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Cambium, Inc.
701 34th Ave
Seattle, WA 98122
206-860-7625
Attn: Michal Lehmann

February 11, 2021

Dear Mr. Lehmann,

Thank you for contacting me about the tree concerns on your client's property at 2761 70th Ave SE in Mercer Island, Washington. You stated that you were going to be making some landscape improvements for your clients, the Anbalagan family. It involved adding a sport court, walkway, and a patio to the side yard. Your client had decided to retain a 24" diameter Douglas fir (*Pseudotsuga menziesii*) that had originally been permitted for removal. Now that it was being retained, the City of Mercer Island wanted documentation from an ISA certified arborist that it would survive construction. There would be some excavation taking place under the trees drip line that would affect its root system.

I met with you onsite on January 28 and you showed me the tree and the proposed work that was to be done. I examined the tree using the standard visual tree assessment method, as outlined in the *Tree Risk Assessment Manual* published by the International Society of Arboriculture. This is considered a Level 2 Basic Tree Risk Assessment.

The tree risk assessment protocol is based on three factors:

- How likely is the tree (or tree part) to fail?
- How likely is the tree (or tree part) to hit a target of value when it fails?
- How likely is the tree (or tree part) to damage the target if it hits it?

Tree risk is categorized as Low, Moderate, High or Extreme. A normal healthy tree is generally considered low risk, because it is not likely to fail. It is the presence of defects in the tree that increases the level of risk. A tree can be a high risk to fail, but a moderate risk overall, if it isn't very likely to strike a target or if it is too small to cause significant damage to the target. A tree can be in poor condition, but a low risk, if there is no target likely to be hit when it fails.

The tree appeared to be in good condition with no significant defects or health problems. I would rate it as a low-risk tree. It was a good candidate for retention with good viability for survival. The drip line encroachment would come from the north and northeast side of the tree.

Root system protection is critical for successful tree retention. Unlike trunk and branch damage, root damage is largely unseen since it is underground. Enough of the root system must be protected for the tree to survive and carry out its normal biological functions (water and nutrient uptake, plant hormone production, etc.). We must also protect enough of the large roots so it can maintain its stability and not fall during high winds or other extreme weather events.

The use of the drip line is sometimes required as a guide for developing a Tree Protection Zone (TPZ). This is the edge of the farthest branch extension in all directions. However, branch extension doesn't necessarily correlate well with root extension. Branch extension is influenced by plant genetics and growing conditions. Crowded trees have shorter branches. Some species have upright growing branches that don't extend very far outward. If a tree's trunk has a significant lean and the crown of the tree is high up in the tree, the dripline may not even extend to the base of the tree.

The current industry standard for root protection is the Critical Root Zone (CRZ) formula. A CRZ is developed for an individual tree by measuring its DBH (diameter at breast height – 4 ½' above ground) and measuring one foot out from the trunk in all directions for every one inch of trunk diameter. Using this formula, a 24" diameter tree would have a CRZ of 24' extending out from the trunk in all directions. The volume of soil protected is usually enough to successfully preserve the tree.

In some circumstances, it isn't possible to develop the property as proposed and protect this much of the root zone. What has been found successful is to allow encroachment into the CRZ on one side of the tree by up to 50%. This will still preserve over three quarters of the CRZ, and most healthy trees can withstand it. This is particularly true when the other side of the tree is not disturbed at all, which is the case in your situation.

The proposed project will encroach past the drip line of the tree, as well as into the CRZ. The new landscape features will be:

- A sport court located to the northeast of the tree with the closest portion being 18' away,
- A slab stairway, patio and gravel walkway located due north of the tree 15' away,
- A new wall against the house located due north of the tree 26' away,
- A new block retaining wall located due north next to the stairway, 18' away.

An optional fire pit extension of the patio has not been included, that would have been located slightly to the northwest, 10' away from the tree.

The encroachments will involve some excavation and some fill. Tree roots are primarily located in the top 18" of soil. Excavation that is less than that depth probably won't remove all the roots in that area. Compacted fill will crush small roots and exclude oxygen from the soil and impede further root growth in the compacted area. However, larger roots that extend past the compaction zone will continue to grow and uptake water and nutrients. Compacted fill is usually not as damaging to the tree as excavation and root removal.

For this tree's 24' CRZ, a 24' TPZ would be recommended. This can't be done here, but since the disturbance will be farther away than 12' (half the CRZ on one side), the tree should still be able to withstand that much root damage. Its growth may be stunted for a few years, but it should recover and grow normally after that. Supplemental irrigation in the summer dry months would help the recovery. Organic mulch over the topsoil will help retain moisture and build the soil organic matter levels, providing a good environment for new root growth. There are also organic fertilizers and biostimulant products that can be used to promote root growth.

I recommend a TPZ be set up and fenced off from and prior to all construction activity. This type of fencing usually follows the soil disturbance line with a one- or two-foot setback for a work area. No heavy equipment or storage of materials should be allowed in the TPZ. Only pedestrian traffic and hand work as needed should be allowed in the TPZ. I would also advise that any large roots (1" diameter or larger) that will be removed should be cut, rather than torn out. Roots that are ripped and shredded die back further and don't recover and regenerate new growth as well. Ones that are sharply cut can generate callus tissue to seal off the wound and regrow new small roots. Any exposed roots should be covered with moist soil or wet cloth/burlap to prevent dehydration.

Please note that all of my recommendations are based on my observations, made on January 28, 2021. The condition of the tree will change over time as it ages and grows and is affected by the weather. Trees with root damage are weakened and this may make them more susceptible to infection by root diseases that are common in our region. My report does not guarantee the health or long-term viability of the tree. It is only an assessment based on my knowledge, training, and experience in the field of arboriculture and tree preservation in construction zones.

I hope this report is helpful for you. Please feel free to contact me if you have any questions or have further need of my services.

Sincerely,

Alan Haywood

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WSNLA Certified Professional Horticulturist – 2332
ISA Qualified Tree Risk Assessor
ASCA Qualified Tree and Plant Appraiser
ecoPRO Certified Sustainable Landscape Professional