Arborist Report

Tree Retention Plan - September 2021

Prepared For:

Carly Bird-Vogel

8750 SE 48th St
Mercer Island, WA, 98040
206.819.6712
carly.birdvogel@gmail.com

Prepared By:

Davey Resource Group, Inc.

18809 10th Ave NE,
Shoreline, WA.
Contact: Marc Leonard
marc.leonard@davey.com
Local Office: 206.331.0869
Corporate Office: 800.828.8312

Notice of Disclaimer

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Introduction

Background

Davey Resource Group (DRG) was contracted by Carly Bird-Vogel to inspect and provide an arborist report and tree retention plan for the residence at 4304 E Mercer Way in Mercer Island, Washington. The client intends to develop the property.

Using a pen tablet computer, the arborist visited each tree on the site which was visually assessed, and the required tree data was collected within a GIS database. Following data collection, specific tree preservation plan elements were calculated that identified each tree's dripline and Limits Of Disturbance (LOD) to better ensure survivability during the planned development. The following details are provided in alignment with the information required by the City of Mercer Island Municipal Code (Mercer Island Municipal Codes 19.10):

- Description of how the arborist meets the threshold requirements for Qualified Arborist.
- A complete description of each tree's diameter, species, critical root zone, limits of allowable disturbance, health, condition, and viability.
- A description of the method(s) used to determine the limits of allowable disturbance (i.e., critical root zone, root plate diameter, or a case-by-case basis description for individual trees).
- Any special instructions specifically outlining any work proposed within the limits of disturbance protection areas (i.e. hand-digging, air space, tunneling, root pruning, any grade changes, clearing, monitoring, and aftercare).
- For trees not viable for retention, a description of the reason(s) for removal based on poor health, high risk of failure due to structure, defects, unavoidable isolation, wind firmness, unsuitability species, etc. If there is no reasonable alternative action (pruning, cabling, etc.) possible, replacement recommendations must be given.
- Describe the impact of necessary tree removal on the remaining trees, including those in a grove or on adjacent properties.
- Describe timing and installation of tree protection measures. Such measures must include fencing and be in accordance with the tree protection standards as outlined in MICC 19.10.
- The suggested location and species of replacement trees to be used when required. The report shall include planting and maintenance specifications to ensure long term survival.

Limits of the Assignment

There are many factors that can limit specific and accurate data when performing evaluations of trees, their conditions, and values. The determinations and recommendations presented here are based on current data and conditions that existed at the time of the evaluation and cannot be a predictor of the ultimate outcomes for the trees. A visual inspection was used to develop the findings, conclusions, and recommendations found in this report. Values were assigned to grade the attributes of the trees, including structure and canopy health, and to obtain an overall condition rating. No physical inspection of the upper canopy, sounding, root crown excavation, and resistograph or other technologies were used in the evaluation of the trees.

Methods

Data was collected by Marc Leonard (WE-11849AU), an ISA Certified Arborist, on September 9, 2021. A visual inspection was used to develop the findings, conclusions, and recommendations found in this report. No physical inspection of the upper canopy, sounding, root crown excavation, and resistograph or other technologies were used in the evaluation of the trees. The results will be used to determine the Limits Of Disturbance (LOD) and any other tree protection measures required during construction. Location and dripline of all trees six inches or greater in diameter at breast height (4.5 ft. above grade) were surveyed. The DBH of those trees with multiple stems was determined by taking the average measurement, per City guidelines.

The following attributes were collected for each site:

Tree Number: Tree ID number was assigned and a numbered aluminum tag was affixed to the tree.

Species: Trees were identified by genus and species, cultivar if evident, and by common name.

Diameter at Breast Height (DBH): Trunk diameter was recorded to the nearest inch at 4.5 feet (standard height) above grade except where noted. When limbs or deformities occurred at standard height, measurement was taken below 4.5 ft. The DBH of multi-trunk trees was determined by taking the square root of the sum of the DBH for each individual stem squared.

Height: Tree Height estimated to the nearest <5ft.

Avg. Crown Radius: Average dripline distance was measured.

Condition: Condition ratings were based on but not limited to:(1) the condition and environment of the tree's root crown; (2) the condition of the trunk, including decay, injury, callusing, or presence of fungus sporophore; (3) the condition of the limbs, including the strength of crotches, amount of deadwood, hollow areas, and whether there was excessive weight borne by them; (4) the condition and growth rate history of the twigs, including pest damage and diseases; (5) the leaf appearance, including abnormal size and density as well as pest and disease damage.

Using an average of the above factors together with the arborist's best judgment, the general condition of each tree was recorded in one of the following categories adapted from the rating system established by the International Society of Arboriculture and 10th Edition of the Council of Tree & Landscape Appraisers (CTLA) *Guide for Plant Appraisal*[1] :

- **Excellent (81%-100%):** High vigor and near-perfect health with little or no twig dieback, discoloration, or defoliation. Nearly ideal and free of structural defects. Nearly ideal form for the species and generally symmetrical.
- **Good (61%-80%):** Vigor is normal for the species and has no significant damage due to disease or pests. Twig dieback, discoloration, or defoliation is minor. Well-developed structure with minor defects that can be corrected easily. Minor asymmetries/deviations from species norm. Function and aesthetics are not compromised.
- **Fair (41%-60%):** 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 comprise up to 50% of the canopy. A single structural defect of a significant nature or multiple moderate defects. Structural defects are not practical to correct or

[1] Council of Tree and Landscape Appraisers. (2019). *Guide for Plant Appraisal, 10th Edition, Second Printing.* Atlanta, GA: International Society of Arboriculture.

would require multiple treatments over several years. Major asymmetries/deviations from species norm. Function and aesthetics are compromised.

- **Poor (21%-40%):** Unhealthy and declining in appearance. Poor vigor and low foliage density and poor foliage color are present. Potentially fatal pest infestation. Extensive twig or branch dieback. A single serious structural defect or multiple significant defects. Observed structural problems cannot be corrected. Failure may occur at any time. Largely asymmetrical or abnormal form. Form detracts from aesthetics or intended use to a significant degree.
- **Very Poor (6%-20%):** Poor vigor and appears to be dying. Little live foliage. Single or multiple severe structural defects. Visually unappealing and provides little or no function in the landscape.
- **Dead (0%-5%)**

Observations

A total of nineteen (19) trees were inspected at the site. Five (5) trees are in good condition. Three (3) trees are in fair condition. Eight (8) trees are in poor condition. Three (3) trees are in very poor condition.

Tree ID# 9000 is a Common hawthorn *(Crataegus monogyna)* and is owned by the property to the south at 9729 SE 43rd Street.

Tree ID# 743 & 744 are English holly *(Ilex aquifolium)*, which is identified as a 'Weed of Concern' by the Noxious Weed Control Board of King County. The County does not require the removal of the species, however, it is encouraged.

Tree ID# 743, 744, 745, 746, 9000, 748, 749, 750, 751, 752 & 753 are all located along the breezeway on the south side of the property and within a utility right-of-way. These trees have been subjected to utility pruning and will have structural imperfections due to poor pruning practices.

Tree ID# 749 & 750 are Cherry laurel *(Prunus laurocerasus)* and in very poor condition. Both trees were previously cut down to a stump at ground height. The resulting regrowth from heavy re-sprouting has led to many codominant stems with weak union attachments and poor taper. The Noxious Weed Control Board of King County designates the species as a 'Weed of Concern.'

Tree ID# 755 is a Douglas fir *(Pseudotsuga menziesii)* with a DBH exceeding 30 inches and is subsequently deemed an '**Exceptional Tree**' by Mercer Island City. Due to this, the tree has a higher priority for retention.

Tree ID# 756 is a Red alder *(Alnus rubra)* in very poor condition and is exhibiting signs of Collar Rot (*Phytophthora alni*). These signs include patches on the bark at the base of the trunk of the tree that are reddish-to-dark-brown in color with stains from oozing fluids. There is also a crack near the soil line of the trunk in the area of the bleeding canker. Further up the trunk at 12 feet above the ground, a larger decay pocket is present at the base of the crotch where the two codominant stems diverge. This decay pocket is on the northeast side of the tree and is roughly 3 ½ feet tall and 8 inches wide. The decay appears to be penetrating the heartwood of the tree and the depth of the decay is unknown. No apparent canopy symptoms were observed.

Tree ID#'s 757 & 758 are Western redcedars *(Thuja plicata)* with a DBH greater than 24 inches. Due to this size, Mercer Island City recognizes the trees as having a higher priority for retention.

Eight (8) of the nineteen (19) trees on site (**Tree ID# 743, 744, 745, 746, 749, 755, 757, 759 & 760)** have English ivy *(Hedera helix)* presently growing on the trunk or up the canopy.

The Tree Inventory table with data attributes for each tree inventoried can be found in Appendix B of this report.

Analysis & Recommendations

As with most tree preservation planning, a critical element is minimizing root disturbance. When evaluating tree root disturbance during construction there are two considerations; the removal of absorption roots and removal of anchoring roots. Removal (or compaction in the area) of the absorption roots can cause immediate water stress and a significant decline in tree health. The ability of a tree to survive the loss of absorption roots is dependent on its tolerance of drought, tree health, and the ability to form new roots quickly. Removal of the larger anchoring roots can lead to structural instability. Trees that suffer substantial root loss or damage are seldom good candidates for preservation.

The Critical Root Zone (CRZ) is considered the ideal preservation area of the root zone of a tree. It is measured as one (1) foot of radius for every inch of trunk diameter measured at 4.5 feet from grade. CRZ measurements are calculated from DBH and may not be an accurate representation of the actual dimensions of the root zone of the trees in the field. Many factors can limit root growth and expansion such as degree of slope, present hardscape or heavily compacted areas, and/or tree health. Final selections for tree preservation are largely determined by the percentage of Critical Root Zone impacted and calculated using a commonly accepted method established by Dr. Kim Coder in Construction Damage Assessments: Trees and Sites[2].

Priority Recommendations Related to Proposed Construction

For all trees on the property, standard tree protection measures provided in subsequent sections of this report will be appropriate. Exceptions will be required to accommodate construction around trees that will have the proposed development project impact the CRZ**.**

Tree ID# 749 & 750. Cherry laurel *(Prunus laurocerasus)* trees are considered to be a 'Weed of Concern' by the County and are not encouraged to be retained. Given the poor structure and condition of the trees, removal is recommended.

Tree ID# 743 & 744 are English holly *(Ilex aquifolium)* and identified as a 'Weed of Concern' by King County. Despite this classification, both trees are in fair condition and are not likely to be disturbed by the proposed construction plans. The two trees have a lower priority for retention than the other trees on-site and would be good candidates for removals if desired.

The retained trees on-site that have English ivy *(Hedera helix)* presently growing on the trunk or canopy should have vines removed to the fullest extent. English ivy is invasive and extremely well adapted to outcompeting mature trees for sunlight and subsequent energy production. Severing the main vine from ground level (girdling) will stop the growth from advancing further up the canopy. Vines that have been girdled can remain in the tree to decompose and fall away from the tree over time.

Tree ID# 756 is a Red alder *(Alnus rubra)* in very poor condition. The tree has a large decay pocket on the trunk and shows signs of *Phytophthora aln*i, a plant pathogen that causes lethal root and collar rot in

[2] Dr. Kim Coder, University of Georgia June 1996

Alder trees. Due to this, the tree has a lower retention priority than the other trees on-site and could be removed. A Tree Risk Assessment performed by an ISA Certified arborist should be completed if retention is desirable. The performance of a Tree Risk Assessment will better gauge the extent of possible hazards presented by the decay pocket in the trunk of the tree that may pose a threat to the residents and neighboring residents.

Managing the spread of *Phytophthora alni* is difficult, as there are no fungicides specifically registered to the pathogen. The Pacific Northwest Pest Management Handbooks recommends that actions be taken in order to control the cultural aspects of the site. Cultural controls include:

- Plant in areas with good drainage.
- Do not allow lawn sprinklers to wet the lower trunk of the tree.
- Correct drainage problems around trees.

Though it is not viable to relocate the tree to an area with good drainage, better watering practices should be employed to ensure that the soil is not being oversaturated for extended periods of time. Monitoring the health and vigor of the tree is important when looking for indicators that the pathogen is spreading.

The site-specific recommendations are as follows:

- Install tree protection fencing for any tree on-site according to standard tree protection measures at the beginning of the project.
- Any demolition or construction activities that are likely to take place within the LOD of retained trees will need to be supervised by an ISA Certified arborist to ensure that the trees are not damaged.
- When anticipated construction activity requires ingress into the LOD, temporarily adjust the fence limits as little as necessary to allow access.
- The supervising arborist will make recommendations at the time of construction to ensure suitable tree protection standards are followed.
- Prohibit any heavy machinery from operating within the CRZ of the trees.

Limits Of Disturbance & Timing

To ensure the long-term viability of trees and stands identified for protection, construction activities shall comply with the minimum required tree protection through an established Limit of Disturbance (LOD) for those trees determined to remain on the site.

- LOD fencing will be installed outside the dripline, at a minimum, of all retained trees. It is recommended that LOD fencing be installed to encompass as much of the tree's root zone as is allowable by design plans.
- Preventative measures are recommended in addition to the installation of tree protection barriers for retained trees including mulching over the drip line, supplemental fertilization for stressed trees, supplemental irrigation as necessary, soil amendments and soil aeration, and pruning to remove deadwood or create clearance on trees to be protected.
- Mulch the root zones of all significant trees to be retained during construction with 3" of organic mulch or arborist wood chips to help maintain moisture, avoid soil compaction, and avoid runoff.
- Instal**l** tree protection fencing for all remaining significant trees on the site and all those trees with canopies that extend onto the subject property.
- LOD fencing will follow the edge of building/road/paved paths where necessary and are not required to extend to the dripline where impervious surfaces are determined to be the limiting factor for root development (fence following existing curb does not trigger 'impact' status). Tree protection fencing may be installed at the edge of the impermeable or paved surfaces for those trees whose driplines extend over the edge.
- LOD fencing shall be a minimum of 4 feet high, constructed of chain link or polyethylene laminar safety fencing or similar material.
- "Tree Protection Area - Keep Out" or similar signs are required to accompany the LOD fencing at regular intervals and include the contact information of the consulting arborist or entity responsible for enforcing tree protection standards.
- LODs shall be constructed in such a fashion as to not be easily moved or dismantled.
- LODs shall remain in place for the entirety of the project and only removed, temporarily or otherwise, with authorization by an ISA-certified arborist after submission and approval of intent.
- Any entry or work within the LOD of retained trees is prohibited.This includes but is not limited to the storage of materials, parking, or contaminating soil by washing out equipment.
- Retain a site arborist for the duration of the project that may conduct periodic site visits to investigate tree protection compliance any changes to tree condition.

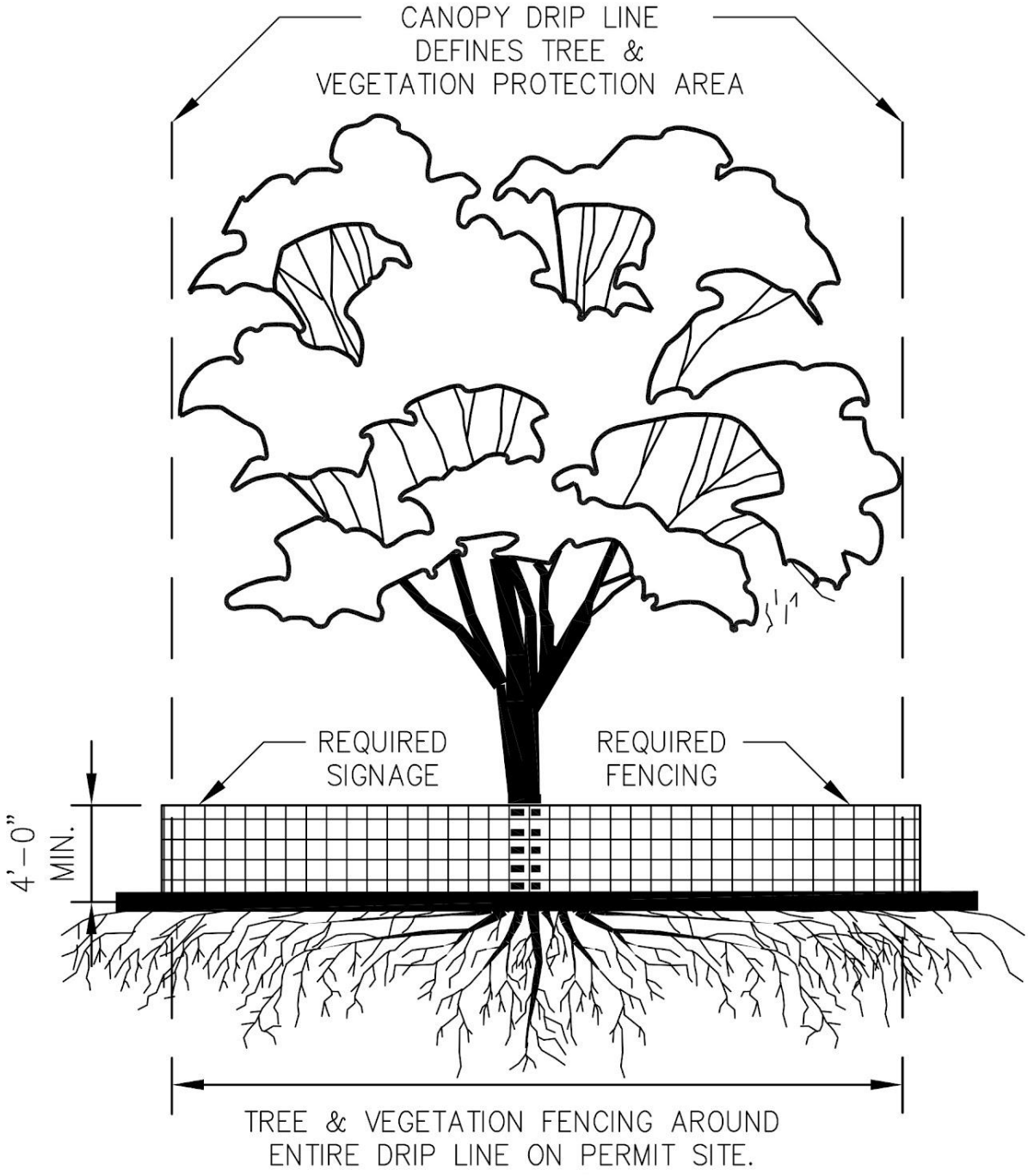

Image 1. An example of a Limit of Disturbance barrier. Contact information of the site manager or consulting arborist should also be included on the sign.

Pre-Development Tree Care

Successful tree preservation efforts begin in the planning and design phase. In order to select the appropriate trees for preservation and then incorporate those trees into future development plans, site managers and designers need detailed information on the health and status of the existing trees. This report satisfies the conditions of the critical first step in the preservation process: a tree inventory, assessment, and analysis conducted by a qualified professional. The resulting findings guide the beginning stages of the preservation process.

Condition rating and preservation priority rating help nominate potential candidates for preservation. Development plans should ensure that no impact or root damage occurs within the inner root zone and plans should take into consideration the significant reduction in the likelihood of tree survival when the root zone is impacted. After individual trees are selected for preservation, the following action-steps are recommended prior to development activities:

- **Prune** trees, as necessary, to remove existing deadwood and stubs. This strategy controls potential future vectors of decay. Clean cuts made at branch collars allow the tree to undergo its natural process of compartmentalizing wounds, preventing the spread of decay. During the pruning process, remove as minimal amount of live foliage as possible and no more than 25% removal in any one season while allowing for the safe and unimpeded operation of construction activities.
- **Install Limits Of Disturbance** (LOD) fencing out to the furthest possible radius distance from the tree.
- If the soil within the LOD is compacted, then **aerate the soil** using an air spade to alleviate compaction and promote the flow of oxygen and water to the roots.
- **Add a 3-inch layer of mulch** to the portion of the root zone protected by the LOD. Be sure not to cover/bury the tree root collar. Mulch aids the soil in water retention and also helps insulate the soil from hot and cold weather extremes.
- Where possible, **add a 12-inch layer of wood chips** over any parts of a root zone not protected by the LOD. This aids in reducing the impact of soil compaction from heavy equipment during the upcoming construction activities.

Tree Care During Development

Once development begins, several measures are necessary to help ensure optimal outcomes for all trees selected for preservation:

- **Retain a Certified Arborist** on site to monitor activities and assess impacts to trees. The arborist can make as-needed recommendations to improve tree preservation activities throughout the development process. This is particularly important in order to make a timely response when a preserved tree is accidentally damaged or otherwise impacted during development.
- **Signage** instructing site workers not to enter Limits Of Disturbance should be posted throughout the job site. Signage should be posted in both English and Spanish as well as any other language as deemed necessary by site managers.

- **Discuss tree protection** regularly at required staff meetings. Reiterate the importance of respecting the Limits Of Disturbance as critical to the safety of staff working on site and the success of tree preservation efforts.
- Strictly **enforce** the Limits Of Disturbance as “No-Go” zones. No activity, human or machinery, should breach the established LOD.
- **Root prune** where any grading or trenching occurs within the critical root zone.
- Ensure the area within the LOD receives the **weekly watering** equivalent to the amount of average natural rainfall for the specific development site. When the amount of natural rainfall received is less than the historical average, manual watering methods should be employed. The on-site Certified Arborist can make the determination when additional manual watering is necessary.
- **Do not raise or lower the soil grade near the LOD**. A tree relies upon small, non-woody roots called feeder roots for the absorption of water and nutrients. These roots predominantly reside in the upper several inches of soil, just below grade. Lowering the soil grade, even just a few inches, will sever these feeder roots and compromise tree health. Raising the soil above existing grade, such as through the addition of fill soil, buries feeder roots too deep and restricts feeder root access to water and oxygen.

Post-Development

A successful tree preservation effort continues well past the conclusion of development activities:

- The preserved trees should be **re-inspected** for signs of impact that may have gone undetected during construction and mitigation measures assigned accordingly.
- The preserved trees should be placed on a **seasonal care plan** for two years that includes both monitoring and routine soil inoculation treatments designed to stimulate new root growth.
- Annual monitoring should continue for several years, as the effects of construction may take anywhere from 3 to 7 years to become visibly apparent.

Concluding Remarks

This report, along with the tree inventory, is the first step in preserving the health, function, and value of the trees on the site during and after development. Trees and green spaces provide benefits and add value to residential properties. Tree preservation starts with a basic understanding of the health and structure of the trees on the site. With proper care and protection, these trees can continue to thrive. Tree protection guidelines and strategies should be shared with contractors and employers prior to any disturbance at the site.

The suitability of a tree for preservation is a qualitative process based on the interaction of a variety of influencing factors. A tree inventory and arborist report provides a snapshot in time of each individual tree assessed across many of the most important observable factors relative to preservation. Healthy, vigorous trees better tolerate impacts from construction and more readily adapt to the new site conditions that exist after completion of development. Additionally, tolerance to impact from construction activities varies across species and sites. The percentage impact on the Limits Of Disturbance also greatly influences the suitability of a particular tree for preservation.

Successful tree preservation requires a team effort to find the right balance and select the appropriate trees. Using the findings of this report as a guiding foundation, planners are equipped to design, prepare, and implement a tree preservation plan tailored to achieving the optimal outcome.

Appendix A: Inventory Site Map

Map 1. Site map showing tree ID number. Aerial photos are only used for reference. Map projections may distort tree canopy size and locations.

Tree Sites
Condition
- Good
- Fair
- Poor
- Very Poor
- Avg Dripline

Tree Inventory

4304 E Mercer Way
Mercer Island, WA
September 2021

N
Feet
0 12.5 25 50

*Tree locations are approximate. Map projections can distort aerial imagery.

Prepared by:
DAVEY Resource Group

Appendix B. Inventory Table

Tree ID#	Species	Condition	DBH (in)*	Height (ft)	Avg Canopy Radius (ft)	CRZ (radius,ft)	Observations
743	English holly *(Ilex aquifolium)*	Fair	10	25	5	10	Topped, Vines, Codominant Stem, Overhead Utilities
744	English holly *(Ilex aquifolium)*	Fair	10 (6, 9)	30	5	10	Codominant Stem, Vines, Small Deadwood (-3"), Topped, Overhead Utilities
745	Douglas fir *(Pseudotsuga menziesii)*	Good	15	75	15	15	Overhead Utilities, Vines, Small Deadwood (-3")
746	Western redcedar *(Thuja plicata)*	Good	19	70	15	19	Vines, Overhead Utilities
9000	Common hawthorn *(Crataegus monogyna)*	Poor	13 (9, 7, 7)	25	15	13	Codominant Stem, Topped, Overhead Utilities, Lean
747	Cherry laurel *(Prunus laurocerasus)*	Poor	10 (5, 4, 3, 2, 1)	20	5	10	Codominant Stem, Vines, Poor Structure, Onesided
748	Golden chain tree *(Laburnum watereri)*	Poor	8 (3, 4, 4, 4, 4)	35	5	8	Basal Decay, Codominant Stem, Topped, Overhead Utilities
749	Cherry laurel *(Prunus laurocerasus)*	Very Poor	17 (3, 6, 7, 5, 11, 2, 6, 3, 2, 3, 3, 1)	40	10	17	Trunk Decay, Codominant Stem, Topped, Codominant Branches, Broken Limbs, Girdling Roots, Full Crown, Overhead Utilities, Vines
750	Cherry laurel *(Prunus laurocerasus)*	Very Poor	14 (7, 7, 7, 3, 3, 5, 2, 2, 2, 2 2, 1, 1, 1, 1, 1, 1, 1)	30	10	14	Codominant Stem, Topped, Overhead Utilities, Girdling Roots, Fruiting Bodies, Codominant Branches
751	Cherry laurel *(Prunus laurocerasus)*	Poor	11 (8, 5, 5, 3, 3)	30	15	11	Codominant Stem, Overhead Utilities, Girdling Roots, Topped, Lean
752	Cherry laurel *(Prunus laurocerasus)*	Poor	7	30	5	7	Trunk Decay, Overhead Utilities, Topped, Mechanical Damage

Tree ID#	Species	Condition	DBH (in)*	Height (ft)	Avg Canopy Radius (ft)		Observations
753	Cherry laurel *(Prunus laurocerasus)*	Poor	13 (13, 2, 2, 1, 1)	45	20	13	Overhead Utilities, Topped, Codominant Stem, Codominant Branches, Weak Union
754	Cherry laurel *(Prunus laurocerasus)*	Poor	21 (10, 3, 10, 11, 11, 2)	45	20	21	Codominant Stem, Topped, Included Bark, Onesided, Overhead Utilities
755	Douglas fir *(Pseudotsuga menziesii)*	Good	40	140	35	40	**Exceptional Tree.** Vines, Slope
756	Red alder *(Alnus rubra)*	Very Poor	21	80	15	21	Cavity, Basal Decay Codominant Stem, Small Deadwood (-3")
757	Western redcedar *(Thuja plicata)*	Good	24	65	20	24	Girdling Roots, Vines
758	Western redcedar *(Thuja plicata)*	Good	28	85	15	28	Small Deadwood (<3")
759	Norway spruce *(Picea abies)*	Fair	20	65	5	20	Codominant Stem, Vines, Small Deadwood (-3")
760	Cherry Species (*Prunus spp.*)	Poor	16	35	15	16	Basal Decay, Vines, Codominant Stem, Small Deadwood (-3"), Poor Structure

***DBH for individual stems of multi-stem trees in parenthesis**