

Class One Arboriculture CA Lic. #982988 2832 Manhattan Ave Glendale, CA 91214 Phone: (818) 495-5344

April 11, 2017

Elaine Klemzak 2861 Piedmont Ave Glendale, CA 91214

Mrs. Klemzak,

Per your request, I have prepared a tree risk assessment of the Coast Live Oak (*Quercus agrifolia*) along the northeast property line at 2861 Piedmont Ave., Glendale, CA 91214. I have concluded that *the risk posed by the tree over the next three year time frame is low*.

Background

In October of 2012, I prepared an arborist report with a basic assessment of all the trees on your property, including the subject oak tree. Subsequently, I performed pruning on the subject oak tree on three occasions: once I brought my crew to remove deadwood from the canopy, and the next two times I personally pruned the branches in contact with the roof of your neighbor to the southeast. I viewed your Oak tree many times in passing since then.

Per our conversation on April 11, 2017, you agreed it would be beneficial to perform a formal Tree Risk Assessment. I visited your property later that day at 12:00pm to collect data for this report. I only collected data from your side of all property lines.

I performed a Level 2 Basic Tree Risk Assessment of the Coast Live Oak. My observations were visual-only. I assessed five targets: your house, the neighboring house to the southeast, the back-house to the northeast, people in the backyard, and people inside the houses. I assessed three tree parts for likelihood of failure: the whole tree, a 4" scaffold branch on the southwestern portion of the canopy, and a 2" dead branch on the northeastern portion of the canopy. Other targets and tree parts were not considered for this report.

The basic premise of a tree risk assessment is to help tree risk managers make an educated decision on how to reduce their risk to tolerable levels. All trees provide benefits, and all trees pose some risk. *Usually the benefits provided by trees outweigh the risks they pose*. The only way to eliminate all tree risk is to eliminate all trees.

Observations and Discussion

The subject Coast Live Oak (*Quercus agrifolia*) is growing six inches to the southwest of an old stone retaining wall along the northeastern edge of the subject property. The trunk of the tree is located about 30 feet to the northeast of your house. The trunk measures 36" DBH, and the tree is about 50 feet tall, with a canopy spread of about 65 feet. This tree is protected by the City of Glendale tree protection ordinance.

The tree is healthy. There are growth cracks along the trunk and scaffold branches. They appear as brownish to reddish colored cracks, indicating an area of rapid tissue deposition. The canopy is dense, and there is ample new growth. It has a prevailing lean to the southwest, away from the old stone retaining wall and towards your house. The spread of the canopy is so broad that it spans both your roof and part of the roof of the house to the southeast.

The expansion of the trunk and root crown over time has caused the old stone retaining wall northeast of the tree to crack. The cracking is evidence of the presence of roots under and around the wall's footing. The more healthy structural roots that are present on the northeast side of the wall, the lower the likelihood of whole tree failure at the root crown. Although I did not perform any excavation, I estimated that the roots of the subject tree are growing under the retaining wall and into the property to the north, anchoring the tree with static forces opposing its prevailing lean.

Branches at the extreme southwestern edge of the canopy have begun to grow downward from the lengthy cantilever and rapid recent growth. A few small branches are resting on the roof of your house. It is possible that one or more of the 4" size branches could fail within the next 3 years as a result of recent rapid growth. While weight reduction may reduce likelihood of branch failure, it would also significantly reduce the health of the branches due to loss of foliage. Therefore, I don't recommend this mitigation option. The consequence of such a branch impacting your house would be *minor*.

Most of the deadwood has been cleaned out of the portion of the tree's canopy over your property. When my pruning crew performed their work a few years ago, we were limited to working over your property. Without access to the neighboring property to the northeast, my crew left the dead branches in the northeast portion of the canopy. Therefore, the remaining deadwood is mostly over the northeast property line. Within the dripline of the canopy, there is a back-house on the eastern portion of the neighboring property to the northeast.

There are several buttress roots on the south and western portions of the root crown that are showing evidence of rapid growth. The additional tissue that the tree is depositing is a response to the static loads applied from its prevailing lean to the southwest. Response growth such as this compression wood reduces the tree's likelihood of failure.

Since my observations were limited to above-ground visual inspection, I determined the extent of the root system of the subject tree based on limited information. A higher level of inspection may yield additional information that could potentially indicate hidden defects below the surface of the soil. Additional information may change the results of this risk assessment.

Tree Risk Assessment Methodology

There are three components to a tree risk assessment: likelihood of failure, likelihood of impact, and consequences of failure and impact. For each combination of tree part and target, I rated each of these components. Then I combined them according to International Society of Arboriculture (ISA) Best Management Practice for tree risk assessment using the tables in Figures 1 and 2 to produce a risk rating for each tree part and target combination. Lastly, I assigned an overall risk rating for the subject tree equal to the risk rating of the tree part and target combination with the highest risk rating.

Targets

I assessed five targets: your house, the neighboring house to the southeast, the back-house to the northeast, people in the backyard, and people inside the houses. The structures are fixed targets. They are present 24/7, and it is not practical to move them to mitigate risk. People are mobile targets. People have an occasional occupancy rate within the target zone. For a large portion of the day, month, week, or year, people are not present within the target zone.

The target zone is defined as the area in which the tree or tree part is most likely to fall if it were to fail. For this assessment, I defined the target zone as the area within one times the tree height of the trunk of the tree.

The likelihood of the whole tree impacting your house and the house to the southeast if the tree were to fail is *high*. If it were to fail, the tree may be expected to impact these targets. The direction of fall is determined by the prevailing lean and center of gravity to the southwest. The likelihood of a 4" branch impacting your house if it were to fail is *high*. The scaffold branches I assessed are growing directly over the house, and they may be expected to impact the house if they were to fail. The likelihood of a 2" dead branch impacting the back house to the northeast is *medium*. The deadwood is approximately distributed between 50% over the back house and 50% not over the back house, so if a dead branch were to fail, it would be about equally as likely to impact the back house as not.

The likelihood of the whole tree impacting a person is *low*. It is unlikely to impact a person because of the *occasional* occupancy rate of the people in the house and backyard. The likelihood of a branch impacting a person is also *low*. The existing structures would act as protection factors, reducing the chance that a failed branch would impact a person. Also, houses act as protection factors for people inside of them, potentially reducing the impact from a tree or scaffold branch.

If the whole tree were to fail and impact your house and the neighboring house to the southeast, the consequences would likely be *significant* property damage. The distance of fall for the whole tree would be about 15-20 feet because there are many low branches in the canopy that would cushion the fall and reduce the force of impact. If the whole tree were to fail and impact a person, the consequences would be *severe* personal injury. If a 4" branch were to fail and impact a a person in the backyard, the consequences would be *severe* personal injury. If it were to fail and impact the house, the consequences would be *minor* property damage. If a 2" dead branch were to fail and impact a structure, the consequences would be *negligible* because of the small part size. If it were to fail and impact a person, the consequences would be *minor* personal injury.

2861 Piedmont Ave. – TREE RISK ASSESSMENT James Komen, Class One Arboriculture Inc. April 11, 2017

Tree Parts

I assessed three tree parts for likelihood of failure: whole tree failure at the root crown, failure of a 4" branch in the southwestern portion of the canopy, and failure of a 2" dead branch in the northeastern portion of the canopy:

- Whole Tree: I rated the likelihood of whole tree failure at the root crown as *improbable*. It is not likely to fail within the assessed time frame, even in extreme weather conditions. There is significant response growth around the trunk, reducing the likelihood of failure. The consequence of impacting a structure would be *significant*, and the consequence of impacting a person would be *severe*.
- *4" Branch*: I rated the likelihood of failure of a 4" branch in the southwestern portion of the canopy as *possible*. There is ample new growth at the extreme southwestern tips, and the rapid increase in canopy weight could potentially cause one of these branches to fail. However, the amount of cantilever within the canopy is well within the tolerable range for the species profile of Coast Live Oak. The consequence of a 4" branch impacting your house would be *minor* property damage. The consequence of impacting a person in the backyard would be *severe*.
- 2" *Dead Branch*: I rated the likelihood of failure of a 2" dead branch in the northeastern portion of the canopy as *probable*. At least one dead branch may be expected to fail in ordinary weather conditions within the assessed time frame. Because these branches are so small, the consequences of impact with the back house to the northeast are *negligible*. The consequence of impacting a person would be *minor* personal injury.

Risk Rating

For all combinations of target and tree part (Figure 4), I combined the likelihood of failure, likelihood of impact, and consequences of failure and impact using the risk rating matrices in Figures 1 and 2. The highest risk rating combination was *low*, so the overall risk rating for the tree is *low*.

Risk Mitigation

As a risk assessor, my job is to present options for risk mitigation. The property owner or manager's responsibility is to choose one or more that meets the budget and level of risk tolerance. Each mitigation option will have residual risk unless the tree is completely removed:

 Perform an Additional Level of Assessment: I only performed an all-visual Level 2 Basic Tree Risk Assessment. A Level 3 Advanced Tree Risk Assessment could potentially provide additional information that could help the tree risk manager decide how to proceed. One such assessment could be a static pull test:

Static pull tests rely on prior research regarding the amount of force required to pull a branch or tree to failure. These tests measure the amount of force required to bend the tree part by 0.25° and then extrapolate the result using curves generated by existing peer-reviewed research. The result of the extrapolation is compared to the amount of force that may be expected to be applied to the tree given the exposed canopy surface area, air density, and expected maximum wind speeds for the time frame. If the force required to pull the tree to failure exceeds a minimum safety factor, then the tree may be rated as having an elevated likelihood of failure.

The advantage to such a test is it helps to measure loads as they are actually applied to the tree. Unique attributes in tree architecture are all taken into account when the tree is physical tested.

- 2) Weight Reduction Pruning: To reduce the likelihood of failure of a 4" branch over your house, you may prune some of the weight off of them. However, a risk mitigation action must take the overall condition of the tree into account. Since the foliage is generally found at the tips of these branches, removing enough foliage to significantly reduce likelihood of failure would cause a significant reduction in the health of those branches. Therefore, this mitigation action is not recommended.
- *3) Deadwood Pruning*: Dead branches over the northeast neighbor's property may be removed. This will not change the risk rating of the tree, but it will reduce the likelihood of them failing.
- 4) *Retain and Monitor*: Every 1-5 years, hire a Qualified Tree Risk Assessor (TRAQ) to reassess the risk rating of the tree. If it increases from *low* to *moderate*, *high*, or *extreme*, then alternative mitigation actions may be discussed.
- 5) *Remove the tree*: Removing this tree would reduce its risk from *low* to zero. It would also eliminate the benefits provided by the tree. Since the subject tree is protected by ordinance, it is unlikely that the City of Glendale would approve a request to remove this tree unless there is evidence that it is causing an undue burden.

Additional Recommendations

- Continue to regularly prune the subject tree for clearance over the roofs of all surrounding structures. Clearance should be at least 5 vertical feet above the roof, per City of Glendale fire code. Pruning should take place once every 1-4 years as needed, and cuts should be smaller than 2 inches in diameter. Pruning should be directly supervised by a Certified Arborist.
- 2) If the cracks in the old stone wall behind the tree become aesthetically unattractive, consider repairing the cracks rather than replacing the wall. Repairing the cracks will have a negligible impact on the health and structure of the tree, but replacing the wall may have an impact on both.

Glossary of Terms

Consequences of impact: The amount of damage or harm caused by a tree or tree part failing and impacting a target. It may be personal injury, property damage, or disruption of an activity.

There are four possible ratings:

- 1) **Severe**: Hospitalization or death of a person, or property damage over \$20,000.
- 2) **Significant**: Personal injury that does not require professional medical care, or property damage costing less than \$20,000 to repair.
- 3) **Minor**: Very minor personal injury, or property damage costing less than \$1,000 to repair.
- 4) **Negligible**: Property damage that can be easily repaired. No personal injury.

Likelihood of failure: The chance that a tree or tree part could fall within a specified time frame. There are four possible ratings:

- 1) **Imminent**: Without regard to the assessed time frame, the tree or tree part is about to fail or has already started to fail.
- 2) **Probable**: Within the assessed time frame, the tree or tree part may fail in ordinary weather conditions.
- 3) **Possible**: Within the assessed time frame, the tree or tree part may fail in extreme weather.
- 4) **Improbable**: Within the assessed time frame, the tree or tree part may not fail, even in extreme weather.

Likelihood of impact: The chance that the subject tree would impact the target if it were to fail. This is primarily determined by the occupancy rate of the targets, the direction of the tree's fall, and any potential protection factors. There are four possible ratings:

- 1) **High**: If the tree or tree part were to fail, it may be expected to impact the target.
- 2) **Medium**: If the tree or tree part were to fail, the chance of impacting the target is approximately 50/50.
- 3) **Low**: If the tree or tree part were to fail, it would be unlikely to impact the target.
- 4) **Very Low**: If the tree or tree part were to fail, the chance of impacting the target is remote.
- **Mobile target**: A target that is constantly moving or stopping intermittently. Such targets include people, animals, bicycles, and vehicles.
- **Movable target**: A target that may be relocated as a mitigation strategy.

Occupancy rate:	The amount of time that a mobile target is present in the target zone. There are four possible ratings:
	 Constant: Within the assessed time frame, the target is always or nearly always present in the target zone. 20-24 hours per day
	 2) Frequent: Within the assessed time frame, the target is present in the target zone for a large portion of the day, month, week, or year, averaging 4-20 hours per day.
	3) Occasional : Within the assessed time frame, the target is infrequently or intermittently present in the target zone, averaging 0.25-4 hours per day.
	 4) Rare: Within the assessed time frame, the target is present in the target zone for a very small portion of time, averaging 0.25 hours per day or less.
Risk Rating:	The combination of likelihood of failure, likelihood of impact, and consequences of impact.
	 Extreme: access to the target zone should be restricted immediately and mitigation should take place as soon as possible.
	2) High : mitigation should take place as soon as practical.
	3) Moderate: mitigation should take place as soon as pruning cycle allows.
	4) Low : The risk may be mitigated as pruning cycle allows, or the tree may be retained and monitored.
Static Target:	A target that does not move. It is present in 24 hours per day, seven days per week. Building and landscape fixtures are considered fixed targets.
Target:	A person that could be injured, property being damaged, or activities that could be disrupted by a failure of a tree or tree part.
Target zone:	The area in which a tree or tree part can reasonably be expected to fall if it were to fail.
Time frame:	The period of time over which the likelihood of failure is assessed. Time frame is often one year, but it may be modified to meet the needs of the client. For this assignment, I used a time frame of three years.

Limitations

I relied upon information regarding the site and the subject tree that you provided to me. For purposes of this report, I assumed all of the information you gave me to be true. If any of the information provided to me is found to be inaccurate, the conclusions in this report may be invalidated.

My observations are based on a strictly visual inspection of the property, and some hidden or buried symptoms and signs may not have been observed. I did not conduct excavation, coring, or aerial inspection to make observations. Specialty arborists would be needed to conduct root crown inspections and extent-of-decay analysis on the tree, if these additional inspections are desired.

Although the condition of the tree will change throughout the year, my analysis is only based on the observations I gathered at the time of inspection. I do not guarantee the safety, health, or condition of the tree. There is no warranty or guarantee, expressed or implied, that problems or deficiencies in the tree may not arise in the future.

Arborists are tree specialists who use their knowledge, education, training, and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living trees. Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot detect every condition that could possibly lead to structural failure of a tree. Trees are living organisms that fail in ways not fully understood. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.

Treatment, pruning, and removal of trees may involve considerations beyond the scope of the arborist's services such as property boundaries, property ownership, site lines, disputes between neighbors, and other issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist. An arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees.

Conclusion

For a three year time frame, the overall risk rating of the subject tree is *low*. Evaluate the risk/benefit tradeoff before considering the subject tree for removal. After reading this risk assessment report, your responsibility as tree risk manager is to determine your risk tolerance threshold and budget. You will use those to determine appropriate mitigation actions, if any. If the tree is retained in the landscape, I recommend a Qualified Tree Risk Assessor regularly reinspect it.

If you have further questions, feel free to give me a call or email.

James Komen Board Certified Master Arborist #WE-9909B Registered Consulting Arborist #555 Class One Arboriculture Inc. 818-495-5344

Photos and Figures

Likelihood of		Likelihood of Imp	acting the Target	
Failure	Very Low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Figure 1: Risk assessment matrix (1 of 2). This matrix synthesizes the likelihood of failure and the likelihood of impacting the target.

Likelihood of		Consec	uences	
Failure & Impact	Negligible	Minor	Significant	Severe
Very Likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat Likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Figure 2: Risk assessment matrix (2 of 2). This matrix synthesizes the likelihood of failure & impact and the consequences of impact.

Site Map



Figure 3: Site map showing the subject tree, surrounding structures, and anticipated target zone.

2861 Piedmont Ave. – TREE RISK ASSESSMENT James Komen, Class One Arboriculture Inc. April 11, 2017

			Likelihood		Likelihood			
Tree #	Species	Tree Part	of Failure	Target	of Impact	Consequences	Risk Rating	Notes
1	Quercus agrifolia	Whole Tree	Improbable	House at 2861 Piedmont	High	Significant	Low	Relatively short distance of fall
1	Quercus agrifolia	4" Branch	Possible	House at 2861 Piedmont	High	Minor	Low	Not large enough to do significant damage
1	Quercus agrifolia	2" Dead Branch	Probable	House at 2861 Piedmont	Low	Negligible	Low	Deadwood not over house
1	Quercus agrifolia	Whole Tree	Improbable	House to southeast	High	Significant	Low	Within target zone
1	Quercus agrifolia	4" Branch	Possible	House to southeast	Low	Minor	Low	Small portion of target zone
1	Quercus agrifolia	2" Dead Branch	Probable	House to southeast	Very Low	Negligible	Low	Not in target zone
1	Quercus agrifolia	Whole Tree	Improbable	Back house	Very Low	Severe	Low	Direction of lean is away
1	Quercus agrifolia	4" Branch	Possible	Back house	Low	Minor	Low	Small portion of target zone
1	Quercus agrifolia	2" Dead Branch	Probable	Back house	Medium	Negligible	Low	Portion of target zone
1	Quercus agrifolia	Whole Tree	Improbable	Person in backyard	Low	Severe	Low	Occasional occupancy rate
1	Quercus agrifolia	4" Branch	Possible	Person in backyard	Low	Severe	Low	Occasional occupancy rate
1	Quercus agrifolia	2" Dead Branch	Probable	Person in backyard	Low	Minor	Low	Occasional occupancy rate
1	Quercus agrifolia	Whole Tree	Improbable	Person in a structure	Low	Severe	Low	Occasional occupancy rate
1	Quercus agrifolia	4" Branch	Possible	Person in a structure	Very Low	Significant	Low	Structure is a protection factor
1	Quercus agrifolia	2" Dead Branch	Probable	Person in a structure	Very Low	Negligible	Low	Structure is a protection factor

Figure 4: Table of risk ratings for each combination of target and tree part.

2861 Piedmont Ave. – TREE RISK ASSESSMENT James Komen, Class One Arboriculture Inc. April 11, 2017



Figure 5: Looking northeast at the subject tree. It has a healthy canopy with a broad drip line over several structures.



Figure 6: Looking southeast at the subject tree. It is growing in close proximity to an old stone retaining wall. It has a prevailing lean to the southwest.



Figure 7: Looking southeast at the canopy that overhangs the house at 2861 Piedmont.



Figure 8: Looking southeast at the canopy that overhangs the house on the property to the southeast.



Figure 9: Looking southwest from the trunk of the subject tree at the branches overhanging the roof of the house at 2861 Piedmont Ave. If the whole tree were to fall, the distance of fall would be about 15-20 feet.



Figure 10: Looking northeast at the trunk of the tree. Buttress roots are showing evidence of compression wood in response to the static loading of the weight of the tree, reducing the likelihood of whole tree failure.



Figure 11: Looking northwest at the trunk of the subject tree. It is within six inches of an old stone retaining wall. The wall is cracking from the expansion of the trunk and root crown.



Figure 12: Looking up at a southwest-facing scaffold branch. There are many growth cracks on the branch, indicating the tree is healthy.