



January 6, 2023

Project: Pre-construction assessment for lot re-development at 3419 72nd Place SE, Mercer Island, WA. Parcel number 1300301381.

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Objectives: Evaluate health of existing trees and establish criteria for the preservation of those to be retained.

Description: The existing house on the subject property was built in 1951 and was part of the Calkins C development which included the surrounding properties. The previous owners purchased the home more than twenty years ago and made few changes to the home over tenure.

A large tree near the property line for the 3413 adjoining property to the north side was removed around 2012 most likely in preparation for selling in 2013 (Figures 1 and 2). The property at the NW corner of the subject lot changed hands in 2015. The original home was demolished another built between 2017 and 2019 (Figures 3-5). As part of this process, and before selling the house in 2022, the entire yard was re-landscaped which included installing a retaining wall along that property's east side and SE corner (Figure 6). The properties to the west, south, and SW had no noticeable changes made over the last twenty years.

RKK Construction purchased the 3419 parcel in February of 2022 and is working on a plan to tear down the existing house and replace it with another which will somewhat occupy the same footprint (Figures 7 and 8). Knowing the Mercer Island would require a tree protection plan RKK reached out to Tree Harmony who in turn contacted Superior NW Enterprises. The request was to assess the significant trees present on the property, along with any within 20' of the borders, as to their health, stability, and overall suitability for retention.

The following itemized tree list begins on the east side of the property and their numerical designations are reflected in Figure 9. Diameters were measured at the standard height of 54" above grade (DSH) during the August 2022 site visit unless otherwise noted. Those in the neighboring yards were conservatively estimated to the tree's favor. Heights were also estimated.

1. English Laurel (*Prunus laurocerasus*) hedge starts on the south side of the existing driveway entrance, runs south to the corner of the yard, then turns west to run 30' down the south side of the yard. Hedge has been groomed to 8' tall and around 8' wide. It is in good condition. The entire east section (fronting the road) is in the City right-of-way.

2. Kwanzan cherry (*Prunus serrulata*) with a graft formation. The basal stem is 26.5" across at the widest and then tapers down rapidly to 21" right where the main graft scaffolds come off at the 66" level. Tree was planted 11' S of the south edge of the existing driveway 3' W of the east property line. Its base is 6' W of the inside power line running between the road and yard. The tree has been carved out multiple times for line clearance. It is in fair condition with average new growth and color and only mild Brown Blossom Rot symptoms.

There are two big camellias and five big rhododendrons growing between the #2 cherry and the house along the south side of the driveway. None achieve the size necessary to reach tree status.

3. A juvenile oak tree (*Quercus sp*) that might be a young Red or even a Burr. It is difficult to tell because of its age. Not sure if this tree was planted or volunteered. It is standing 5' N of the north side of the existing driveway about 12' W of the road. There is also several small Mountain Hemlocks (*Tsuga mertensiana*) standing to either side of the oak (Figure 10). All these trees are less than 4" caliper. A small stone border lines the edge.

4. Douglas fir (*Pseudotsuga menziesii*) engulfed in ivy from the ground to at least the midpoint of the column (Figure 11). Accounting for the sheath of ivy stems the tree measures out to be 31" DSH. It stands 14' S of the northwest corner marker for the property, 28' W of the existing house foundation, and 22' W of the poured concrete back patio at the northwest corner of the existing house. The fir is 75' tall and its canopy comes down past the halfway point. It exhibits good color and new growth and an above average cone load. The west side (3420) neighbor's yard drops off rapidly 5' W of the base of the tree, as much as 8' over a 10' span. There is likely a retaining wall under the ivy and undergrowth. Exceptional by definition.

There's a holly clump (*Ilex aquifolium*) standing about 8' W of the west property line and 14' NW of the #4 fir. The plant is on the lower level of the 3420 yard. It is formed of multiple stems between 3" and 8" DSH and reaches 22' tall and 10' wide overall.

5. Vine Maple (*Acer circinatum*) formed from eight stems 2.5-3" DSH and half a dozen in the ½-1" DSH sizing. Tree reaches about 15' tall, has a 6' radial spread, stands 3' E of the back fence, and 11' S of the #4 fir. The older stems are in below average condition. The young ones exhibit good new color and growth. Likely struggling with Verticillium Wilt. Significant even with the small stems because of its typical formation for the species.

6. Dogwood (*Cornus florida*) whose base is 16' N of the south line and 12' E of the west fence. The tree grows nearly horizontal 12' east from its base before beginning to turn upright (Figure 12). The east end of the tree stops 11' W of the existing house. The majority of the canopy forms a 7' radial spread centered on a point 16' W of the house as shown in Figure 13.

7. Ponderosa pine (*Pinus ponderosa*) 25" DSH, 40' tall standing 11' N of the south line, 16' E of the west line, 9.5' W of the poured concrete patio at the SW corner of the house, and 19' W of the existing foundation. The lower canopy of the tree has been pruned back from the existing house roof line. The tree is in quite good health for the species. Might have been topped before as it has multiple leaders from near the 20' level.

There are a number of juvenile Western Red cedars that have volunteered on this site. They are worth digging up and salvaging for any replacement trees that may be required. They do meet the 6' tall size requirements.

Several trees stand in neighboring yards along the west and south borders. These trees are all small enough and stand far enough back from the property lines that their roots systems will not be affected in any meaningful way by the proposed project. They were not individually reviewed.

Methods: Tree assessment is both an art and a science. To properly perform, an arborist must have an extensive background in biology, tree mechanics, and tree structure that is equal parts academic and field knowledge. It takes years of study to recognize and correctly diagnose the subtle signs trees exhibit before their failure, whether it be partial or total. The process begins with a visual inspection (visual tree assessment, VTA) which is followed up as necessary with soundings, core testing, and/or other detection means. Each tree is examined and evaluated according to several factors including species type, size, vigor, injuries present, root and grade disturbance, deadwood, location and extent of decay, stem taper, exposure, and targets that are at risk.

Analysis: There are two levels of impact at this site, primary and secondary. The primary zone includes the environs immediately within the boundaries of the demolition, proposed new construction, and the regions within ten feet of those boundaries. The east leg of the front hedge, the #2 flowering cherry, the #3 set of trees, and the #7 pine are all standing in this zone. The #3 and #7 are to be retained and will be discussed further below. The #2 cherry and at least the entire east hedge will be removed during the demolition stage of the project.

The secondary impact zone includes the trees which have root systems extending within the construction impact area. This region, the Critical Root Zone (CRZ), is a radial area extending out from the tree a distance equal to one foot per inch of diameter. For example, the #4 Douglas fir, with a 31" DSH, has a theoretical 31' radial CRZ.

Typically intrusion within the Critical Root Zone is strongly discouraged by the tree care industry. However trenching type incursion, that is excavation that will occur along only one sector of a tree's CRZ, can reach significantly into the root growth area without having a detrimental long term effect. What does have to be absolutely protected is a tree's Structural Root Plate (SRP). This radial area is again related to the diameter inches of the tree in question but not quite in a direct proportion as in the CRZ. Figure 14 on the next page illustrates the relationship.

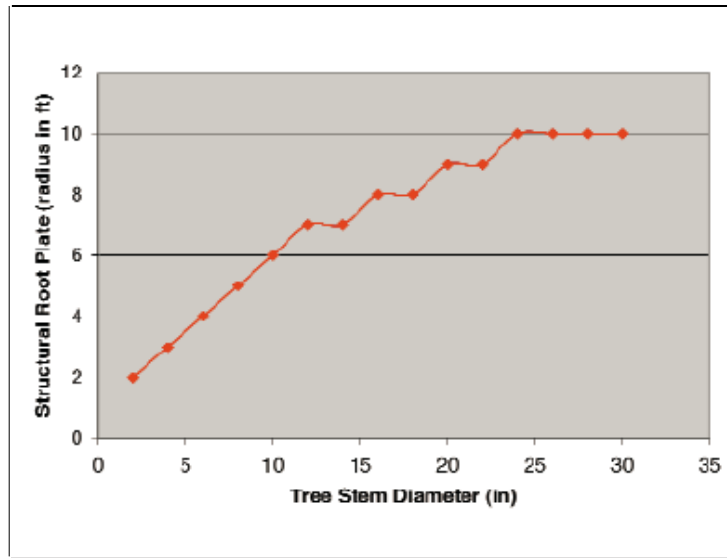


Figure 14. Size of the Structural Root Plate in relation to tree stem diameter. Note that the SRP levels off at 10' for any tree over 24" in diameter. (Coder, 1996)

Based on the plan set the #7 pine, with a full 10' radial SRP, is the only site tree that is close enough to potentially be affected by the demolition work. The SW patio sits right at the edge of its root plate. Extreme care will have to be taken when the demolition is taking place. This work should take place under arborist oversight.

The chart shown in Figure 15 below is used to determine what percentage of a tree's Critical Root Area (CRA) will be affected by trenching type incursion. In general trees can sustain losses of up to 30% of the overall area within their CRZ without having long term detrimental results.

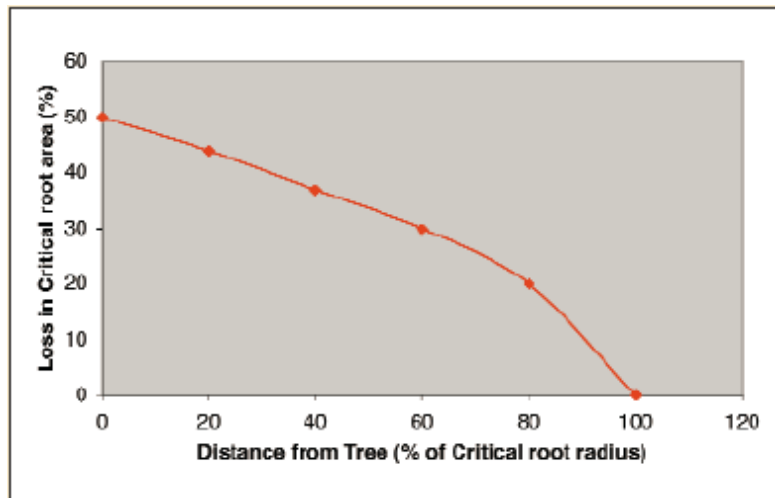


Figure 15. Chart giving the loss in critical root area as a function of the radial distance to the CRZ disturbance. (Coder 1996)

The #3 set of trees is technically within the primary impact zone, being just 5' off of the existing driveway which will be removed. As long as the stones at the edge are not disturbed the root systems of the young trees will be fine.

The #4 fir will experience disturbance from the demolition. The tree is large enough that it has likely extended its root system around the north end of the house and the full length of patio. It is doubtful that any roots go under the concrete because of its distance from the tree. The proposed new construction is 12-24' further east from the tree than the existing. Taking everything into consideration there could be a potential loss of 35 square feet of Critical Rooting Area.

Assuming that the tree only has 1750 square feet of rooting space because of the drop offs and/or retaining walls to its north and west and that based on its diameter it should have 3018 square feet of CRA it is highly likely that the fir has nearly double the root concentration present in the area. Even taking all that into account the loss in rooting space from the demolition will be significantly below threshold for the tree.

This will only hold true if the demolition impact is held to no more than 5' W of the existing house.

The SW corner patio is 10' E of the 25" DSH #7 pine tree so its demolition will potentially create root disturbance. The tree likely has roots running around both the south and north ends of the patio. It is much less limited in its rooting space than the #4 tree so probably has a more normal root density. If care is taken during demolition (monitoring by the arborist will ensure this) it is likely the pine will lose no more than 30 square feet of its Critical Rooting Area well within its threshold.

Again, this will only hold true if the demolition impact is held to no more than 5' W of the existing house.

According to the proposed plans the new SW corner of the house will shift east and end up at least 30' back from the #7 tree. There is a rear patio that will occupy nearly the same space as the existing foundation at the SW corner of the house. Its SW corner is 20' E of the base of the #7 pine.

Discussion: The demolition of the existing home has the potential to create root disturbance in the CRZ of the #4 and #7 trees. It will be vitally important to use extreme care when removing the patios at the corners of the existing house. There are roots from the #4 fir and #7 pine running against both. The big Exceptional fir has adapted to the limited confines for its roots and while it will gain rooting space ultimately it can ill afford damage to what currently gives it support.

If care is taken and arborist oversight is utilized the impact should be minimal on the two evergreens.

Ideally protection fencing will be set up prior to the demolition. In front a short section of fence set on the north side of the existing driveway south of the stone border will ensure the #3 set of trees will be fully protected.

The protection fence on the west side should run from the north property line south along the edge of the NW patio (5' W of the existing foundation) to meet up with the edge of the SW patio and hence to the south line (Figure 16). This will protect both the #5 vine maple and the #6 dogwood along with the larger fir and pine.

A layer of arbormulch 6-8" deep should be laid down to 3' past the driplines for the four west side trees within the subject property.

If there are going to be significant changes made to the rear landscaping anywhere within the protection fencing it should be discussed with the project arborist. This is especially true for the #4 fir. No grading, scraping, or any other soil changes should occur west of the protection fence.

The ivy needs to be severed at the base of the #4 fir creating at least a 3' tall completely clear swath all the way around the trunk of the tree.

It is worth thinking about retaining the south leg of the front hedge. It provides useful privacy and is well established. It is not shown on the survey and may be fully on the south side property anyway.

Removing the #2 cherry will trigger requirements for two replacement trees.

Waiver of Liability Because the science of tree assessment is constantly broadening its understanding, it cannot be said to be an exact science. Every tree is different and performing tree risk assessment is a continual learning process. Many variables beyond the control, or immediate knowledge, of the arborist involved may adversely affect a tree and cause its premature failure. Internal cracks and faults, undetectable root rot, unexposed construction damage, interior decay, and even nutrient deficiencies can be debilitating factors. Changes in circumstance and condition can also lead to a tree's rapid deterioration and resulting instability. All trees have a risk of failure. As they increase in stature and mass their risk of breakdown also increases, eventual failure is inevitable.

While every effort has been taken to provide the most thorough and accurate snapshot of the trees' health, it is just that, a snapshot, a frozen moment in time. These findings do not guarantee future safety nor are they predictions of imminent events. It is the responsibility of the property owner to adequately care for the tree(s) in question by utilizing the proper professionals and to schedule future assessments in a timely fashion.

This report and all attachments, enclosures, and references, are confidential and are for the use of the Scott Sinclair, Tree Harmony Arborists, Jason Koehler, RKK Construction, and their representatives only. It may not be reproduced, used in any way, or disseminated in any form without the prior consent of the clients concerned.

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Qualified Tree Risk Assessor
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Figure 1. Aerial view of the subject and surrounding properties circa 2009.



Figure 2. Aerial photo circa 2012 showing the large evergreens missing in the 3413 yard.



Figure 3. Aerial photo circa 2015.



Figure 4. Aerial photo circa 2017 showing the changes occurring on the 3412 lot.



Figure 5. Aerial photo circa 2019 showing the new house on the 3412 property.



Figure 6. Aerial from 2021 showing the retaining wall(s) in place in the 3412 backyard.

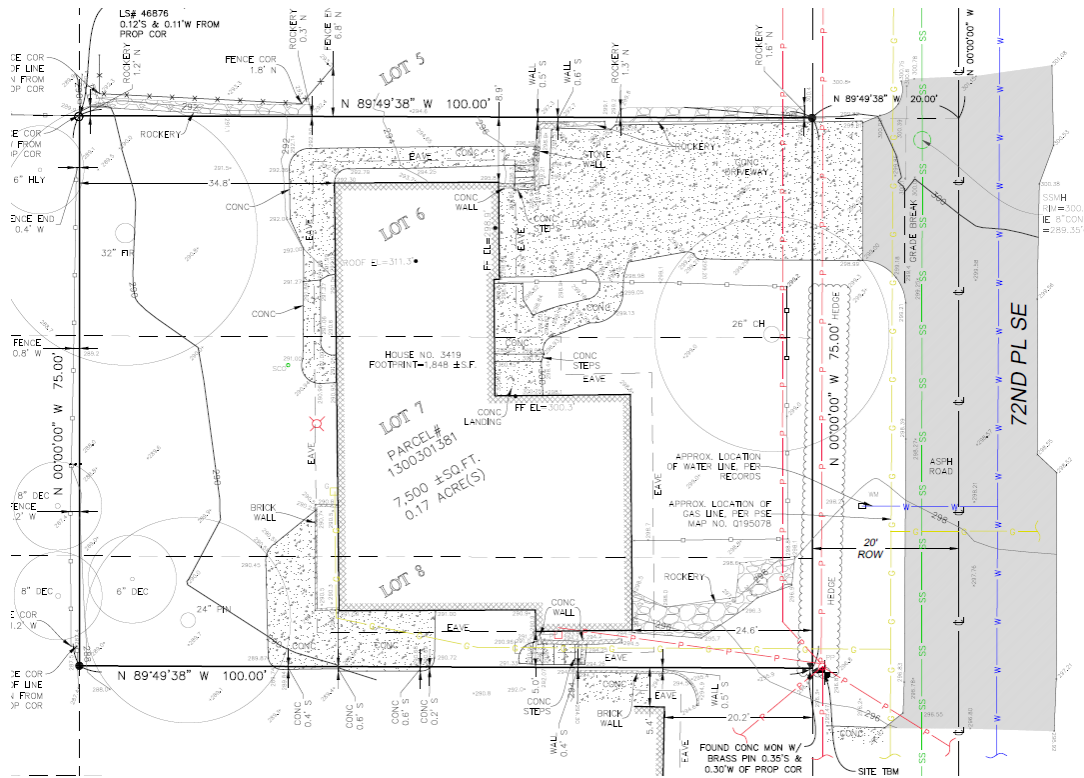


Figure 7. Excerpt from the survey showing the current layout of the property.

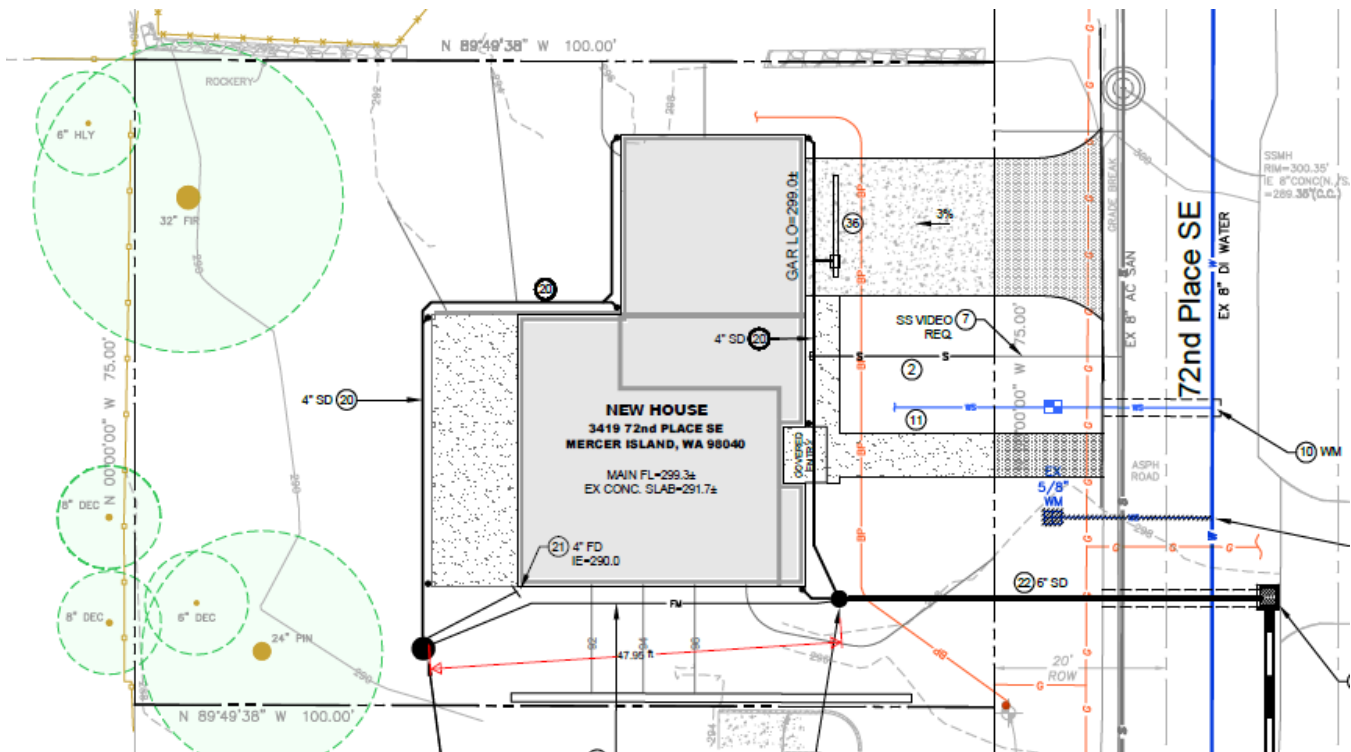


Figure 8. Excerpt from the proposed plan set showing the new layout. Note the greater distance of the west side of the house to the trees on that side. The circles around the trees are not fully representative of the extent of the Critical Root Zones of the subject trees. (See Figure 16 below). Note the new water main cutting through the area where the #2 cherry is standing (blue line).



Figure 9. Aerial photo circa 2021 showing the approximate locations of the trees noted in the study (white numerals).



Figure 10. Looking north at the #3 oak and hemlocks and the stone border wall.



Figure 11. Looking west at the base of the #4 fir and the #5 vine maple to its left. Note the thick ivy on the base of the fir which needs to be severed.



Figure 12. Looking west at the stem of the #6 dogwood.



Figure 13. Looking south at the canopy of the #6 dogwood extending toward the existing house. The #7 pine is in the background center.

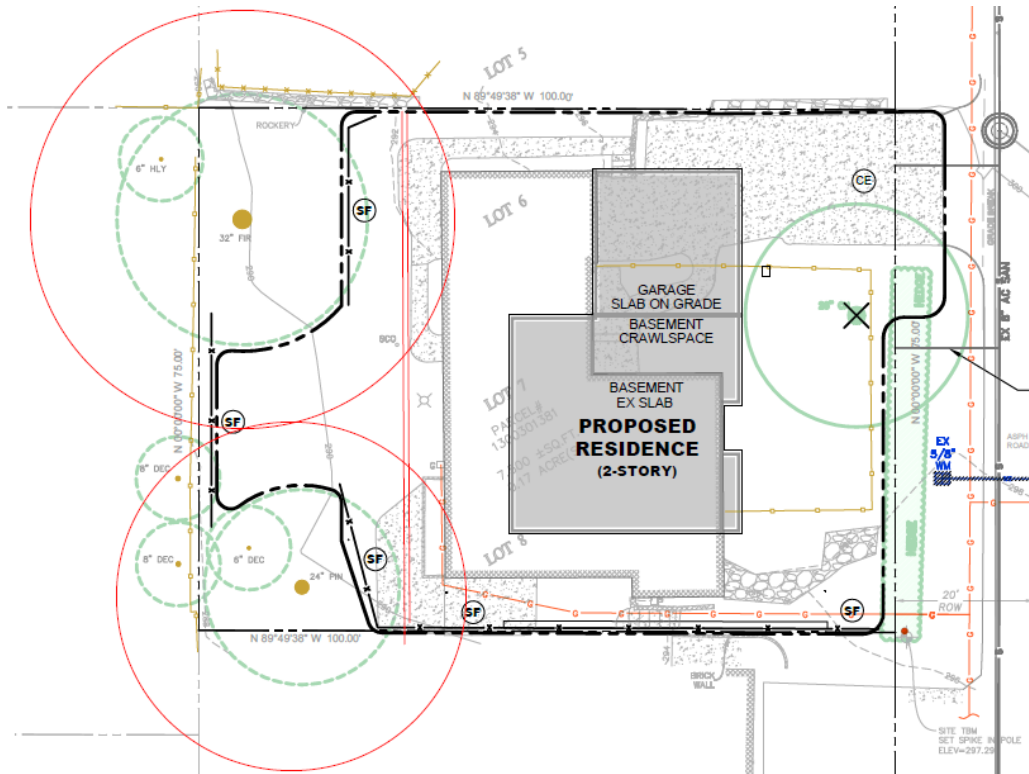


Figure 16. Excerpt from the C1.0 plan sheet with illustrations from the author overlaid. The two large red circles are scaled to match the actual CRZs of the #4 and #7 trees. The double red line running north to south is where the fence for these trees has to be set up to ensure necessary protection. Nothing should happen west of the fence without arborist input and oversight.