



ARBORIST NOTES

SITE: Rudolf Property, Mercer Island, Washington

DATE: June 18, 2019

FROM: Anna Heckman
ISA Certified Arborist #PN-6153B
Tree Risk Assessment Qualified

VISIT DATES: June 13, 2019

CONTACT: James Rudolf, Owner

CC: Carmel Gregory, CG Engineering
Jared Underbrink, CG Engineering

PURPOSE: Assess the air excavation for roots around the current driveway, provide evidence and professional guidance regarding the impact to tree # 122 and if tree removal will be required with planned excavation for the wall.

Attachments: Soil Excavation and Root Location map
General Tree Protection Guidelines

I met the air excavation company *Root Cause LLC* on June 13th at the Rudolf property at 8255 West Mercer Way, to excavate soil around the edge of the current driveway within the critical root zone of the Douglas fir, (*Pseudotsuga menziesii*), tree #122. The following notes provide documentation of the roots found, the implications to tree retention, and recommendations to protect the tree through construction.

Tree # 122 is 45.8 inch in diameter. This tree is located on the very steep portion of the slope and is considered exceptional by the City of Mercer Island due to its size. The existing driveway is 10 feet from the tree on the north east side. The driveway runs perpendicular to the slope. Heavy vegetation grows between the tree and the driveway. Bigleaf maple, (*Acer macropyllum*), trees grow on the uphill side of this section of driveway, and the two large western red cedars, (*Thuja plicata*), are downhill. The driveway has cracks in it that are likely associated with root growth underneath. The wall will be installed two feet below the current grade through the middle of the current driveway.

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Air excavation of the soil was conducted to assess for root spread and depth of the Douglas fir tree near the area where the wall will be installed. Trenches were cut 12 inches wide and 18" deep on both sides of the existing driveway. Roots found within the excavation area were further uncovered until the source and direction of growth were determined. The attached map and photos identify the areas where the wall is planned, where soil excavation occurred, and where roots were found.

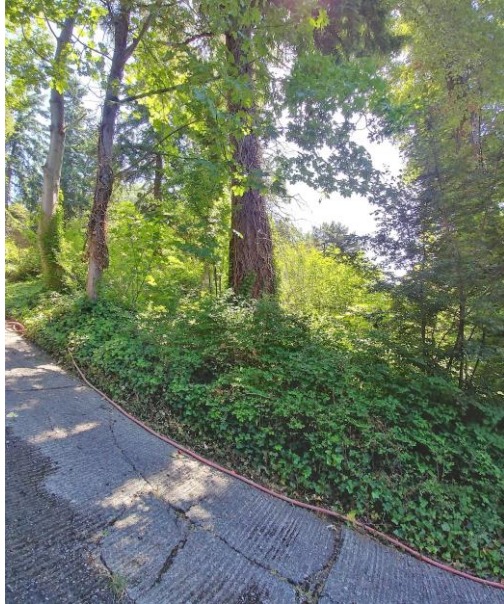


Photo 1 and 2. This is the Douglas fir tree #122 from the side with the two maple trees uphill and a perspective of the Douglas fir with the two maples closer to the driveway.

The first trench began at a pavement panel (Photo A on attached map) and was excavated about 40 feet along the edge of the driveway farther from the Douglas fir. Three large roots were found ranging from 2.5 to 4" in diameter. See the attached map, Photo A and B. These roots originate from tree #109 located 11 feet up the hill. When the roots met with the pavement, they ran parallel to the pavement with smaller roots running under the pavement causing the noticeable pavement cracking.

The second 20-foot long trench was excavated on the part of the driveway closest to the Douglas fir just 12 feet from the trunk. Roots from the ivy, snowberry, and blackberry vegetation were apparent in this trench (Photo 3). One 3.5-inch, unhealthy root from the maple #123 just 3 feet uphill was identified (Photo 3, Photo C). This root angled straight down into the soil when it encountered the driveway.

Both maple tree roots were found directly downhill from the trees they were associated with.



Photo 3 The Douglas fir tree behind the root found from the maple. This root is below the grade of the pavement and three feet long.

They both followed paths parallel with the driveway in the same patterns water would flow on this site.

No Douglas fir roots were found during this site visit. It is common to have tree roots concentrate on the up and down hill sides of trees to stabilize them on steep slopes. The information gathered in this assessment indicate that it is highly unlikely Douglas fir roots from tree #122 will be impacted during construction of the wall parallel to this tree on the slope. To protect the trees surrounding the retaining wall construction, the following recommendations are provided.

Recommendations.

1. Retain stumps to trees removed for construction unless they directly impact construction.
The roots from these stumps hold the slope and intertwine with roots from retained trees.
2. Retain an arborist onsite during soil excavation for the wall.
*The arborist will be able to identify and professionally prune back any conflicting tree roots. It is expected many roots from the maple tree stumps will be found.
Roots from Tree #110 and #111 may be encountered and should be managed.*
3. If roots are found that belong to any trees to be retained, these should be professionally pruned, measured, and documented to assess the cumulative impacts of root removal to the tree.
4. Dig the wall foundation starting from the downhill side and work uphill.
The probability of roots encounters will increase on the uphill side of the trees to be retained.
5. Air spade or vactor truck excavation is recommended for areas within the CRZ on the up and down hill side of any trees to be retained on site.
6. Implement the general tree protection guidelines attached in this document.

Implementing these recommendations will minimize the consequences of any accidental impacts to roots encountered. The findings during this site visit indicate there is a low probability any roots encountered will be large enough or in high enough quantities to significantly impact the Douglas fir tree.

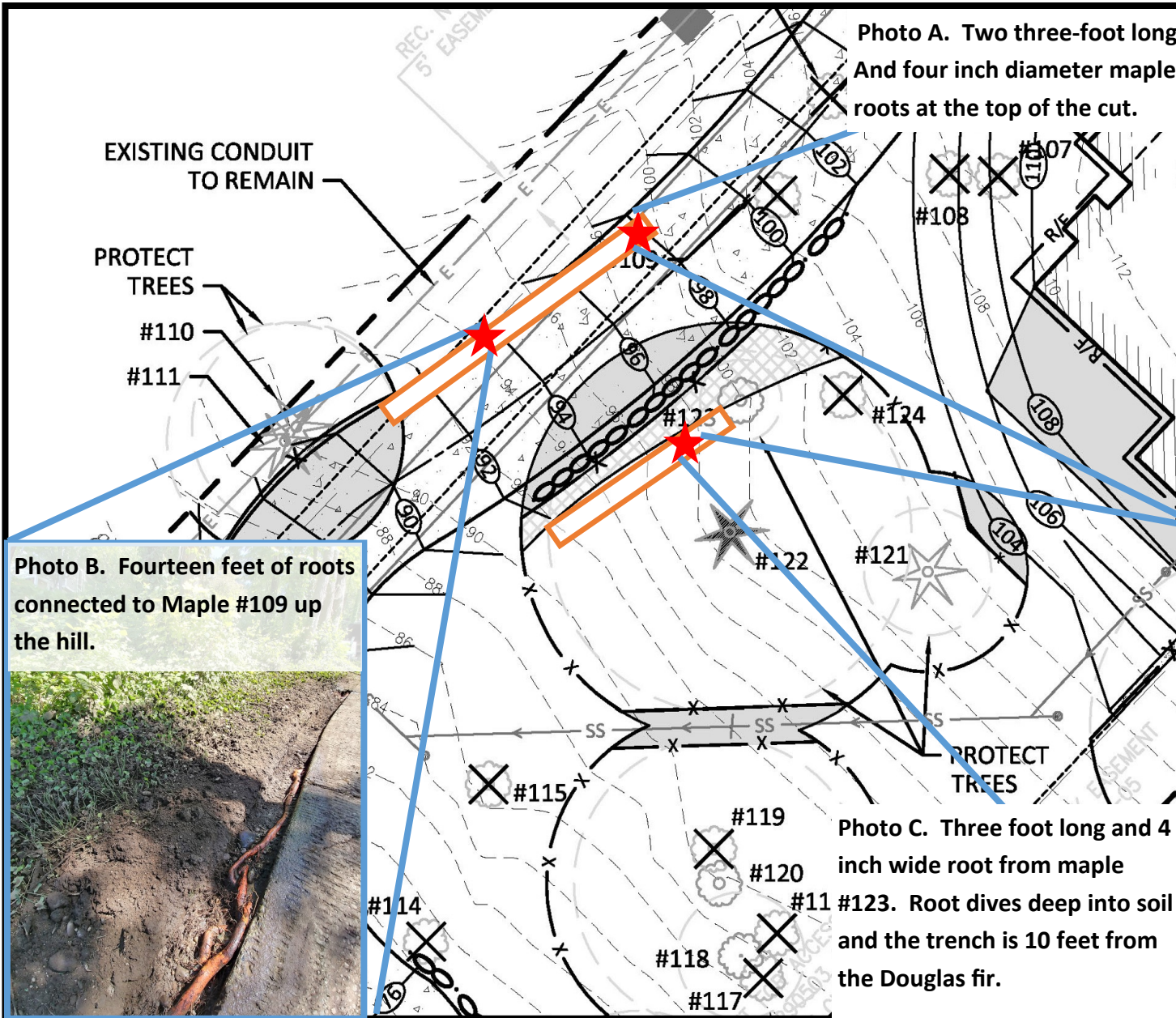


Photo A. Two three-foot long
And four inch diameter maple
roots at the top of the cut.



Photo B. Fourteen feet of roots
connected to Maple #109 up
the hill.



Photo C. Three foot long and 4
inch wide root from maple
#11 #123. Root dives deep into soil
and the trench is 10 feet from
the Douglas fir.



Rudolf Property Root Assessment
8255 West Mercer Way, Mercer Island, Washington
March 20, 2019



URBAN FORESTRY SERVICES, INC.
15119 McLean Road
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General Tree Protection Guidelines With Critical Root Zone Explanation Attachment

- 1. Responsibilities:** These Guidelines pertain to any disturbance, use or activity within the Critical Root Zone of any retained tree on this project. See attached **Critical Root Zone Explanation** for reference. The owner's arborist and general contractor shall meet onsite before any site work begins, to review and designate the most appropriate methods to be used to protect the retained trees during construction.

These guidelines apply to work provided by all contractors and sub-contractors on the project.

The project consulting arborist shall be contacted prior to any work that may need to enter the tree protection fencing. Two days notice shall be provided to the project consulting arborist. A proposed method for work shall be provided to the arborist. This method shall be reviewed by the project consulting arborist and either approval and / or comments provided by the project consulting arborist prior to commencing works within the tree protection area. He or she should be notified within 8 hours should any injury occur to any protected tree or its larger roots (greater than 2-inch diameter) so that appropriate assessment and/or treatment may be made.

- 2. Soil Disturbance:** No soil disturbance shall take place before tree protection fences are installed. All evaluated trees to be retained within these areas are clearly illustrated on the Site Plan.
- 3. Designated Tree Removals:** The owner's arborist and contractor shall confirm on site which trees are to be removed and those to be retained. Directional felling and removal of trees will be completed with great care to avoid any damage to the trunks, limbs, and critical root zones of the retained trees.
- 4. The Tree Protection Site Plan** shows the recommended location of the Tree Protection Fence (TPF). Immediately after the clearing limits and grading stakes are set in the field, the owner's arborist, during review and discussion with the contractor, will make a final determination on the tree protection requirements depending on construction limits and impact on major roots and soil condition. The arborist may adjust clearing limits in the field so that, in his/her opinion, tree roots and soils are protected while necessary work can proceed.
- 5. The Tree Protection Fence (TPF)** shall be installed along the clearing limits, with special consideration of the Critical Root Zone (CRZ) of trees to be preserved. The CRZ of a tree is generally described as an area equal to 1-foot radius for every 1-inch diameter of tree. For example, a 10-inch diameter tree has a CRZ of 10-foot radius. Work within the CRZ may be limited to hand work or alternate method of construction.

The Tree Protection Fence (TPF) shall be constructed with steel posts driven into the ground with 6-ft. chain link fence attached. Upon consultation with the contractor, the arborist shall determine the placement of the fence and the extent and method of clearing that may be done

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near preserved trees. Additional follow-up determinations may be required as work progresses on the project. See attached **Critical Root Zone Explanation**.

No parking, storage, dumping, or burning of materials is allowed beyond the clearing limits or within the Tree Protection Fence.

The TPF shall not be moved without authorization by the owner's arborist or City arborist. The TPF shall remain in place for the duration of the project.

Work within this area shall be reviewed with and approved by the owner's arborist. Call Urban Forestry Services, Inc. at 360-428-5810 with questions.

6. **Silt Fence:** If a silt fence is required to be installed within the Critical Root Zone of a retained tree, the bottom of the silt fence shall not be buried in a trench, but instead, folded over and placed flat on the ground. The flat portion of the silt fence shall be covered with gravel or soil for anchorage.
7. **CRZ over Hardscape:** Where the Critical Root Zone (CRZ) includes an area covered by hardscape, the TPF can be placed along the edge of the hardscape if and until it is removed. After hardscape removal, the available CRZ should be backfilled with topsoil up to 6 inches deep and protected with the TPF. Incorporation of topsoil into the existing sub-grade shall be determined by the consulting arborist. Where applicable a specification for topsoil will be provided or approved by Urban Forestry Services, Inc.
8. **Tree Protection Signs** shall be attached to the fence only and shall be shown as required on the Site Plan. They should read "Protect Critical Root Zone (CRZ) of trees to be retained. No soil disturbance, parking, storage, dumping, or burning of materials is allowed within the Tree Protection Barrier. " Monetary Fines based on the appraised dollar value of the retained trees may also be included on these signs. Telephone contact details for the project consulting arborist should also be included in the sign.
9. **Soil Protection within the Critical Root Zone (CRZ):** Where vehicular access, temporary work pad or storage pad is required within the CRZ of any preserved tree that is not protected with hardscape, the soil shall be protected with 18" of woodchips and/or plywood or metal sheets to protect from soil compaction and damage to roots of retained trees. A biodegradable coir mat netting is recommended to be placed on the existing grade before woodchip placement to protect the condition and confirm the location of the existing grade. The netting is a valuable benchmark upon removal of the material within the CRZ.
10. **Landscape Plans, Irrigation Design and Installation Details:** Great care shall be exercised when landscaping within the Critical Root Zone (CRZ) of any tree. Roots of preserved trees and other vegetation shall not be damaged by planting or installation of irrigation lines. The owner's arborist shall review the Landscape Plan for any potential design and tree preservation conflicts and approve related irrigation and landscape installation activities within the CRZ of retained trees. A proposed method for work shall be provided to and approved by the arborist.
11. **Backfill and Grade Changes:** The owner's arborist will determine to what extent backfilling may be allowed within the Critical Root Zone of a preserved tree, and if needed, the specific

material which may be used. Grade cuts are usually more detrimental than grade filling within the CRZ and should be reviewed by the arborist well in advance of construction.

- 12. Tree Maintenance and Pruning:** Trees recommended for maintenance and approved by the owner, shall be pruned for deadwood, low hanging limbs, and proper balance, as recommended for safety, clearance or aesthetics. All pruning shall be done by an International Society of Arboriculture Certified Arborist. *ANSI A300 American Standards for Pruning* shall be used. Limbs of retained trees within 10 feet or less, of any power line, depending on power line voltage, may only be pruned by a Utility Certified Arborist. This pruning must be coordinated with the local power company, as they may prefer to provide this pruning.
- 13. Underground Utilities:** Utility installation within the Critical Root Zone (CRZ) of any retained tree shall be reviewed by the Project Consulting Arborist. A less root disturbing route or minimal impact installation method of utility installation may be discussed and recommended i.e. tunneling or trenchless excavation. Trenching through the Interior CRZ of a retained tree is not usually allowed. **See CRZ Explanation to differentiate between the Perimeter and Interior CRZ.** An Air spade and Vac., Truck may be required when utility installation is mandatory near a retained tree or other methodology such as trenchless excavation.
- 14. Root Pruning:** Required work may result in the cutting of roots of retained trees. Cutting roots 2" or greater should be avoided. Potential root pruning needs should be reviewed in advance with the Project Consulting Arborist to minimize potential root fracturing and other damage. Severed roots of retained trees shall be cut off cleanly with a sharp saw or pruning shears. Applying pruning paint on trunk or root wounds is not recommended. Severed roots shall be covered immediately after final pruning with moist soil or covered with mulch until covered with soil. Excavation equipment operators shall take extreme care not to hook roots and pull them back towards retained trees. In all cases, the excavator shall sit outside of the CRZ. Soil excavation within the CRZ shall be under the direct supervision of the owner's arborist.
- 15. Supplemental Tree Irrigation:** If clearing is performed during the summer, supplemental watering and/or mulching over the root systems within the Tree Protection Fencing of preserved trees may be required by the owner's arborist. The arborist should be notified of the proposed schedule for clearing and grading work. Supplemental watering and mulching over the root systems of roots impacted or stressed trees are strongly recommended to compensate for root loss and initiate new root growth. Long periods of slow drip irrigation will be most effective. A large coil of soaker hose starting at least 18" from the trunk and covering the Interior Critical Root Zone area is recommended. Water once per week and check soils for at least 12 inches infiltration. This work shall be under the direct supervision of the owner's arborist.
- 16. Additional Measures:** Additional tree protection recommendations may be required and may be specified in Urban Forestry Services, Inc. report(s).
- 17. Final Inspection:** The owner's arborist shall make a final site visit to report on retained tree condition following completed work and shall report to the city to release the bond for the retained trees.

ASSUMPTIONS AND LIMITING CONDITIONS

**Urban Forestry Services, Inc.
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1. Limitations of this Assessment

This Assessment is based on the circumstances and observations as they existed at the time of the site inspection of the Client's Property and the trees inspected by Urban Forestry Services, Inc. and upon information provided by the Client to Urban Forestry Services, Inc. The opinions in this Assessment are given based on observations made and using generally accepted professional judgment, however, because trees and plants are living organisms and subject to change, damage, and disease, the results, observations, recommendations, and analysis took place and no guarantee, warranty, representation, or opinion is offered or made by Urban Forestry Services, Inc. as to the length of the validity of the results, observations, recommendations, and analysis contained within this Assessment. As a result, the Client shall not rely upon this Assessment, save and except for representing the circumstances and observations, analysis, and recommendations that were made as at the date of such inspections. It is recommended that the trees discussed in this Assessment should be re-assessed periodically.

Urban Forestry Services, Inc. shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in our fee schedule and contract of engagement.

Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

2. Reaction of Assessment

The Assessment carried out was restricted to the Property. No assessment of any other trees or plants has been undertaken by Urban Forestry Services, Inc. Urban Forestry Services, Inc. is not legally liable for any other trees or plants on the Property except those expressly discussed herein. The conclusions of this Assessment do not apply to any areas, trees, plants, or any other property not covered or referenced in this Assessment.

3. Professional Responsibility

In carrying out this Assessment, Urban Forestry Services, Inc. and any Assessor appointed for and on behalf of Urban Forestry Services, Inc. to perform and carry out the Assessment has exercised a reasonable standard of care, skill, and diligence as would be customarily and normally provided in carrying out this Assessment. The Assessment has been made using accepted arboricultural techniques. These include a visual examination of each tree for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of insect attack, discolored foliage, the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the tree(s) and the surrounding site, and the current or planned proximity of property and people. Except where specifically noted in the Assessment, none of the trees examined on the property were dissected, cored, probed, or climbed and detailed root crown examinations involving excavation were not undertaken.

While reasonable efforts have been made to ensure that the trees recommended for retention are healthy, no guarantees are offered, or implied, that these trees, or all parts of them will remain standing. It is professionally impossible to predict with absolute certainty the behavior of any single tree or group of trees, or all their component parts, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential to fall, lean, or otherwise pose a danger to property and persons in the event of adverse weather conditions, and this risk can only be eliminated if the tree is removed.

Without limiting the foregoing, no liability is assumed by Urban Forestry Services, Inc. or its directors, officers, employers, contractors, agents, or Assessors for:

- any legal description provided with respect to the Property;
- issues of title and or ownership respect to the Property;
- the accuracy of the Property line locations or boundaries with respect to the Property; and
- the accuracy of any other information provided to Urban Forestry Services, Inc. by the Client or third parties;
- any consequential loss, injury, or damages suffered by the Client or any third parties, including but not limited to replacement costs, loss of use, earnings, and business interruption; and
- the unauthorized distribution of the Assessment.

The total monetary amount of all claims or causes of action the Client may have as against Urban Forestry Services, Inc. including but not limited to claims for negligence, negligent misrepresentation, and breach of contract, shall be strictly limited to solely to the total amount of fees paid by the Client to Urban Forestry Services, Inc. pursuant to the Contract for Services as dated for which this Assessment was carried out. Further, under no circumstance may any claims be initiated or commenced by the Client against Urban Forestry Services, Inc. or any of its directors, officers, employees, contractors, agents, or Assessors, in contract or in tort, more than 12 months after the date of this Assessment.

4. **Third Party Liability**

This Assessment was prepared by Urban Forestry Services, Inc. exclusively for the Client. The contents reflect Urban Forestry Services, Inc. best assessment of the trees and plants on the Property in light of the information available to it at the time of preparation of this Assessment. Any use which a third party makes of this Assessment, or any reliance on or decisions made based upon this Assessment, are made at the sole risk of any such third parties. Urban Forestry Services, Inc. accepts no responsibility for any damages or loss suffered by any third party or by the Client as a result of decisions made or actions based upon the use of reliance of this Assessment by any such party.

5. **General**

Any plans and/or illustrations in this Assessment are included only to help the Client visualize the issues in this Assessment and shall not be relied upon for any other purpose.

This report and any values expressed herein represent the opinion of Urban Forestry Services, Inc. Our fee is in no way contingent upon any specified value, a result or occurrence of a subsequent event, nor upon any finding reported.

The Assessment report shall be considered as a whole, no sections are severable, and the Assessment shall be considered incomplete if any pages are missing. The right is reserved to adjust tree valuations, if additional relevant information is made available. This Assessment is for the exclusive use of the Client.