Tree Solutions Inc
Consulting Arborists

Project No. TS - 8063

Arborist Report
DRAFT

To:	Sarah Lee
Site:	9772 SE 41st St Mercer Island, WA 98040
Re:	Tree Inventory
Date:	October 19, 2021
Project Arborist:	Andrea Starbird ISA Certified Arborist #PN-9084A ISA Qualified Tree Risk Assessor
Reviewed By:	Josh Petter ISA Board Certified Master Arborist #PN- 8406B ISA Qualified Tree Risk Assessor
Attached:	Table of Trees Tree Site Map

Summary

I inventoried and assessed three 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. I tagged each tree with an aluminum tree tag. Tree identifier corresponds to the number on each tag.

Of the trees assessed, none met the exceptional tree criteria outlined in the MICC. I found no tree groves on site.

There were seven 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 site development. All trees on adjacent properties were estimated from the subject site or public property such as the adjacent right-of-way. I used an alphabetical tree identifier for trees off-site.

Assignment and Scope of Work

This report outlines the site inspection by Andrea Starbird of Tree Solutions Inc, on October 5, 2021. I was asked to visit the site and provide a report including findings and recommendations. Sarah Lee, owner of the property, requested these services for project planning purposes.

Observations & Discussion

Site

This 8,875 square foot site was located on 41st St in Mercer Island. According to Mercer Island GIS portal, the property falls within a landslide hazard environmental area. There was a single-family home and ornamental gardens on site.

Trees

Site Trees

Three large trees were tagged and assessed on site.

Based on parcel outlines as shown on King County iMap, all three of the site trees assessed may be shared between the property and the public right-of-way. The location of all trees should be confirmed with a survey.

Off Site Trees

I assessed seven off-site trees. These trees were on private properties abutting the subject site and were all in good health condition.

Trees B, C, and D were western redcedars (*Thuja plicata*) growing in a row along the western property line. There is a short rockery on site that crosses through the root zone of these three trees (Photo 1).

Tree C had a diameter at standard height (DSH) of 26.4 inches, and was in good health and structural condition. This tree was growing into the fence and had a water feature at the base. There were multiple branches overhanging the site that have been indiscriminately sheared. I recommend pruning to return the tree to a more natural crown shape.

Tree F was a 14-inch DSH Scot's pine (*Pinus sylvestris*) in good health and structural condition. The canopy was asymmetrical and the portion overhanging the subject site was low hanging.

Tree G was a 12-inch DSH sweetgum (*Liquidambar styraciflua*) with an open-grown, spreading canopy form. This tree overhangs the roof of the existing house.

I have attached an aerial photograph of the site to serve as the site map and a table of trees that has detailed information about each tree.

Construction Impacts

T*his report is preliminary as I have not reviewed design or construction plans for this area.*

Each of the three site trees were in good to fair health and structural condition and are suitable for retention should development plans allow.

Off-site trees must be retained throughout construction and should be protected at their recommended limits of disturbance, which I have provided in the attached table of trees.

Trees B, C, and D should be protected as a group. Their root zone extends below the existing fence and rockery near the property line. No ground disturbance should occur within the recommended limits of disturbance for these trees without arborist coordination; arborist monitoring may be required.

Trees F and G may require pruning to raise the canopy and provide access clearance for site demolition and new building construction. If clearance pruning is required, remove the minimum canopy necessary using 2-inch diameter cuts and smaller. Remove no more than 10% of the live canopy for either tree in a 3-year period. (Photos 2, 3)

Supplemental irrigation must be provided for all impacted trees during the drought season (April through September) during and after site development to mitigate construction stress, western redcedars (B, C, and D), are particularly sensitive to drought. These trees should be monitored closely for stress during development.

Recommendations

- Obtain all necessary permits and approval from the City prior to commencement of site work.
- Confirm tree locations with a site survey.
- Add on and off-site trees to site plans; include limits of disturbance as identified in the table of trees.
- Plan utilities, grading, and any excavation so that no soil work is required within or through the tree protection area of any retained trees.
- Provide Tree Solutions with any design/construction plans showing any work that may cause ground disturbance, including civil, grading, demolition, landscaping, and structural plans to finalize tree impact analysis and retention/removal recommendations.
- Tree protection consisting of chain-link fencing should be installed at the recommended limits of disturbance for all retained trees. Trees growing in a group should be protected at the edge of their shared driplines. General tree protection specifications can be found in Appendix G.
- All off-site trees must be protected during construction. Root zones of off-site trees extend into the site, and therefore must be protected at the recommended limits of disturbance.
- 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.

Respectfully submitted,

Andrea Starbird,
Consulting Arborist

Appendix A **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 B **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 C **Photographs**

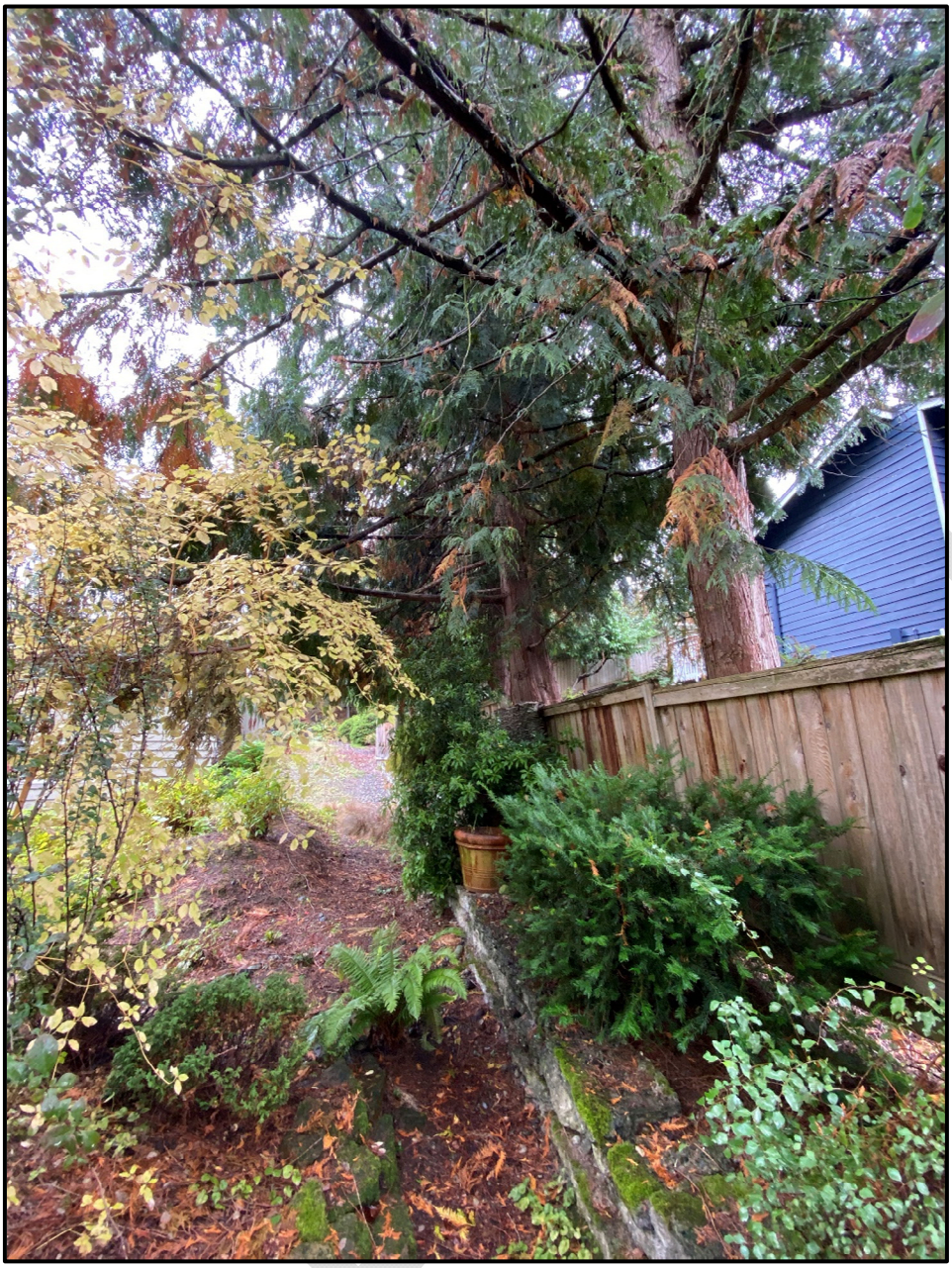


Photo 1. Trees B, C, and D. Off-site western redcedars growing near the fence. Note the rockery at the base on the subject site.

Photo 2. Tree F, an off-site Scot's pine with low-hanging canopy. If clearance pruning is necessary, perform minor canopy reduction, removing no more than 10% of the live crown in any 3 year period. Use the smallest pruning cuts (2 inch-diameter and smaller) possible to achieve clearance.

Photo 3. Tree G, an open grown sweetgum with overhanging canopy. An experienced ISA certified arborist should reduce the crown using the small diamter cuts to achieve any clearance required. Do not remove any more than 10% of the live canopy within a 3 year period.

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 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.
1. Tree Protection Zone (TPZ): The city of Mercer Island requires a tree protection zone (TPZ) 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.
2. **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.
3. **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.
4. **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.
5. **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.
6. **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.
7. **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.
8. **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.
9. **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.

10. **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.
11. **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.
12. **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.
13. **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.
14. **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.
15. **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.
16. **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.
17. **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.
18. **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.
19. **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.
20. **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

9772 SE 41st St Mercer Island, WA 98040

Arborist: A. Starbird
Date of Inventory: 10.5.2021
Table Prepared: 10.19.2021

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.
Limits of disturbance are based on 1-foot radial distance per 1-inch DSH.

							Dripline Radius (feet)								
Tree ID	**Scientific Name**	**Common Name**	**DSH** (inches)	**DSH Multistem**	**Health Condition**	**Structural Condition**	**N**	**E**	**S**	**W**	**Exceptional Threshold**	**Exceptional**	**Limits of Disturbance**	**Proposed Action**	**Notes**
676	*Liriodendron tulipifera*	*Tulip Tree*	13.7		Good	Good	17.6	16.6	15.1	17.6	*30.0*	-	14	Retain	Codominant at 9 feet, included bark at union, consider subordinating smaller stem
677	*Cedrus atlantica* 'Glauca'	*Blue Atlas cedar*	13.8		Good	Fair	17.6	11.6	6.6	13.1	*30.0*	-	14	Retain	Previously lost top, reiterating, pruned for line clearance
678	*Cedrus atlantica* 'Glauca'	*Blue Atlas cedar*	13.6		Good	Fair	16.6	16.6	7.6	12.6	*30.0*	-	14	Retain	Previous heading cuts, subordinate branch on low trunk growing straight upright. Extreme girdling roots, previously severed, likely planted with rootball tied. Invasive spurge laurel (*Daphne laureloa*) growing on slope near base
A	*Alnus rubra*	*Red alder*	16.0		Good	Good	17.5	15.0	26.0	20.0	-	-	16	Retain	Very slightly overhanging site, 17 feet from driveway
B	*Thuja plicata*	*Western Redcedar*	20.4		Good	Good	20.4	18.9	7.9	18.4	*30.0*	-	20	Retain	Some interior flagging throughout, corrected lean, branches have been sheared on east side, growing adjacent to fence; root zone for B, C, D falls within rockery area, retention will depend on excavation plans close to property line; saturated soils upslope on owners side
C	*Thuja plicata*	*Western Redcedar*	26.0		Good	Good	9.1	18.6	8.1	15.1	*30.0*	-	26	Retain	Pruning in upper canopy has been shared, water feature at base, tree growing into fence
D	*Thuja plicata*	*Western Redcedar*	19.6	6.2,6.8,17.3	Good	Good	5.8	11.8	12.8	10.8	*30.0*	-	20	Retain	Some internal flagging, likely seasonal and/or due to drought stress
E	*Prunus cerasifera*	*Flowering Plum*	15.0		Good	Fair	23.1	23.1	23.1	23.1	*21.0*	-	15	Retain	Corrected lean, root zone not likely impacted but canopy overhangs property slightly, dripline based on east portion of canopy. Estimated DSH

Tree Solutions Inc
Consulting Arborists

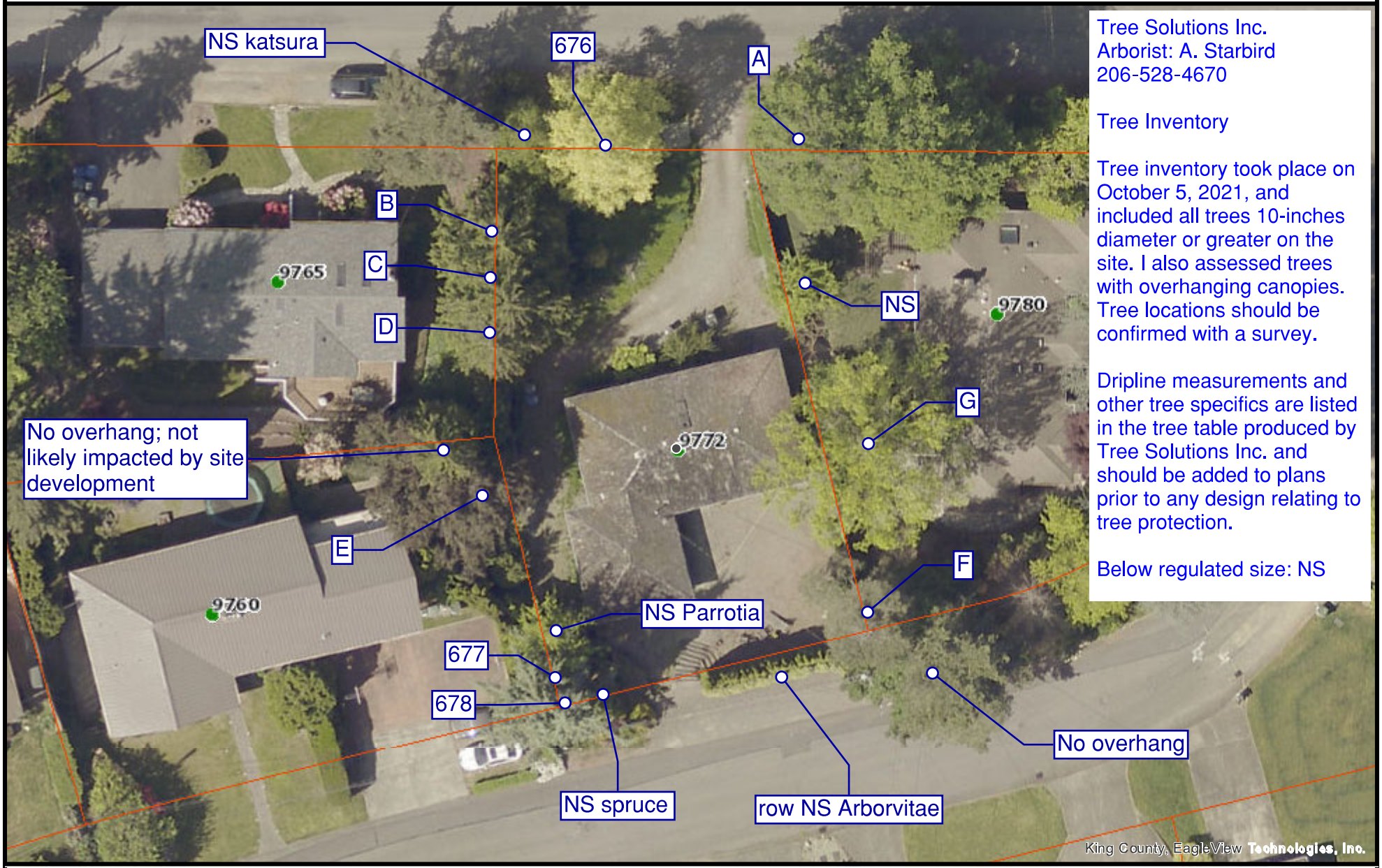
Table of Trees

9772 SE 41st St Mercer Island, WA 98040

Arborist: A. Starbird
Date of Inventory: 10.5.2021
Table Prepared: 10.19.2021

Tree ID	Scientific Name	Common Name	DSH (inches)	DSH Multistem	Health Condition	Structural Condition	N	E	S	W	Exceptional Threshold	Exceptional	Limits of Disturbance	Proposed Action	Notes
F	*Pinus sylvestris*	*Scot's Pine*	14.0		Good	Good	17.1	17.1	17.1	17.1	*24.0*	-	14	Retain	Overhangs site on west side, dripline based on west portion of canopy, somewhat low hanging canopy, perform selective reduction if necessary using cuts 3" and below only. Estimated DSH
G	*Liquidambar styraciflua*	*Sweetgum*	12.0		Good	Good	32.5	32.5	32.5	32.5	*27.0*	-	20	Retain	Open grown canopy, dripline based on west portion of canopy, overhangs existing house, perform selective reduction if required using smallest diameter cuts possible. *Limits of disturbance are increased due to crown spread.

King County iMap



Tree Solutions Inc.
Arborist: A. Starbird
206-528-4670

Tree Inventory

Tree inventory took place on October 5, 2021, and included all trees 10-inches diameter or greater on the site. I also assessed trees with overhanging canopies. Tree locations should be confirmed with a survey.

Dripline measurements and other tree specifics are listed in the tree table produced by Tree Solutions Inc. and should be added to plans prior to any design relating to tree protection.

Below regulated size: NS

Date: 10/5/2021 Notes:

N

King County