TERAGAN & ASSOCIATES, INC.
ARBORICULTURAL CONSULTANTS

4/21/2022

Jim Raze
Raze Custom Homes, Inc.
4020 NE 216th Ave
Fairview, OR 97024

RE: Level II, Basic Tree Risk Assessment for Three (3) Trees in Jewelberry Ridge Subdivison

Summary

Jim Raze (Raze Custom Homes, Inc.) contacted Teragan & Associates, Inc. regarding three (3) trees of concern in a proposed subdivision. The assessed trees were rated as having poor health and structural condition. Visual risk assessments were performed and resulted in high risk for two trees and low risk for one tree. Removal of all three trees is recommended.

Assignment

Conduct a visual tree risk assessment on three (3) trees in the proposed Jewelberry Ridge Subdivision. Prepare a supplemental arborist report documenting the assessed risk.

Limitations

Tree risk assessments are based on tree and site conditions at the time of assessment. Any changes to the tree or site parameters merit a reassessment. Trees need to be visually re-assessed if site parameters change (i.e., construction, severe weather event, hit by a car). In addition, risk assessments are not guarantees that a tree will not fail within the stated time frame. Even healthy trees can fail under the right storm conditions or from defects that cannot be visually detected.

Observations

I visited the site and met with Mr. Raze on 4/18/22. Three (3) trees were measured and assessed for risk. I used a rubber mallet to sound the trees, binoculars to observe the health and structure of the upper canopies, a clinometer to measure tree height, and a Bosch Professional GLM 50C laser measurer to measure distances to nearby structures. Please see Appendix 4 for a site map of the assessed trees.

Tree #26, Lot 1

Tree #26 is a 21" DBH bigleaf maple (*Acer macrophyllum*). The tree was not tagged and is assumed to be tree #26 based on distances to nearby structures and the site map provided. It is 70-75' tall. The tree is in poor health and poor structural condition. Mechanical damage was observed on a surface root, 16" east of the trunk. Girdling roots are present on the south side of the trunk flare. The lower trunk sweeps slightly south and then self-corrects. The trunk splits into codominant leaders at approximately 35' above ground level and the northwest leader was topped 10' above the split. The live crown ratio is approximately 30%[1]. The canopy was significantly raised in the past and is also unbalanced to the west/northwest. Tree #26 is fully exposed to wind and nearby trees were recently removed. Mechanical root damage on the east side suggests that heavy equipment was likely operating within

[1] Live crown ratio is a measurement of the trees' live crown compared to the total height of the tree.

the dripline of the tree at one point. It is possible that some soil compaction has occurred near this tree prior to tree protection fencing being erected. A new(er) home (37330 American St) is 16' west of the tree. Based on the proximity of the home to the tree, it is possible that tree #26 experienced root disturbance or damage, and/or loss of roots to accommodate the home. Photographs of tree #26 are in Appendix 3, Figures 1-3.

Tree #35, Lot 3

Tree #35 is also a 21" DBH bigleaf maple. The tree was not tagged and is assumed to be tree #35 based on distances to nearby structures. It is 70-75' tall. The tree is in poor health and poor structural condition. There are two injuries on the lower trunk. On the northwest side there is a decay cavity and seam that stretches from approximately 3' to 20' above ground level. On the east side there is a decay cavity at 3.5' above ground level. Soil has been piled on the north side of the trunk. Epicormic growth is present on all sides of the lower trunk. The live crown ratio is approximately 30%. The canopy is unbalanced to the west/northwest. Tree #35 is fully exposed to wind and nearby trees were recently removed. Piles of soil around the base of the trunk suggest that construction may have occurred close to this tree at one time. It is possible that some soil compaction has occurred near this tree prior to tree protection fencing being erected. A new(er) home (15262 Penny Ave) is 21' west of the tree and a retaining wall sits at the property line, approximately 20' west. Based on the proximity of the home and retaining wall to the tree, it is possible that this tree experienced root disturbance or damage, and/or loss of roots to accommodate the retaining wall and home. Photographs of tree #35 are located in Appendix 3, Figures 4-6.

Tree #116, Lot 5

Tree #116 is a 14" DBH western redcedar (*Thuja plicata*). The tree was tagged. It is 30' tall. The tree is in poor health and poor structural condition. The central leader broke of natural causes several years ago and the tree is dying from the top down. Dead branches are present in the lower canopy. Foliage was thin, chlorotic, and uncharacteristically brown. There are no targets near the tree at this time, however a sidewalk and/or street will likely be within 14' of tree #116 with the proposed subdivision and a proposed home will be within 20'. Photographs of tree #116 are located in Appendix 3, Figures 7-9.

Risk Assessment Methodology and Ratings

Teragan & Associates, Inc. rated the trees for risk utilizing the visual risk assessment process. We utilize the standards for a Level II, Basic Tree Risk Assessment found in the American National Standards Institute (ANSI) A300 standards[2] and the International Society of Arboriculture's (ISA) best management standards for Level II, Basic Tree Risk Assessment[3]. The risk assessment timeframe was set at 5 years.

Targets

A *target* is defined as any person, object, or service disruption within reach of a falling tree or part of a tree, that may be injured, damaged, or disrupted. If a target is within 1-times the height of the tree being assessed, it is typically included in a risk assessment. This parameter is based off the ISA's Basic Tree Risk Assessment process and is a good guideline when considering what property or who may be impacted by a tree or tree part failure. Two existing targets and two future targets were

[2]American National Standards Institute. (2017). *ANSI A300 (Part 9) - 2017 Tree Risk Assessment a. Tree Failure.* A revision of ANSI A300 (Part 9) – 2011.
[3]International Society of Arboriculture. (2017). *Tree Risk Assessment Manual* (2nd ed.) Champaign, IL: International Society of Arboriculture.

assessed: 37330 American St, 15262 Penny Ave, a proposed sidewalk/road near tree #116, and a proposed home on lot 6 near tree #116. An *occupancy rate* (constant, frequent, occasional, rare) is associated with a target. The homes have/will have a constant occupancy rate and the proposed sidewalk/road is likely to have an occasional occupancy rate.

Risk Categorization

Tree risk assessment is conducted using a systematic approach to identify, analyze, and evaluate tree risk. If targets are present, then risk are assessed. When performing a tree risk assessment, an arborist's task is to evaluate the parameters of the site and the trees' characteristics, taking note of any defects or unusual features the tree and/or the site may have or pose to the stability of the tree or parts of the tree.

From the collection of data, the arborist then uses three factors to calculate the overall risk rating: (1) the likelihood of failure, (2) the likelihood of impact, and (3) the consequence of failure. A summary of the risk ratings for each target is located in Table 1 below.

Likelihood of failure is the chance of a tree or tree part failing within the stated time frame of five years. There are four levels: improbable, possible, probable, and imminent. A tree would be given an improbable likelihood of failure if it were healthy and not likely to fail in normal or even stormy weather conditions. Possible likelihood of failure would mean that there may be a significant defect, but the tree is not expected to fail in normal storm events, or even in storms that would be expected to occur every year. Probable likelihood rating would indicate that the defect is likely to cause failure within the stated time frame. A tree would be given an imminent likelihood of failure if it has already started to fail or would fail in the near future, within three weeks or so.

Likelihood of impact assesses that once the tree or tree part with the defect has failed, what is the likelihood of the tree or tree part impacting the target. There are four levels: very low, low, medium, and high. A tree would be given a very low likelihood of impact if the occupancy rate of the target of concern in that area is rare. A low rating would mean the target of concern being struck by the failing tree or tree part is less than 50 percent but greater than rare. A rating of medium is given if the target of concern is as likely to get struck as not. A tree would be given a high likelihood of impact if it is likely to impact the target when it fails.

Consequences of failure is the level of damage associated with a tree or tree part failure that has struck a target of concern. There are four levels: negligible, minor, significant, and severe. A negligible consequence would consist of a tree or tree part failing and resulting in no injuries to people and little to no damage to property or disruption to service. A minor consequence would be damage that could be repaired at a reasonable cost or injuries that people could heal quickly from and would not necessitate a hospital stay. Examples would be a damaged gutter, or a cut or minor bone breakage on a person. Significant consequences would be damage with higher repair costs and injuries that would require a hospital stay but one could expect a full recovery with no lingering impacts. An example of significant property damage would be where a roof's structural support is significantly damaged. A severe consequence would be a tree or tree part failing and resulting in a serious injury with lifelong impacts or death, or property damage with very high repair costs.

Table 1 Summary of risk ratings.

Target	Tree	Tree Part	Likelihood of Failure[1]	Likelihood of Impact[2]	Consequence of Failure[3]	Risk Rating[4]
37330 American St 16' W	#26	Whole tree	Probable	High	Severe	**High**
15262 Penny Ave 21' W	#35	Whole tree	Probable	High	Severe	**High**
Proposed sidewalk/road, ~17'	#116	Whole tree	Improbable	Low	Severe	Low
Proposed home lot 6, ~20'	#116	Whole tree	Improbable	Low	Minor	Low

[1]Likelihood of Failure: Improbable, Possible, Probable, Imminent.
[2]Likelihood of Impact: Very low, Low, Medium, High.
[3]Consequence of Failure: Negligible, Minor, Significant, Severe.
[4]Risk rating: Low, Moderate, High, Extreme.

Discussion and Risk Mitigation Recommendations

Trees #26 and #25 resulted in high risk rating and tree #116 resulted in a low risk rating.

Tree #26, Lot 1

In the next five years, the likelihood that tree #26 will fail due to a compromised root system (mechanical damage 16" east of trunk, girdling roots on south side, and suspected compaction) interacting with a high and unbalanced canopy and recent exposure to wind is *probable*. The likelihood of tree #26 failing west or northwest onto 37330 American St is *high*. The home is within the dripline of the tree. The compromised roots are on the east and south side and the canopy is high and unbalanced to the west and northwest. This creates a long lever arm with an imbalance of static and dynamic forces playing against the canopy and roots. The most likely direction of failure is to the west or northwest. The consequence of failure of tree #26 falling on the home is *severe*. A 21" DBH tree falling onto a home would cause significant property damage. **Removal is recommended to mitigate for the high risk.**

Tree #35, Lot 3

In the next five years, the likelihood that tree #35 will fail due to decay in the lower trunk (decay cavity and seam on north side and decay cavity on east side) and possibly a compromised root system (suspected compaction and grade changes) interacting with a high and unbalanced canopy and recent exposure to wind is *probable*. The likelihood of tree #35 failing west or northwest onto 15262 Penny Ave is *high*. The home is within the dripline of the tree. Stem decay on the east and northwest sides of the tree in combination with the high and unbalanced canopy to the west and northwest creates a long lever arm with an imbalance of static and dynamic forces. It is difficult to predict the direction of failure of this tree due to the multiple defects, but the locations of lower stem defects and the unbalanced canopy are most likely to cause the tree to fail west, either northwest, west, or southwest. The consequence of failure of tree #35 falling on the home is *severe*. A 21" DBH tree failing onto a home would cause significant property damage. **Removal is recommended to mitigate for the high risk.**

Tree #116, Lot 5

In the next five years, the likelihood that tree #116 will fail due to poor health is *improbable*. Tree #116 is dying, but it still has live branches. Over the next five years it will continue to decline standing. It is unlikely that it will uproot and fail. The likelihood of tree #116 failing west or northwest onto the proposed sidewalk/road and the proposed home on lot 6 is *low*. It is extremely hard to predict

the direction of failure of a dead tree. Since both targets are within 30' of the tree, either could be impacted. The consequence of failure of tree #116 falling onto the proposed sidewalk/home is *severe*. A 14" DBH tree could severely injure a person. If the sidewalk is not occupied by a pedestrian, then the consequence would be negligible. The consequence of failure of tree #116 falling onto the proposed home is minor. The top of the tree is dead so if it were to reach the house it would likely break on impact and cause some minor damage, but not structural damage. A gutter may be dented. Tree #116 is in an irreversible state of decline and will not recover. **The only mitigation to lower the low risk is removal.**

Trees #26 and #35 meet the City of Sandy's definition of a hazardous tree because they present a danger to existing structures and the only mitigation available to mitigate that danger is removal. The dangers these two trees pose cannot be alleviated by pruning, as they have already been aggressively pruned.

Tree #116 is not hazardous, but it is in an irreversible state of decline. Retaining and protecting tree #116 during the construction of the proposed subdivision will not improve the trees' health, nor will it help meet the intended goals of section 17.102.50 of the Development Code.

Conclusion

Trees #26 and #35 are recommended for removal to mitigate high risk. Tree #116 poses a low risk, but will not recover from its poor state of health. Removal of this tree is recommended based on the poor condition of the tree and not the risk.

Sincerely,

Christine Johnson

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ISA Tree Risk Assessment Qualified
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Enclosures:

Appendix 1:	Certification of Performance
Appendix 2:	Assumptions and Limiting Conditions
Appendix 3:	Photographs of the Trees and Site
Appendix 4:	Site Map of Assessed Trees

Appendix 1: Certification of Performance

I, Christine Johnson, certify:

- That a representative of Teragan & Associates, Inc., has inspected the tree(s) and/or the property referred to in this report. The extent of the evaluation is stated in the attached report.
- That Teragan & Associates, Inc. has no current or prospective interest in the vegetation of the property that is the subject of this report, and Teragan & Associates, Inc. has no personal interest or bias with respect to the parties involved.
- That Teragan & Associates, Inc.'s compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party, or upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.
- That the analysis, opinions, and conclusions that were developed as part of this report have been prepared according to commonly accepted arboricultural practices.
- That a Board-Certified Master Arborist has overseen the gathering of data.

Appendix 2: Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. Teragan and Associates, Inc. checked the species identification and tree diameters in the field.
2. It is assumed that this property is not in violation of any codes, statutes, ordinances, or other governmental regulations.
3. The consultant is not responsible for information gathered from others involved in various activities pertaining to this project. Care has been taken to obtain information from reliable sources.
4. Loss or alteration of any part of this delivered report invalidates the entire report.
5. Drawings and information contained in this report may not be to scale and are intended to be used as display points of reference only.
6. The consultants' role is only to make recommendations. Inaction on the part of those receiving the report is not the responsibility of the consultant.
7. This report is to certify the trees that are on site, their size and condition and assessed risk.

Appendix 3: Photographs of the Trees and Site

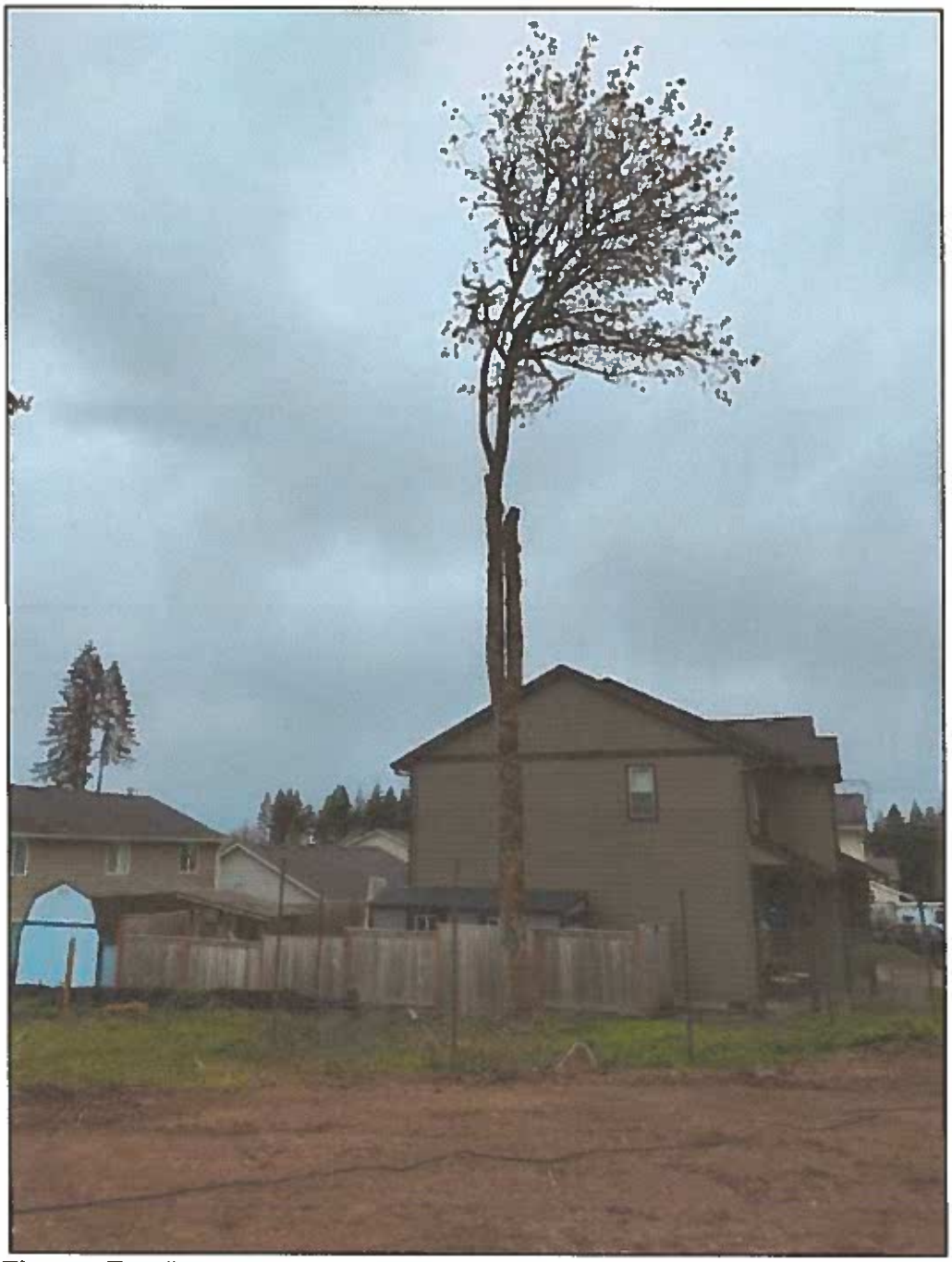

Figure 1 Tree #26, 21" DBH bigleaf maple. This tree has a high risk rating. 4/18/2022.

Figure 2 Tree #26, mechanical root damage on the east side 16" from the trunk. 4/18/2022.

Figure 3 Tree #26, girdling roots on the south side of the trunk flare. 4/18/2022.

Figure 4 Tree #35, 21" DBH bigleaf maple. This tree has a high risk rating. 4/18/2022.

Figure 5 Tree #35, seam and decay cavity on northwest side of trunk. 4/18/2022

Figure 6 Tree #35, decay cavity and epicormic growth on east side of trunk. 4/18/2022.

Figure 7 Tree #116, 14" DBH western redcedar. Notice the lost top, dead, dying, and thin foliage. 4/18/2022.

Figure 8 Tag on Tree #116. 4/18/2022.

Figure 9 Tree #116, Dead and chlorotic foliage at the tips of branches. 4/18/2022.