Superior NW Enterprises

June 28, 2025

Project: Pre-construction assessment for lot re-development at 4115 78th Avenue SE, Mercer Island, WA. Parcel number 3623500210.

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

Description: The subject property is a vacant lot. The home on the lot to its north was built in 1952. Both parcels are part of the Island Park replat and sit at the junction of West Mercer Way and 78th Avenue SE (Figure 1). RKK Construction purchased the property in the summer of 2024 from the owners of the 4105 north side property who had owned both lots since 1991.

Knowing the Mercer Island would require a tree protection plan RKK reached out to 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, overall suitability for retention, and potential for construction impact. Mitigation and preservation requirements for those to be retained would also be addressed.

The following itemized tree list begins in the north corner of the 4115 lot (it is diamond shaped when orientated to the cardinal directions). The trees were marked with 1" circular green tags and their numerical designations are reflected in Figures 2 and 3. Diameters were measured at the standard height of 54" above grade (DSH) during the September and October 2024 site visits. Heights were estimated. Spreads were measured as possible and estimated otherwise.

1. Douglas fir (*Pseudotsuga menziesii*) 27.5" DSH, 80' tall standing 34' WSW of the north corner marker and 10' E of the SE corner of the 4105 house's foundation. It is either on or just north of the property line. The top of the tree has been damaged, likely in the 2006 storm, and bends over to the northeast. It began showing signs of discoloration and thinning in 2022 and currently exhibits 12' of dieback (Figure 4). There are a handful of large dead branches hanging in the tree. The overall canopy has limited to no new growth and poor color. Heavy cone load present.

2. Douglas fir 26.5" DSH, was damaged near the 55' mark, reaches 65-70' tall on multiple, malformed spars. Three of the spars go horizontal and carry excess weight at their ends. Heavy cone load, exhibits average new growth and color. It stands 26' ENE of the west corner marker post, about 5' above the line, and 10' SSW of the SW corner of the foundation of the 4105 house. It shows a marked lean to the NE from its base and returns to vertical above the 18' level. Base of the stem is non symmetrical, nearly square to the east and west. There are cracks visible on the north and south faces, almost directly across from each other, indicative of a beam fracture, with fresh pitch seeping and fairly fresh reaction wood visible. There is fungal fruiting body on the south side of the tree's base that is likely *Heterobasidion annosum* (Figure 5).

3. Douglas fir 26.5" DSH, 75' tall with average new growth and color. Stands 13' SSW of the #2 fir. Tree has a large canker in the west quadrant of its base that is 24" tall, 12" across, with bleeding present around its north edge (Figure 6). Couple of smaller ones are visible on the south face of the trunk in the 16-18' range and then three larger ones between 25' and 30' are present on its NW face.

4. Western red cedar (*Thuja plicata*) 17" DSH, 45' tall stands 5' ESE of the #3 fir. Fair health although it is subordinated to the larger tree. It has a large lateral arm growing to the west at the 6' level which turns to the vertical 8' out from the trunk.

There is a clump of Hazel growing 12' W of the #3 tree and close to the top of the west side embankment. There is a young Douglas fir about 5" DSH, 22' tall standing just over the top of the embankment about 6' S of the corner marker. Blackberries and other vines are tangled around its base and in its branches.

Along the lower part of the west embankment, an area which appears to be in the Mercer Island ROW, is a handful of medium sized dead and dying Big Leaf Maples (*Acer macrophyllum*). They range from 9-12" DSH, 35-45' tall and most are close enough to reach the road below should they fail partially or in total.

5. Douglas fir 27.5" DSH, 70' tall standing 15.5' SE of #1. It has branches that are reaching as far as and slightly over the main power lines at the west edge of 78th Avenue. Tree exhibits fair health with average new growth and color.

6. Big Leaf Maple 9.5" DSH, crooks east at the 16' level, leans slightly east up to the 35-40' range, and then the upper canopy bends completely to the east. Much of it crosses the plane of the high voltage lines 14' to its east. Tree reaches 55-60' tall and exhibits fair health. It stands 15' SSE of #5.

7. Big Leaf Maple 20.5" DSH, 70' tall, 24' spread mainly to the east over the street and the power lines. Tree has two subordinates coming off at the 4' level. The first is a 10" caliper coming off the south side at a 20 degree angle and stretches out close to 22' on a couple of large spars. The second is a 6.5" caliper atrophied spar that has little or no viable canopy present that comes off in the SE quadrant. Overall the tree is weak condition with a sparse canopy and poor color. It stands 8' SE of #6.

There's a clump of trees east of the #6 and #7 maples that are standing beneath the power lines and have been topped multiple times. They are fully in the ROW. Most are maples but there are three or four Douglas firs (Figure 7). They range from 4-8" DSH.

8. Douglas fir 6.5” DSH, 35’ tall in fair condition although it's subordinated to the #7 maple and standing 9’ SW of it.

9. Big Leaf Maple, dual stem from the base, 14” and 5.5” DSH, they reach into 35’ range and the canopy on both is limited to the tree’s south quadrant and stretches out near 14’. Weak health and weak structure with significant dieback and large deadwood throughout. Tree stands 4’ NW of #8.

10. Big Leaf Maple 10” DSH, 45’ tall, leans slightly north as it rises, majority of canopy is in the NW quadrant and in below average condition. Stands 6’ NNW of #9.

11. Douglas fir 6.5” DSH, 35’ tall with a sparse canopy. Stands 9’ WSW of #9.

12. Douglas fir 10” DSH, tops out about the 45’ level due to impact from a maple spar crossing over it from the east. Majority of the canopy is to the west side, sparse with weak color. Tree stands 5’ S of #11.

13. Pacific madrone (*Arbutus menziesii*) 6” DSH, 30’ tall, top is dead and there is only a handful of viable branches mainly in the SE quadrant. Atrophy and decay present at the base, die back throughout. Tree is covered in a clematis vine. It stands 11.5’ SSE of #12.

14. Douglas fir 27.5” DSH, 90’ tall standing 8’ S of #13. Tree is engulfed in ivy from its base to nearly the top. Canopy appears to be in fair condition and comes down to just below the halfway point.

15. Big Leaf Maple 10” DSH, reaching up to 40’ and stretching 18’ entirely to the west on a handful of scaffolds above the halfway mark. Base of the tree is 5’ SE of #14 and the main stem crosses between #14 and #16 as it rises.

16. Douglas fir 32” DSH, 100’ tall standing essentially 5’ SW on center of #14. It's also engulfed in ivy up past the halfway point. Canopy exhibits fair health. Exceptional by definition.

There is a Pacific madrone 11.5” DSH, 35’ tall standing just south of the #16 tree with little to no viable canopy. The tree is designated as being dead and not significant.

17. Big Leaf Maple 16” DSH, 50’ tall bifurcates at 10’ level, south stem canopy mainly in the SE quadrant and out to 24’, north stem pretty evenly spread out to 14’ on its side. Below average condition with dieback throughout, poor color, stunted new growth, and weak structure. Stands 39’ SE of #14 and nearly centered on the lower property line.

18. Douglas fir 22” DSH, close to 85’ tall standing 5’ S of #17. Tree has a large canker on its north face at the 8’ level that is 28” tall, 12” wide with decay likely present based on the canker’s age and formation (Figure 8). Bleeding associated with it coming down the trunk on the north face. There are large cankers along the trunk from the 1/3 to the halfway point. Tree has a structural fault near the 55’ mark and several large spars in the 10” caliper range are coming off south at this point and stretch out as far as 28’ ft. Above the fault the tree is still vertical and appears to be in fair health. Majority of its canopy is above the halfway point.

19. Big Leaf Maple 10” DSH, close to 65’ tall, 14’ spread stands 18’ SSE of #18. Exhibits below average condition.

20. Big Leaf Maple 16.5” DSH, 45’ tall, spreads west and reaches over the bike lane roughly 20’ off its base and no more than 12-14’ in the other directions. Tree separates into four main stems at the 10’ mark. The stems are fairly separate from each other but their scaffolds are overextended, and conflict, as they reach into the west and southwest for light. Base of this tree is at the bottom of the slope nearly level with West Mercer and 6.5’ nearly due east of the south corner marker (Figure 9).

21. Douglas fir 34” DSH, top was damaged or broke out near the 60’ level, and the tree now has a large spar originating there that kinks to the NE, goes up another 12-14’, and then separates into multiple subordinate spars. Eventually the tree reaches into the 80’ range. Large lateral limbs have formed below the damage point and the majority are overextended. Tree appears to be in fair health. It stands 14’ NW of #20 at on the top of the embankment. Exceptional by definition.

22. Big Leaf Maple 32” DSH, separates into four main stems above the 9’ level. The largest grows mostly vertical and into the 80’ range, the three others reach southwest and west over West Mercer and top out near 65’. There is evidence of recent breakage in the 6-10” caliper range on the street side. Considerable deadwood and dieback present throughout the tree and it exhibits less than 15% viable canopy. The majority of the live material is on a single overextended scaffold reaching over West Mercer. The maple stands 16’ NNW of #21 and is likely in the ROW. Exceptional by definition.

23. Madrone 6” DSH, 16’ tall standing at the top of the embankment 22’ W of #16. It is in good condition. Exceptional by definition.

There is a volunteer cherry (4” DSH) and a small fir (3.5” DSH) overshadowing the madrone. Underbrush, blackberry vines, and ivy are crowing it also.

Numerous other saplings stand throughout the property. They include firs, maples, and cherries with less than 6” diameters and were not considered significant for this study.

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 two levels of impact at this site, primary and secondary. The primary zone includes the environs immediately within the boundaries of the proposed new construction and the regions within ten feet of those boundaries. Trees #5-18 are standing in this zone and will be removed during the clearing and grading portion 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 #3 fir, with a 26.5" DSH, has a theoretical 26.5' 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 10 below illustrates the relationship.

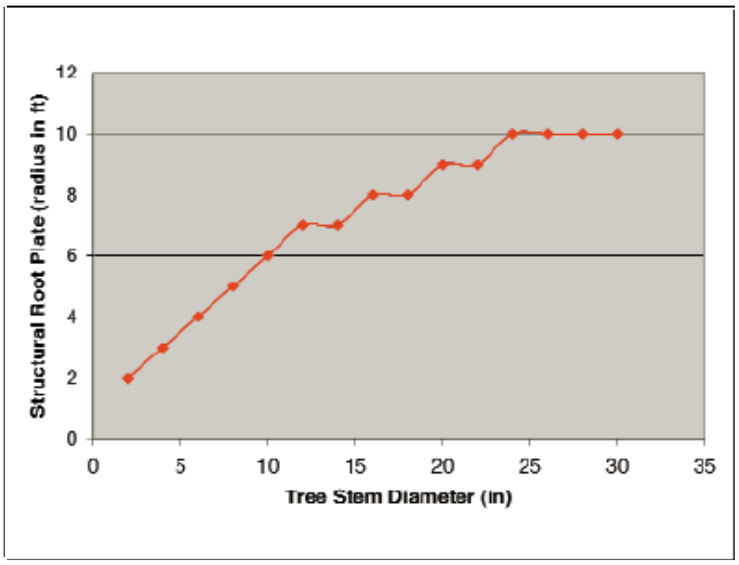

Figure 10. Size of the Structural Root Plate in relation to tree stem diameter. Note that the SRP levels off at 10' for any tree over 24" in diameter. (Coder, 1996)

In this case there are no retained trees which will experience impact to their SRPs.

The #4 cedar (17" DSH) will be the nearest tree to any potential impact. The site plan excerpt in Figure 11 shows that the excavation for the back right corner of the covered patio area will come no closer than 13' to the base of the cedar.

The chart shown in Figure 12 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 CRA without having long term detrimental results.

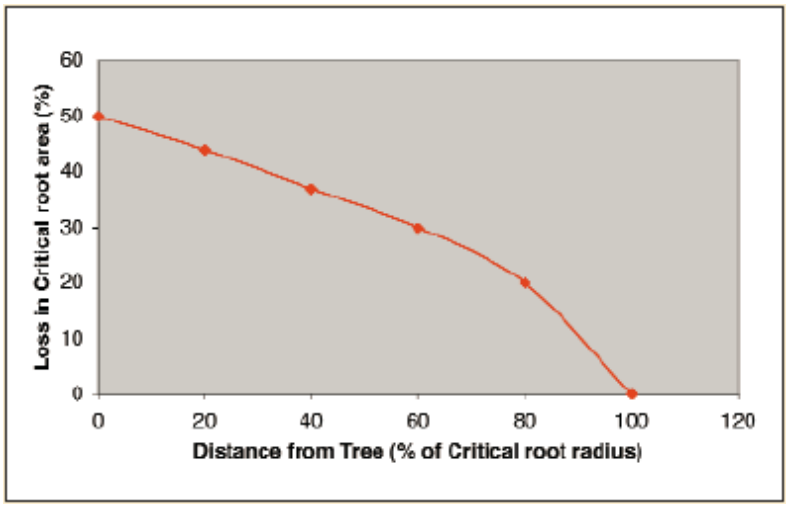

Figure 12. Chart giving the loss in critical root area as a function of the radial distance to the CRZ disturbance. (Coder 1996)

Using the #4 cedar as the example, with the proposed new rear patio 13' from the tree's base and it having a 17" DSH, if the cut for the patio ran all the way across the cedar's rooting space it would result in impact at a linear distance equal to 76% of the tree's CRZ (13'/17'). The chart shows that this could equate to a 22% loss of the cedar's Critical Root Area. However, because the cut will make a right angle turn away from the tree 12' short of its center line the actual loss of rooting space will likely be less than half that volume or around 10% CRA. The cedar should be fine long term.

The #3 fir (26.5" DSH) will experience the same type of notched impact 18' from its base. According to the chart in Figure 12, and using the same rational as for the #4 cedar, the #3 tree should lose no more than 12% of its Critical Root Area. It will be fine long term.

The #19 tree is completely outside any potential impact from the construction.

The #20 tree (16.5" DSH) is offsite, in the right-of-way, and more than 30' from the closest construction impact.

The #21 fir (34" DSH) is 24' from the closest excavation point for the back left corner of the house. The notch out will occur at 71% CRZ and should result in no more than a 10% loss in CRA for the tree. It should be fine long term.

The #22 maple (32" DSH) is just outside the property line and in the City ROW. The excavation work will come no closer than 25' to the tree but will, for all intents and purposes, cut completely across its CRA. The impact will occur at 78% CRZ and should result in no more than a 21% loss of potential CRA according to the chart. The maple will experience some detrimental impact from the construction work but the potential loss of rooting area is well within the industry allowable tolerances.

The #23 madrone is well outside any potential impact from the construction.

The hazel clumps and other small trees at the back left corner of the lot should experience little to no impact from construction work.

Recommendations: As stated earlier, trees #5-18 will be removed during the clearing and grading stage of the project. According to the Mercer Island inventory and replacement sheet their removals will necessitate the planting of 27 new trees.

The most reasonable construction entry point is off of 78th. It would make sense to remove the existing scrub trees beneath the wires, both from the standpoint of their being poor species choices to be beneath the wires in the first place and from their structures being compromised by having been repeatedly topped. Post construction a number of more suitable trees can be established to take their places.

There is a generalized planting plan that places trees along 78th below the utility lines. Suitable species include Lavelle hawthorns, service berries (count as native species), vine maples (can count as natives if *Acer circinatum* is used), and redbuds. If these species are used there is room to plant five between the driveway and the power pole and another between the pole and the south entry walk.

If greater privacy from the street is desired then three staggered sets of three Mountain hemlocks can be used between the driveway and the existing power pole with another being set between the pole and the walk. The hemlocks are sometimes allowed to count as natives by the City.

Strawberry trees or one of the smaller broad leaf magnolias (Teddy Bear or Little Gem or the like) can be interspersed with the hemlocks for texture/color.

The planting plan shows a tree at the front left corner of the house. One of the Japanese vine maple varietals would be an excellent choice.

South of the entry walk it will make the most sense to use dense screening to protect the house from headlight flashes when vehicles turn onto 78th. Excelsa cedars are a great choice and would count as natives. The first should be installed 10-12' back from the wires along 78th and right on the south (left side) property line. Five more can then be planted 10-12' on center along the property border. Not only will the trees provide screening from headlights but they will mitigate the storm winds that slash through the area in the winter and provide shade in the summer.

The back left corner would be an excellent spot to plant a pair of sequoia of either variety. They could be set 15' to either side of the #21 fir.

Along the back border the most ideal trees would be smaller deciduous native species like vine maples, cascaras, and serviceberries. Adding a couple of shore pines would be good. There is room to plant 11 of these type of trees along the back line.

When the trees are planted along the back area it will be quite important to not install them too close to the madrone and hazels. They can be set rather close to the big maple, like within 8' of its base if a spot clear of roots can be found that close to it.

In the area between the #3 and #4 trees and the heat pump there is room to plant three Serbian spruce. Placing them in this space will offer a nice visual screen between the patio living space and the neighbor's house.

Finally, at the front right corner of the property there is space to plant a couple of finer ornamental types like a pair of stewartia or weeping sequoia. Or single columnar Copper beech or Persian ironwood if they are set at least 12' back from the electrical lines.

In any case there is room on the lot to plant anywhere from 27 to 33 trees fully accounting for the replacement requirements.

In general, the #20 tree requires weight reduction pruning at the extremities to prevent limb breakage. The #21 tree requires pruning to remove the broken and dead branches and to reduce weight on the laterals to prevent their failure(s). And while the large #22 maple is in the ROW a serious discussion should be had with Mercer Island as to whether the tree should be retained based on its condition and placement. It does lock down the top of the embankment but if it continues to decline at its current the rate the tree is going to come apart and land in West Mercer. There really are no good places to prune the tree back to in order to reboot its structure.

The junk plants and invasive vines need to be cleared away from the #23 madrone so it can mature with good structure.

There is a large clump of hazel growing about 9' N of the little madrone. It is also a good plant to retain along the top of the embankment.

Prior to any excavation work chain link fencing should be set to ensure there is no accidental encroachment on the site trees. The fence should start 45' E (toward 78th) from the back right corner marker. It should curve from that point to stay as far as possible from the #3 and #4 trees and intersect with a point 24" off the back right corner of the proposed patio. It should run 24" W (toward West Mercer) of the back patio and then curve slightly around to the point 24" off the back left corner of the house. From that point it should angle out to intersect with the south (left) property line 14' E (toward 78th) of the #19 maple.

If the protection fencing is installed as described there should be no instances where roots larger than 1" diameter from the retained trees are exposed during the excavation(s). On the slight chance that this may occur the root in question should be sliced cleanly off at the cut line with a handsaw or other sharp cutting tool.

Under no circumstance should the fencing be moved once installed unless an arborist in on site to monitor the situation.

The area between the protection fencing and the rear property line SHOULD NOT be scraped by machinery to clear the vegetation as is often done. Instead, any blackberries and other invasives should be removed by hand and the area covered in 4-6" of arbormulch. Because this space is the primary rooting area for the large trees in the rear of the lot it will have to be left as naturally as possible. It can not have lawn installed or underground sprinklers dug in or in any other way have significant disturbance within the rooting space.

Whatever landscaping may occur in the back yard region will have to be carefully thought out and designed to minimize impact to the area. It should be done entirely by hand with no heavy machinery (skidsteers or otherwise) used in the process.

A watering system using surface tubing and drip type irrigation should be simple to design, monitor, and customize for whichever types of plants are installed in the area.

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 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 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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Figure 1. Aerial view of the subject and surrounding properties from 2023.

Figure 2. Aerial photo circa 2023 showing the approximate locations of the trees noted in the study (white numerals). The dying maples are shown as ‘dm’. The locations of the juvenile fir (jf) and large hazel (hz) are also noted.

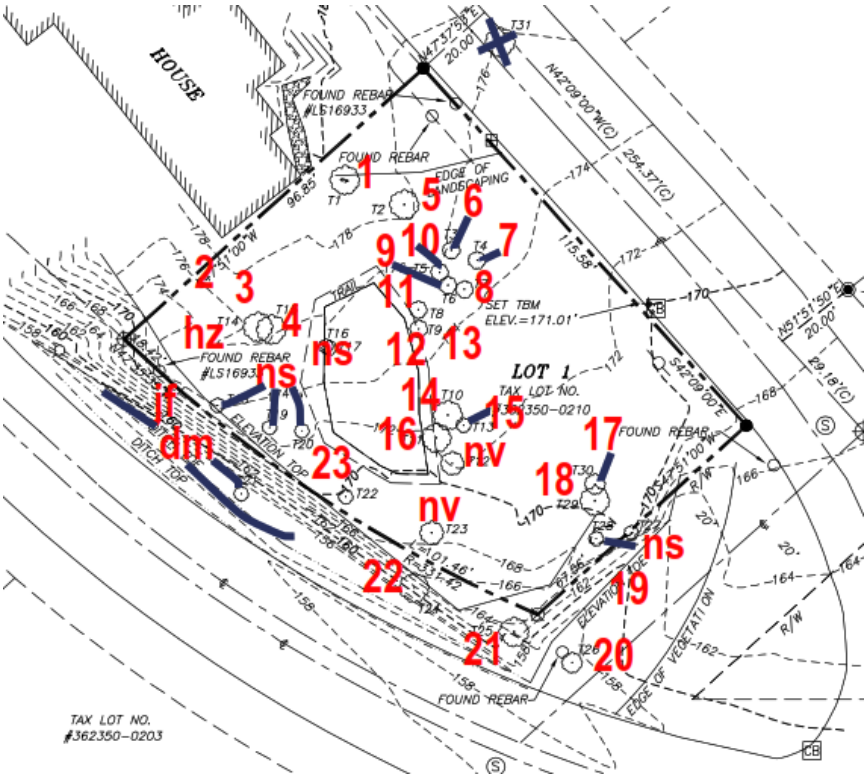

Figure 3. Excerpt from the topographic survey with the tree numbers overlaid. The same annotations are used in this figure as in Figure 2 with the addition of 'ns' for non-significant and 'nv' for non-viable.

Figure 4. Looking up and SW at the top of the #1 fir.

Figure 5. The fungal fruiting body at the base of the #2 tree.

Figure 6. Canker at base of #3 tree.

Figure 7. Looking SE at the line of scrub trees beneath the wires.

Figure 8. Large canker low on the column of the #18 tree.

Figure 9. Looking down and to the south showing the placement of the #20 tree.

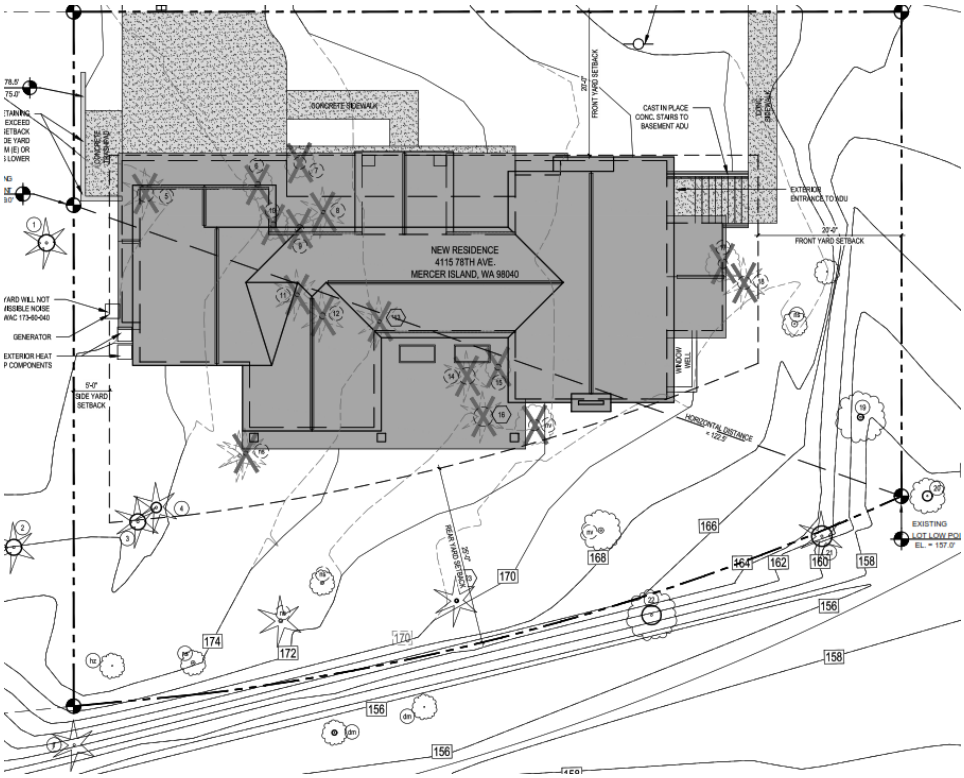

Figure 11. Excerpt from the site plan showing the layout of the proposed home.

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