Appendix B. 3593 Multiview Dr. Arborist Report

Protected Tree Report

For the compliance of the City of Los Angeles Tree Protection Ordinance

3593 Multiview Drive
Los Angeles, CA 90068
APN# 2425011009

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January 2026

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SUMMARY OF DATA

Total number of native Protected Trees or Shrubs in the work zone	30
Total number of off-site live native Protected Trees or Shrubs with canopies encroaching over the work zone	0
Total number of non-viable or hazardous native Protected Trees or Shrubs in the work zone	2
Total number of live Protected Trees or Shrubs that will be removed or relocated	21
Total number of live Protected Trees or Shrubs to be preserved in place and encroached by construction within dripline	7
Total number of live Protected Trees or Shrubs which will not be encroached	0
Total number of proposed mitigation trees to be planted on site	84

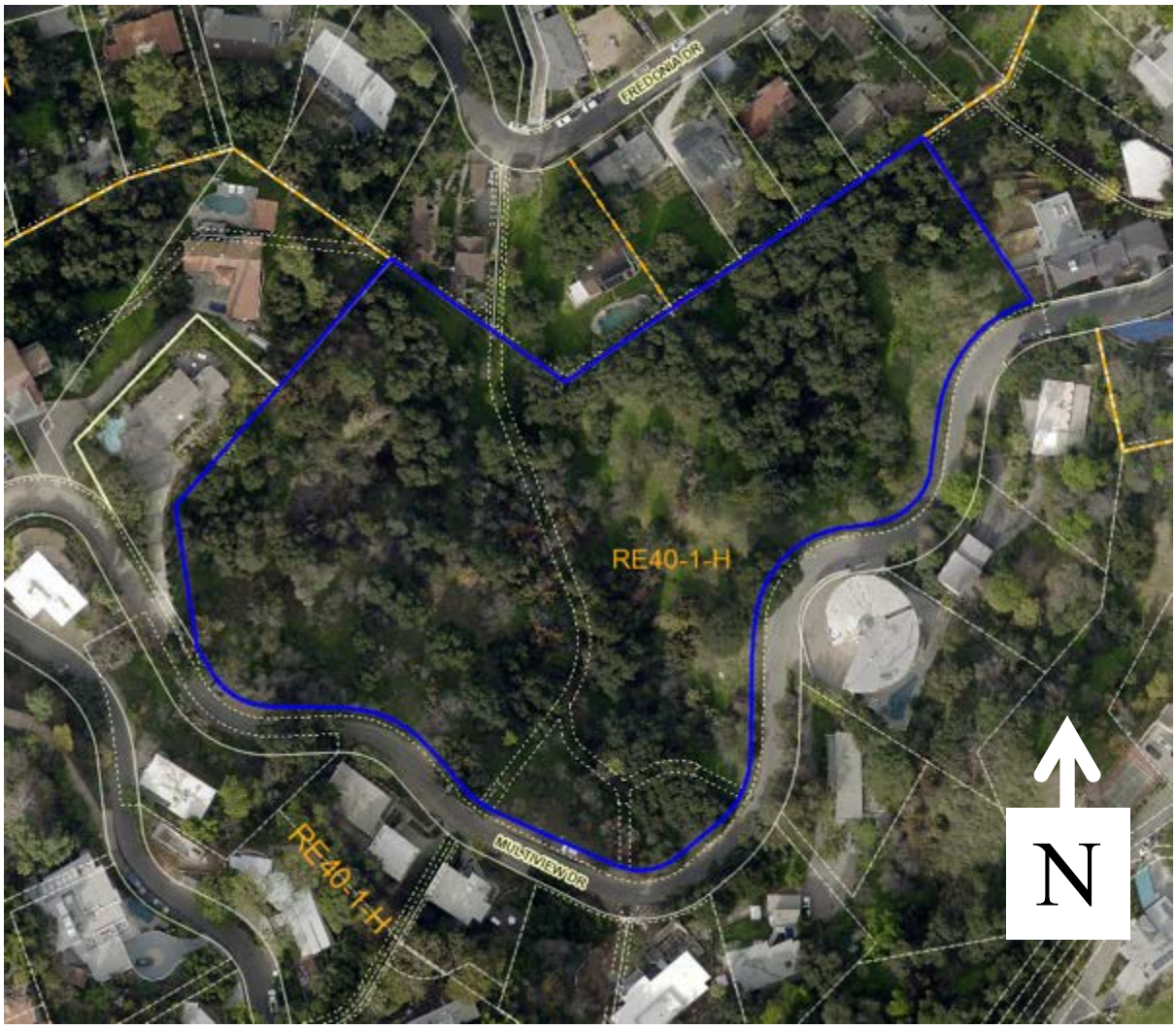
BACKGROUND & PURPOSE

Lot size	215,580 ft^2
Existing footprint of home and other structures	0 ft^2
Footprint of completed project Main House – 6,349.30 ft^2; Guest House – 761 ft^2; Garage –819 ft^2	7,929.30 ft^2

I was retained by the property owner to write a protected tree report (PTR) for the native (Protected) trees that are located at 3593 Multiview Dr., Los Angeles. As part of my preparation, I made multiple site visits to the property in August 2025 and January 2026. I was provided with a scaled topographic survey and the most recent site plan for my analysis.

The proposed grading and construction will be limited to a relatively small portion of the property and a fence is planned to be set to define the limits of any soil disruptions. The fence will contain the entire work zone, including haul route, parking, and staging. This report includes analysis of only trees located within the defined work zone and those outside of it that have portions of their canopies extending over the boundary.

PROJECT LOCATION, DESCRIPTION & TREE ORDINANCE



This aerial view (courtesy of zimas.lacity.org) shows the boundary area of 3593 Multiview Dr.

The property is undeveloped, and a single-family home will be built on it. The home will also include an ADU, swimming pool and a detached raised deck. The only existing infrastructure is an asphalt paved entry drive, and this will be used as the entrance and primary haul route during construction; and will be resurfaced and incorporated into the completed project.

The property is densely populated with Protected Trees and Shrubs, which are all naturalized and in mostly good health and condition. The property has over 500 Protected Trees and Shrubs and great care has been taken to plot the structure to impact as few trees as possible. All these trees and shrubs will be preserved in place, except for the ones located within the limits of grading. No modifications to the topography are planned to occur outside the limits of grading, and all mitigation trees are planned to be installed in this vast portion.

The property is located within the Mulholland Scenic Parkway, Outer Corridor.

Protected Tree Definitions

City of Los Angeles Protected Trees and Shrubs

Ordinance #186873 - Protected Tree or Shrub- Any of the following Southern California indigenous tree species, which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree; or any of the following Southern California indigenous shrub species, which measure four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the shrub:

Protected Trees:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

Protected Shrubs:

(a) Mexican Elderberry (Sambucus Mexicana

(b) Toyon (Heteromeles arbutifolia)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

DESIGN ANALYSIS: PLANNED TREE REMOVALS AND EXPECTED TREE ENCROACHMENTS

Refer to Site Plan on page 11; Tree Identification, Size and Condition Matrix on page 5, Construction Impacts Matrix on page 7; and Photos in Appendix A, B and C

The site plan shows a planned fence line drawn in green that will enclose the entire work zone and limits of grading. A total of 30 Protected Trees and Shrubs are located within the work zone. These trees and shrubs are identified as numbers 1 – 30 on the site plan, and in all other sections of this report.

A total of one Protected tree is non-viable, and one is hazardous. A total of seven Protected Trees and Shrubs will be preserved in place and encroached by either grading to construct the building pad or grading for the replacement and widening of the existing driveway, and 21 Protected trees will be removed and mitigated.

The raised deck, identified as a yoga deck on the site plan, is not located within the limits of grading. The deck will be built in an area that is void of trees and shrubs. It will be raised and will not require any grading for construction; and will not require a haul route to be built.

The original tree surveyor, James Komen, RCA #555, determined that 44 Protected Trees and Shrubs were either diseased/hazardous or non-viable (9 x Quercus agrifolia, 19 x Juglans californica, 13 x Sambucus mexicana, 3 x Heteromeles arbutifolia). They were all removed under permit #1-14457024321.

There are over 500 Protected Trees and Shrubs located on the property that were surveyed by James Komen, RCA #555 in 2022.

Two unprotected Mexican Fan Palms (Washingtonia robusta) tree numbers 289 and 336 were also removed because it is listed as a prohibited plant in the Mulholland Scenic Corridor Guidelines.

Trees 606 and 607, both Sambucus mexicana, toppled during a landslide that occurred in the winter of 2023. Both trees were documented as barely alive in the 2020 arborist report. Woody debris from both plants remains on site, and the areas of hillside washout are still clearly visible.

Tree 609, Juglans californica, which had experienced prior trunk failure as documented in the 2020 report, also toppled during the same landslide event. The washed-out portions of the hillside remain evident.

Tree 623, Juglans californica, which was identified as failing in the 2020 report, is now dead in another area that experienced hillside washout. The dead trunk remains visible on site.
Four additional trees were removed with approval on June 26, 2025. These include Trees 533 and 585 (previously identified as Tree 12 in the prior report), both Juglans californica, and Trees 621 and 93 that were both Quercus agrifolia.

Two tree removals identified in the previous report are proposed to be amended. Tree 469, which had Polyphagous Shot Hole Borer on one branch that naturally fell on its own. The remaining tree has since been inspected, and the disease has not spread so removal is therefore no longer necessary. Tree 476, which was previously proposed for removal is no longer recommended for removal as it does not pose a risk to landscaping or site safety.

There are currently 526 protected trees and shrubs on the property, consisting of 51 Sambucus mexicana, 122 Juglans californica, 226 Quercus agrifolia, and 127 Heteromeles arbutifolia. The proposed removal of 21 trees will reduce the total to 505 protected trees and shrubs. Following mitigation at a 4:1 ratio, the total number of protected trees and shrubs on the property will be 589.

This chart includes all Protected Trees and Shrubs that are either located or encroaching the work zone. It provides physical data collected from field observations. The trees have been tagged in the field and the numbers correspond to the Site Plan included in this report.

Tree Identification, Size & Condition Matrix

Identification			Size			Health				Structure			Rating
Tree Number / Tag	Species		Trunk Diameter (Inches)	Height (Feet)	Spread (Feet)	Good	Fair	Poor	Non-Viable	Sound and Stable	Manageable Defects	Hazardous	Overall Health and Structure
1 - 507 / 7405	Juglans californica	California Black Walnut	6, 3	10	8		X				X		Dead
2 - 506 / 7404	Juglans californica	California Black Walnut	17, 13	30	40			X			X		Fair
3 - 530 / 7425	Quercus agrifolia	Coast Live Oak	24	35	35	X				X			Good
4 - 547 / 7440	Quercus agrifolia	Coast Live Oak	10	15	30	X				X			Good
5 - 548 / 7441	Quercus agrifolia	Coast Live Oak	8	8	15	X					X		Good
6 - 588 / 7479	Juglans californica	California Black Walnut	4,3,3,3	18	15	X				X			Good
7 - 587 / 7478	Juglans californica	California Black Walnut	4,4,4,3,3,2,2	18	18	X				X			Good
8 - 589 / 7480	Quercus agrifolia	Coast Live Oak	14,13, 11, 11	40	45	X					X		Good
9 - 592 / 7483	Quercus agrifolia	Coast Live Oak	9, 9, 8, 7, 6	30	35	X				X			Good
10 - 595 / 7486	Quercus agrifolia	Coast Live Oak	17,12, 7, 6	27	25	X				X			Good
11 - 620 / 7511	Juglans californica	California Black Walnut	10	18	18		X				X		Fair
12 - 610 / 7501	Sambucus mexicana	Mexican Elderberry	9, 8, 8, 5	18	18	X						X	Poor
13 - 612 / 7503	Quercus agrifolia	Coast Live Oak	12	25	20	X				X			Good
14 - 419 / 7329	Quercus agrifolia	Coast Live Oak	23	25	30		X					X	Dead
15 - 605 / 7496	Quercus agrifolia	Coast Live Oak	7, 7	18	18	X				X			Good

Tree Identification, Size & Condition Matrix

Identification			Size			Health				Structure			Rating
Tree Number / Tag	Species		Trunk Diameter (Inches)	Height (Feet)	Spread (Feet)	Good	Fair	Poor	Non-Viable	Sound and Stable	Manageable Defects	Hazardous	Overall Health and Structure
16 - 604 / 7495	Quercus agrifolia	Coast Live Oak	10, 9, 5, 5	27	30	X				X			Good
17 - 603 / 7494	Quercus agrifolia	Coast Live Oak	12, 9	25	30	X				X			Good
18 - 597 / 7488	Juglans californica	California Black Walnut	8	18	22	X					X		Good
19 - 601 / 7492	Juglans californica	California Black Walnut	6, 6, 6	22	20	X				X			Good
20 - 599 / 7490	Juglans californica	California Black Walnut	5, 5	20	15	X				X			Good
21 - 598 / 7489	Juglans californica	California Black Walnut	5, 4	20	15	X				X			Good
22 - 498 / 7397	Quercus agrifolia	Coast Live Oak	12	25	20	X				X			Good
23 - 494 / 7393	Quercus agrifolia	Coast Live Oak	11	27	27	X				X			Good
24 - 500 / 7398	Juglans californica	California Black Walnut	10, 10, 6	18	18		X				X		Fair
25 - 421 / 7330	Quercus agrifolia	Coast Live Oak	14	40	40	X				X			Good
26 - 663 / 7551	Heteromeles arbutifolia	Toyon	5, 4, 3, 3, 2, 2	15	15	X				X			Good
27 - 661 / 7550	Juglans californica	California Black Walnut	7, 7, 6	18	22		X				X		Fair
28 - 618 / 7509	Quercus agrifolia	Coast Live Oak	16	27	40	X				X			Good
29 - 583 / 7474	Quercus agrifolia	Coast Live Oak	11, 9, 9	27	25	X				X			Good
30 - 578 / 7469	Quercus agrifolia	Coast Live Oak	9, 9, 9	27	25	X				X			Good

This section includes all Protected Trees and Shrubs that are either located or encroaching on the property. It provides data collected from the analysis of construction plans. The tree has been surveyed and numbers correspond to the Site Plan included in this report. Tree numbers with an "os" indicate that the specimen is located off-site and a portion of the canopy extends over the subject property.

CONSTRUCTION IMPACTS MATRIX

	TREE SPECIES	SIZE & CONDITION		ROOTZONE IMPACTS								REQUIRED PRUNING OF LIVE CROWN				
TREE / TAG NUMBER		TRUNK DIAMETER (DBH)	CONDITION	Sides of tree where excavation (six inches or deeper) will occur	Sides where excavation impacts are buffered by existing infrastructure	**Excavation will remain a distance of at least 10 X DBH from trunk**	**Excavation will remain a distance of at least 5 X DBH from trunk**	**Excavation will remain a distance of at least 3 X DBH from the trunk**	**Removal or Relocation**	Additional light grading less than 6" deep to occur within dripline	Estimated % of total root mass to be removed or severed	**No Pruning Required**	**Pruning not to exceed 10%**	**Pruning not to exceed 30%**	Number of cuts larger than 3" in diameter required	Diameter of cuts for branch removals
1 – 507 / 7405	Juglans californica	M 9	Dead													
2 - 506 / 7404	Juglans californica	M 30	Fair													
3 - 530 / 7425	Quercus agrifolia	24	Good	2	0											
4 - 547 / 7440	Quercus agrifolia	10	Good													
5 - 548 / 7441	Quercus agrifolia	8	Good													
6 - 588 / 7479	Juglans californica	M 13	Good													
7 - 587 / 7478	Juglans californica	M 22	Good													
8 - 589 / 7480	Quercus agrifolia	M 49	Good													

CONSTRUCTION IMPACTS MATRIX

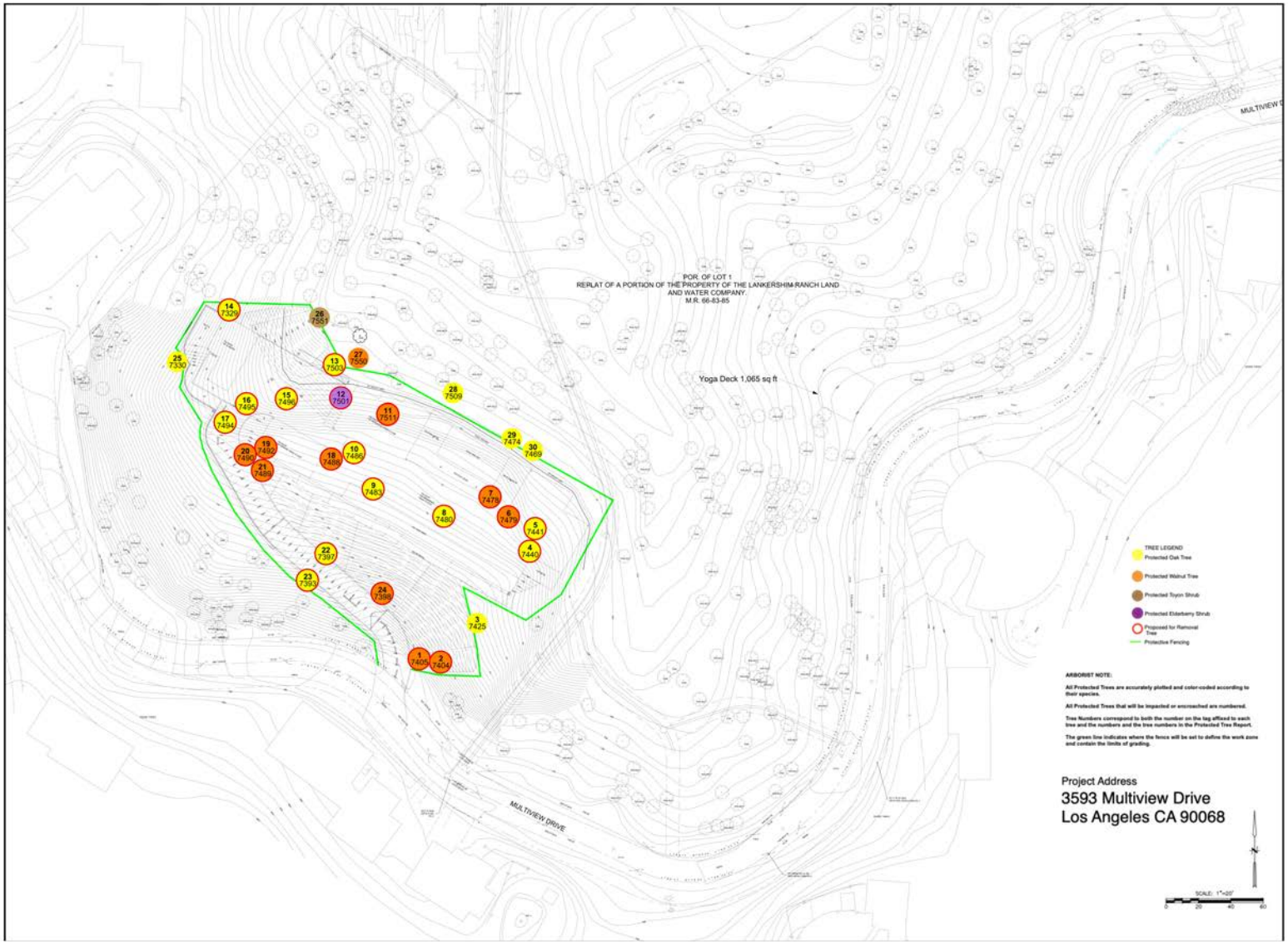
	TREE SPECIES	SIZE & CONDITION		ROOTZONE IMPACTS								REQUIRED PRUNING OF LIVE CROWN				
TREE / TAG NUMBER		TRUNK DIAMETER (DBH)	CONDITION	Sides of tree where excavation (six inches or deeper) will occur	Sides where excavation impacts are buffered by existing infrastructure	**Excavation will remain a distance of at least 10 X DBH from trunk**	**Excavation will remain a distance of at least 5 X DBH from trunk**	**Excavation will remain a distance of at least 3 X DBH from the trunk**	**Removal or Relocation**	Additional light grading less than 6" deep to occur within dripline	Estimated % of total root mass to be removed or severed	**No Pruning Required**	**Pruning not to exceed 10%**	**Pruning not to exceed 30%**	Number of cuts larger than 3" in diameter required	Diameter of cuts for branch removals
9 - 592 / 7483	Quercus agrifolia	M 39	Good													
10 - 595 / 7486	Quercus agrifolia	M 42	Good													
11 - 620 / 7511	Juglans californica	10	Fair													
12 - 610 / 7501	Sambucus mexicana	M 30	Poor													
13 - 612 / 7503	Quercus agrifolia	12	Good													
14 - 419 / 7329	Quercus agrifolia	23	Dead													
15 - 605 / 7496	Quercus agrifolia	M 14	Good													
16 - 604 / 7495	Quercus agrifolia	M 29	Good													
17 - 603 / 7494	Quercus agrifolia	M 21	Good													
18 - 597 / 7488	Juglans californica	8	Good													

CONSTRUCTION IMPACTS MATRIX

	TREE SPECIES	SIZE & CONDITION		ROOTZONE IMPACTS								REQUIRED PRUNING OF LIVE CROWN				
TREE / TAG NUMBER		TRUNK DIAMETER (DBH)	CONDITION	Sides of tree where excavation (six inches or deeper) will occur	Sides where excavation impacts are buffered by existing infrastructure	**Excavation will remain a distance of at least 10 X DBH from trunk**	**Excavation will remain a distance of at least 5 X DBH from trunk**	**Excavation will remain a distance of at least 3 X DBH from the trunk**	**Removal or Relocation**	Additional light grading less than 6" deep to occur within dripline	Estimated % of total root mass to be removed or severed	**No Pruning Required**	**Pruning not to exceed 10%**	**Pruning not to exceed 30%**	Number of cuts larger than 3" in diameter required	Diameter of cuts for branch removals
19 - 601 / 7492	Juglans californica	M 18	Good													
20 - 599 / 7490	Juglans californica	M 10	Good													
21 - 598 / 7489	Juglans californica	M 9	Good													
22 - 498 / 7397	Quercus agrifolia	12	Good													
23 - 494 / 7393	Quercus agrifolia	11	Good													
24 - 500 / 7398	Juglans californica	M 26	Fair													
25 - 421 / 7330	Quercus agrifolia	26	Good	1	0											
26 - 663 / 7551	Heteromeles arbutifolia	M 19	Good	1	0											

CONSTRUCTION IMPACTS MATRIX

	TREE SPECIES	SIZE & CONDITION		ROOTZONE IMPACTS								REQUIRED PRUNING OF LIVE CROWN				
TREE / TAG NUMBER		TRUNK DIAMETER (DBH)	CONDITION	Sides of tree where excavation (six inches or deeper) will occur	Sides where excavation impacts are buffered by existing infrastructure	**Excavation will remain a distance of at least 10 X DBH from trunk**	**Excavation will remain a distance of at least 5 X DBH from trunk**	**Excavation will remain a distance of at least 3 X DBH from the trunk**	**Removal or Relocation**	Additional light grading less than 6" deep to occur within dripline	Estimated % of total root mass to be removed or severed	**No Pruning Required**	**Pruning not to exceed 10%**	**Pruning not to exceed 30%**	Number of cuts larger than 3" in diameter required	Diameter of cuts for branch removals
27 - 661 / 7550	Juglans californica	M 20	Fair	1	0											
28 - 618 / 7509	Quercus agrifolia	16	Good	1	0											
29 - 583 / 7474	Quercus agrifolia	M 29	Good	1	0											
30 - 578 / 7469	Quercus agrifolia	M 27	Good	1	0											


POR. OF LOT 1
REPLAT OF A PORTION OF THE PROPERTY OF THE LANKERSHIM RANCH LAND AND WATER COMPANY.
M.R. 66-83-85
Yoga Deck 1,065 sq ft
MULTIVIEW DRIVE
TREE LEGEND
Protected Oak Tree
Protected Walnut Tree
Protected Toyon Shrub
Protected Elderberry Shrub
Proposed for Removal Tree
Protective Fencing
ARBORIST NOTE:
All Protected Trees are accurately plotted and color-coded according to their species.
All Protected Trees that will be impacted or encroached are numbered.
Tree Numbers correspond to both the number on the tag affixed to each tree and the numbers and the tree numbers in the Protected Tree Report.
The green line indicates where the fence will be set to define the work zone and contain the limits of grading.
Project Address
3593 Multiview Drive
Los Angeles CA 90068
SCALE: 1"=20'

FINDINGS

- The limits of grading and construction have been determined and a fence shall be installed prior to the commencement of any work. A four-foot-tall fence constructed with plastic barrier material set on wood posts set in the ground at eight feet on center had been previously installed but it was found to be interfering with wildlife, so it was removed. It is proposed that this type of fence is installed prior to the grading phase to define the limits of grading and remain in phase until grading is complete. The plastic barrier fence shall then be removed and replaced with a six-foot-tall chain link fence set on metal posts driven in the ground at approximately eight feet on center for the duration of the project. This fence will be sturdy, immovable, and appropriate for the remaining phases of construction.

- One Protected Tree is non-viable, and one Protected tree is hazardous. Both are planned to be removed without mitigation.

- Twenty Protected Trees and Shrubs are planned to be removed and mitigated with in-kind species.

- Typical mitigation for Protected Trees and Shrubs is 4:1 with 24" box specimens of a Protected species. The mitigation for 21 removals would be 84 trees or shrubs. The property is large enough to accommodate all of the required mitigation. The 24" box sizes are too large for this situation in my professional opinion as there is very limited access to the naturalized woodland area of the property with equipment and the plants will need to be hand-carried. Hauling boxes will likely cause excessive erosion to the unstable hillside, which would damage existing trees and shrubs. I recommend #15 container size nursery plants instead of 24" boxes. This was also recommended by the original tree surveyor James Komen, RCA #555.

- Seven Protected Trees and Shrubs will be encroached by the required grading, but impacts will not greatly impact their health or stability. These trees and shrubs will be preserved in place.

- The construction of the yoga deck will not encroach or impact any Protected Trees or Shrubs; won't require any grading; and won't require a haul route for heavy equipment.

- All haul routes, parking of construction vehicles, as well as all staging and storage of materials and equipment will be kept within the fenced work zone area and well clear of the many Protected Trees and Shrubs that will be preserved on the property.

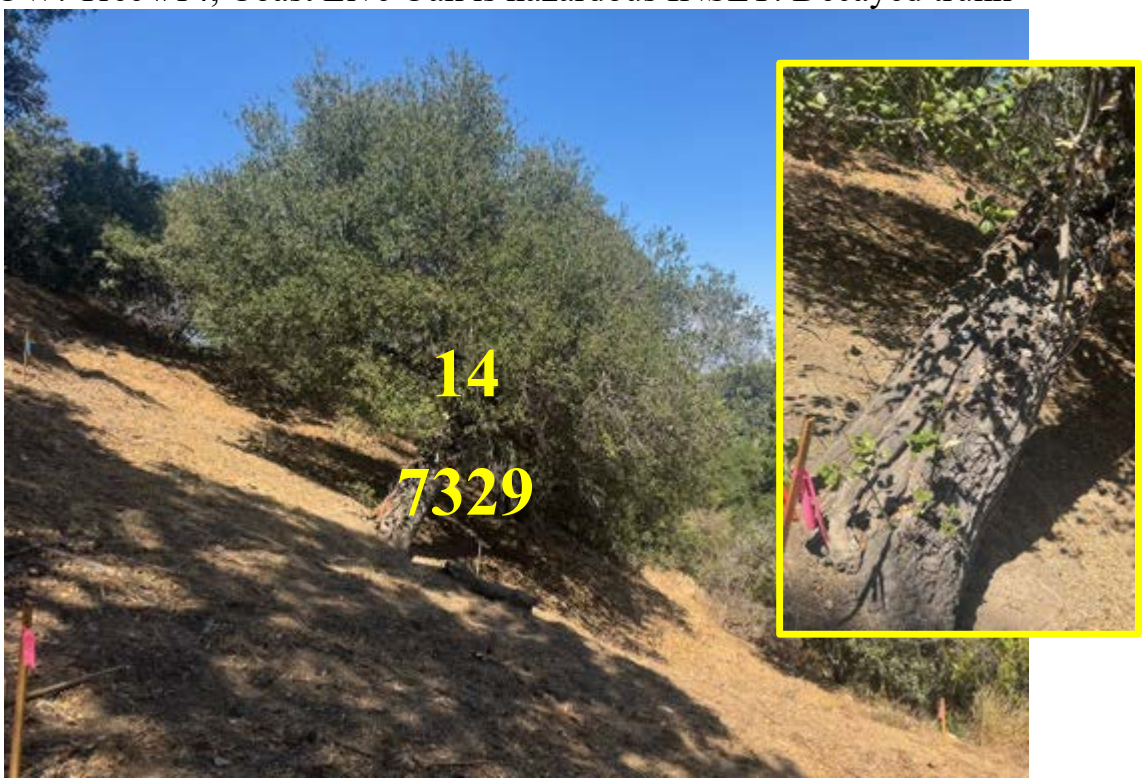
- No pruning of the live crown of any tree or shrub planned for preservation will be required to complete the project.

FURTHER RECOMMENDATIONS

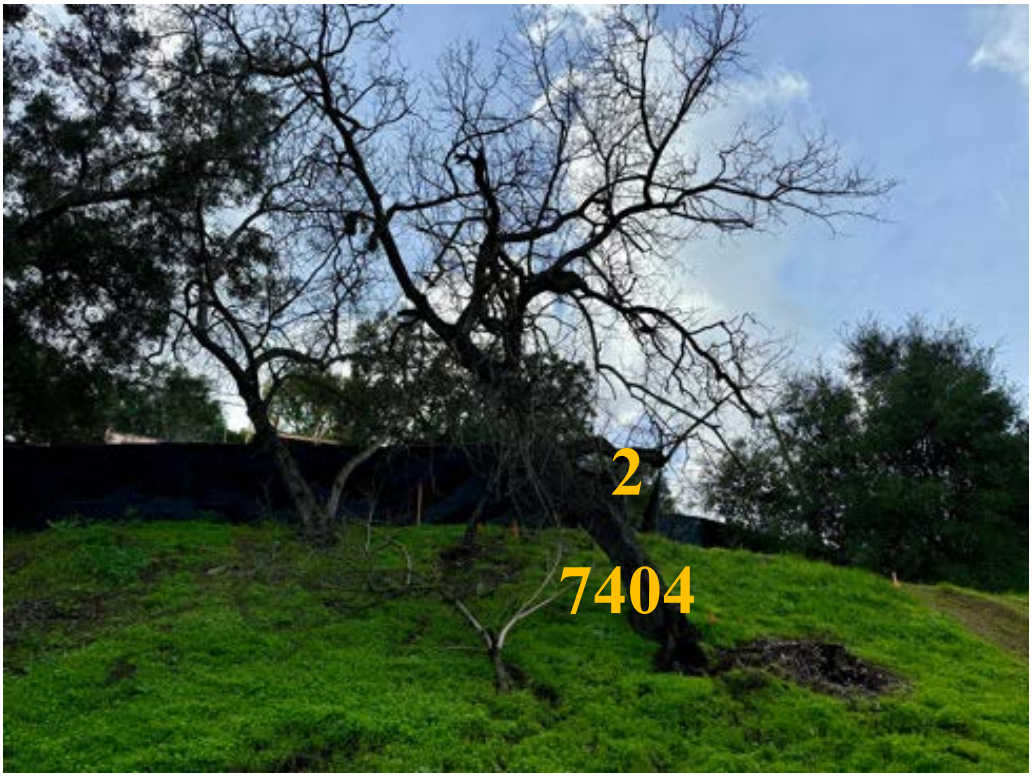
- The arborist of record shall monitor all grading including the replacement of the existing driveway.
- Mitigation trees shall be planted by a licensed landscape contractor. The preferred time to plant is late fall so they can establish during the cool and rainy season.
- Refer to the Construction Impacts Guidelines in Appendix C for important general preservation measures concerning trees encroached by construction.

APPENDIX A – Photos of Non-Viable or Hazardous Protected Trees to be removed and not mitigated

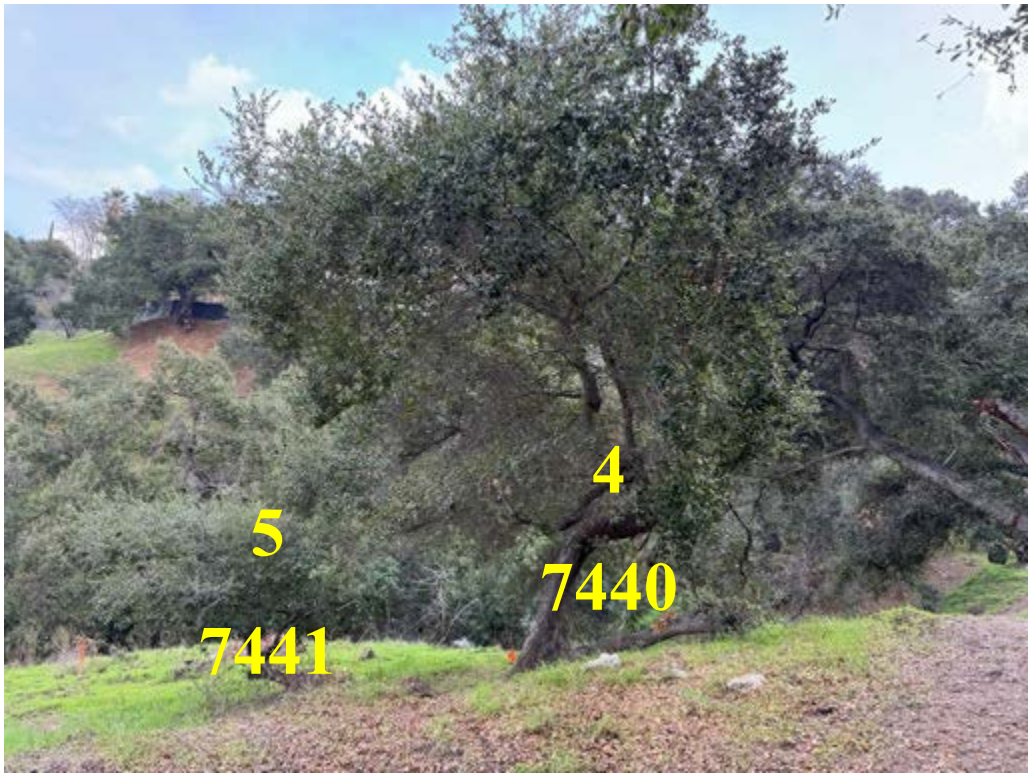
ABOVE: Tree #1 Black Walnut is non-viable
BELOW: Tree #14, Coast Live Oak is hazardous INSET: Decayed trunk



APPENDIX B – Photos of Protected Trees planned to be removed and mitigated



ABOVE: Tree #2, Black Walnut to be removed and mitigated
BELOW: Trees #4 and #5, Coast Live Oaks, to be removed and mitigated



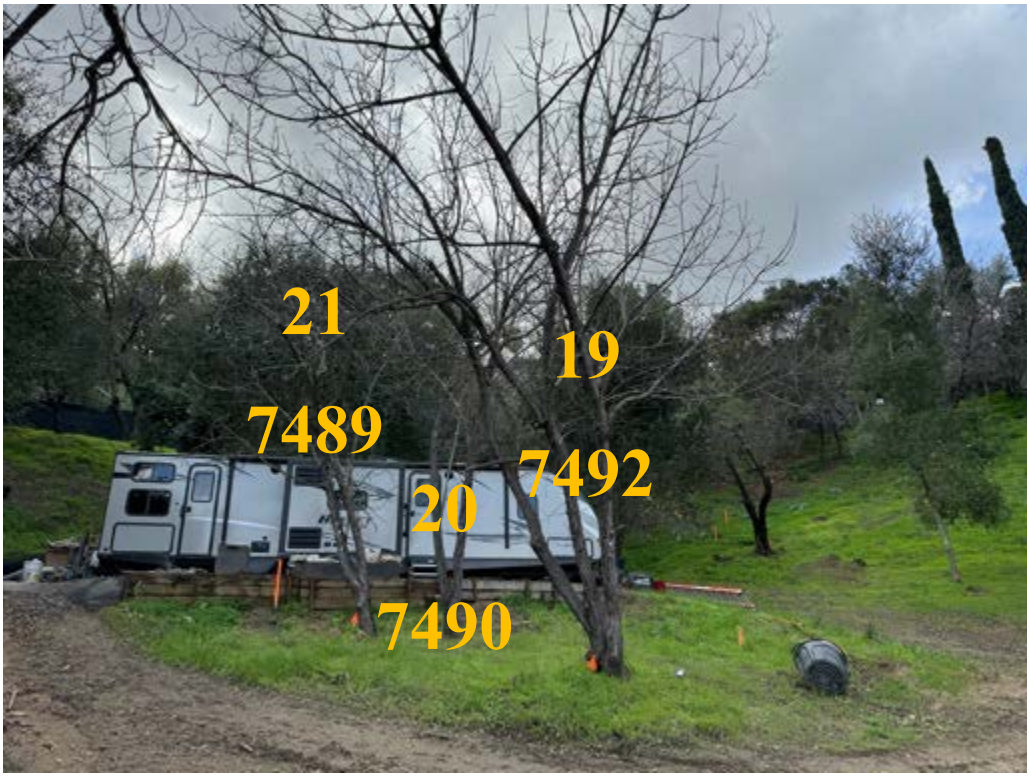
ABOVE: Trees #6 and #7, Black Walnuts, to be removed and mitigated
BELOW: Tree #8, Coast Live Oak, to be removed and mitigated

ABOVE: Trees #9 and #10, Coast Live Oaks, to be removed and mitigated
BELOW: Tree #11, Black Walnut, to be removed and mitigated

ABOVE: Shrub #12, Mexican Elderberry, to be removed and mitigated
BELOW: Tree #13, Coast Live Oak, to be removed and mitigated

ABOVE: Tree #15, Coast Live Oak, to be removed and mitigated
BELOW: Trees #16 and #17, Coast Live Oaks, to be removed and mitigated

ABOVE: Tree #18, Black Walnut, to be removed and mitigated
BELOW: Trees #19, #20, and #21, Black Walnuts, to be removed and mitigated



ABOVE: Tree #22, Coast Live Oak, to be removed and mitigated
BELOW: Tree #23, Coast Live Oak, to be removed and mitigated

ABOVE: Tree #24, Black Walnut, to be removed and mitigated

APPENDIX C – Protected Trees planned to be preserved or encroached and preserved.

ABOVE: Tree #3, Coast Live Oak, to be preserved in place
BELOW: Tree #25 Coast Live Oak, to be encroached and preserved in place.

ABOVE: Tree #26, Toyon, to be encroached and preserved in place.
BELOW: Tree #27, Black Walnut, to be preserved in place

ABOVE: Tree #28, Coast Live Oak to be encroached and preserved in place
BELOW: Trees #29 and #30, Coast Live Oaks, to be encroached and preserved in place

APPENDIX D - Protected Tree Construction Impact Guidelines

Size and Distribution of Tree Roots – Taken from Arboriculture, Integrated Management of Landscape Trees Shrubs and Vines. Harris, R.W., Clark, J.W., Matheny N.P. Prentice Hall 2004.

Roots of most plants, including large trees, grow primarily in the top meter (3 ft) of soil (see figure below). Most plants concentrate the majority of their small absorbing roots in the upper 150 mm (6 in.) of soil if the surface is protected by a mulch or forest litter. In the absence of a protective mulch, exposed bare soil can become so hot near the surface that roots do not grow in the upper 200 to 250 mm (8 to 10 in.). Under forest and many landscape situations, however, soil near the surface is most favorable for root growth. In addition, roots tend to grow at about the same soil depth regardless of the slope of the soil surface.

Although root growth is greatly influenced by soil conditions, individual roots seem to have an inherent guidance mechanism. Large roots with vigorous tips usually grow horizontally. Similar roots lateral to the large roots grow at many angles to the vertical, and some grow up into the surface soil. However, few roots in a root system actually grow down.

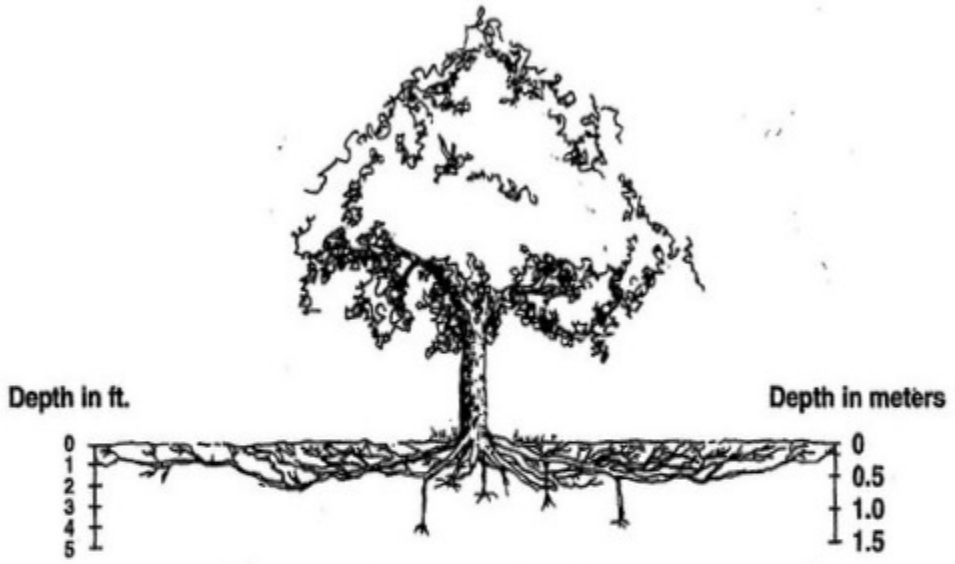


FIGURE In mature trees, the taproot is either lost or reduced in size. The vast majority of the root system is composed of horizontally oriented lateral roots.

The importance of soil

Soil supports and anchors tree roots and provides water, minerals and oxygen. Furthermore, soil is a habitat for soil microorganisms that enhance root function. A soil's ability to sustain tree growth is largely determined by its texture, structure (bulk density), organic matter, water and mineral content, salinity, aeration, and soil-microbe abundance and diversity.

Soil physical properties

Soil texture – the relative proportion of sand, silt and clay, is important because it affects water – and nutrient-holding capacity, drainage and aeration (gaseous diffusion). Soil structure is the arrangement of individual soil particles into clumps (aggregates). The net result is the formulation of larger voids between the aggregates which serve as channels for gaseous diffusion, movement of water and root penetration. Unfortunately, soil aggregates are readily destroyed by activities that compact the soil (increase bulk density). When this occurs, gaseous exchange, permeability, drainage and root growth are restricted.

The influence of the organic matter content of soil properties is quiet significant. Its decomposition by soil organisms releases substances that bind soil particles into larger granules, which improves both soil aeration, and drainage. In essence, the breakdown of organic matter improves water – and nutrient-holding capacity and reduces bulk density. Furthermore, it is the primary source of nitrogen and a major source of nitrogen and a major source of phosphorus and sulfur. Without organic matter soil organisms could not survive and most biochemical processes in the soil would cease.

Soil aeration, the movement and the availability of oxygen, is determined by both soil texture and structure. In general, compacted and finer soils, due to a higher proportion of small pore spaces (micropores), tend to drain slowly and hold less air than coarser, sandy, or well-structured find soils. Water retained in the small pores displaces oxygen and inhibits gaseous diffusion.

The availability of soil water is largely determined by the size of the pore spaces between the soil particles and the larger aggregates in which water is held. Most of the water in the larger pore spaces drains readily due to gravitational forces. A relatively thin film of water, which is readily available to plant roots, remains following drainage. Much of water held within the smaller pore spaces resists uptake by plant roots because it is held tightly on the soil surfaces.

Plant roots require an adequate supply of oxygen for development. Injury or dysfunction results when oxygen availability drops below a critical level. Root respiration is the first process to be restricted, followed by disruptions in growth, metabolism, nutrient and water uptake, and photosynthesis. Furthermore, the accumulation of high levels of

carbon dioxide, produced by the roots during respiration can also impair root function. Reduced soil aeration resulting from soil compaction, flooding, excess irrigation, or

impervious pavement favors the development of crown rot (Phytophthora root disease). It also inhibits mycorrhizal fungi that enhance water and nutrient uptake and resist root pathogens.

The forest floor under a canopy in most undeveloped forests and woodland settings is typically covered by a layer of fallen leaves and other woody debris. It is usually cool, shady, well-aerated, and relatively moist – conditions that favor normal root growth. When the natural leaf litter is removed and when a tree's lower canopy is pruned up to provide clearance, the absorbing roots in the upper few inches of the soil experience higher soil temperatures and increased desiccation due to direct exposure to sunlight.

Minimizing the Effects of Construction and Development on Tree Root Systems

Activities that injure roots or adversely affect the root zone should be avoided or kept as far from the trunk as possible. Design changes or alternative building practices that avoid or minimize construction-related impacts should be considered and proposed when applicable.

Soil Compaction

Soils are intentionally compacted under structures, sidewalks, reads, parking areas, and load-bearing fill to prevent subsidence, and to prevent soil movement on slopes. Although unintentional, soil within the root zone of trees is often compacted by unrestricted foot traffic, parking of vehicles, operation of heavy equipment, and during installation of fill. Compaction destroys the soil's natural porosity by eliminating much of the air space contained within it. It leaves the soil hardm impenetrable and largely unfavorable for root growth. The soil's natural porosity, which allows for water movement and storage, gaseous exchange, and root penetration, is greatly reduced. Consequently, root growth and tree health suffer. Soil compaction is best managed by preventing it.

Bulk density is used to describe a soil's porosity, or the amount of space between soil particles and aggregates. High bulk densities indicate a low percentage of total pore space.

Pavement

Paving over the root systems of trees is another serious problem because it reduces the gaseous diffusion and soil moisture. Most paving materials are relatively impervious to water penetration and typically divert water away from a tree's root zone. Cracks and expansion joints do, though, allow for some water infiltration into the soil below. Of greater concern, is the loss of roots from excavation to achieve the required grade, and the necessary compaction to prevent subsidence. Once the soil surface is compacted, a

base material is then added and compacted as well. With that done, the surface can then be paved. Thus, pavement within the root zones of trees can damage roots and create unfavorable soil conditions. One alternative to minimize pavement impacts is to consider placing the pavement on the natural grade over a layer of minimally compacted base material. To reduce sub-grade compaction, consider using reinforced concrete or asphalt over a geotextile blanket to help stabilize the soil. On-grade patios or paving that covers more than one-third of the tree protection zone (TPZ) should be constructed using permeable materials that allow aeration and water penetration. Soil under permeable surfaces should not be compacted to more than 80 percent.

Excavation and root pruning

Excavation within the root zones of trees should be avoided as much as possible. The extent of root pruning (selective) or cutting (non-selective) should be based on the species growth characteristics and adaptive traits, environmental conditions, age, health, crown size, density, live crown ration and structural condition of the tree. The timing of the root pruning or cutting is another important consideration. Moderate to severe root loss during droughts or particularly hot periods can cause serious water-deficit injury or death.

When root pruning/ cutting is unavoidable, roots should be pruned or cut as far from the trunk as possible. Cutting roots on more than one side of a tree should also be avoided. Root cutting extending more than half-way around a tree should generally be no closer than about 10 times the trunk diameter. Recommended distances range from as little as 6 times trunk diameter (DBH) for young trees to 12 times trunk diameter for mature trees. The size of the TPZ should, however, be increased for over mature and declining trees and species that are sensitive to root loss.

The minimum distance from the trunk that roots can be cut on one side of the tree without destabilizing it, is a distance equal to about three times the diameter (DBH) of the trunk. Roots severed within that distance provide little or no structural support. Root pruning or cutting distances from the trunk should be greater for trees that lean and/ or those growing on shallow or wet soil.

In cases where the proposed grading will adversely affect trees designated for retention, special attention should be given to proper root pruning and post-construction care for injured trees. Where structural footings are required for foundations, retaining walls, etc., and roots larger than 2 inches in diameter will be impacted, consider design changes or alternative building methods.

When excavation within 5 times trunk diameter is unavoidable, roots greater than 1 ½ inches in diameter should be located prior to excavation and then pruned to avoid unnecessary damage. Hand-digging or use of a hydraulic or pneumatic soil excavation tool is the least disruptive way to locate roots for pruning. Although mechanical root pruners make clean cuts, they are non-selective. A backhoe bucket, dozer blade or

trencher will typically pull, rip or shatter the larger root, causing additional damage toward the tree. Once the roots that interfere with the structure being built, e.g., foundations, footings, retaining wall, curbs, etc., are exposed, they should then be cut perpendicular to their long axis using a hand-saw, 'carbide-tipped chainsaw' or sharp ax, depending on size. Roots that are pruned in this manner typically regenerate new roots from near the cut. Roots exposed by excavation should be protected from exposure to sun and desiccation. Exposed roots that can not be covered with soil by the end of the day should be covered with moistened burlap or similar material.

Roots can generally be cut in a non-selective manner when excavating near of beyond the dripline. Ripped, splintered or fractured portions of roots however, should be re-cut. The damaged portion should be removed using sharp tools. The cut should be flat across the root with the adjacent bark intact. Wound dressings should not be applied to pruned or damaged roots except when recommended for disease, insect or sprout control.

The best approach to avoid water-deficit injury following root loss during the growing season is to provide ample irrigation. Irrigation should be considered prior to, during, and after root pruning. Watering schedules should also consider local soil conditions, climate, topography, time of year, species adaptability, extent of root pruning and tree health. If possible, irrigate the tree 7 to 10 days prior to excavation so that there is an adequate reservoir of soil water. Water can be delivered to large construction sites via water-tank trucks and applied directly to affected trees or stored nearby in plastic tanks. On relatively flat terrain, a 6 to 8 inch soil berm at the tree's dripline should be constructed to act as a watering basin. On steep terrain, soaker hoses should be used. They can be placed across the slope or spirally around the trunk, from about six feet away to the dripline. In addition, a two to four inch layer of wood chip mulch should be applied to as much of the root zone as possible to retard soil water loss.

Pruning foliage to compensate for root loss is not supported by scientific research and likely to result in slower recovery. Fertilization to stimulate root growth is generally unwarranted and may be counterproductive.

Trenching within the Tree Protection Zone

Trenching for underground utilities should be routed around the TPZ. When this is unavoidable, trenching within the TPZ should be done by 'hand' or using a pneumatic or hydraulic soil excavation tool, carefully working around larger roots. Roots larger than 1 ½ inches in diameter should not be cut. Dig below these roots to route utilities or install drains. A combination of tools can also produce satisfactory results, for example, a skillful backhoe operator under the arborist's supervision can dig down several inches at a time and detect larger roots by 'feel' (resistance). At that point, as assistant can expose the root and dig around it. In this manner, the backhoe can then continue extending the trench though the TPZ. Tunneling (boring) through the TPZ is the preferable alternative. For most large trees, tunneling depth should be at least 36 inches. Tunneling should begin at the edge of the TPZ, but no closer than a distance equal to one foot of clearance for each inch of tree DBH. Tunnels should also be offset to either side

of the trunk. For trenching that extends only part way into TPZ, consider trenching radially to the tree trunk, as this is less harmful than tangential trenching. All trenches made within the TPZ should be backfilled as quickly as possible to prevent root and soil desiccation.

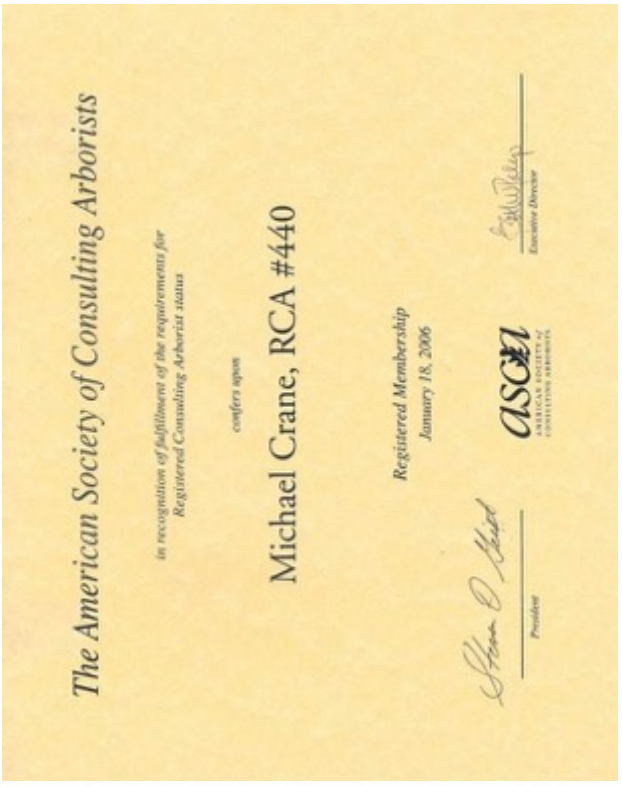
Managing Root Injured Trees

Root-pruned trees should be monitored for symptoms of water-deficit injury for a specified period following root pruning. Irrigation should be considered prior to, during, and after root pruning. Irrigation schedules should consider local soil conditions, climate, topography, time of year, species tolerance, extent of root pruning and tree health.

Grade Change: Fill Soil

Fill soil placed within the root zones of trees can have an adverse effect, particularly if the soil is compacted to support a structure or pavement. Soil compaction reduces aeration and water infiltration. Fill soil, die to textural changes, can also prevent water from penetrating the original soil layer below where the roots are. Furthermore, soil placed against the root crown and lower trunk can lead to root disease problems, especially if the soil near the trunk remains moist during the summer from irrigation. Alternatives to placing fills over roots zones shall be considered and proposed as appropriate.

AUTHOR'S CURRENT CREDENTIALS



CERTIFICATION OF PERFORMANCE

I, Michael Crane, certify that:

- I have personally inspected the tree(s) and the property referred to in this report and have stated my findings accurately.
- I have no current or prospective interest in the vegetation or the property that is the subject of this report and have no personal interest or bias with respect to the parties involved.
- The analysis, opinions, and conclusions stated herein are my own and are based on current scientific procedures and facts.
- My analysis, opinions, and conclusions were developed and this report has been prepared according to commonly accepted arboricultural practices.
- No one provided significant professional assistance to me, except as indicated within the report.
- My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party not upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.

I further certify that I am a member in good standing of the American Society of Consulting Arborists and the International Society of Arboriculture. I have been involved in the field of Horticulture in a full-time capacity for a period of more than 30 years.

Signed: _____

Registered Consulting Arborist #440; American Society of Consulting Arborist
Board Certified Master Arborist #WE 6643B; International Society of Arboriculture
Licensed California Agricultural Pest Control Adviser #AA08269

Date: January 19, 2025