir)	27	Fair	CRZ of 27 feet but setback 5 feet from the edge of the road with no existing sidewalk. There is no room for a new sidewalk between tree and the road.
Grand Total		11		

Table 4. Summary of trees identified for removal.

Trees on the Private Property

Tree #200

This is an Excelsa western red cedar with a visually estimated DBH of 12 inches and a CRZ of 12 feet. It has a Good current health rating right against a residential driveway and approximately 7 feet from the existing sidewalk. It is believed that due to its current condition and location, this tree would survive construction.

Tree #201

Tree #201 is a medium sized Western red cedar with an estimated DBH of 12 inches. It is rooted two feet from a residential driveway and six feet from the existing sidewalk. It is believed that due to its Fair condition and location, this tree would survive construction.

Tree #202

This is a large Douglas-fir with an estimated DBH of 24 inches, a height of 100 feet, and a CRZ of 24 feet. It is rooted behind a private fence, approximately 12 feet from the existing sidewalk. The property is elevated from the street and sidewalk with a large, rock retaining wall providing support. Although it has a CRZ of 24 feet, this tree would most likely survive the construction of a new sidewalk with minimal critical roots impacted due to being elevated and protected by the retaining wall.

Tree #203

This is a medium sized Western white pine tree with an estimated DBH of 11 inches and a height of 60 feet. Due to a sparse canopy, this tree has been given a condition rating of Poor. It is rooted behind a private fence and is approximately 12 feet from the existing sidewalk. The property is elevated from the street and sidewalk with a large, rock retaining wall providing support. Due to having a relatively small CRZ of 11 feet, this tree would most likely survive the construction of a new sidewalk with minimal critical roots impacted due to being elevated and protected by the retaining wall.

Tree #204-205

These two trees are Douglas-firs in Poor to Fair condition. Tree #204 is estimated to have a DBH of 12 inches and is leaning against a private fence, rooted approximately 7 feet from the edge of the street. Tree #205 is 22-inches in diameter and rooted nearby, also 7 feet from the existing sidewalk. Like tree #202 & #203, these trees are rooted on an elevated property away from the existing street and should be unaffected by the construction.

Tree #206

This is a Western red cedar with an estimated DBH of 15 inches in Fair condition. It is rooted 10 feet from the street with no sidewalk in front of it. With a CRZ of 15 feet, this tree will have minor impact, but would likely survive.

Tree #207-209

These trees are all Douglas-firs rooted on an elevated property approximately 15 feet above street level. They have all been pruned and topped to control their form and DBHs that range from 6 to 10 inches. They are in Poor condition with sparse canopies and are rooted on steep slopes that face west and are approximately 6-7 feet from the edge of the street. Tree #209 is approximately four feet from the existing garage. These trees would have minor impact from construction but would likely survive.

Tree #209-213

These trees are all Douglas-firs rooted on the east side of 5th Ave NE, on steep slopes that face the street. They range from 10- to 22-inches in diameter and are approximately 20 feet from the edge of the road. They are in Fair to Good health and would most likely survive the construction.

Tree #214-225

These 11 Douglas-firs are all planted in a row and have been pruned and topped into a privacy screen. They are relatively small, with a DBH that ranges between six to nine inches and maintained at a height of 10 feet. They are well maintained and are in Good health and the property they are rooted on is elevated approximately 15 feet above the level of the street. They are in likely to survive any construction due to their position above the street.

Tree #226-234

These Douglas-firs are all rooted on adjacent properties and range from 6- to 35-inches in diameter. They are all rooted approximately 20 to 40 feet from the edge of the road in ranging health conditions. Though their condition rating may vary, they are rooted far enough from the edge of the street that would protect them from construction.

Tree #235-236

These two Douglas-firs are rooted on the opposite side of the street from Tree #226-234. Tree #235 has a DBH of 22 inches and is in Poor condition with an unbalanced canopy and some deadwood present. It is approximately 8 feet from the edge of the street and should be removed prior to construction. Tree #236 is 95 percent dead and is six inches in diameter. It is rooted six

feet from the edge of the street and covered in invasive blackberry. This tree should be removed prior to construction.

Tree #242-246

These trees are a row of Norway spruce planted as a privacy screen. They are rooted two feet away from the edge of the street and range from 7- to 20-inches in diameter and are Fair to Poor in health. Due to their close proximity to the existing street and their current health rating, there is a high likelihood that they would die following construction. Due to their purpose as a privacy screen for the house, efforts should be made to retain these trees through moving the sidewalk.

Tree #247

This is a Japanese flowering cherry tree in Poor health and has an estimated DBH of 15 inches. It is rooted behind a private fence and approximately 20 feet from the existing sidewalk. The tree is in Poor health with a sparse canopy and invasive ivy growing on the main stem. Although it is in poor health, it is rooted far enough from the street to be unaffected by construction.

Tree #248

Tree #248 is a European white birch with an estimated DBH of 12 inches. The upper branches within the canopy have substantial dieback, which is a characteristic of the Bronze Birch Borer, an insect that has led to the death of many local birch trees. Rooted approximately six feet from the ROW and declining health, this tree most likely would not survive construction.

Tree #249

This is a Katsura tree in Good health with an estimated DBH of 15 inches. It is rooted 8 feet from the edge of the street, but two feet from a compacted gravel parking lane. Some critical roots may be lost, however if the outlined Tree Protection Measures are followed then the tree should survive construction.

Tree #250

This is Maidenhair tree with an estimated DBH of 10 inches. It is rooted approximately 10 feet from the edge of the street with no existing sidewalk. With a CRZ of 10 feet, some critical roots would be severed during the excavation process of construction, but the tree has a health condition rating Good and should survive the construction process.

Tree #251

Tree #251 is a large Douglas-fir with an estimated DBH of 35 inches. The tree has a broken top and is in Poor health. Rooted 20 feet from the edge of the street, construction would lead to the

severance of critical roots and could contribute to further decline and eventual death of the tree. Due to the size of this tree and its ecological importance, this tree should be retained by not building the sidewalk in front of it.

Tree #252

This is a medium sized Silver maple tree with a DBH of 18 inches and setback approximately 15 feet from the edge of the road, behind a large laurel hedge. A compact gravel/concrete parking lane is on 5th Ave NE in front of the subject tree. The CRZ of the subject tree is 18 feet and construction would lead to the severance of some critical roots but should be retained and protected by following the Tree Protection Measures.

Tree #253

Tree #253 is a Western red cedar with an estimated DBH of 18 inches rooted on a raised property. It is setback approximately 20 feet from the edge of the sidewalk and in Fair condition. Due to its location, this tree has a high likelihood of surviving construction.

Tree #254

This is a Shore pine in Good condition. This tree has an estimated DBH of 15 inches and is setback approximately four feet from the sidewalk. The tree has been topped to provide clearance for overhead utility wires. If the new sidewalk does not impede further into the CRZ of the subject tree, then the tree should survive construction and should be retained and protected.

Tree #255

This is a Norway spruce with a DBH of 22 inches. It is setback approximately 35 feet from the edge of the road, and seven feet from a compacted gravel parking lane. The tree is rooted deep enough on the private property that although some critical roots may be severed, however the tree has a high likelihood of survival.

Tree #256

Tree #256 is a medium sized European beech tree with a DBH of 12 inches and rooted 30 feet from the edge of the road, and 10 feet from a compacted gravel parking lane. The tree is in Good health with a dense, healthy canopy and has a high chance of survival following construction.

Tree #257

This is a small flowering dogwood with a DBH of nine inches and a CRZ of nine feet. The subject tree is dead and rooted 10 feet from the edge of the street. No action is needed since the tree is already dead and will not be impacted by construction.

Tree #258

Tree #258 is a large Western white pine tree with a DBH of 35 inches and a CRZ of 35 feet. The subject tree is in Poor condition that splits into co-dominant leaders at 15 feet but one of the leading stems is dead. The tree is rooted approximately 30 feet from the edge of the road. Although the tree is rooted far from the edge of the road, it is already in Poor condition and even the minor critical root loss would further negatively affect the vigor of the tree. Due to the size of this tree and its ecological importance in the community, it should be protected and retained by following the Tree Protection Measures.

Tree #259-260

These two trees are medium sized Honey locust trees. Tree #259 has a DBH of 19 inches and is rooted 25 feet from the edge of the road in Fair condition. Tree #260 has a DBH of 30 inches and is rooted 50 feet from the edge of the road and in Good condition. Both trees have a high likelihood of survival following construction.

Tree #261

This is a small Black hawthorn with a DBH of 6 inches in Good condition. It is rooted approximately 25 feet from the edge of the road. This tree has a high likelihood of survival.

Tree #262

Tree #261 is a medium sized Western red cedar with a DBH of 15 inches and rooted on a rock wall approximately 25 feet from the street. In Good condition, a small number of critical roots may be disturbed but the tree is in a strong position to survive construction.

Tree #263

This is a medium sized Douglas-fir with a DBH of 13 inches. It is in Fair condition and rooted 25 feet from the edge of the road. Like tree #262, some critical roots may be disturbed, but the tree has a high chance of survival following construction.

Tag #	Scientific Name / Common Name	DBH (inches)	Condition	Reason for Removal
235-236	<i>Pseudotsuga menziesii</i> (Douglas-fir)	22, 6	Poor-Severe	Both are in Poor health and rooted within 6 feet of the edge of the road. A new sidewalk would sever what remaining healthy critical roots are left causing both trees to die.
248	<i>Betula pendula</i> (European white birch)	12	Poor	Is already stressed from the Bronze Birch Borer, the sidewalk would result in the loss of about 50% of the critical roots.
	Grand Total	3		

Table 5. Summary of trees on Private Property identified for removal.

Tree Protection Measures

For the health and longevity of the existing trees to remain, the arborist recommends determining which trees will be preserved and implementing tree protection best management practices (BMPs).

The following BMPs are recommended to protect retained trees:

- **Tree protection fencing:** The critical root zone (CRZ) is the area that contains tree roots critical to the health and stability of the tree. Tree protection fencing should be installed along the outer dripline edge of all trees to remain. Because tree roots can extend many times the distance of the overhead canopy and several of the trees are growing closely together, the arborist advises extending the fence to a minimum distance of one foot for every diameter inch of the trunk to ensure adequate root survival. The fencing should be four to six feet high, constructed of chain link, wire-mesh, or high-visibility plastic fencing, and include warning signs, such as “Tree Protection Area – Keep Out.”
- **Minimize root zone disturbance:** All construction activities, including staging and driving machinery, should be located outside of the CRZ. If temporary impacts in the CRZ are unavoidable, the arborist recommends using one of the following temporary measures to minimize soil compaction and root damage:
 - Install six to twelve inches of wood chip mulch over the CRZ.
 - Lay down a ¾-inch thick plywood sheet over at least four inches of wood chip mulch.
 - Apply four to six inches of gravel over staked geotextile fabric.
 - Place commercial logging mats on top of a 4-inch mulch layer.

The gravel, geotextile fabric, mats, and all mulch over four-inches thick **must** be removed after the temporary disturbance is finished.

- **Minimize grade changes:** Most tree roots grow in the top six to 18 inches of soil and are highly susceptible to damage from grade changes. If the grade is lowered in the CRZ, roots critical to health and stability will be removed. If the grade is raised in the CRZ, roots can suffocate from lack of oxygen. The grade should not be altered in the CRZ.
- **Root pruning:** If mechanical excavation occurs near a tree to remain, the arborist recommends using an air or water excavator and root pruning by hand, or using a mechanical root pruning tool designed to cut roots. Any roots over one inch that are exposed after mechanical excavation should be clean cut by hand.
- **Canopy pruning:** All construction activities should stay out of the canopy zone. However, if the canopy of a tree will conflict with construction, the canopy could be raised to a maximum of 20 feet to avoid aerial conflicts. Any pruning of trees should be done using best management practices as defined by the International Society of Arboriculture (ISA), and performed by ISA certified arborists. Topping, coppicing, or pollarding are **not** acceptable pruning methods for these trees. After the other trees are removed, the shaded inner canopy will likely contain dead branches that could be removed for aesthetic purposes. No other pruning should be necessary and could negatively impact the health of the trees.
- **Maintenance:** The impacts of construction are stressful to trees, which may not show the signs of stress for up to five to ten years after being impacted. When trees are removed, the remaining tree roots and soil will be exposed to more sunlight. To help the trees adjust to the new conditions, two to four inches of wood chip mulch can be placed in the CRZ (keep mulch 12 inches away from trunks). Additionally, applying one to two inches of water to the root zones each month in the summer during construction will help the trees regenerate roots and acclimate to their new conditions.
- **Monitoring:** After construction is complete, the tree protection fencing can be removed. Any branches accidentally broken during construction should be pruned. An ISA certified arborist could assist with health assessment, monitoring, and provide management recommendations for the trees post-construction as the trees recover from the impacts of construction and adapt to their new conditions.

Limitations to the Study

The findings of this report are based on the best available science and are limited to the scope, budget, and site conditions at the time of the assessment. Although the information in this report is based on sound methodology, internal physical flaws (such as cracking or root rot) or other conditions that are not visible cannot be detected with this limited basic visual screening. Trees are inherently unpredictable. Even vigorous and healthy trees can fail due to high winds, heavy snow, ice storms, rain, age, or other causes.

This report is based on the current observable conditions and may not represent future conditions of the trees. Changes in site conditions, including clearing and grading, will alter the condition of remaining trees in a way that is not predictable. The conclusions contained within this report have been made for permitting purposes only and are not intended for tree risk assessment purposes.

Sincerely,



Jake Robertson
ISA Certified Arborist® PN-8934A



Kyle Braun, PLA, ASLA
Landscape Architect & ISA TRAQ Certified
Arborist®

Enclosures: Tree Map & Tree Inventory Table

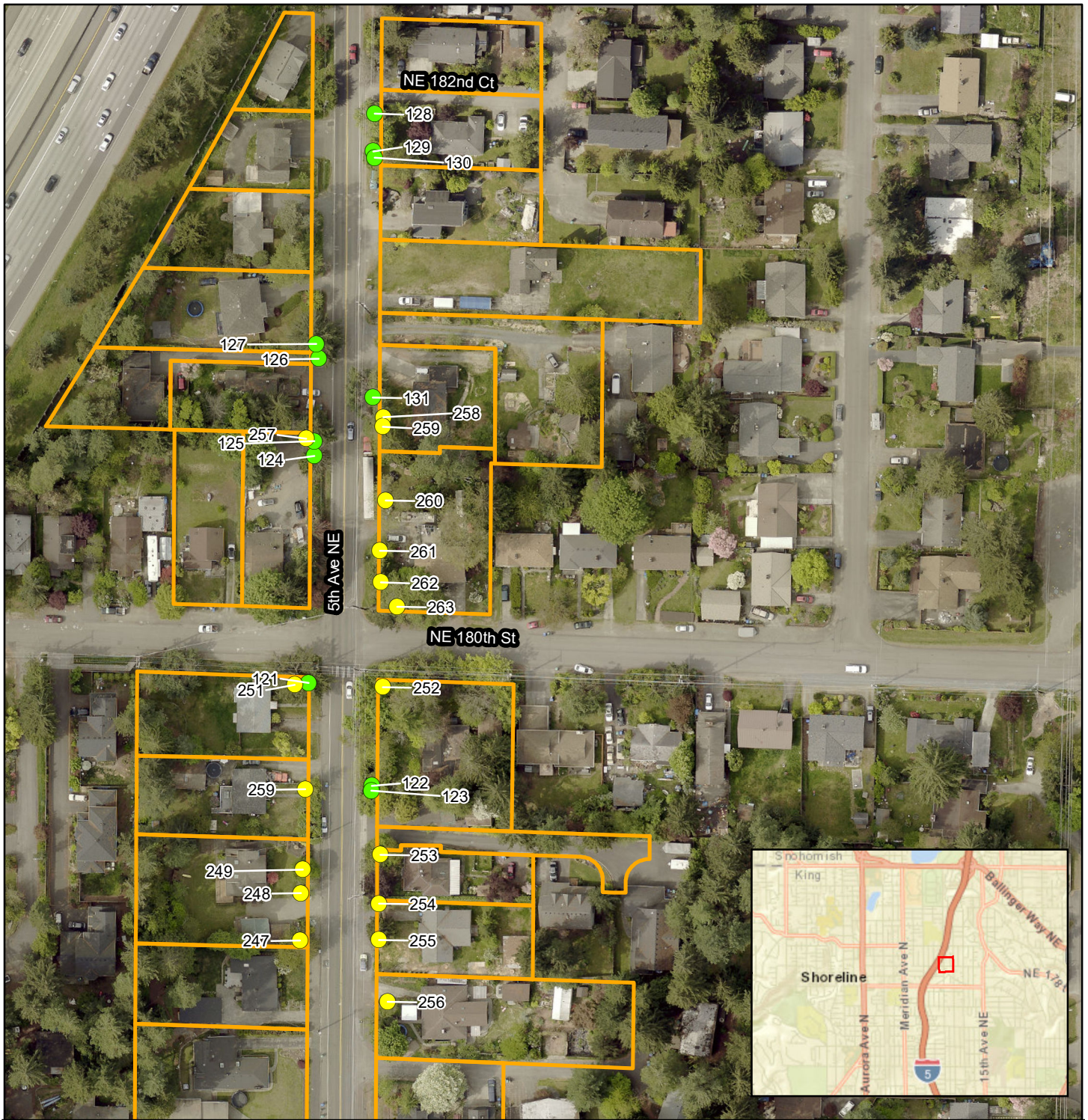
Enclosure A: Tree Inventory Table

TAG #	TREE NAME	EV / DEC	# STEMS	COMBINED DBH (IN)	HEIGHT (FT)	DRIPLINE BOUNDARY (FT)	CONDITION	CRITICAL ROOT ZONE (CRZ) (FT)	NOTES
101	Pinus nigra (Austrian pine)	E	1	15	40	14	Fair	15	History of pruning. Unbalanced canopy. Rootzone ends at existing sidewalk 2 ft from trunk.
102	Pseudotsuga menziesii (Douglas-fir)	E	1	14	45	15	Fair	14	Sparse canopy. Rooted at existing sidewalk. Growing out from slope bank.
103	Pseudotsuga menziesii (Douglas-fir)	E	1	20	70	15	Good	20	Rooted on retaining wall. Evidence of past pruning .
104	Tsuga heterophylla (Western hemlock)	E	1	23	45	16	Fair	23	Rooted on slope that break 5 ft from trunk. Shedding branches
105	Pseudotsuga menziesii (Douglas-fir)	E	1	7	45	15	Fair	7	Root zone extends to curb 2 ft from trunk
106	Pseudotsuga menziesii (Douglas-fir)	E	1	9	45	10	Fair	9	Sparse canopy. Rooted on slope approx. 2 ft from wall of garage.
107	Pseudotsuga menziesii (Douglas-fir)	E	1	17	50	18	Good	17	Growing around garage and rooted 2 ft from curb.
108	Thuja plicata (Western red cedar)	E	1	19	35	15	Good	19	
109	Chamaecyparis lawsoniana (Lawson falsecypress)	E	1	19	25	11	Good	19	Rooted 5 ft from curb.
110	Chamaecyparis lawsoniana (Lawson falsecypress)	E	1	20	35	20	Fair	20	Less than 1 ft from concrete bus stop. Exposed surface roots. Topped.
111	Pseudotsuga menziesii (Douglas-fir)	E	1	11	45	15	Fair	11	Rooted on slope, 10 ft from road.
112	Pseudotsuga menziesii (Douglas-fir)	E	1	15	35	15	Poor	15	Topped.
113	Pseudotsuga menziesii (Douglas-fir)	E	1	27	100	20	Good	27	
114	Thuja plicata (Western red cedar)	E	2	46	100	25	Good	46	Rooted 6 ft from road.
115	Thuja plicata (Western red cedar)	E	1	5	14	10	Good	5	
116	Thuja plicata (Western red cedar)	E	1	6	20	5	Poor	6	
117	Thuja plicata (Western red cedar)	E	1	36	100	20	Good	36	Ivy on stem. Rooted 6 ft from road.
118	Malus sp. (Crabapple)	D	3	11	20	12	Poor	11	Covered in ivy.
119	Thuja plicata (Western red cedar)	E	1	5	30	7	Fair	5	
120	Pinus monticola (Western white pine)	E	2	19	50	30	Poor	19	Covered in ivy. Rooted 10 ft from road.
121	Pseudotsuga menziesii (Douglas-fir)	E	1	22	25	25	Poor	22	Topped. Uncorrected lean. Unbalanced canopy. Utility wire conflicts.
122	Gleditsia triacanthos (Honeylocust)	D	2	11	30	15	Good	11	Ivy surrounding tree.
123	Gleditsia triacanthos (Honeylocust)	D	1	12	30	20	Good	12	Ivy surrounding tree.
124	Thuja plicata (Western red cedar)	E	3	16	50	15	Good	10	Leaning against fence.
125	Pseudotsuga menziesii (Douglas-fir)	E	1	20	75	20	Fair	20	Evidence of cut roots.
126	Pinus monticola (Western white pine)	E	1	7	25	10	Poor	7	Growing atop 127.
127	Pseudotsuga menziesii (Douglas-fir)	E	1	27	60	30	Fair	27	Rooted on steep slope. Crowded by 126.
128	Sorbus aucuparia (European mountain ash)	D	2	21	30	15	Fair	21	
129	Acer circinatum (Vine maple)	D	3	11	30	15	Poor	11	Has turkey tail, evidence of deadwood.
130	x Cuprocyparis leylandii (Leyland cypress)	E	2	10	30	15	Good	10	
131	Pinus monticola (Western white pine)	E	1	40	65	25	Poor	40	Poor structure .

TAG #	TREE NAME	EV / DEC	# STEMS	COMBINED DBH (IN)	HEIGHT (FT)	DRIPLINE BOUNDARY (FT)	CONDITION	CRITICAL ROOT ZONE (CRZ) (FT)	NOTES
200	Thuja plicata 'Excelsa' (Excelsa western Red Cedar)	E	1	12	25	8	Good	12	Rooted against driveway. 7 ft from sidewalk.
201	Thuja plicata (Western red cedar)	E	1	12	17	9	Fair	12	Rooted 2 ft from driveway. 6 ft from existing sidewalk.
202	Pseudotsuga menziesii (Douglas-fir)	E	1	24	100	26	Fair	24	Rooted behind fence, approx 12 ft from existing sidewalk.
203	Pinus monticola (Western white pine)	E	1	11	60	7	Poor	11	Sparse canopy. Rooted behind fence approx. 12 ft from sidewalk.
204	Pseudotsuga menziesii (Douglas-fir)	E	1	12	60	20	Fair	12	Leaning against fence. Rooted approx. 6 ft from sidewalk.
205	Pseudotsuga menziesii (Douglas-fir)	E	2	22	80	20	Poor	22	Rooted approx. 7 ft from sidewalk. On raised property.
206	Thuja plicata (Western red cedar)	E	1	15	45	20	Fair	15	Rooted 10 ft from curb
207	Pseudotsuga menziesii (Douglas-fir)	E	1	8	55	12	Poor	8	On steep slope. Rooted 6 ft from curb.
208	Pseudotsuga menziesii (Douglas-fir)	E	1	6	60	6	Poor	6	Sparse canopy. Rooted 6 ft from curb.
209	Pseudotsuga menziesii (Douglas-fir)	E	1	10	60	12	Poor	10	Rooted nn slope 4 ft from garage & 7 ft from curb.
210	Pseudotsuga menziesii (Douglas-fir)	E	1	14	100	20	Fair	14	Rooted on slope approx. 20 ft from curb.
211	Pseudotsuga menziesii (Douglas-fir)	E	1	14	100	20	Fair	14	
212	Pseudotsuga menziesii (Douglas-fir)	E	1	22	100	20	Good	22	Rooted 20 ft from curb.
213	Pseudotsuga menziesii (Douglas-fir)	E	1	12	45	15	Good	12	Rooted 17 ft from curb.
214	Pseudotsuga menziesii (Douglas-fir)	E	1	9	8	10	Good	9	Topped. 3 ft from retaining wall.
215	Pseudotsuga menziesii (Douglas-fir)	E	1	9	9	10	Good	9	Topped. 3 ft from retaining wall.
216	Pseudotsuga menziesii (Douglas-fir)	E	1	9	9	10	Good	9	
217	Pseudotsuga menziesii (Douglas-fir)	E	1	9	9	10	Good	9	
218	Pseudotsuga menziesii (Douglas-fir)	E	1	7	9	10	Good	7	
219	Pseudotsuga menziesii (Douglas-fir)	E	1	8	9	10	Good	8	
220	Pseudotsuga menziesii (Douglas-fir)	E	1	8	9	10	Good	8	
221	Pseudotsuga menziesii (Douglas-fir)	E	1	8	9	10	Good	8	
222	Pseudotsuga menziesii (Douglas-fir)	E	1	9	9	10	Good	9	
223	Pseudotsuga menziesii (Douglas-fir)	E	1	8	9	10	Good	8	
224	Pseudotsuga menziesii (Douglas-fir)	E	1	7	9	10	Good	7	
225	Pseudotsuga menziesii (Douglas-fir)	E	1	6	9	10	Good	6	
226	Pseudotsuga menziesii (Douglas-fir)	E	1	35	120	25	Good	35	Co-dominant at 12 ft.
227	Pseudotsuga menziesii (Douglas-fir)	E	1	22	120	30	Poor	22	Sparse canopy. Rooted 30 ft from ROW.
228	Pseudotsuga menziesii (Douglas-fir)	E	1	6	40	15	Fair	6	On retaining wall. 15 ft from ROW.
229	Pseudotsuga menziesii (Douglas-fir)	E	1	35	120	30	Good	35	Rooted behind fence 20 ft from ROW.
230	Pseudotsuga menziesii (Douglas-fir)	E	1	35	120	20	Fair	35	Roted near home. 35-40 from ROW.
231	Pseudotsuga menziesii (Douglas-fir)	E	1	22	100	20	Good	22	Rooted near fence. 25 ft fro ROW.
232	Pseudotsuga menziesii (Douglas-fir)	E	1	15	90	15	Fair	15	Sparse canopy. 20 ft from ROW.
233	Pseudotsuga menziesii (Douglas-fir)	E	1	25	120	20	Fair	25	Sparse canopy. 20 ft from ROW

TAG #	TREE NAME	EV / DEC	# STEMS	COMBINED DBH (IN)	HEIGHT (FT)	DRIPLINE BOUNDARY (FT)	CONDITION	CRITICAL ROOT ZONE (CRZ) (FT)	NOTES
234	Pseudotsuga menziesii (Douglas-fir)	E	1	18	100	16	Fair	18	Sparse canopy. Rooted 15 ft from ROW
235	Pseudotsuga menziesii (Douglas-fir)	E	1	22	100	25	Poor	22	Deadwood within canopy. Unbalanced canopy. Rooted 8 ft from ROW.
236	Pseudotsuga menziesii (Douglas-fir)	E	1	6	25	8	Severe	6	6 ft from ROW. Mostly dead. Covered in blackberry.
237	Pseudotsuga menziesii (Douglas-fir)	E	1	35	120	40	Fair	35	Rooted 20 ft from ROW.
238	Pseudotsuga menziesii (Douglas-fir)	E	1	8	70	15	Poor	8	Covered in ivy. 4 ft from ROW. Unbalanced canopy
239	Pseudotsuga menziesii (Douglas-fir)	E	1	12	55	15	Poor	12	Unbalanced canopy. Rooted 6 ft from ROW.
240	Pseudotsuga menziesii (Douglas-fir)	E	1	8	50	15	Poor	8	Past pruning pruned. Unbalanced canopy. Rooted 6 ft from ROW.
241	Pseudotsuga menziesii (Douglas-fir)	E	1	20	70	20	Poor	20	Poor structure. 6 ft from ROW.
242	Picea abies (Norway spruce)	E	1	15	100	9	Poor	15	Rooted 2 ft from ROW.
243	Picea abies (Norway spruce)	E	1	10	100	12	Fair	10	
244	Picea abies (Norway spruce)	E	1	7	100	12	Fair	7	
245	Picea abies (Norway spruce)	E	1	20	100	12	Fair	20	Ivy on stem.
246	Picea abies (Norway spruce)	E	1	18	100	12	Fair	18	Ivy on stem.
247	Prunus serrulata (Japanese flowering cherry)	D	1	15	40	16	Poor	15	Ivy on stem. Sparse canopy. Rooted 20 ft from ROW.
248	Betula pendula (European white birch)	D	1	12	40	16	Poor	12	Dead top. Possible Brone Birch Borer. 6 ft from ROW.
249	Cercidiphyllum japonicum (Katsuratree)	D	1	15	20	10	Good	15	Rooted 8 ft from ROW.
250	Ginkgo biloba (Maidenhair tree)	D	1	10	40	12	Good	10	Rooted 10 ft from ROW.
251	Pseudotsuga menziesii (Douglas-fir)	E	1	35	25	25	Poor	35	Broken top. 20 ft from ROW.
252	Acer saccharinum (Silver maple)	D	1	18	25	20	Fair	18	Rooted 15 ft from ROW
253	Thuja plicata (Western red cedar)	E	1	18	30	20	Fair	18	On raised landscape. 20 ft from sidewalk.
254	Pinus contorta (Shore pine)	E	1	15	20	15	Good	15	Topped. Rooted 4 ft from sidewalk.
255	Picea abies (Norway spruce)	E	1	22	40	12	Fair	22	Rooted 35 ft from edge of the road.
256	Fagus sylvatica (European beech)	D	1	12	30	15	Good	12	On raised property. Rooted 30 ft from edge of road.
257	Cornus florida (Flowering dogwood)	D	1	9	40	30	Dead	9	Rooted 10 ft from edge of road
258	Pinus monticola (Western white pine)	E	1	35	90	25	Poor	35	Rooted 30 ft from edge of road. Co-dominant stem at 15 ft. Dead leaders.
259	Gleditsia triacanthos (Honeylocust)	D	1	19	45	20	Fair	19	Rooted 25 ft from edge of the road
260	Gleditsia triacanthos (Honeylocust)	D	1	30	60	30	Good	30	Rooted 50 ft from edge of road.
261	Crataegus douglasii (Black hawthorn)	D	1	6	25	12	Good	6	Rooted 25 ft from edge of road.
262	Thuja plicata (Western red cedar)	E	1	15	30	15	Good	15	Rooted on rock wall. 25 ft from street.
263	Pseudotsuga menziesii (Douglas-fir)	E	1	13	55	15	Fair	13	Rooted 25 ft from road.

Enclosure B: Annotated Tree Map



5th Ave NE - Tree Inventory (North)

MATCHLINE

Legend

- Trees on Private Property
- Trees in ROW
- King County Parcels in Vicinity

Tree Inventory Map

Site Address: 5th Ave NE, from
NE 175th St to 182nd Ct
Parcel Number: Right of Way
Site Visit Date: June 1, 2020
Prepared for: KPFF
TWC Project #: 191008.1

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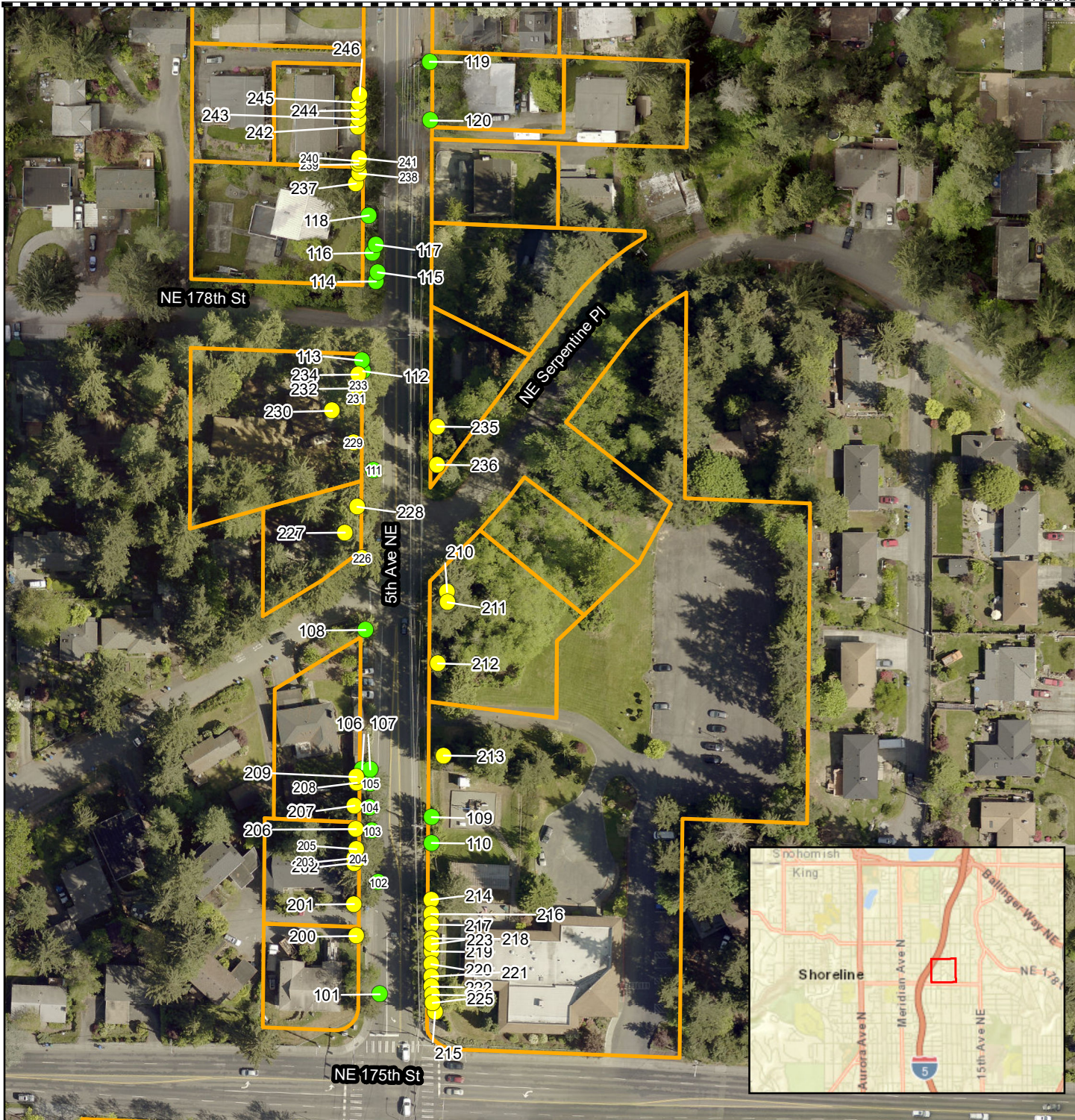


0 25 50 100 Feet



THE
WATERSHED
COMPANY

All significant trees located in the study area within the public right of way were tagged with a numbered round aluminum tag between 101-131. All significant trees located in the study area on private property were numbered between 200-263. For questions on tree locations, contact Jake Robertson at the Watershed Company. Phone: (425) 822-5242



5th Ave NE - Tree Inventory (South)

Legend

- Trees on Private Property
- Trees in ROW
- King County Parcels in Vicinity

Tree Inventory Map

Site Address: 5th Ave NE, from
NE 175th St to 182nd Ct
Parcel Number: Right of Way
Site Visit Date: June 1, 2020
Prepared for: KPFF
TWC Project #: 191008.1

N



0 25 50 100 Feet



THE
WATERSHED
COMPANY

All significant trees located in the study area within the public right of way were tagged with a numbered round aluminum tag between 101-131. All significant trees located in the study area on private property were tagged with a numbered round aluminum tag between 200-263. For questions on tree locations, contact Jake Robertson at the Watershed Company. Phone: (425) 822-5242