Michael L. Bench
Consulting Arborist
(831) 594-5151

7327 Langley Canyon Road
Prunedale, California 93907

A Preliminary Tree Protection Plan
1958 Latham Street
Mountain View, California

Assignment

I was asked by Yin Su, Project Architect, Barry Swensen Builder, to evaluate the feasibility of the most recent design plan near two large oak trees at 1958 Latham Street, Mountain View, California.

The most recent plan, which was provided to me, was dated March 4, 2015. This was a Site Plan. The Utility Plan, the Landscaping Plan, and the Grading and Drainage Plan were not available at the time of this review. As such, this report is not a complete Tree Protection Plan. This report will focus on those items, which are currently provided, but would not be considered complete until the aforementioned plans would be reviewed.

Observations

I inspected the trees on April 8, 2015.

The descriptions of the trees are accurately described in the report, dated October 28, 2014, by Mr. Jeff Hillman, Valley Crest Tree Care.

The subject trees are Tree # 1, a 36 inch DBH (Diameter at Breast Height = 54 inches above grade) Coast live oak (*Quercus agrifolia*), and Tree # 2, a 40 inch DBH Coast live oak (*Quercus agrifolia*). Both trees are in excellent health and structure. Comments and recommendations in this report are made on the assumption that these two trees would be preserved in good condition.

The proposed plan of March 4, 2015 appears feasible to achieve, but it would push these trees to the limit of their tolerances. If all goes well, they could survive construction in good condition, but it would require that all elements be done timely and with diligence. There would be no room for error.

Canopy losses (a result of pruning to provide access for the buildings and the scaffolding) and root losses (a result of driveway construction) are both damaging events. If these damaging events are carefully planned and executed, the trees would likely survive in good condition. If poorly executed the trees may not survive. However, **both** the canopy losses and the root losses must be considered as a total, not independently.

These trees should tolerate a total of up to 30% damage (a total of both canopy losses and root losses). If the trees were pruned to reduce the canopy by 30% for access, the damage to the root zone would then have to be 0%. Thus, what is done above ground impacts what may be done below ground, and visa-versa.

These trees are very healthy and vigorous. Mr. Ken Johnson, who lives on the property, reports that these two trees are approximately 35-40 years old. This is relatively young for an oak tree. Because of these circumstances, these trees should be able to tolerate approximately 30% canopy reduction. The ISA standard is 25% maximum. Because these trees are quite vigorous and young, I believe they could tolerate a little more (approximately 5% greater than the ISA standard) but that amount must be the maximum.

I measured the canopies of these trees to estimate the canopy losses for access. In this case, access must be provided for the buildings to be constructed, but also for scaffolding to be used outside the buildings during construction. The attached map shows an estimate of the canopies of these trees in relation the proposed new buildings.

Preliminary Tree Protection Plan

1. Construction of the driveway would require modifications to the driveway in the area (minimum) shown on the attached map. In this area inside the root zone, the following modifications would be essential:
    - There must be no grading of excavation, which would destroy roots. Driveway materials must be installed "On Grade".
    - The sub-soil must not be stabilized. This limitation would exclude the use of pervious pavers.
    - A Geo-Grid (or equivalent material) must be installed to distribute the vehicle loads, as underlayment for the surface material.
    - Compaction must be limited to 80 per cent Procter Scale.
    - The surface material would not have to be completely pervious, but pervious materials would be essential every 2-4 feet.

2. It appears that the ultimate total canopy loss would be 30-35%.
   This exceeds the ISA standard of 25% in a single pruning cycle, which is 1 to 2 years, depending on the vigor of the tree. In this case, the trees are very vigorous, and for that reason, a one year (approximate) pruning cycle would be feasible. This means the trees could be pruned (any time of the year except February – June, which is the primary growing period) up to 25% on the south side of the canopies and then pruned again in 10-12 months approximately 10%, depending on the construction schedule. On the other hand, it may be possible to prune only 10% -15% initially, if the construction schedule would allow for a more delayed harder prune; then, prune 20% - 25% in 10-12 months. This second option would be preferred.

3. Any pruning must be done by an arborist certified by the ISA (International Society of Arboriculture) and according to ISA, Western Chapter Standards, 1998.

4. Tree Protective Fencing would be required to protect as much of the root zone as possible for as long as possible. This may require that the fencing be relocated for specific phases of the project (Demolition; Grading; Construction of the Structures; Utilities). For each of these phases, the Project Arborist must be consulted and support the relocation of the Tree Protective Fencing for each phase.

5. I recommend that Tree Protective Fencing must consist of the following:
    - Consist of chain link fencing and having a minimum height of 6 feet.
    - Be mounted on steel posts driven approximately 2 feet into the soil.
    - Fencing posts must be located a maximum of 10 feet on center.
    - Protective fencing must be installed prior to the arrival of materials, vehicles, or equipment.
    - Protective fencing must not be moved, even temporarily, and must remain in place until all construction is completed, unless approved by the Project Arborist.

6. There must no grading or excavation inside the drip lines of these trees without the prior consultation and supervision of the Project Arborist (Refer to Item # 1).

7. Construction of a Bio-Retention System must be outside the drip lines of the Trees # 1 and # 2, unless approved by the Project Arborist.

8. Materials must not be stored, stockpiled, dumped, or buried inside the driplines of Trees # 1 and # 2.

9. Excavated soil must not be piled or dumped, even temporarily, inside the driplines of Trees # 1 and # 2.

10. Trees # 1 and # 2 must be irrigated during the entire construction process to compensate the trees for the anticipated root losses as a result of driveway construction, despite the fact that the impact may be minimal to moderate. I recommend a temporary drip or soaker irrigation system. The trees must be irrigated every 2 weeks during construction. The moisture must penetrate the soil to a depth of 18-24 inches with each irrigation. The moisture volume and penetration must be monitored and reported monthly to the Project Arborist and to a designated City official, if required.

11. The Landscape Irrigation must include a valve dedicated to irrigate this trees, separate form the other landscape plants. The long term maintenance of these trees after construction would require irrigation every 6 weeks between May and October. The moisture must penetrate the soil to a depth of 18-24 inches with each irrigation. It is critical that there be a drying period between irrigations. Thus, the 6 week intervals.

12. Landscape plants planted within the drip lines of Trees # 1 and # 1 must be compatible with the culture of Coast Live Oaks. A publication about plants compatible with California native oaks can be obtained from the California Oak Foundation, 1212 Broadway, Suite 810, Oakland 94612.

13. To prevent excavation of larger holes for planting of new plants inside the drip lines of Trees # 1 and # 2, I recommend the use of 1 gallon size plants only.

14. To prevent significant root loss, recommend that new plants (inside the drip lines) of Trees # 1 and # 2 must be spaced a minimum of 6 feet on center.

15. Rotortiling of soil for the planting of ground cover plants inside the driplines of Trees # 1 and # 2 must not be done (See Item # 14).

16. Any pathways or other hardscape inside the driplines of protected trees must be constructed completely on top of the existing soil grade without excavation. Fill soil may be added to the edge of finished hardscape for a maximum distance of approximately 2 feet from the edges to integrate the new hardscape to the natural grade.

17. I recommend that some type of barrier(s) must be installed to prevent autos from parking in the soil areas inside the driplines of Trees # 1 and # 2 after the completion of construction. Large boulders or other devises may be used.

Respectfully submitted,

Michael L. Bench, Consulting Arborist
International Society of Arboriculture Certification # WE 1897A
American Society of Consulting Arborists Member

Michael L. Bench
Consulting Arborist
(831) 594-5151

7327 Langley Canyon Road
Prunedale, California 93907

A Comparative Impact Study
Between Two Design Site Plans
1958 Latham Street
Mountain View, California

Assignment

I was asked by Yin Su, Project Architect, Barry Swensen Builder, to prepare an impact study between Site Plan Option 1 and Site Plan Option 2 with regard to the canopy loss of the large oak Tree # 2 at 1958 Latham Street, Mountain View, California. The primary question was whether or not the canopy loss to Tree # 2 would be significantly different between Option 1 and Option 2.

Previously I had prepared an Arborist Report, dated April 8, 2015, concerning the two large oak trees on this site.

Observations

I inspected Tree # 2 on May 21, 2015.

Tree # 1, a 36 inch DBH (Diameter at Breast Height = 54 inches above grade) is a Coast live oak (*Quercus agrifolia*), and Tree # 2 is a 40 inch DBH Coast live oak (*Quercus agrifolia*). Both trees are in excellent health and structure.

The proposed buildings in relation to Tree # 1 are the same between the two plans. For this reason, there would be no difference in canopy loss to Tree # 1 between the two plans.

In relation to Tree # 2, Site Plan Option 1 proposes two Apartment Units perpendicular with Latham Street and one Apartment Unit parallel with Latham Street.

Also, in relation to Tree # 2, Site Plan Option 2 proposes one Apartment Unit perpendicular with Latham Street, one L shaped center Apartment Unit, and one Apartment Unit parallel with Latham Street.

For this study, there were no engineering survey stakes or marking paint to indicate the locations of the proposed new structures. The original buildings (residence, shed, garage, shop) still exist on site. I used these existing structures for reference.

Based on the location of the existing residence and the existing shed in relation to Tree # 2, I was able to make an assessment. The roof edge (north side) of the existing shed is 12 feet from the trunk of Tree # 2. This is the distance shown on the plan as the location of the north wall of the proposed L Shaped Apartment Unit shown on Option 2.

The single trunk of Tree # 2 forks into 4 primary scaffolding leaders at approximately 4 feet and 7 feet above grade, as follows:
A – 24 inch diameter faces South
B – 24 inch diameter faces Northeast
C – 22 inch diameter faces Southwest
D – 12 inch diameter off of Leader C and faces West/ Northwest

I made a sketch of the scaffolding configuration of these leaders in relation to the trunk and approximate to their length. Because of the existing fences and buildings on this site, some of which are inside the drip line of this tree, I was not able to measure the lengths of these scaffolding leaders more accurately, compared to a tree in an open space. I used the existing buildings and fences for some measurements, but I used them primarily as visual references.

In this photo, Leader A is in the center.
Leader B is on the right.
Leader C is on the Left.
Leader D is hidden by A.

The roof of the existing shed is seen in the top left corner of this photo.

Leader A from this tree extends over the shed, which is 12 feet from the trunk.

The relationship between this shed and the scaffolding of the Tree # 2 provided a good estimated of the quantity of canopy loss expected to occur to this tree by each of the proposed Site Plans.

I used a light table to super-impose my sketch of the primary scaffolding structure of Tree # 2 on to each of the proposed Site Plan Options. Because the two Site Plan Options had been provided to me in different scales, I had to reduce exhibit of Option 1 to match Option 2 in order to make a fairly accurate comparison. The sketch of the scaffolding structure of Tree # 2 in relation to the proposed two design options are attached.

Obviously Tree # 2 would experience some canopy losses by each of these designs. The significant difference is that the Leader A would be severed at 10-12 feet from the trunk of Tree # 2 should Option 2 be construction. This would result in a stub cut or "topping" cut on Leader A leaving a stub approximately 15-17 inches in diameter. Almost all of the live canopy on Leader A would be removed by making this cut. Because Leader A has a relatively high percentage of the total canopy, I estimate that the removal of Leader A would be a reduction of approximately 1/3 of the total canopy.

In addition, a stub of 15-17 inches in diameter in all likelihood would develop into a cavity. Branch wounds approximately 8-10 inches in diameter in most cases develop into a cavity over time. Thus, it is reasonably assured that a stub of 15-17 inches by the removal of Leader A, as described, will develop into a cavity.

By comparison, the canopy loss to Tree # 2 by the construction of Option 1 would be greatly reduced. Per this Option, I estimate that the largest wounds would be 2-3 inches in diameter. Overall I estimate that the total canopy loss to Tree # 2 by the construction of Option 1 would be approximately 15%, which is well within industry standard.

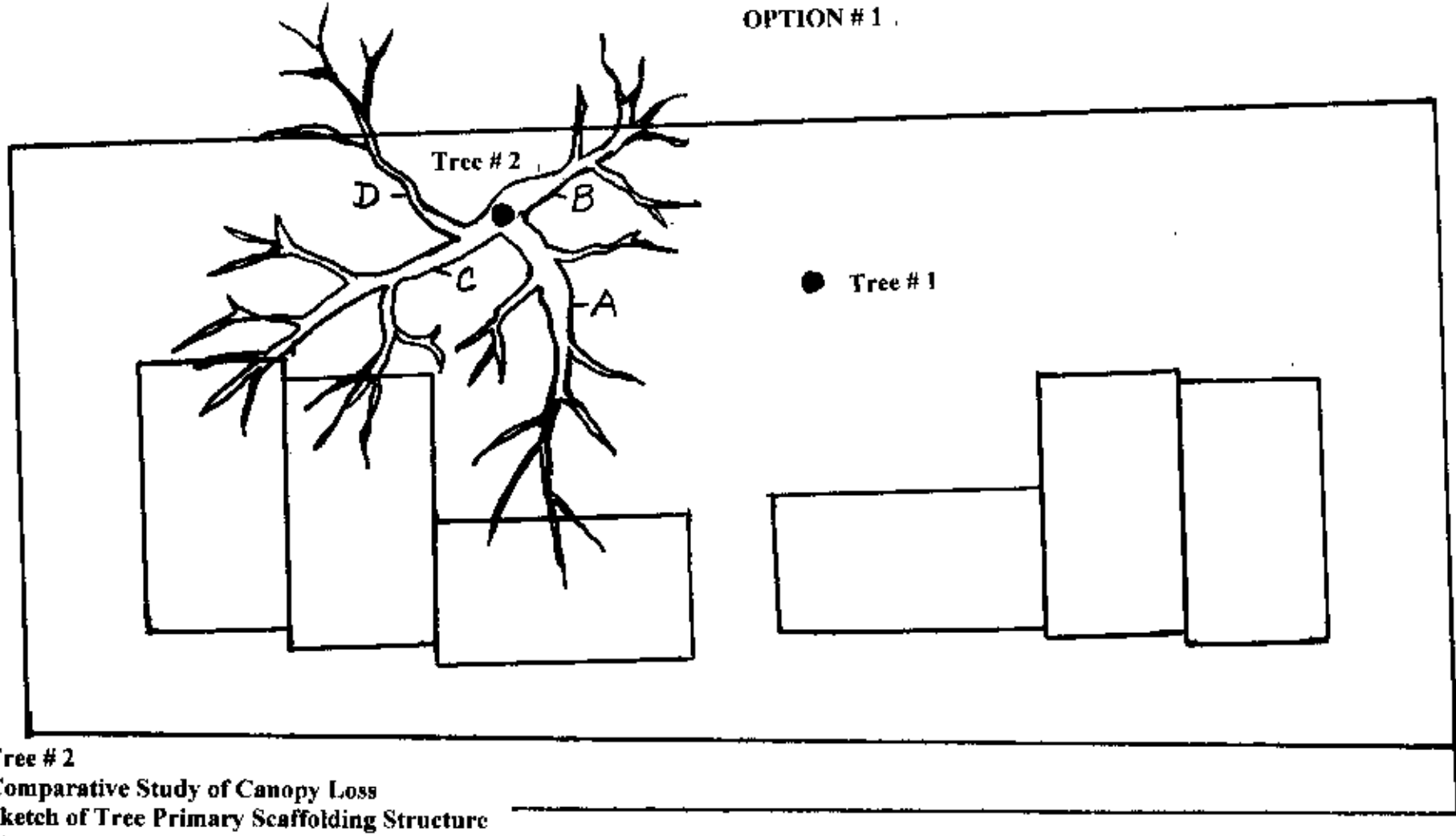
Conclusion
The canopy loss to Tree # 2 by the proposed Option # 1 would be approximately 15% by my assessment, which would be relatively minor.

The canopy loss to Tree # 2 by the proposed Option # 2 would be approximately 30% by my estimate, but the mere percentage loss does not adequately express the loss. The majority of this loss would be by the removal of one of the primary leaders, which would in time develop into a major trunk cavity. Not only would this tree be badly disfigured, but it could be the beginning of the end for this tree, recognizing that these types of events take a long time to reach full development.

Respectfully submitted,

Michael L. Bench, Consulting Arborist
International Society of Arboriculture Certification # WE 1897A
American Society of Consulting Arborists Member

OPTION # 1

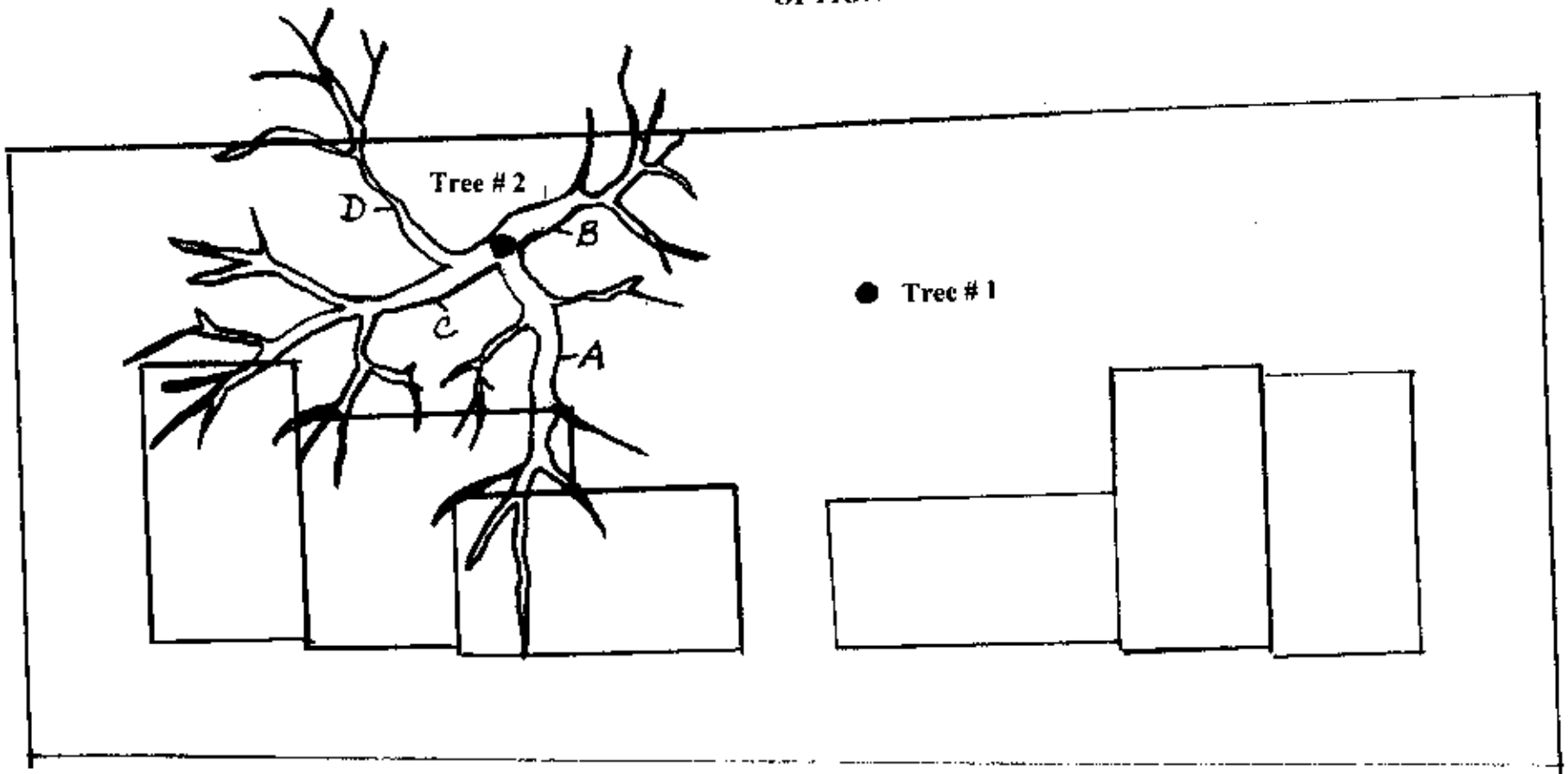


Tree # 2
Comparative Study of Canopy Loss
Sketch of Tree Primary Scaffolding Structure
Site Plan Option # 1
Site: 1958 Latham Street
Mountain View, California
Observations: 5-21-15
Michael L. Bench
Consulting Arborist

LATHAM STREET

OPTION # 1

OPTION # 2



Tree # 2
Comparative Study of Canopy Loss
Sketch of Tree Primary Scaffolding Structure
Site Plan Option # 2
Site: 1958 Latham Street
Mountain View, California
Observations: 5-21-15
Michael L. Bench
Consulting Arborist

LATHAM STREET

OPTION # 2