Tree Solutions Inc
Consulting Arborists

Project No. TS - 7682

Arborist Report

To:	The Miller Hull Partnership LLP
Site:	Matthew Wiley Property 6838 96th Ave SE, Mercer Island
Re:	Tree Inventory
Date:	September 15, 2021
Project Arborist:	Andrea Starbird ISA Certified Arborist #PN-9084A ISA Qualified Tree Risk Assessor
	Connor McDermott ISA Certified Arborist #PN-8704A ISA Qualified Tree Risk Assessor
Reviewed By:	Joseph Sutton-Holcomb ISA Certified Arborist #PN-8397AM Municipal Specialist, Qualified Tree Risk Assessor
Referenced Documents:	Mercer Island House Progress Set: The Miller Hull Partnership LLP Civil Progress Set (8/27/2021) Structural Progress Set (8/11/2021) Landscape Progress Set (8/30/2021)
Attached:	Table of Trees Tree Site Map

Summary

Tree Solutions Inc. inventoried and assessed 33 trees on this lot. Based on the Mercer Island City Code (MICC) large (regulated) and exceptional trees are required to be assessed for development projects. We tagged each tree with an aluminum tree tag. Tree identifier corresponds to the number on each tag.

We included three on-site trees below regulated size. These trees are likely to be impacted by development, are shared trees, or will likely be regulated by the time development begins. A small Japanese maple (*Acer palmatum*), identified as ACPA-NR in our tree table, is not tagged.

Of the trees assessed, seven on-site trees met the exceptional tree criteria outlined in the MICC.

We found two tree groves on site. The first is on the southwest corner of the property and includes trees 332 through tree 344 and off-site trees A and B. The second grove is upslope along the northern property line and includes trees 345 through 362 and off-site trees D and E. Trees that are part of a grove shall also be considered exceptional trees unless they also meet the definition of a hazardous tree.

There were 12 adjacent trees that required documentation for this property. Trees on neighboring properties were documented if they appeared to be greater than 10-inches diameter and their driplines extended over the property line, or if they were likely to be impacted by development. All trees on adjacent properties were estimated from the subject site or from public property such as the adjacent right-of-way. We used an alphabetical tree identifier for trees off-site. Two off-site trees, trees B and C, meet the MICC exceptional tree criteria.

Assignment and Scope of Work

This report outlines the site inspection by Andrea Starbird and Connor McDermott of Tree Solutions Inc, on April 15th, 2021. We were asked to visit the site and provide a report including findings and management recommendations. April Ng, of Miller Hull Partnership LLP, requested these services for project planning purposes.

Observations & Discussion

Site

This 41,214 square foot site is located on 96th Ave SE in Mercer Island and is zoned single-family residential. There is an existing single-family home, detached garage, driveway, and garden shed on the site.

According to the King County iMap, the entire site is located within a steep slope erosion hazard environmentally critical area. There are steep slopes on the north and south sides of the property, and the site slopes east toward Lake Washington.

The understory is primarily invasive ivy (*Hedera helix*) with some areas vegetated with native sword fern (*Polystichum munitum*). The amount and density of the ivy will affect the tree and vegetation management. We recommend managing ivy on the site.

Trees

Thirty-three trees were assessed on site. Three of these trees are below regulated size, one of which is not tagged. Tree health and structural condition ranged from good to poor. Details for each tree are included in the attached table of trees.

Tree species on the site are primarily western redcedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*) and bigleaf maple (*Acer macrophyllum*). Several other native and ornamental species are present throughout the site.

There are two groves on site. The first grove (grove 1), is on the southwest corner of the property and includes trees 332 through tree 344 and off-site trees A and B. The second grove (grove 2), is upslope along the northern property line and includes trees 345 through 362 and off-site trees D and E.

Tree 344 is an exceptional size 49.7-inch DSH western redcedar tree in good health and structural condition growing west of the existing garage.

Tree 336 is a bigleaf maple in fair health and poor structural condition, this tree is codominant, and the southern leader targets the house on the property to the south. We recommend further assessment of this tree to provide management options and recommendations.

Tree 339 is a bigleaf maple in poor health and structural condition. It is codominant at 5 feet and targets the house to south. We recommend reducing this tree to a wildlife snag. This species will continue to put out live growth; new regrowth should be managed with pruning every 3 to 5 years.

Tree 341 is a bigleaf maple in fair health and fair to poor health and structural condition. We recommend reducing this tree to a wildlife snag.

Tree 357 is an exceptional western redcedar that has been previously topped and as a result has many codominant reiterated leaders. Based on our limited visual assessment, unions appear stable at this time. An aerial inspection would provide more information about canopy stability. Tree Solutions can perform an aerial assessment of this tree upon request.

Tree 362 is a 31-inch DSH Sawara cypress (*Chamaecyparis pisifera*) in good health and structural condition located within a small, fenced area near the garden shed just north of the house.

Off-site tree C is a large western redcedar that has a broken top and three codominant reiterations growing asymmetrically to the east. We recommend a follow-up assessment of this tree, in coordination with the adjacent property owner, to assess structural stability and provide recommendations for long-term management.

We have included an annotated survey of the site to serve as the site map.

Construction Impacts
Most recent plans (Mercer Island House Progress Set, Miller Hull Partnership LLP dated between 8/11-8/27/2021) propose a new single-family home. The proposed footprint will largely match the footprint of the existing home and existing driveway but will have an extended overhang to the west and a new covered walkway connecting the garage.

The existing garage will be removed and replaced, and the existing garden shed will be removed and replaced with a prefabricated shed. The concrete driveway and several retaining walls across the site will also be removed and replaced.

<u>Tree 332</u>
Tree 332 is a codominant bitter cherry tree (*Prunus emarginata*) that overhangs the existing driveway. This tree is proposed for removal to allow for construction access.

<u>Tree Protection:</u>
Tree protection must meet the requirements as outlined by MICC. Additional tree protection specifications are provided in Appendix F.

Recommended limits of disturbance (RLOD) for each retained tree both on and off site are provided in the attached table of trees. Tree protection fencing should be placed at the limits of disturbance for each tree and only moved to accommodate required work.

Any equipment staging for demolition should remain outside the RLOD of all on and off-site trees. If equipment must enter tree protection areas, soil protection is required. Install a layer 6-inches deep of coarse arborist wood chips or hog fuel and cover with ¾ inch plywood or composite mats, such as

AlturnaMats. This will help disperse the weight from machinery and prevent damage to tree roots through soil compaction.

No grade cuts should occur within the RLOD of any retained trees on or off site. If the grade must be raised, limit fill to 1 foot of well-draining topsoil kept at least 1 foot away from the trunk. If grade changes must occur within the RLOD, coordinate design with the project arborist to limit impacts to roots.

Work that is required within the RLOD of all retained trees and off site, even if it extends beyond the fencing, is subject to alternative methods as outlined in the tree protection specifications in Appendix F and as called out in this report.

All groundwork within the tree protection areas should be monitored by the project arborist to assess root impacts and guide any root cutting as necessary.

Stormwater Infrastructure

The Civil Progress Set dated 8/27/2021 shows storm drainage lines running through the tree protection areas of tree 362 and off-site trees F through K. Per a project meeting with Miller Hull and LPD Engineering, these lines will be relocated to outside the limits of disturbance for these trees; Tree Solutions has not verified that plans have been updated at this time.

The storm line near 362 should be adjusted to follow the footprint of the house as closely as possible. While this is still within the RLOD, because of existing site conditions it is our opinion the impacts to the tree will be minor if the line location is adjusted.

The storm line near F through K should be relocated north, outside the RLOD.

Excavation required for storm infrastructure near retained trees should be monitored by the project arborist. Any roots larger than 2-inches diameter should be retained and worked around or cut cleanly. The arborist monitoring site work can guide root management during work and assess potential root impacts.

Tree 344

The RLOD for tree 344 is 33 feet. Work proposed within this distance of the tree must be coordinated with the project arborist and may require monitoring. Work within the RLOD is subject to tree protection specifications in Appendix F.

Railroad timbers:

There are large railroad timbers throughout the garden bed area east of tree 344. These timbers are proposed for removal and the area will be regraded. All of this work falls within the RLOD for this tree. Removal of the timbers must be done with equipment that is staged outside the tree protection area, or soil protection must be in place.

Should any roots 2-inches and diameter be exposed during the work, the arborist monitoring the work should ensure roots are cut cleanly or worked around and kept moist until the area is backfilled. Under no circumstances may timbers be pulled from the site if roots are intertwined with them. If necessary, cut the timbers into smaller pieces and abandon in place, or bury in place to accommodate new planting beds.

Retaining walls:
There is an existing retaining wall northeast of tree 344 planned for replacement. The wall should be replaced following the same footprint. If layback or over-excavation beyond 1-2 feet is required to accommodate drainage, a subbase or wall footings, consider constructing the wall just north of its current location and backfilling to meet existing grade. Care should be taken to prevent any soil shifting when the retaining walls are replaced to avoid potentially disturbing tree roots.

Tree 362
The RLOD for tree 362 is 21 feet. Because of existing site conditions, most of the work proposed near tree 362, including demolition of the existing home, falls within the RLOD. Note on the plan set that required work in this area is all within the tree protection area. All work within the tree protection area is subject to arborist monitoring and tree protection specifications outlined in Appendix F. Alternative methods may be required.

Shed demolition and replacement:
To preserve the root system of tree 362 and the adjacent off-site trees, the shed should be demolished carefully with equipment staged outside the tree protection area. The project arborist should be on site to monitor this work and document any root impacts. The soil area exposed by the removal should be backfilled with native soil from the site or well-draining topsoil or prepped for new landscaping.

If the soil exposed in the shed footprint is compacted, consider decompacting the soil with pneumatic air tools and integrating new planting soil prior to installing new plantings. Tree Solutions can perform pneumatic air work on this site upon request.

When installing the proposed prefabricated shed, install the foundation on a platform with sonotube footings. Exact footing locations should be finalized in the field and oriented to avoid impacting any structural roots of tree 362. Any excavation for footings must use excavation methods and specifications as indicated in the tree protection specifications provided in Appendix F.

Demolition of existing home:
The demolition of the existing home should be done from the west and south. Stage all equipment outside of the RLOD as possible. When access is required through the tree protection area, equipment may only traverse soils if adequately protected.

Clearance pruning:
Tree 362, several trees below regulated size growing as a hedge east of tree 362, and tree L, may require clearance pruning to accommodate demolition and construction access.

Tree 363 and trees F through K may require clearance pruning for construction of the westward overhang.

Tree 363 is a saucer magnolia (Magnolia × soulangeana) below regulated size. We included it in our inventory as it is likely to be impacted by proposed plans. The tree has an asymmetric, low-growing canopy. Depending on access requirements for demolition and construction, this tree may not be suitable for retention, as clearance pruning would remove an extensive amount of the canopy. This tree may be shared with the property to the south; we were not able to establish the exact location of the property line while on the site.

Trees F through K will require clearance pruning to accommodate the construction of the westward building overhang. Two of these adjacent trees, H and I, will require the most canopy management to provide construction clearance. To reduce canopy loss, use a combination of pruning and limb tying to achieve the required clearance. Pruning should be limited to the minimum required to meet access needs and must be performed by an ISA Certified Arborist.

Tree Solutions can provide detailed pruning specifications upon request.

Landscape and irrigation:
The Landscape Progress Set produced by Berger Partnership calls for importing topsoil across the site to support new plantings. We observed viable native soils on the site and do not recommend tilling in in any existing soils associated with trees, even beyond the RLOD, unless soils are compacted and deemed incapable of supporting restoration plantings.

The landscape notes specify that areas around existing trees shall not be cultivated within a minimum 8-foot radius around the trunk or tilled within the dripline, both which are well within the RLOD. Update the plans to avoid tilling or cultivation of soils within the RLOD for each tree.

In areas within the RLOD where soils must be amended to support new plantings, all soil preparation and amendment should be limited to the top 4-6 inches, approved by the project arborist, and done by hand methods only. Under no circumstances shall soils be excavated from within the RLOD of retained trees.

Design irrigation plans so that trenching for lines remains outside the RLOD of retained trees.

Recommendations

- Obtain all necessary permits and approval from the City prior to commencement of site work.
- Update plans to:
    - Show the limits of disturbance for all retained trees on and off site.
    - Show the location of tree protection fencing.
    - Identify areas where required work falls within a tree protection area, particularly where fencing may not encompass the area due to existing infrastructure.
        - Include notes to show that work within the tree protection area may require arborist monitoring and is subject to alternative methods and tree protection specifications as outlined in Appendix F.
        - This is particularly important near trees 344, 362 and the row of off-site trees along the southern property line (trees F through K)
    - Type of erosion control used within tree protection areas.
    - Amend location of soil amendment; do not excavate soils within RLOD of trees.
- Avoid grade cuts within the RLOD and limit fill to 1-foot of well-draining uncompacted soil.
- Design irrigation plans so that any trenching remains outside of RLOD of trees.

- All pruning should be conducted by an ISA certified arborist following current ANSI A300 specifications.
- All tree retention and removal regulations must be followed and are outlined in MICC Chapter 19.10 Trees.
- Ensure tree protection standards comply with MICC 19.10.080 and ISA Best Management Practices (BMP) – Managing Trees During Construction.
- Remove invasive ivy across the site and revegetate with non-invasive ornamental plantings or native understory plants.

Respectfully submitted,

Andrea Starbird & Connor McDermott,
Consulting Arborists

Glossary

DBH or DSH: diameter at breast or standard height; the diameter of the trunk measured 54 inches (4.5 feet) above grade (Council of Tree and Landscape Appraisers 2019)

tree grove: a group of eight or more trees each 10 inches or more in diameter that form a continuous canopy. Trees that are part of a grove shall also be considered exceptional trees, unless they also meet the definition of a hazardous tree. (MICC 19.16.010)

exceptional tree: a tree measuring 36 inches DSH or greater or with a diameter that is equal to or greater than the diameter listed in the Exceptional Tree Table (MICC 19.16.010)

ISA: International Society of Arboriculture

large tree (regulated): A tree measuring 10 inches or greater DSH (MICC 19.16.010)

MLOD (Minimum Limits of Disturbance) Minimum Limits of Disturbance: represents a distance five (5) times that of the trunk and is the minimum distance from a trunk that a structural root can be cut to maintain tree stability.

RLOD (Recommend Limits of Disturbance): As outlined in ISA Best Management Practices: Managing Trees During Construction, this is calculated as a radial distance 8 times the trunk diameter. Some cases require 12 times the trunk diameter. For the purpose of this report, this represents the critical root zone (CRZ).

Visual Tree Assessment (VTA): method of evaluating structural defects and stability in trees by noting the pattern of growth (Mattheck & Breloer 1994)

Appendix A **References**

Accredited Standards Committee A300 (ASC 300). ANSI A300 (Part 1) Tree, Shrub, and Other Woody Plant Management – Standard Practices (Pruning). Londonderry: Tree Care Industry Association, 2017.

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

Fite, Kelby and Dr. E. Thomas Smiley. Best Management Practices: Managing Trees During Construction, Second Edition. Champaign, IL: International Society of Arboriculture (ISA), 2016.

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

Mercer Island Municipal Code (MICC) 19.16.010. Definitions

Mercer Island Municipal Code (MICC) 19.10. Trees

Appendix B **Site Map**

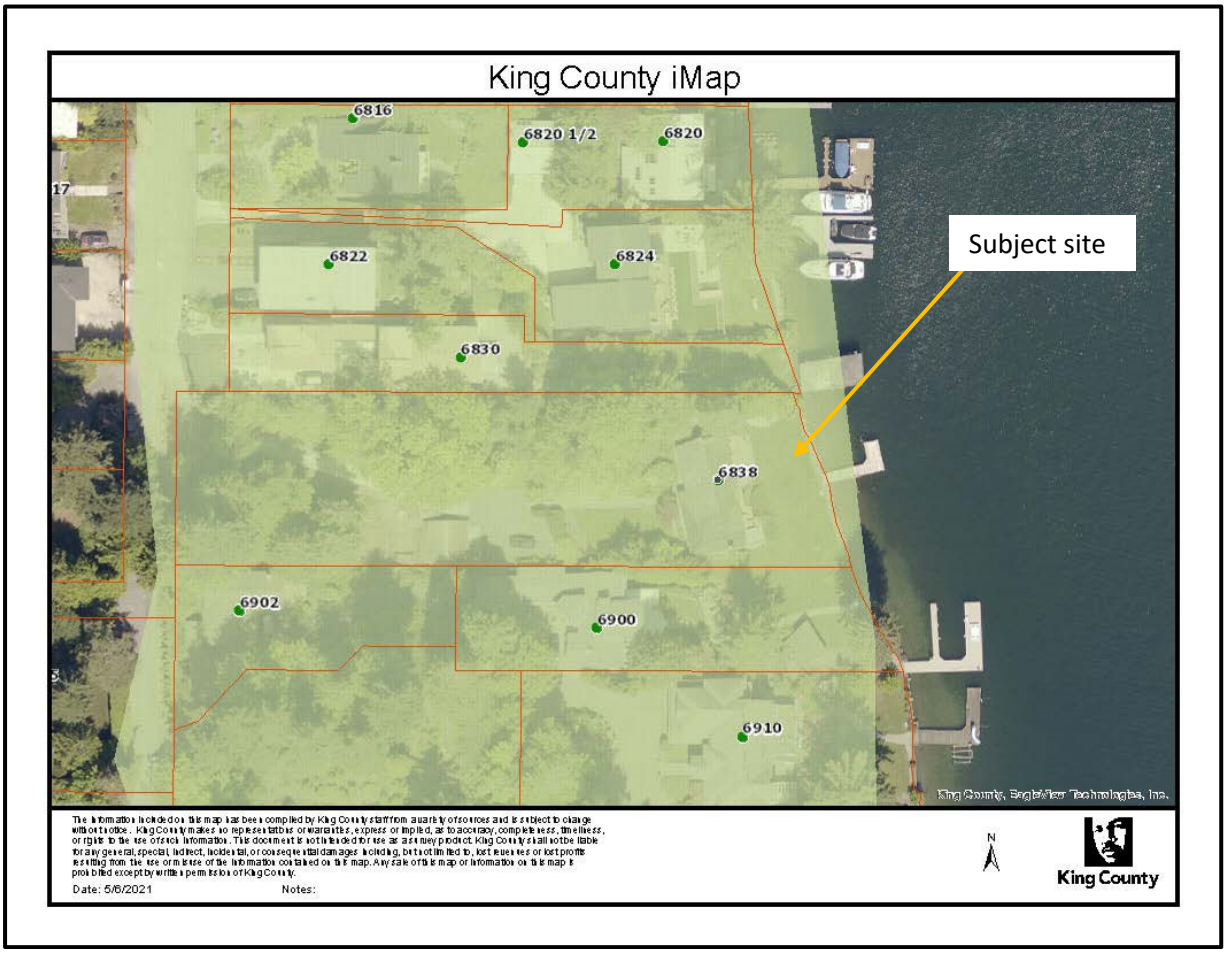

Figure 1. Aerial image. Green areas indicate erosion hazard environmentally sensitive area. Sourced: King County iMap, accessed 5/6/2021.

Appendix C **Photographs**

Photo 1. Looking to the southeast from the top of the driveway. Tree 331, a bitter cherry, will likely require some clearance pruning to accommodate construction access.

Photo 2. Looking east from near the top of the driveway. Rockery to the north is planned for retention.

Photo 3. Tree 362, a Sawara cypress, directly adjacent to the shed proposed for removal. Demolition and construction activities adjacent to this tree should be monitored by an ISA certified arborist. Some clearance pruning may be required to accommodate site work.

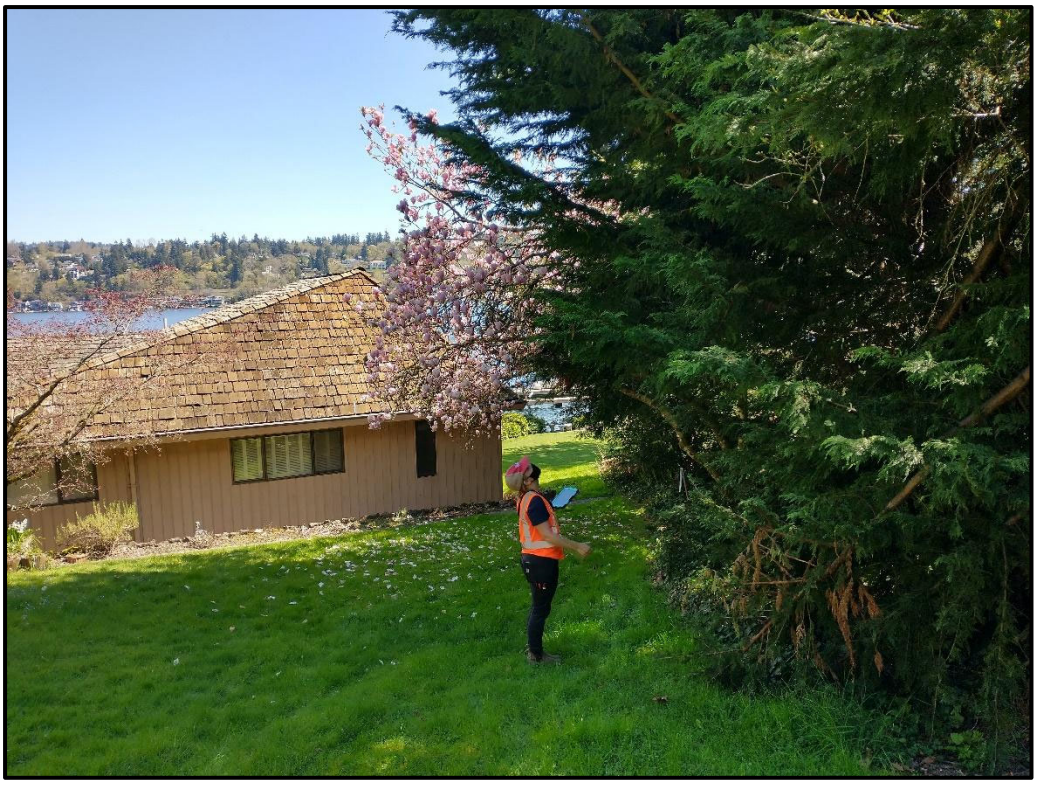

Photo 4. Off-site trees on southern property line and tree 363, a phototropic saucer magnolia. Depending on clearance requirements, the magnolia may not be suitable for retention as clearance pruning would remove a significant portion of the canopy.

Photo 5. Trees north of the driveway. Stacked block retaining wall is proposed for replacement. Note extensive ivy understory.

Photo 6. Off-site Japanese maple may require some clearance pruning to accommodate demolition and construction activities. Blue arrows identify overhanging branches that may need pruning management.

Photo 6. Off-site tree C, a western redcedar with a broken primary leader and three reiterations. We recommend further assessment of this tree in coordination with the adjacent property owner.

Appendix D **Assumptions & Limiting Conditions**

1 Consultant assumes that the site and its use do not violate, and is in compliance with, all applicable codes, ordinances, statutes or regulations.

2 The consultant may provide a report or recommendation based on published municipal regulations. The consultant assumes that the municipal regulations published on the date of the report are current municipal regulations and assumes no obligation related to unpublished city regulation information.

3 Any report by the consultant and any values expressed therein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specific value, a stipulated result, the occurrence of a subsequent event, or upon any finding to be reported.

4 All photographs included in this report were taken by Tree Solutions, Inc. during the documented site visit, unless otherwise noted. Sketches, drawings and photographs (included in, and attached to, this report) are intended as visual aids and are not necessarily to scale. They should not be construed as engineering drawings, architectural reports or surveys. The reproduction of any information generated by architects, engineers or other consultants and any sketches, drawings or photographs is for the express purpose of coordination and ease of reference only. Inclusion of such information on any drawings or other documents does not constitute a representation by the consultant as to the sufficiency or accuracy of the information.

5 Unless otherwise agreed, (1) information contained in any report by consultant covers only the items examined and reflects the condition of those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, climbing, or coring.

6 These findings are based on the observations and opinions of the authoring arborist, and do not provide guarantees regarding the future performance, health, vigor, structural stability or safety of the plants described and assessed.

7 Measurements are subject to typical margins of error, considering the oval or asymmetrical cross-section of most trunks and canopies.

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

9 Our assessments are made in conformity with acceptable evaluation/diagnostic reporting techniques and procedures, as recommended by the International Society of Arboriculture.

Appendix E **Methods**

Measuring

I measured the diameter of each tree at 54 inches above grade, diameter at standard height (DSH). If a tree had multiple stems, I measured each stem individually at standard height and determined a single-stem equivalent diameter by using the method outlined in the city of Seattle Director's Rule 16-2008 or the Guide for Plant Appraisal, 10th Edition Second Printing published by the Council of Tree and Landscape Appraisers. A tree is regulated based on this single-stem equivalent diameter value. Because this value is calculated in the office following field work, some unregulated trees may be included in our data set. These trees are included in the tree table for informational purposes only and not factored into tree totals discussed in this report.

Tagging

I tagged each tree with a circular aluminum tag at eye level. I assigned each tree a numerical identifier on our map and in our tree table, corresponding to this tree tag. I used alphabetical identifiers for trees off-site.

Evaluating

I evaluated tree health and structure utilizing visual tree assessment (VTA) methods. The basis behind VTA is the identification of symptoms, which the tree produces in reaction to a weak spot or area of mechanical stress. A tree reacts to mechanical and physiological stresses by growing more vigorously to re-enforce weak areas, while depriving less stressed parts. An understanding of the uniform stress allows the arborist to make informed judgments about the condition of a tree.

Rating

When rating tree health, I took into consideration crown indicators such as foliar density, size, color, stem and shoot extensions. When rating tree structure, I evaluated the tree for form and structural defects, including past damage and decay. Tree Solutions has adapted our ratings based on the Purdue University Extension formula values for health condition (*Purdue University Extension bulletin FNR-473-W - Tree Appraisal*). These values are a general representation used to assist arborists in assigning ratings.

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

Good - Imperfect canopy density in few parts of the tree, up to 10% of the canopy. Normal to less than ¾ typical growth rate of shoots and minor deficiency in typical leaf development. Few pest issues or damage, and if they exist, they are controllable, or tree is reacting appropriately. Normal branch and stem development with healthy growth. Safe useful life expectancy typical for the species.

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

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

Appendix F **Tree Protection Specifications**

The following is a list of protection measures that must be employed before, during and after construction to ensure the long-term viability of retained trees.

1. **Project Arborist:** The project arborists shall at minimum have an International Society of Arboriculture (ISA) Certification and ISA Tree Risk Assessment Qualification.
2. **Tree Protection Zone (TPZ):** The city of Mercer Island requires a tree protection zone (TPZ) that based on the ISA Best Management Practices (BMP) for tree protection. In some cases, the TPZ may extend outside tree protection fencing. Work within the TPZ must be approved and monitored by the project arborist.
3. **Tree Protection Fencing:** Tree protection shall consist of 6-foot chain-link fencing installed at the TPZ as approved by the project arborist. Fence posts shall be anchored into the ground or bolted to existing hardscape surfaces.
    a. Where trees are being retained as a group the fencing shall encompass the entire area including all landscape beds or lawn areas associated with the grove.
    b. Per arborist approval, TPZ fencing may be placed at the edge of existing hardscape within the TPZ to allow for staging and traffic.
    c. Where work is planned within the TPZ, install fencing at edge of TPZ and move to limits of disturbance at the time that the work within the TPZ is planned to occur. This ensures that work within the TPZ is completed to specification.
    d. Where trees are protected at the edge of the project boundary, construction limits fencing shall be incorporated as the boundary of tree protection fencing.
4. **Access Beyond Tree Protection Fencing:** In areas where work such as installation of utilities is required within the TPZ, a locking gate will be installed in the fencing to facilitate access. The project manager or project arborist shall be present when tree protection areas are accessed.
5. **Tree Protection Signage:** Tree protection signage shall be affixed to fencing every 20 feet. Signage shall be fluorescent, at least 2' x 2' in size, with 3" tall text. Signage will note: "Tree Protection Area – Do Not Enter: Entry into the tree protection area is prohibited unless authorized by the project manager." Signage shall include the contact information for the project manager and instructions for gaining access to the area.
6. **Filter / Silt Fencing:** Filter / silt fencing within the TPZ of retained trees shall be installed in a manner that does not sever roots. Install so that filter / silt fencing sits on the ground and is weighed in place by sandbags or gravel. Do not trench to insert filter / silt fencing into the ground.
7. **Monitoring:** The project arborist shall monitor all ground disturbance at the edge of or within the TPZ, including where the TPZ extends beyond the tree protection fencing.
8. **Soil Protection:** No parking, foot traffic, materials storage, or dumping (including excavated soils) are allowed within the TPZ. Heavy machinery shall remain outside of the TPZ. Access to the tree protection area will be granted under the supervision of the project arborist. If project arborist allows, heavy machinery can enter the area if soils are protected from the load. Acceptable methods of soil protection include applying 3/4-inch plywood over 4 to 6 inches of wood chip mulch or use of AlturnaMats® (or equivalent product approved by the project arborist). Retain existing paved surfaces within or at the edge of the TPZ for as long as possible.
9. **Soil Remediation:** Soil compacted within the TPZ of retained trees shall be remediated using pneumatic air excavation according to a specification produced by the project arborist.
10. **Canopy Protection**: Where fencing is installed at the limits of disturbance within the TPZ, canopy management (pruning or tying back) shall be conducted to ensure that vehicular traffic does not

damage canopy parts. Exhaust from machinery shall be located five feet outside the dripline of retained trees. No exhaust shall come in contact with foliage for prolonged periods of time.

11. **Duff/Mulch:** Apply 6 inches of arborist wood chip mulch or hog fuel over bare soil within the TPZ to prevent compaction and evaporation. TPZ shall be free of invasive weeds to facilitate mulch application. Keep mulch 1 foot away from the base of trees and 6 inches from retained understory vegetation. Retain and protect as much of the existing duff and understory vegetation as possible.
12. **Excavation:** Excavation done at the edge of or within the TPZ shall use alternative methods such as pneumatic air excavation or hand digging. If heavy machinery is used, use flat front buckets with the project arborist spotting for roots. When roots are encountered, stop excavation and cleanly sever roots. The project arborist shall monitor all excavation done within the TPZ.
13. **Fill:** Limit fill to 1 foot of uncompacted well-draining soil, within the TPZ of retained trees. In areas where additional fill is required, consult with the project arborist. Fill must be kept at least 1 foot from the trunks of trees.
14. **Root Pruning:** Limit root pruning to the extent possible. All roots shall be pruned with a sharp saw making clean cuts. Do not fracture or break roots with excavation equipment.
15. **Root Moisture:** Root cuts and exposed roots shall be immediately covered with soil, mulch, or clear polyethylene sheeting and kept moist. Water to maintain moist condition until the area is back filled. Do not allow exposed roots to dry out before replacing permanent back fill.
16. **Hardscape Removal:** Retain hardscape surfaces for as long as practical. Remove hardscape in a manner that does not require machinery to traverse newly exposed soil within the TPZ. Where equipment must traverse the newly exposed soil, apply soil protection as described in section 8. Replace fencing at edge of TPZ if soil exposed by hardscape removal will remain for any period of time.
17. **Tree Removal:** All trees to be removed that are located within the TPZ of retained trees shall not be ripped, pulled, or pushed over. The tree should be cut to the base and the stump either left or ground out. A flat front bucket can also be used to sever roots around all sides of the stump, or the roots can be exposed using hydro or air excavation and then cut before removing the stump.
18. **Irrigation:** Retained trees with soil disturbance within the TPZ will require supplemental water from June through September. Acceptable methods of irrigation include drip, sprinkler, or watering truck. Trees shall be watered three times per month during this time.
19. **Pruning:** Pruning required for construction and safety clearance shall be done with a pruning specification provided by the project arborist in accordance with American National Standards Institute ANSI-A300 2017 Standard Practices for Pruning. Pruning shall be conducted or monitored by an arborist with an ISA Certification.
20. **Plan Updates:** All plan updates or field modification that result in impacts within the TPZ or change the retained status of trees shall be reviewed by the senior project manager and project arborist prior to conducting the work.
21. **Materials:** Contractor shall have the following materials onsite and available for use during work in the TPZ:
    - Sharp and clean bypass hand pruners
    - Sharp and clean bypass loppers
    - Sharp hand-held root saw
    - Reciprocating saw with new blades
    - Shovels
    - Trowels
    - Clear polyethylene sheeting
    - Burlap
    - Water

Tree Solutions Inc
Consulting Arborists

Table of Trees

6838 96th Ave SE, Mercer Island, WA 98040

Arborist: AS, CM
Date of Inventory: April 15, 2021
Table Updated: Sept 15, 2021

DSH (Diameter at Standard Height) is measured 4.5 feet above grade, or as specified in the Guide for Plant Appraisal, 10th Edition, published by the Council of Tree and Landscape Appraisers.
DSH for multi-stem trees are noted as a single stem equivalent, which is calculated using the method defined in the Guide for Plant Appraisal, 10th Edition.
Letters are used to identify trees on neighboring property with overhanging canopies.
Dripline is measured from the center of the tree to the outermost extent of the canopy.

Recommened limits of disturbance (RLOD) is based on 8x trunk diameter. Ensure tree protection standards comply with MICC 19.10.080 and ISA Best Management Practices (BMP) – Managing Trees During Construction.

							Dripline Radius (feet)								
Tree ID	**Scientific Name**	**Common Name**	**DSH (inches)**	**DSH Multistem**	**Health Condition**	**Structural Condition**	**N**	**E**	**S**	**W**	**Exceptional Threshold**	**Exceptional**	**Grove**	**Rec. Limits of Disturbance (feet)**	**Notes**
332	*Prunus emarginata var. mollis*	*Bitter cherry*	17.0	13.8,10	Good	Good	21.2	14.7	5.7	1.7	-		1	N/A Proposed for removal	Codominant at 4.5 feet, narrow union. Blackberry in canopy and at base.
333	*Thuja plicata*	*Western Redcedar*	35.0		Good	Good	29.5	19.5	11.5	4.5	*30.0*	Exceptional - Size	1	23	Codominant at 5 feet, narrow union, northern stem topped at 25 feet. Ivy at base and in canopy. Sharing rootzone with 334.
334	*Thuja plicata*	*Western Redcedar*	28.7		Good	Good	19.2	4.2	11.2	15.2	*30.0*		1	19	Ivy at base, and in canopy, canopy is asymmetric to the north. Shares root zone with 333.
335	*Thuja plicata*	*Western Redcedar*	16.2		Fair	Fair	18.7	11.7	14.7	15.7	*30.0*		1	11	Heavy woodpecker activity, living snag, previously lost top, multiple reiterating leaders.
336	*Acer macrophyllum*	*Bigleaf Maple*	13.7		Fair	Poor	10.6	6.6	23.6	6.6	*30.0*		1	9	Ivy at base and on stem, previously lost top. **Recommend further assessment.**
337	*Thuja plicata*	*Western Redcedar*	9.9		Good	Fair	8.4	10.4	6.4	8.4	*30.0*		1	7	Ivy into canopy, previously lost top, bit suppressed. **Not regulated at this time.**
338	*Pseudotsuga menziesii*	*Douglas-fir*	41.7		Good	Good	23.7	19.7	31.7	21.7	*30.0*	Exceptional - Size	1	28	Ivy in canopy, previously managed.
339	*Acer macrophyllum*	*Bigleaf Maple*	21.7		Poor	Poor	3.9	18.9	18.9	8.9	*30.0*		1	14	Codominant at 5 feet, low live crown ratio, north stem dead, ivy on stem, targets the house, **recommend reduction to snag or removal.**
340	*Pseudotsuga menziesii*	*Douglas-fir*	32.0		Good	Good	21.3	26.3	26.3	13.3	*30.0*	Exceptional - Size	1	21	Sharing root zone with 341, large ivy stems on trunk, DSH estimated, corrected lean.

Table of Trees

6838 96th Ave SE, Mercer Island, WA 98040

Arborist: AS, CM
Date of Inventory: April 15, 2021
Table Updated: Sept 15, 2021

Tree ID	Scientific Name	Common Name	DSH (inches)	DSH Multistem	Health Condition	Structural Condition	N	E	S	W	Exceptional Threshold	Exceptional	Grove	Rec. Limits of Disturbance (feet)	Notes
341	*Acer macrophyllum*	*Bigleaf Maple*	23.5		Fair	Fair to Poor	23.0	26.0	19.0	10.0	*30.0*		1	16	Sharing root zone with 340. Low live crown ratio, codominant at 20 feet, ivy on stem. **Recommend reducing to snag.**
342	*Alnus rubra*	*Red alder*	19.3		Fair	Good	22.8	19.8	16.8	22.8	-		1	13	Corrected phototropic lean to north. Ivy previously managed on base and stem.
343	*Thuja plicata*	*Western Redcedar*	42.2		Good	Good	17.8	19.8	17.8	19.8	*30.0*	Exceptional - Size	1	28	Ivy at base.
344	*Thuja plicata*	*Western Redcedar*	49.7	33,37.2	Good	Good	22.1	20.1	22.1	17.1	*30.0*	Exceptional - Size	1	33	Debris piled at base. Codominant at 3 feet with included bark to 6 feet. Ivy at base. Previous northernmost tridominant stem removed.
345	*Acer macrophyllum*	*Bigleaf Maple*	12.6	8.7,7,5.9	Poor	Fair	3.5	0.5	20.5	24.5	*30.0*		2	8	Group of 3 stems, sharing root zone with 346. Heavy ivy in canopy, few live buds.
346	*Acer macrophyllum*	*Bigleaf Maple*	26.3	10.7,24,	Poor	Poor	21.1	6.1	23.1	21.1	*30.0*		2	18	Small center stem dead, multiple cavities with decay, extensive canopy dieback, heavy ivy on trunk. *Kretzschmaria deusta* on south side at base.
347	*Acer macrophyllum*	*Bigleaf Maple*	23.5	19.7,12.9	Fair	Fair	9.0	1.0	25.0	19.0	*30.0*		2	16	Phototropic lean to south, heavy ivy.
348	*Acer macrophyllum*	*Bigleaf Maple*	19.4		Fair	Fair	15.8	18.8	10.8	15.8	*30.0*		2	13	Ivy on stem previously managed, mostly dead ivy.
349	*Acer macrophyllum*	*Bigleaf Maple*	18.4	15.3,10.2	Fair	Fair	8.8	15.8	20.8	8.8	*30.0*		2	12	Old dead ivy on stem, ivy at base, corrected phototropic lean to south.
350	*Acer macrophyllum*	*Bigleaf Maple*	24.8	11.5,9,8.2,8.4,6.1,5.7,9.1,9.3,5.8	Fair	Fair	23.0	16.0	18.0	16.0	*30.0*		2	17	Multistemmed at base, north canopy overhangs neighbors house by ~5 feet.
351	*Acer macrophyllum*	*Bigleaf Maple*	21.7		Good	Good	20.9	24.9	29.9	18.9	*30.0*		2	14	Heavy ivy at base.
352	*Acer macrophyllum*	*Bigleaf Maple*	18.5	13,13.2	Fair	Poor	6.8	10.8	29.8	25.8	*30.0*		2	12	Codominant at base, phototropic lean to south, dead central leader, heavy ivy, grafted at 4 feet.
353	*Pseudotsuga menziesii*	*Douglas-fir*	20.0		Fair	Poor	15.8	10.8	10.8	14.8	*30.0*		2	13	Previously cut to 10 feet, reiterated leaders, north stems removed.
354	*Pseudotsuga menziesii*	*Douglas-fir*	10.0		Good	Good	14.4	14.4	14.4	14.4	*30.0*		2	7	Kink in stem near top.

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355	*Pseudotsuga menziesii*	*Douglas-fir*	15.2		Good	Good	12.6	12.6	12.6	12.6	*30.0*		2	10	A bit sinuous, corrected lean.
356	*Acer macrophyllum*	*Bigleaf Maple*	30.0		Good	Fair	21.3	30.3	30.3	23.3	*30.0*	Exceptional - Size	2	20	Swept base, codominant at 25 feet, stable union.
357	*Thuja plicata*	*Western Redcedar*	55.5	22,28,14,18 ,36	Good	Fair	25.3	24.3	24.3	22.3	*30.0*	Exceptional - Size	2	37	DSH estimated, multistemmed at 4 feet, many leaders, previously topped and has many reiterated leaders, a few have narrow unions but appear stable
358	*Acer macrophyllum*	*Bigleaf Maple*	26.0		Fair	Fair	16.1	19.1	21.1	26.1	*30.0*		2	17	Ivy throughout canopy.
359	*Ilex aquifolium*	*English holly*	12.0	8.6,8.4	Fair	Fair	11.5	11.5	11.5	11.5	-		2	8	Heavy sapsucker activity, top dying back, possibly girdled by bird activity.
360	*Ilex aquifolium*	*English holly*	12.9	10.3,7.8	Good	Fair	10.5	10.5	10.5	10.5	-		2	9	Previously topped at 15 feet.
361	*Corylus cornuta*	*Beaked hazelnut*	15.4	4,3.5,5.5,5, 6,4.5,5,3.5, 5.5,5.5	Fair	Fair	8.6	12.6	10.6	4.6	-		2	10	Multistemmed at base, heavy ivy throughout canopy.
362	*Chamaecyparis pisifera*	*Sawara cypress*	31.0		Good	Good	16.3	16.3	16.3	19.3	-		2	21	Heavy ivy in canopy, located within small shed fenced area.
363	*Magnolia x soulangiana*	*Saucer magnolia*	8.0	4.3,5,4.6	Good	Good	14.3	15.3	5.3	12.3	-			5	Likely a shared tree, phototropic to north. **Not regulated at this time;** included as is likely to be impacted by development.
ACPA-NR	*Acer palmatum*	*Japanese Maple*	6.0		Good	Good	0.3	0.3	0.3	0.3	*12.0*			4	Small Japanese maple to be transplanted. Located in a wooden planter box but large roots were evident under gravel below the box itself. **Not regulated or tagged.**
Off-site trees with overhanging canopy or likely to be impacted															
A	*Thuja plicata*	*Western Redcedar*	28.0		Good	Fair to Poor	14.2	13.7	11.2	16.2	*30.0*			19	Right-of-way tree, pruned for power and road clearance, stub cuts, codominant at 6 feet, north stem codominant at 50 feet. Ivy at base.
B	*Thuja plicata*	*Western Redcedar*	32.0		Good	Fair	16.3	17.3	19.3	16.3	*30.0*	Exceptional - Size		21	Codominant at 35 feet, pruned for power clearance and mailbox clearance. Located on the top of the slope, ivy at base.

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C	*Thuja plicata*	*Western Redcedar*	32.0		Fair to Good	Poor	16.3	16.3	11.3	9.3	*30.0*	Exceptional - Size		21	Living snag, large reiterated stems 8 feet east of primary stem, healthy canopy. Recent tearout on south side.
D	*Thuja plicata*	*Western Redcedar*	14.0		Good	Fair	-	-	15.6	-	*30.0*			9	Managed as a hedge, topped. Dripline is only canopy near/overhanging.
E	*Thuja plicata*	*Western Redcedar*	16.0		Good	Fair	-	-	15.7	-	*30.0*			11	Managed as a hedge, topped. Dripline is only canopy near/overhanging.
F	*Thuja plicata*	*Western Redcedar*	15.0		Good	Fair	13.1	10.6	-	-	*30.0*			10	Managed as a hedge, topped. Dripline is only canopy near/overhanging.
G	*Thuja plicata*	*Western Redcedar*	8.6	5,7	Good	Fair	9.4	-	-	-	*30.0*			6	Managed as a hedge, topped. Dripline is only canopy near/overhanging.
H	*Thuja plicata*	*Western Redcedar*	5.5		Good	Fair	8.2	-	-	-	*30.0*			4	Managed as a hedge, topped. Dripline is only canopy near/overhanging.
I	*Thuja plicata*	*Western Redcedar*	14.0		Good	Fair	14.6	-	-	-	*30.0*			9	Managed as hedge, topped; multiple reiterating leaders. Dripline is only canopy near/overhanging.
J	*Cuprocyparis leylandii*	*Leyland cypress*	12.0		Good	Fair	17.5	-	-	-	-			8	Previously topped. Dripline is only canopy near/overhanging.
K	*Cuprocyparis leylandii*	*Leyland cypress*	15.0		Good	Fair	17.6	-	-	-	-			10	Recent branch tearout. Dripline is only canopy near/overhanging.
L	*Acer palmatum*	*Japanese Maple*	5.0	4,3	Good	Good	13.2	-	-	-	*12.0*			3	Will need clearance pruning for proposed work around garage. Dripline is only canopy near/overhanging.

TOPOGRAPHIC & BOUNDARY SURVEY

Tree Solutions Inc.
Arborist: AS & CM
206-528-4670

Tree Inventory: April 15, 2021

Inventory included all trees equal to or greater than 10 inches DSH and all trees meeting the City of Mercer Island size threshold for exceptional trees below 10 inches DSH.

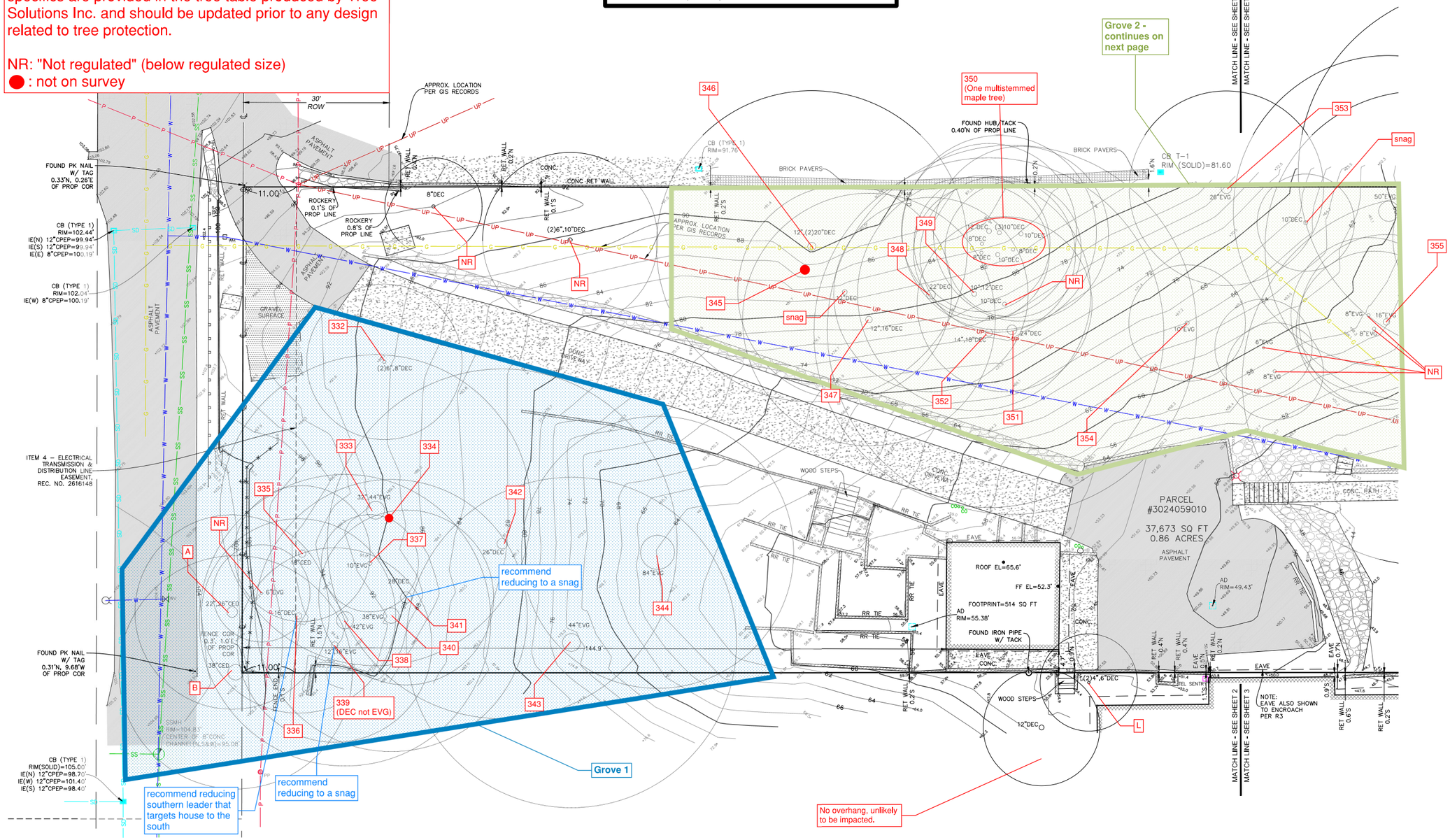
We also assessed trees with overhanging canopies. Tree icons used on the survey do not denote accurate canopy drip lines. Drip line measurements and other tree specifics are provided in the tree table produced by Tree Solutions Inc. and should be updated prior to any design related to tree protection.

NR: "Not regulated" (below regulated size)
● : not on survey

LEGEND

- AREA DRAIN
- ASPHALT SURFACE
- BRICK SURFACE
- BUILDING
- CENTERLINE ROW
- CO — CLEANOUT
- CULVERT PIPE
- CONCRETE SURFACE
- RETAINING WALL
- DECK
- FENCE LINE (CHAIN LINK)
- FENCE LINE (WOOD)
- FIRE HYDRANT
- G — GAS LINE
- G — GAS METER
- GRAVEL SURFACE
- CATCH BASIN (TYPE 1)
- HUB/TACK
- NAIL AS NOTED
- MONUMENT IN CASE (FOUND)
- MONUMENT (SURFACE, FOUND)
- PH — POWER HAND HOLE
- P — POWER METER
- P — POWER (OVERHEAD)
- PP — POWER POLE
- REBAR AS NOTED (FOUND)
- ROCKERY
- SS — SEWER LINE
- SEWER MANHOLE
- SD — STORM DRAIN LINE
- TEL SENTRY — TELEPHONE SENTRY
- SIZE TYPE — TREE (AS NOTED)
- W — WATER LINE
- WM — WATER METER
- WV — WATER VALVE
- HB — HOSEBIB
- YARD LIGHT
- UP — POWER (UNDERGROUND)

10 0 5 10
(IN FEET)
1 INCH = 10 FT.



measure success

TOPOGRAPHIC & BOUNDARY SURVEY
PARCEL NO. 3024059010

BUTTENWIESER / WILEY RESIDENCE
6838 96TH AVE SE
MERCER ISLAND, WA 98040

J. GREEN JR. — REGISTERED PROFESSIONAL LAND SURVEYOR — STATE OF WASHINGTON — 22063 — 02/11/21

Terrane
10801 Main Street, Suite 102, Bellevue, WA 98004
phone 425.458.4488 support@terrane.net
www.terrane.net

JOB NUMBER:	202552
DATE:	02/04/21
DRAFTED BY:	TGC
CHECKED BY:	EJG/TMM
SCALE:	1" = 10'

REVISION HISTORY

02/11/21	UPDATE DRAWING

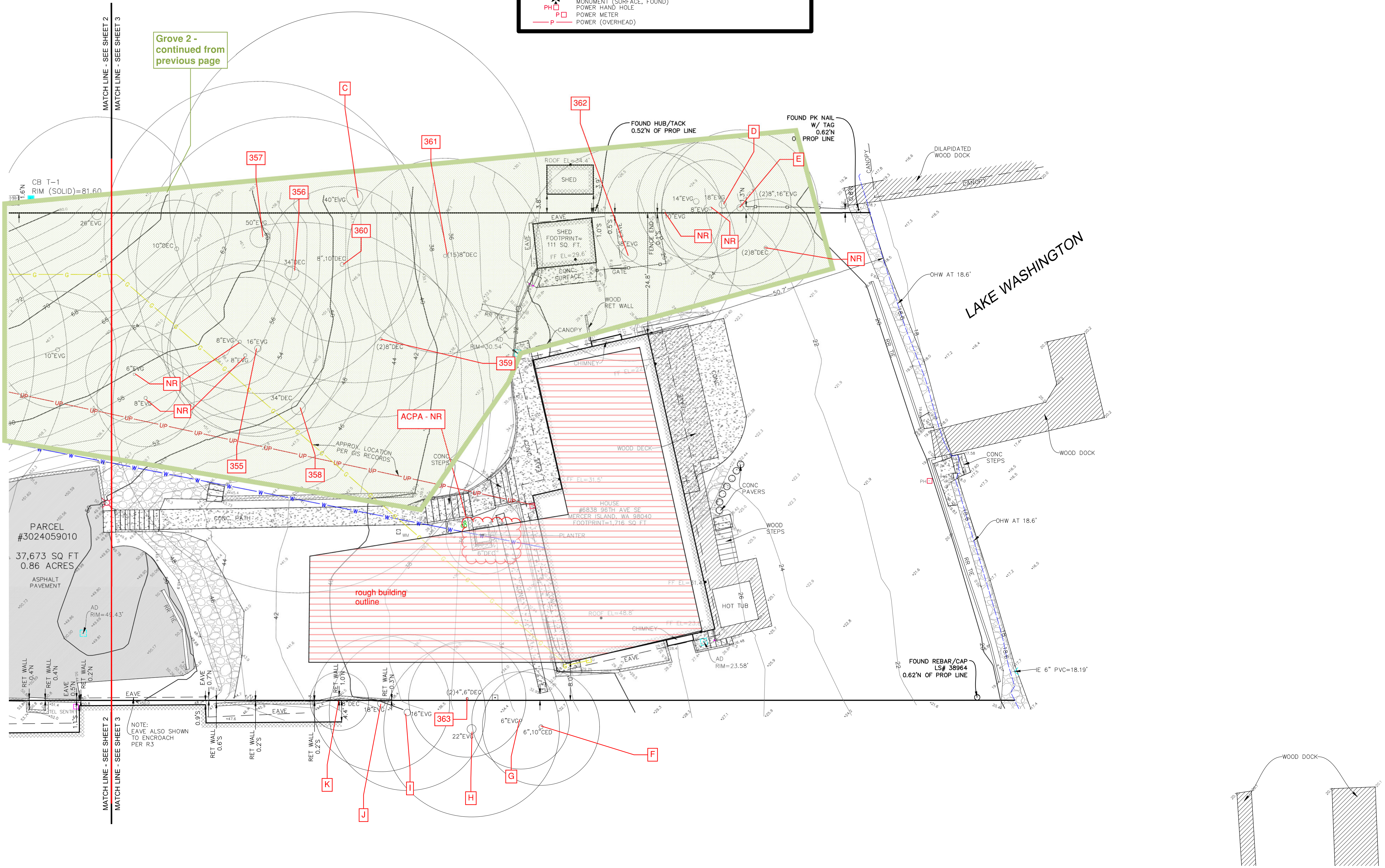
SHEET NUMBER
2 OF 3

TOPOGRAPHIC & BOUNDARY SURVEY

LEGEND

AREA DRAIN	POWER POLE
ASPHALT SURFACE	REBAR AS NOTED (FOUND)
BRICK SURFACE	ROCKERY
BUILDING	SEWER LINE
CENTERLINE ROW	SEWER MANHOLE
CLEANOUT	STORM DRAIN LINE
CULVERT PIPE	TELEPHONE SENTRY
CONCRETE SURFACE	TREE (AS NOTED)
RETAINING WALL	WATER LINE
DECK	WATER METER
FENCE LINE (CHAIN LINK)	WATER VALVE
FENCE LINE (WOOD)	HOSEBIB
FIRE HYDRANT	YARD LIGHT
GAS LINE	POWER (UNDERGROUND)
GAS METER	
GRAVEL SURFACE	
CATCH BASIN (TYPE 1)	
HUB/TACK	
NAIL AS NOTED	
MONUMENT IN CASE (FOUND)	
MONUMENT (SURFACE, FOUND)	
POWER HAND HOLE	
POWER METER	
POWER (OVERHEAD)	

(IN FEET)
1 INCH = 10 FT.



TOPOGRAPHIC & BOUNDARY SURVEY
PARCEL NO. 3024059010

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measure success

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02/11/21	UPDATE DRAWING
SHEET NUMBER	
3 OF 3	