Superior NW Enterprises

August 2, 2021

Project: Pre-construction assessment for property re-development at 9611 SE 72nd Street, Drive East, Seattle, WA. Parcel number 2579500040.

Contact: Kate Miller – Brandt Design Group
66 Bell Street, Unit 1, Seattle, WA 98121
Phone – 860 391 1008 Email – kate@brandtdesigninc.com

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

Description: The existing home on the 9611 property was built in 1980 on a third of an acre at the SE corner of Mercer Island (Figure 1). Few changes were made to the property until around 2016 when significant upgrades were made inside and out including new exterior stairs on the north side, new driveway entrance design, new path on the south side, and substantial changes to the vegetation around the perimeter of the home (Figures 2 and 3). The garden area on the east side of the home changed gradually from 2007 until it reached its current form during the 2016 event.

The 9615 house to the south was substantially remodeled in 2009 (Figures 4 and 5). Changes to the conformation of its garage and driveway would have had some impact on the trees along the border between the two properties. No substantial changes occurred on the 9605 property over the time period.

The property owners began working with Brandt Design on plans which include the demolition of the existing house and the construction of a new one nearly in the same footprint as shown in Figures 6 and 7. Knowing that the City of Mercer Island would request a formal tree protection plan Brandt Design reached out to Superior NW and initial site visits were completed in May of 2021. Follow up visits stretched into July of 2021.

The following itemized list begins near the NW corner of the parcel, collects the trees along the city ROW and in the orphaned area inside the curve of the entrance drive, and then carves a figure eight through the subject property. Trees standing on the neighboring properties within 15' of the lines were included in the inventory. The trees were tagged (excepting those off the property) and their locations noted in survey excerpt shown in Figure 8. The tree diameters measured were taken at the standard height of 54" above grade (DSH). Caliper measurements were taken at 6" above grade per industry standard. Heights were estimated.

Numerous small caliper trees and shrubs are scattered about the property. Only the larger hedge rows were included in the study.

1. Big Leaf Maple (*Acer macrophyllum*) clump, probably a stump sprout, with four trunks 9", 9", 10", and 10.5" DSH coming off a common base. The tree stands 12-13' N of the NW property corner marker stake and 18-19' E of the edge of the asphalt for 72nd Street. The larger stem is on the south side of the group, goes up to 40' tall where it cracked off. It has several epicormics rising from the damage point and a larger scaffold jutting out to the west crossing over the top of two of the smaller stem in the group. The two 9" trunks begin to bend to the west as they rise, turning nearly horizontal by the 40' level, and extend over the street. The canopy on the larger stem has weak color and below average leaf size. The two 9" exhibit average color and leaf size. The fourth trunk grows out to the east. It's stunted with only a handful of branches with viable canopy present. It reaches 45' tall.

2. Another stump sprout Big Leaf maple with six trunks; the smallest is 3" DSH, there is a 4.5", 7.5", 8", 9.5", and 12" trunk. They cross up and against each other as they rise and reach into the surrounding trees. Weak conditioned with poor structure, below average color, and less than normal new growth. Some of the sections grow west over 72nd Street. Others reach out as much as 16' to the northeast. There is atrophy along the columns of several of the stems. Tree stands 8' on center NE of the #1, 7' on center SSE of the #3 tree, and near to 19' E of the asphalt edge.

3. Dual stem Black Cottonwood (*Populus trichocarpa*) co-joined from the base and fully separating above the 6' level. An active fracture plane shows on the west face (Figure 9). The east side exhibits better attachment (Figure 10). Tree stands 12' E of the edge of the asphalt and 7' NNW of the #2 maple clump. It measured 54" caliper. The larger stem reaches 100' tall, the smaller about 85' tall. The lesser trunk separates into multiple scaffolds above the 60' level all of which begin to bend over to the west. The scaffolds extend completely over 72nd Street and the tips reach over the power line and ditch on west side of the street. Exhibits average new growth and color. The majority of the scaffolds on the larger trunk extend to the south out as far as 26' and parallel to the street. The top of the tree begins to bend south on a large scaffold. This half of the tree has average color and new growth. The NW quadrant of the base of the cottonwood shows an adverse growth habit indicative of decay in the species (Figure 11). The structural roots on the west side may have been damaged when the street was widened and/or by vehicles parking in the gravel verge between the street and the tree. There are surface roots present showing decay and atrophy (Figure 12).

4. Three trunk cottonwood from the base, standing 6' NNE of #3. There is decay and atrophy in the area where the center trunk joins the west side (Figure 13). The NW basal quadrant shows the abnormal growth pattern present in the #3 tree (Figure 14). West trunk is 28.5" DSH, middle stem is 36" DSH, and the east is 20.5" DSH. The smaller stem leans slightly east from the base, bends over in a couple kinks, and goes nearly horizontal 30' out to the east on a couple of scaffolds. The center stem reaches 100' tall, spreads 35' radially, flattens a little on the west due to competition with #3 and its own west side stem. West trunk attains 85' tall, bends into the NW quadrant, reaches 25-30' across 72nd and over the wires. Center trunk is more stunted then the other two and exhibits die back and deadwood. Decay may be more advanced than is readily noticeable.

5. Cottonwood standing at the corner where the shared driveway for the 9601, 9605, and 9611 properties comes off of 72nd. This tree is 8' E of the asphalt, has a water meter box 4' to its SW, and there is a storm sewer access panel 13' to its west in the center of the road. The curve of the driveway comes within 14' and then widens the gap to 20'. Tree is 42" DSH averaging for the slight slope differential. It reaches 90' tall, spreads up to 30' in all directions. Slightly below average condition compared to the other cottonwoods nearby and exhibiting signs of stress. Has poor resonance at the base when tapped. Likely accelerating into its decline cycle.

6. Three trunk cottonwood standing on the lower bit of the slope at the inside driveway curve. It is 11' W of the inside edge of the asphalt. There are signs that its roots may have intruded beneath the driveway and been removed for its repair in the recent past. The main stems measure 14", 21", and 32" DSH. The smaller stem leans into the medium one as it rises, then curves over at nearly a right angle to the north. The 21" stem leans slightly northeast as it rises, bends to nearly 30 degrees above the 30' level, and extends out nearly 40' to the northwest. Likely that a top spar cracked out of the trunk for it to exhibit this morphology. Color and new growth are good on this tree probably from it living at the base of the slope and getting more nutrients and water than the #5 tree. There are at least five spots where scaffolds as large as 10" caliper have broken out of the three trunks. The 32" trunk grows mostly vertically, reaches 100' tall, and spreads in a narrow band 28' to the south but less to the north. Volunteers from this tree are coming out from underneath the keystone block wall. There are roots from the tree protruding beneath the wall alongside the driveway asphalt.

7. Dual stem Red Alder (*Alnus rubra*) standing 6' nearly due east of the NW corner Marker. The tree's small stem is 8" DSH, the larger measured 19.5" DSH, and both have advanced decay running up their SE faces (Figures 15 and 16). The smaller stem leans at 45 degrees from its base, curves around under the larger stem to the northeast, and stretches out to 40' long. Show weak new growth, poor color, and dieback throughout. The larger grows slightly north from it base and doesn't ever return to vertical. Reaches 60' tall, has an 8' spread, and exhibits weak new growth, poor color, and die back throughout.

8. Western red cedar (*Thuja plicata*) 28" DSH, 60' foot tall, standing 16' SW of the southwest corner of the retaining wall for the existing parking / driveway area. It is 18' W of the 4' tall retaining wall on the west side of the garage of the existing house.

9. Western red cedar 24.5" DSH, 45' tall, standing 9' N of the 9615 house and 10' S of subject garage. There are stone and keystone block walls encircling the tree within 6' of its base. Fair condition. Canopy has been pruned away from both homes.

10. Deodar Cedar (*Cedrus deodora*) field measured at 4.5' N, 9.5' W of the northwest corner of the 9615 garage. Tree is 26" DSH, 60' tall and is in fair condition. Canopy is rather open in the upper half. Its lower branches have been pruned away from the house.

11. Deodar Cedar 24" DSH, 70' tall with a separation point near the 40' mark. Has one main leader and several subordinates reaching up and out from that level. Fair health based on color and new growth. Some deadwood present, appears normal of the species. Stands 13' W of the #10 tree.

12. Deodar Cedar 18.5" DSH, 65' tall, standing 17' W the #11. It rises fairly straight and is in fair condition.

13. Douglas fir 10" DSH, 45' tall, stands at the inside corner of a wooden bridge and walkway that the neighbors built 12' WSW of the #13 tree. The platform crosses into the subject property near the corner area.

14. Deodar Cedar 8" DSH, 30' tall standing 11' W of #13. Below average condition with stunted foliage and subordinated to the large maples in the area.

15. Leyland cypress 11" DSH, standing 3' SE of the southwest corner marker and 17' W of the #14 deodar. Tree is in fair condition, has a low canopy, and was probably topped along with a couple of smaller ones to its west. It is now about 20' tall.

16. Last stem of a Big Leaf maple stump sprout, 10" DSH, goes to 25' and crooks over nearly horizontal to the SE on a single spar that extends over the #14 deodar and nearly over the neighbor's driveway. There are indications that two other stems atrophied and failed at the base. It stands 15' NE of the SW corner marker near the west property line.

17. Big Leaf maple, bifurcates right at the standard height, 14" and 26", larger stem splits again 4' above this point. All three stems go to 70' tall, spread as much as 28' into the southwest quadrant. Couple branches coming off this tree cross over the #14 tree. Some large deadwood present. Tree stands 4' N of #16.

18. Dual stem Big Leaf maple fully separates at the 27" mark, 18" and 16.5" DSH, 55' tall standing 10' NNE of the #17 maple along the lower edge of the west side embankment. Canopy spreads on a narrow column in the northwest quadrant out to 25' off of the larger trunk. The smaller stem has branches reaching 16' into the NE quadrant. Some elements have been pruned out of this tree and there are signs of breakout in the upper crown. Average new growth and color, large deadwood present in upper canopy.

19. Big Leaf maple 17.5" DSH, leans to the east from the base, reaches 50' tall, stands 12' NE of #18. This tree also appears to have been crown cleaned at some point. Some moderate deadwood present currently along with breakage. Canopy stretches out 25' E on larger scaffolds, less than half of that to the north and south. Average new growth, color rather weak. Indian Plum (*Oemleria cerasiformis*) grows around its base.

20. Dual stem Big Leaf maple from the base, 10" and 21.5" DSH, splitting the difference of their standard heights above the embankment. Smaller side was full of ivy which has been cut near the base. Branches are malformed and stunted. There is an open decay point at the 6' mark. Stem is in weak condition. Larger trunk bends north from the base, turns toward vertical above 9', and then bends gently to the NW above the 18' level. Exhibits average new growth and color. The larger trunk was also full of ivy which was cut some time ago (Figure 17). Tree stands 15' NNE and a little further up the bank of #19. It is quite near to the west property line. Canopy reached out no more than 10' off the column.

Between this tree and the #7 alder there are several small caliper maple volunteers, some holly, some hazel (*Corylus cornuta*), and more of the Indian plum.

21. Alder 12.5" DSH, 45' tall, leans west from its base and over the road (Figure 18), There are a couple of scaffolds with viable canopy coming off mid column and then short branches in the upper column with sparse foliage and limited new growth. Tree is in weak condition, exhibits stress fracture indications along the lower column, and there is an atrophied area with decay present at the crook near the halfway point (Figure 19). Tree bends noticeably greater above this point. The alder stands 18' N of #20, close to 29' SW of the #1 tree, and 17.5' E of the asphalt edge. It is fully in the ROW. Based on the alder's growth profile it is retrenching below the weak spot in the column.

22. Three stem maple standing 12' NW of the #17 Maple and 16' WSW of the #18 tree. Trunks are 12", 12", and 13" DSH, separate at the base, go fairly vertical, and their canopies don't intermingle. Average new growth and color. Northwest stem's canopy extends 14' nearly entirely into the NW quadrant and hangs over the parking strip. The center stem has one scaffold going north just above halfway then everything else reaches pretty much vertical as it squeezes between the other two stems. The east side stem is entirely vertical with only a little north-south spread sandwiched between the center stem and the #17 maple. Its canopy reaches about 16' east to west.

23. Big Leaf maple, bifurcates at the base and then each stem splits again around the 5' level. This tree grew over or out of an old stump that is covered with ivy (Figure 20). Tree is in below average condition, has some larger deadwood present, some over elongated branches especially over the neighbor's driveway, and it has been pruned for power line clearance in the mid canopy on the west side. No sign of active fracture planes at the junctures. Tree has been crown cleaned not too long ago. It stands 17' SW of #22, 16' NW of the SW corner marker, and 10' E of the edge of the asphalt.

24. Mixed evergreen privacy hedge starting 12' E of the east edge of the driveway and running along the north border line. The hedge hooks around to the SE following the jog in the north property line. Part of the hedge is formed of arborvitae and the other plants are Leyland Cypress. Good health.

25. An apple tree (*Malus domestica*) standing 18' N of the north edge of the walkway on the north side of subject house and even with the top of the stairs. Tree has a 12" caliper base with three main stems starting from it. The tree has been pruned back out of the hedge a couple times. It reaches 20' tall and has a 10' spread. Fair health.

26. Scots pine (*Pinus sylvestris*) 11.5" DSH, broke over in 30' range. Tree stands 3.5' N of the keystone wall end by the lower patio (Figure 21). Tree is in below average health.

27. Scots pine standing 7' N of the base of the lower patio, 5' E of the #26 tree. It has a 11" DSH, leans south from the base, increasingly so as it passes 8', and then bifurcates. One spar goes south horizontally then curves upright 8' out from the junction (Figure 22). It has been pruned (poorly) to clear the house and ends up turning back over itself to the northeast (Figure 23). The other goes vertical for 3' and then crooks over to the east due to impact from the larger #26 pine (Figure 24). It has unique structure but is becoming over extended. Some deadwood is present in the tree but it is in decent health overall.

28. Dead Scots pine stub, 7.5" DSH, 18' tall, standing 5' ESE of #27 (see Figures 22-24).

29. Scots pine estimated at 14" DSH, 45' tall, standing 13' N of lower patio and nearly due north of the #28 stub. It leans to the north and its entire canopy stretches to that side. Appears to be in fair condition for the species.

30. Black Pine (*Pinus thunbergii*) 14" DSH standing at the north end of the rock retaining wall that runs north to south in the lower yard (Figure 25). Tree has been pruned to maintain an average 18' height. Branches are becoming overextended especially on the south and east sides and could be susceptible to snow load damage. Just on neighbor's side based on survey.

31. European Birch (*Betula pendula*) 11" DSH, 45' tall, 9' spread standing at the base of the stone wall on the south side of the lower yard (Figure 26). Showing signs of light dieback in the upper canopy that could be due to beetle attack. Below average condition. Birch stands somewhere between 12' and 16' south of the south property line.

32. European Birch 10.5" DSH, 40' tall, 12' spread almost entirely to the south. It is standing 4.5' SSE of the #31 tree. Below average condition with more dieback present.

33. Leyland cypress hedge that starts at the SE corner of the existing house and runs due east down the south line. Reaches 12' tall at the east end but is only 8' tall at the west mainly due to the slope. It is in good condition.

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.

Impact Analysis: There are primary and secondary impact issues at this site. The primary construction impact zone includes the trees standing within a 10' envelope of the boundaries of the proposed excavation for the new home, the areas where the shoring will be placed, and the changes in hardscaping. At this time trees #8, #9, #26, and #30, the #24 hedge, and the west end of the #33 hedge stand within this zone. Typically all the primary zone trees are removed at project onset. In this case trees #26 and #30 have special circumstances and will be discussed below. There may be additional impacts for utility and/or drain line routing which will arise later. These will be addressed at the time.

The secondary impact zone includes those regions where the construction work or hardscaping changes cross into the Critical Root Zone (CRZ) of the surrounding trees. This region is defined as a radial distance equal to one foot per inch of tree diameter. For example the #10 Deodar cedar, with a 26 inch DSH, theoretically has a 26 foot radial root spread. The trees in this zone will include #3, #4, #7, #10, #11 and potentially #6 if changes to the entrance drive result in the stone edge work on the west side being replaced.

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 27 below illustrates the relationship.

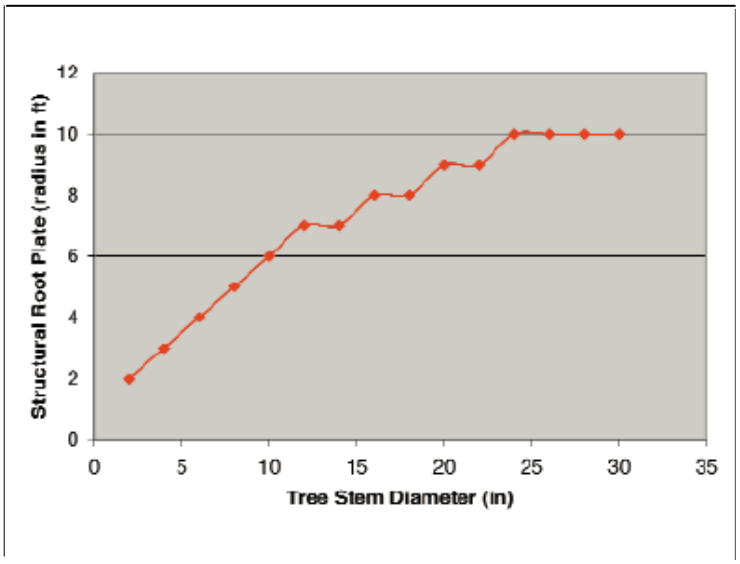

Figure 27 . Size of the Structural Root Plate in relation to tree stem diameter. Note that the SRP levels off at 10' for any tree over 24" in diameter. (Coder, 1996)

The 11" DSH #26 pine has a 6.5' SRP according to Figure 27. According to the proposed plan and field measurements the pine sits just 3.5' back from the end of the brickwork at the NE corner which is slated to be demolished. While the survey shows the wall curving south of the pine (Figures 8 and 28) the photo in Figure 21 shows the end of the wall pointing directly at the base of the pine. There is a high likelihood that the pine has structural roots reaching into the soil above the wall.

According to the shoring plan the east end pile in this area will be set 10' W of the #27 tree so its installation will be well outside the pine's SRP. However, something has to happen to the soil volume between the end of the shoring wall and the curve of the removed keystone blocks. If this section of soil can be retained and protected the pine's Structural Root Plate should be fine. If the soil has to be removed or can't be protected, and if there are significant roots present, this pine will be considerably compromised.

The #27 pine (11" DSH) has the same 6.5' Structural Root Plate. The tree sits between 4' and 5' further east than the #26 and around 3' further north. It is in on the outside of the existing retaining wall so should have few if any roots present in that area. The grade will change little if at all to its south so the tree should experience no SRP impact.

The #30 pine has two stone retaining walls leading up to it. The west wall creates a 3' step down with a gently rising 17' wide shelf to its west that is fairly contiguous with the level of grade on the north property (Figures 25 and 29). The wall begins to angle SW about 6' S of the pine and then shifts to WSW around 16' S of it. The pines base is right at the north end of this wall.

The second wall starts about 3' E of the first and runs WSW in a straight line for 25'. It creates a flat shelf to its west that widens quickly to 13' across. There is a 30" step down to the lower east yard that gently slopes down to the lake. A shallow rockery starts at the north end of this wall. It follows the property line close to perfectly angling off to the NE 55' east- southeast of its origin point.

The south end of the 9605 house is 6' N of the pine at most. Its foundation runs 35' E of the tree but only 7' W where it makes a ninety degree angle to the north. The 14" DSH pine ends up with a geometrically intricate rooting space. It should theoretically have a 7' radial SRP according to the chart. The 9605 foundation significantly impedes this space on the north. The two retaining walls further hinder the proper formation of the plate. But the pine has had to reach further into the south to compensate for its northern limitations.

The area will have to be air spaded to expose the actual root formation so the reality of the impact can be determined. If too great an accumulation of major structural elements are exposed, than thought will have to be given as to whether to shift the impact or remove the tree.

Most of the #24 hedge will be removed during the shoring wall construction. There will be a section running north and south at the east edge of the patio area that shouldn't be impacted. It may make sense to preserve these plants just to provide a privacy screen for the new home.

The #33 hedge is less than 10' away from the excavation lines for the SE corner of the new house. But they appear to be more than 5' away on the plan set and only need 3-4' for their Structural Root Plates.

The proposed plan appears to show that the grade in the west side of the yard will be raised at least 12". Adding more than 6" of soil over the CRZ of a tree will more likely than not cause its roots to atrophy. Positive grade changes are thusly treated the same as negative ones.

The chart shown in Figure 30 below is used to determine what percentage of a tree's Critical Root Area 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.

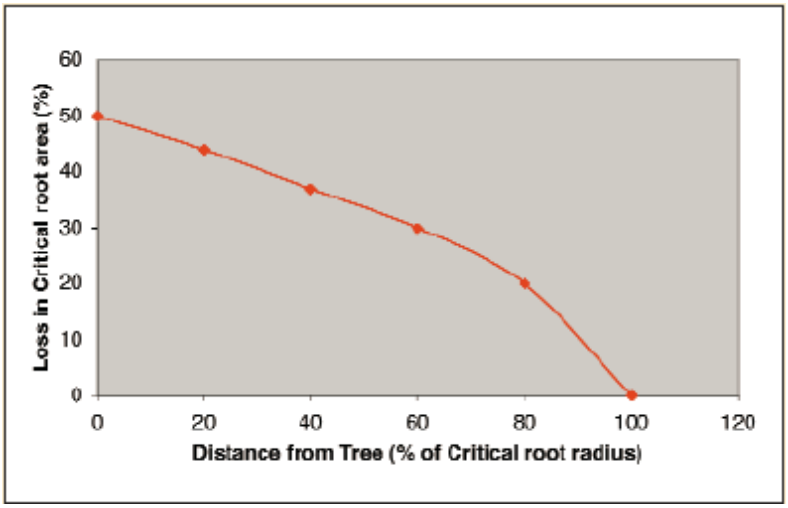

Figure 30. Chart giving the loss in critical root area as a function of the radial distance to the CRZ disturbance. (Coder 1996)

The #3 and #4 cottonwoods have 50" calculated diameters and could easily have roots stretching out 50' or more to the east. Especially when the limited rooting space to their west sides is taken into account. The shoring for the driveway turning bay will come to within 30' of the #3 and 33' of the #4 tree but it will only notch out a relatively small area in their SE quadrants. Roughly calculated the trees will potentially lose 7% and 5% of their CRAs respectively well within their tolerance.

If the #7 alder (19.5" DSH) were to be retained it would experience an impact at a linear distance equivalent to 64% of its CRZ (12.5/19.5) at the closest point. The chart shows that this roughly equates to a 27% potential loss in the alder's Critical Root Area *if the cut went straight across*. As it simply notches out a section on its east side the impact could be closer to an 18% loss. Even in its compromised state this should be within the tolerance level of the tree.

The #10 Deodar cedar will incur impact 12' out from its base in its NE quadrant. If the cut went all the way across it would be equivalent to 46% CRZ and the tree would potentially lose 33% of its Critical Rooting Area. The new foundation excavation will not cross the tree's center line in either direction though. This means the tree should experience less than half that in root loss percentage and it could be as little as 12% well within its tolerance level.

The #11 tree is smaller (24" DSH) and the impact will be 10' further out from its base than the #10 tree experienced. Logically it will incur a significantly smaller CRA loss.

The #26 pine should theoretically have an 11.5' radial CRZ but it has matured with the retaining wall carving out more than 50% of its south side space. So its root system distribution is in an area roughly 70% of normal which should result in a higher concentration of roots in its available space. The east end pile post will be set right at the outer margin of the pine's expected spread.

The cubic volume of soil between the keyblock wall, the property line, and the shoring wall cut could contain 30% or more of the #26 pine's functional roots.

The #27 pine is further east and north of the disturbance and would be expected to lose less overall rooting mass than the #26.

The #30 pine, with its limited rooting space to the north and layer cake shelves of available space to the south, is in a rather precarious situation. If the stone walls are removed within 14' of the tree, as shown in the plans, and the area is regraded it is more likely than not that the tree will lose more than 50% of its Critical Rooting Space.

Recommendations: There are a handful of Deodar cedar saplings growing around the slope on the west side of the #8 cedar. These volunteers could be easily salvaged and transplanted along the slope either on the subject property or even in the space encapsulated by 72nd and the entry driveway.

A serious conversation should be had between the owners of the subject property, the 9605 property, and the City of Mercer Island about removing the #3-6 cottonwoods. These trees have been dropping large limbs consistently. There is decay present in the trees, weak unions, and off set canopies.

Cottonwood trees are notorious for being weak in structure. They are one of a handful of species that are known to be susceptible to the sudden limb drop phenomenon, a condition where a tree will shed a large limb on a calm day for no apparent reason. The root system of the black cottonwood is typically shallow, especially in wet areas. Cottonwoods appear consistently in the tree failure data base with failed crotches, broken limbs, sheared spars, and uprooting. The more rapid the growth of these trees the more prone they become to these types of failure.

None of the cottonwoods will be adversely impacted by the construction project. They may lose some root mass but it will be well within their tolerances.

The #7 alder should just be removed. It has severe decay along the columns of both trunks and alders in this condition break off more often than not. The tree does not offer any redeeming attributes and the maples above and beyond it lock down the slope.

The #10 and #11 Deodar cedars will not be impacted to any great extent and will be fine long term.

The #16 maple is another weak tree that should be removed. The remnant stem on the tree is over extended, hangs over the #14 deodar and the 9615 driveway, and has nothing functional to prune back to.

The #17 maple should be pruned away from the #14 tree so that it has a chance to mature with good structure.

The overextended scaffolds on the #19 maple should be pruned to reduce weight on the laterals so as to reduce the chance of breakage in the canopy.

The #21 alder is in quite poor condition and hangs over the parking and street. As the tree is fully in the City ROW they should probably make the decision as to take care of it or not.

The island of orphaned soil in the SW quadrant of the #26 and #27 pines will have to be carefully considered. There may be a means of preserving all, most, or at least enough of it to prevent significant impacts to the two pines. The section could be air spaded or it could just be scratched back carefully and inspected in real time by the arborist.

All things being considered it probably makes the best sense to figure out an acceptable redesign of the area around the #30 pine that incorporates at least 10’ of the two stone walls. Removing the walls and grading in the area will result in the demise of the tree.

Setting up tree protection fencing before project onset, even before the demolition, and at the proper distances will ensure that no accidents will result in having to remove trees slated for retention. Making sure that the contractors understand what the fences mean and that they cannot move them without arborist oversite is critically important for the health and longevity, if not outright safety, of the onsite trees. No materials can be stored, even temporarily, within the protection zones.

Typically fencing is installed at the distance proscribed by the City of Mercer Island for non-incursion which is one linear foot per linear inch of diameter. Orange vinyl barrier fencing can be used, although chain link is preferred. Because of the intricacies at this site much of the fencing will have to be customized for the different areas.

Beginning with the simplest section, the fence can be started 24' E of the #10 tree, go north for a 10' panel, angle to the NW run for 40', past the #8 tree, and then run to the west edge of the property line 10' S of the 37 tree. The fencing will have to be adjusted once the excavation for the SW corner of the garage is going to be started. But it should only be done with arborist oversite so that the digging in the vicinity of the #10 and #11 trees can be monitored.

If the decision is made to retain the #33 hedge fencing can start 6' past the west end of it, wrap 4' north of the line of plants and then turn back to the south line 6' past the east end.

A section of fence should be wrapped 14' out from the #30 pine on the subject property. This fencing should not be moved unless an arborist is present. Anything done in the CRZ of this tree will have to be documented.

It makes no sense to set a fence around the #26-#28 pines. The entire area will have to be worked with arborist oversite and it will all be changed right up to the property line according to the proposed plan set.

It is not quite clear whether the existing patio slab at the NEW corner of the house will be removed. If not, or if the demo is completed extremely carefully, the small run of hedge plants to its east can be retained. Either way some sort of protection fence should be set up around 4' west of the trees if they are to be retained.

As the work begins to expose roots during either the demolition or construction phases, systematic hand root pruning, rather than tearing and shearing by machine, should be done. As the arborist should be on hand when working within the CRZs of the trees they can assist with showing how to do this to the onsite crews.

All the trees which are to be retained within 10' of the construction zones will have to be protected by laying down layers of arbormulch. A rough rule of thumb would be 8-12" of mulch laid down out to 3' past the existing driplines as possible. This will also help with establishing the proper soil biology.

Waiver of Liability Because the science of tree assessment is constantly broadening its understanding, it cannot be said to be an exact science. 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 Kate Miller, Brandt Design Group, Hamish Anderson, the home owners, and their representatives only. They may not be reproduced, used in any way, or disseminated in any form without the prior consent of the client concerned.

Anthony Moran, BS
Certified Arborist
Qualified Tree Risk Assessor
ISA #PN-5847A

Figure 1. Aerial over view of the subject property and nearby lots.

Figure 2. Aerial from 2015.

13110 NE 177th Place #304 * Woodinville, WA 98072 * Anthony@SuperiorNW.com
206-930-5724

Figure 3. Aerial from 2017 showing changes to the subject property.

Figure 4. Aerial from 2009.

13110 NE 177th Place #304 * Woodinville, WA 98072 * Anthony@SuperiorNW.com
206-930-5724

Figure 5. Aerial image from 2013 showing changes to the 9615 property. Note changes to the east garden area of the 9611 property.

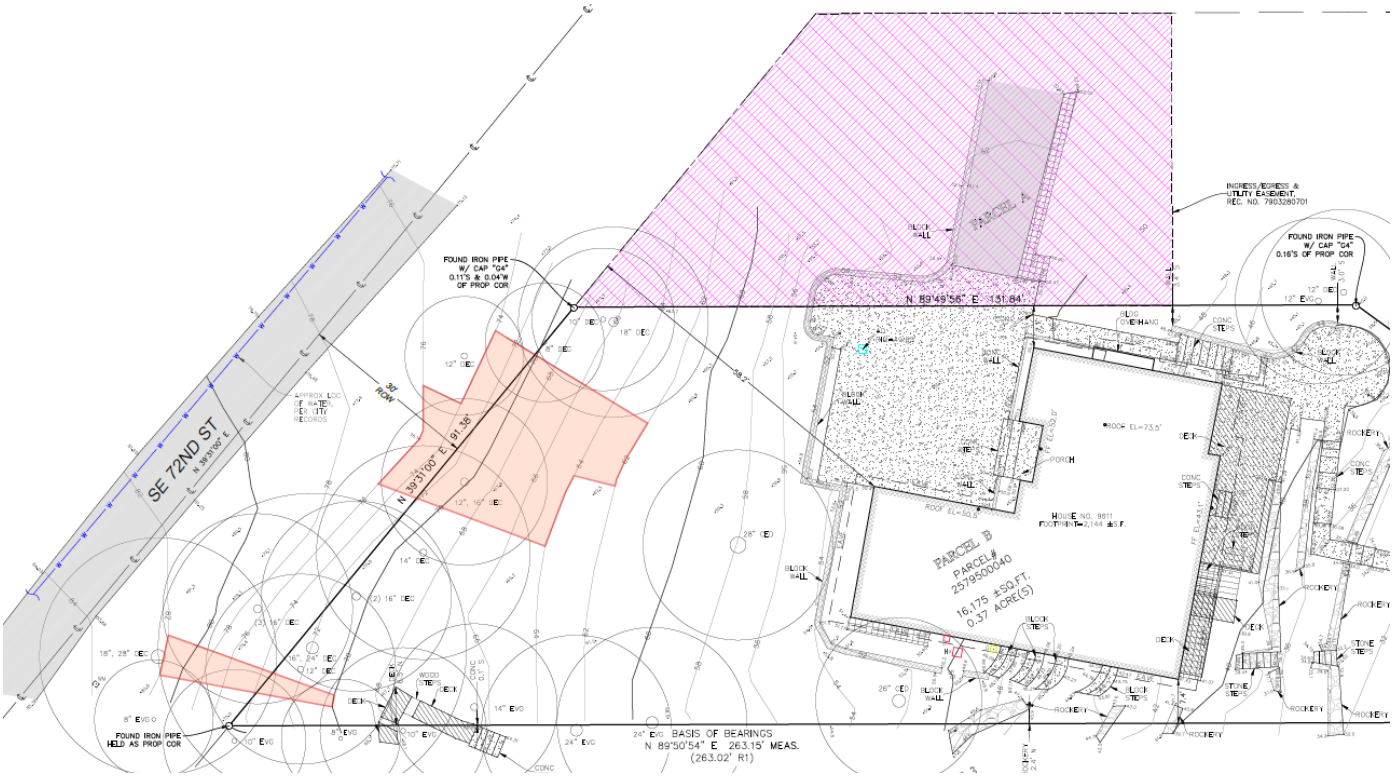

Figure 6. Excerpt from the survey showing the current layout of the subject home and majority of the yard.

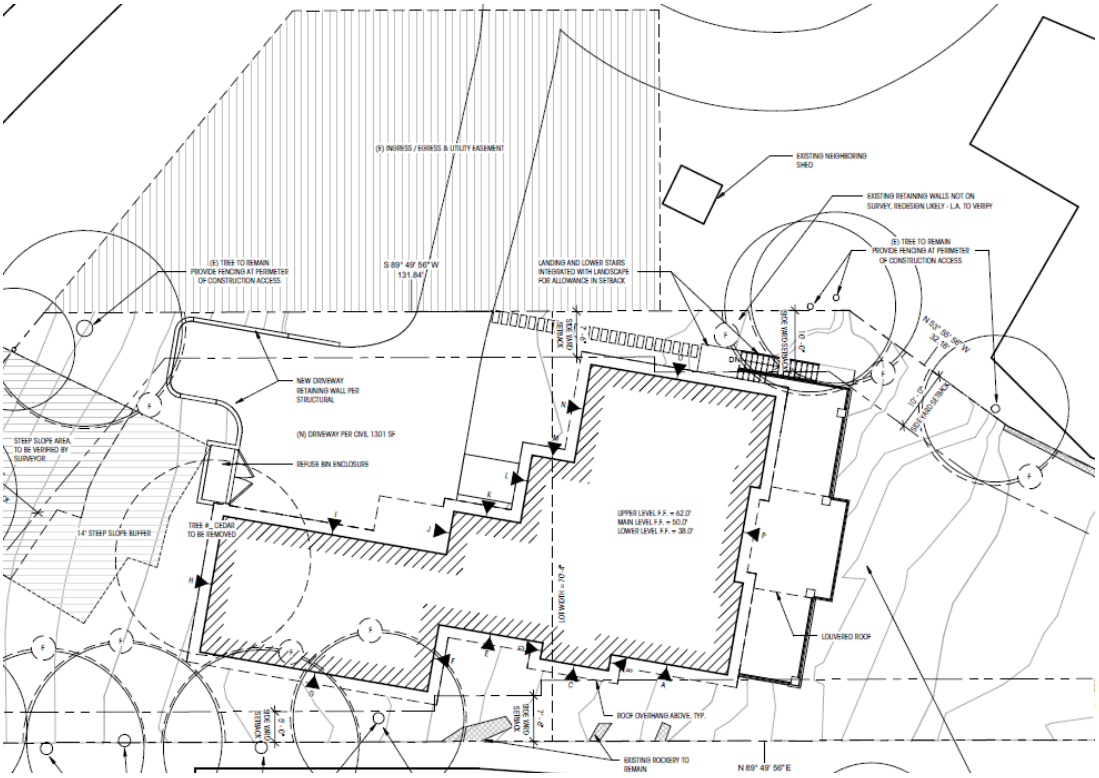

Figure 7. Excerpt from the proposed plot plan showing the layout of the new home.

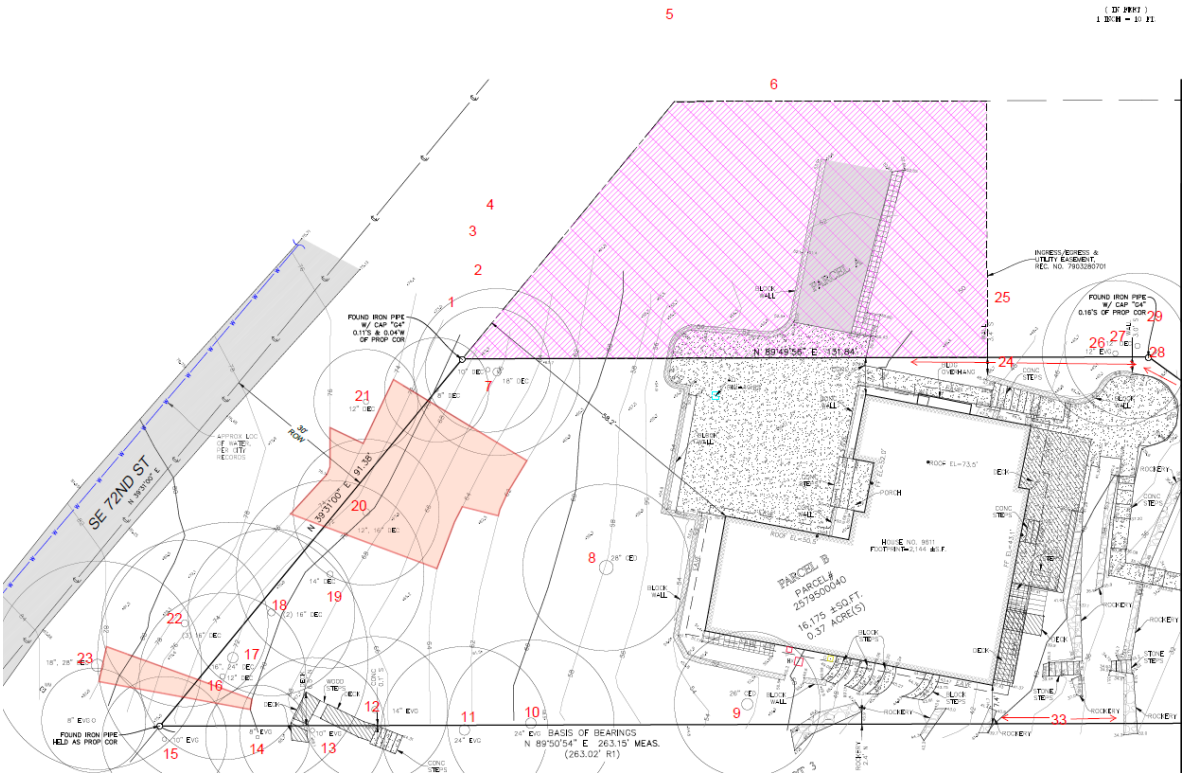

Figure 8. The tree numbers overlaid on the west end of the survey. Note that trees #1-6 are in an area not covered by the survey.

13110 NE 177th Place #304 * Woodinville, WA 98072 * Anthony@SuperiorNW.com
206-930-5724

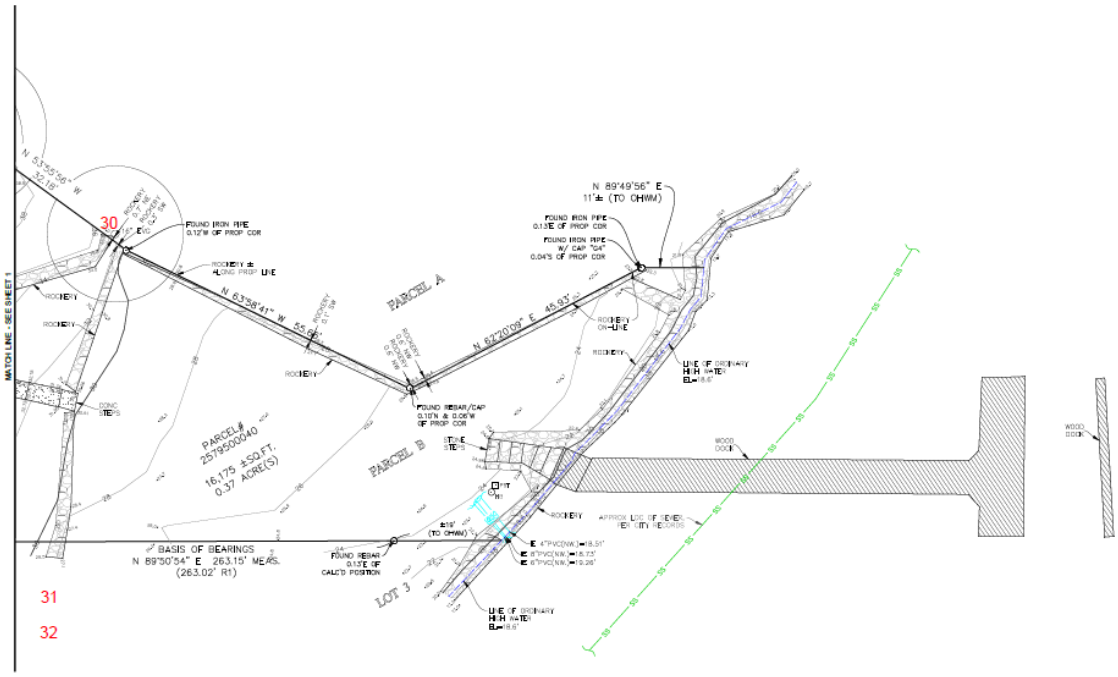

Figure 8. The tree numbers overlaid on the east end of the survey. Note that #31 and #32 are off site and not noted by the surveyors.

Figure 9. Looking west at the base of the #3 cottonwood. The #4 is at the left side of the image.

Figure 10. Looking east at the base of the #3 cottonwood.

Figure 11. Looking down at the NW quadrant of the base of the #3 cottonwood. Abnormal area is outlined in yellow.

Figure 12. Looking NE down 72nd and showing surface roots from the #3 and #4 trees in the parking strip. Note the cracking in the asphalt indicative of root pressure.

Figure 13. Looking at the separation point on the #4 cottonwood.

13110 NE 177th Place #304 * Woodinville, WA 98072 * Anthony@SuperiorNW.com
206-930-5724

Figure 14. Looking down and east at the base of the #4 tree showing the abnormal basal formation.

Figures 15 and 16. The main and smaller trunks of the #7 alder showing the advanced decay running up the column of each.

13110 NE 177th Place #304 * Woodinville, WA 98072 * Anthony@SuperiorNW.com
206-930-5724

Figure 17. Looking east into the canopy of the #20 maple showing the old ivy.

Figure 18. Looking north at the #21 alder leaning over the road.

13110 NE 177th Place #304 * Woodinville, WA 98072 * Anthony@SuperiorNW.com
206-930-5724

Figure 19. Area of advanced decay in the #21 alder.

Figure 20. Looking south at the base of the #23 maple.

Figure 21. Looking north at the base of the #26 pine at the end of the keystone wall.

Figure 22. Looking up and NE and the south spar on the #27 pine. Note the top of the #28 stub (circled).

Figure 23. Looking up and NW at the #27 south spar showing how it turns back over itself. Note the 328 peeking in from the right side.

Figure 24. Looking up and north at the east spar of the #27 pine showing its unique conformation. The #28 stub is at the center.

Figure 25. Looking north at the #30 pine showing its location at the north end of stone retaining wall (west). The east section of the #24 hedge is left of center. The lip of the patio is just visible at the left edge of the image.

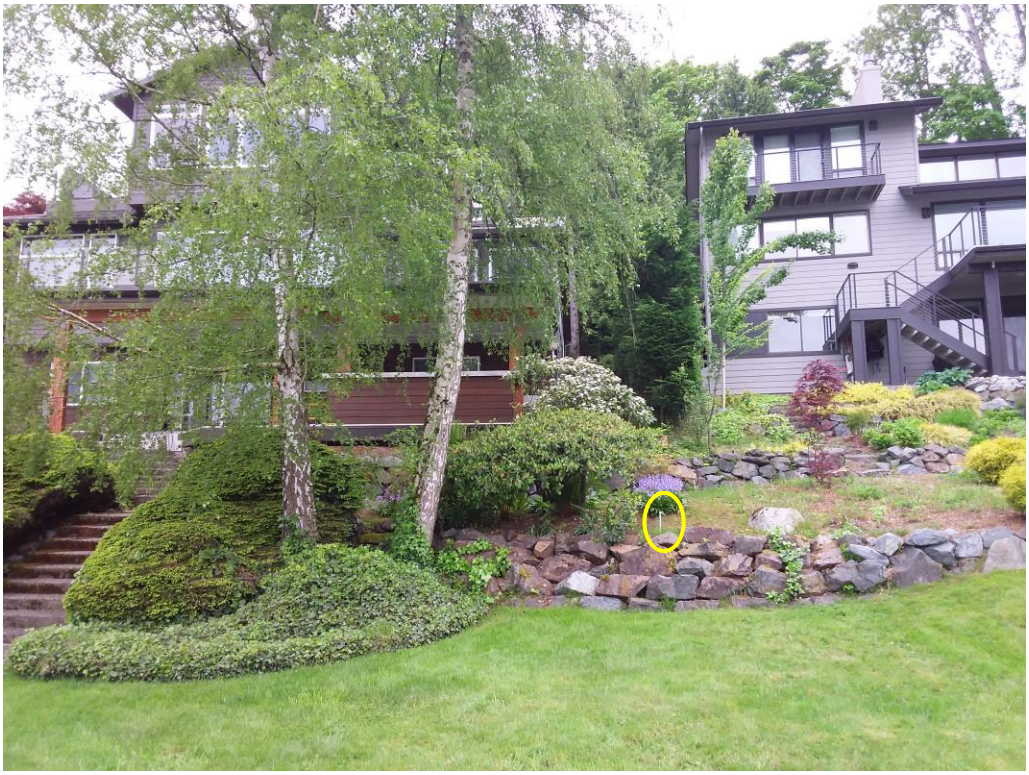

Figure 26. Looking west at the #31 and #32 birch trees. Note the property line stake (circled) and the #33 hedge at the center of the image.

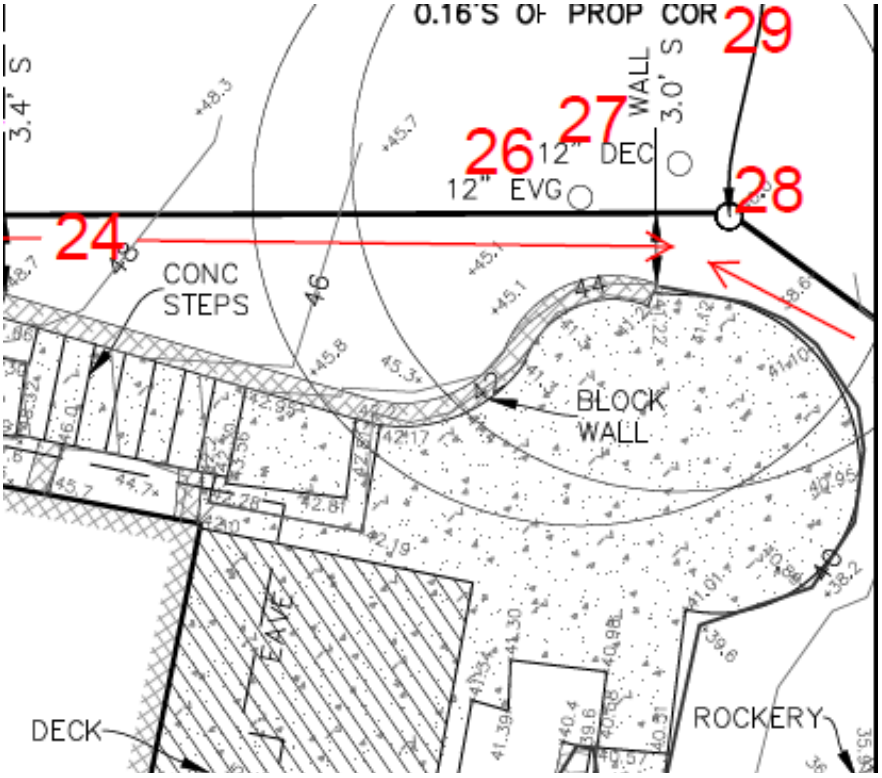

Figure 28. Enlarged excerpt from the tree plot showing how the survey drew the keystone wall formation. Compare to Figure 21.

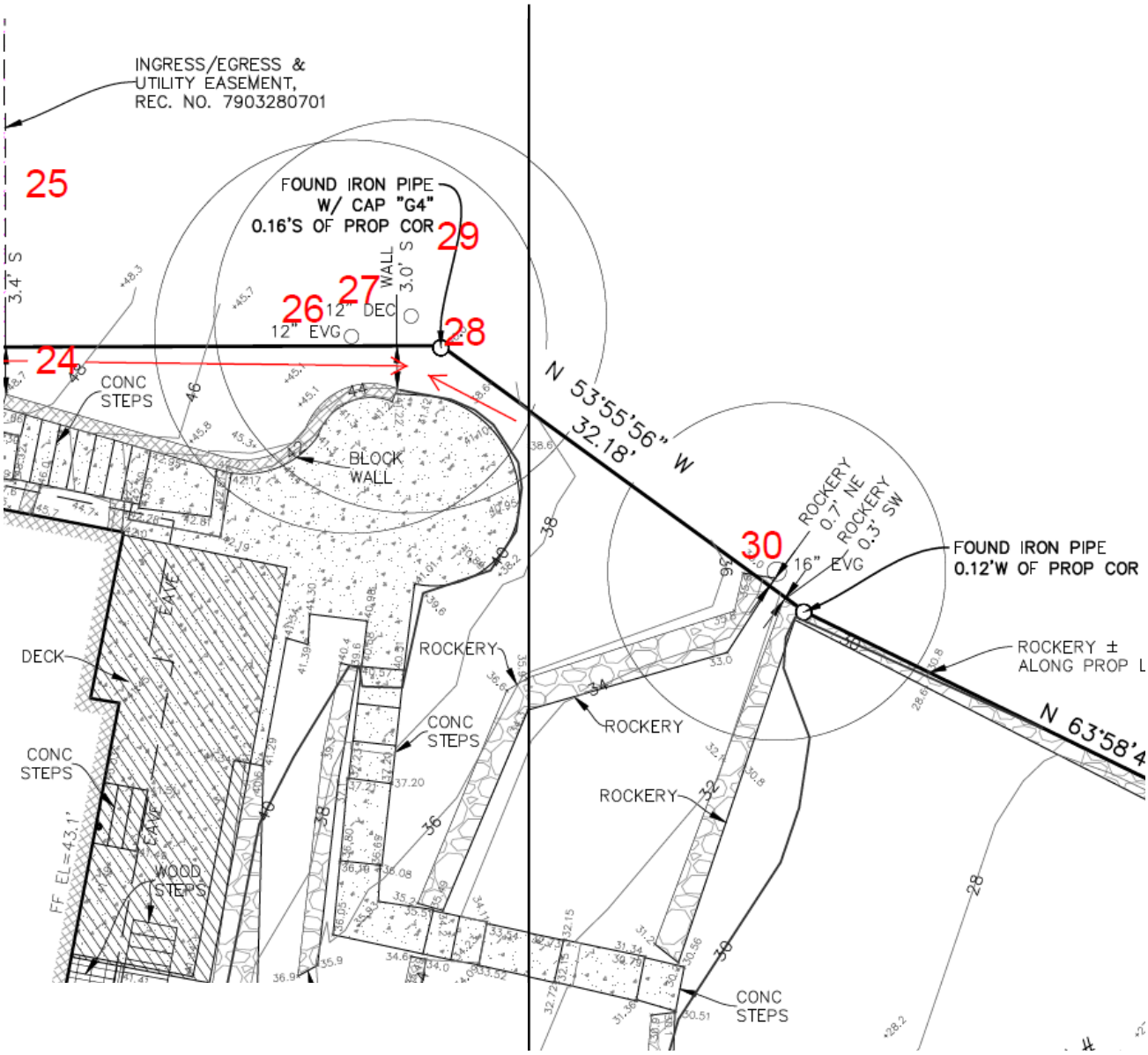

Figure 29. Schematic formed from two excerpts from the tree plot overlay. Note how the stone walls nearly meet at the #30 pine and the conformation of the terraces.