



## Memorandum

**Date:** August 8, 2023

**To:** Kimley-Horn  
555 Capitol Mall, Suite 300,  
Sacramento, California 95814  
Attention: Sherina Lam, Alex H. Jewell

**From:** Andrew Ford | ISA-Certified Arborist, CNPS-Certified Consulting Botanist  
Sequoia Ecological Consulting, Inc.

Jesse Reeb | Senior Biologist and Senior Project Manager  
Sequoia Ecological Consulting, Inc.

**RE:** **Arborist Report**  
**Adobe Road and Main Street Intersection Improvement Project**  
**Penngrove, Sonoma County, California**

### 1.0 INTRODUCTION

Kimley-Horn, on behalf of Sonoma County Public Infrastructure, requested Sequoia Ecological Consulting, Inc. (Sequoia) perform a tree inventory and assessment, and prepare a summary arborist report for the Adobe Road and Main Street Intersection Improvement Project located in the census-designated place of Penngrove in Sonoma County, California (Figures 1 and 2).

Accordingly, on May 26, 2022, Sequoia performed a tree inventory and assessment on the project site, and prepared this summary arborist report for trees which may be impacted by the proposed project. This report provides a summary inventory of trees present on the project site, including tree location, genus, species, diameter at breast height (DBH), total tree height and crown spread of all trees within the area of impact for the project and provides a baseline assessment that will inform future mitigation. The data collected and presented in this report may be used in assessing compliance standards with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) process and assist the project proponent in planning.

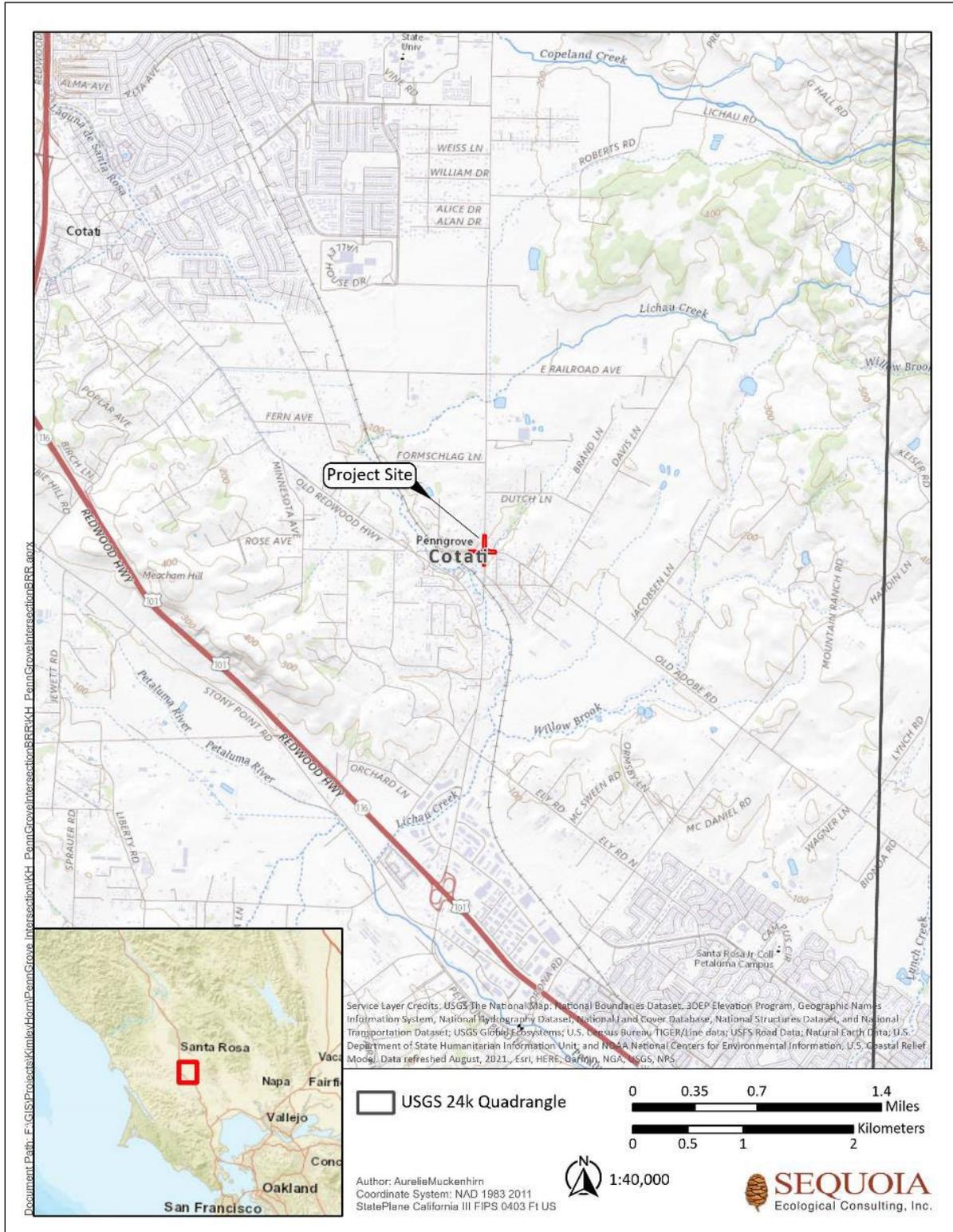


Figure 1. Regional Map of the Adobe Road and Main Street Intersection Improvement Project



Figure 1. Location Map of the Adobe Road and Main Street Intersection Improvement Project Site



## 2.0 PROJECT DESCRIPTION

### 2.1 Purpose and Need

The proposed project has the following purposes:

- Improve intersection operations and reduce travel time delay
- Improve pedestrian accessibility at the intersection
- Enhance overall safety of the facility

The proposed project is needed to address the following:

- Travel time delay and queuing resulting due to insufficient intersection capacity
- Improve pedestrian facilities to meet the latest Americans with Disabilities Act (ADA) requirements
- Facilitate pedestrian and bicycle circulation at the intersection

### 2.2 Project Location

The project is located at the intersection of Adobe Road and Main Street in the Penngrove Community of unincorporated Sonoma County intersection (Figures 1 and 2; Appendix A). The project site is comprised of ruderal/developed, non-native annual grassland, and riparian woodland communities.

### 2.3 Project Description

Adobe Road is an east-west major collector roadway with a posted speed limit of 40 mph within the intersection area. Heading north from Adobe Road is Petaluma Hill Road, a major collector roadway with a posted speed limit of 40 mph. Running south of Adobe Road is Main Street, a major collector roadway with a posted speed limit of 25 mph. The Penngrove Elementary School located in the northwest quadrant of the project intersection.

The proposed project would modify the existing signalized intersection to:

- Construct a dedicated westbound to northbound right-turn lane on Adobe Road at the northeast quadrant
- Construct a dedicated northbound to westbound left-turn lane on Main Street (south leg)
- Construct pedestrian curb ramps and install signal equipment that comply with ADA
- Construct signal improvements and evaluate signal phasing and timing

Within the intersection, three crosswalks are present on the north, south and west legs. There are two existing Sonoma County Transit bus stops located on both sides of Main Street south of the intersection that would remain. The existing on-street parking on the west side of Main Street approximately 100 feet south of the existing crosswalk may be affected by this project. An existing midblock crossing located approximately 600 feet west of the intersection on Adobe Road would remain.



In order to minimize impacts to existing wetland areas and private properties, a retaining wall is proposed on the north side of Adobe Road, east of the intersection, to accommodate the roadway widening for a dedicated right-turn lane. The existing box culvert running through the intersection would be extended at the northeast corner as part of the intersection widening. Overhead utilities would be relocated to accommodate the retaining wall construction. The project would modify the existing signal, pave the intersection and install pavement delineation and markings. Additional right-of-way would be required in the northeast corner of the intersection to accommodate the construction the proposed dedicated westbound right-turn lane and retaining wall. Approximately 0.035 acres of additional right-of-way would be required in this area.

### **2.3.1 Construction**

Project construction would occur in one phase and occur over a period of 6 months beginning in the second quarter of 2025. The project would involve import of 626.25 cubic yards of soil.

## **3.0 SURVEY METHODS**

On May 26, 2022, International Society of Arboriculture (ISA)-Certified Arborist (WE-13284A) Andrew Ford performed a tree inventory and assessment on the project site. The study area for the arborist survey covers approximately 2.7 acres and includes all areas of the proposed project (Figure 2).

Field data was recorded using an iPad with the ArcGIS Field Maps application, connected via Bluetooth to a Juniper Systems Geode GPS receiver with sub-meter accuracy. A total of thirty (30) trees that could be potentially impacted by the proposed project were evaluated and data was recorded for tree location, species, overall health condition, DBH, tree total height (TTH), and crown spread (CS) (Appendix A).

### **3.1 Diameter at Breast Height**

DBH was collected for all trees within the proposed project footprint. Diameter measuring tape was used to collect all diameter data. Tree DBH was taken for all individual trees by measuring 4.5 feet from the ground (supposed breast height) and measures were taken around the trunk. For multi-stemmed trees arising from the ground, DBH was determined by measuring all the trunks, and then adding the total diameter of the largest trunk to one-half the diameter of each additional trunk. For split-trunk trees that split below the 4.5-foot mark, the measurement was taken directly below the split (crotch) of the stems.



### 3.2 General Tree Health

When assessing tree health, the arborist took multiple factors into account. The arborist studied both the canopy, root zone, and trunk for signs of damage or rot. For canopy, the arborist inspected leaf color, canopy spread, canopy density, presence of herbivory, leaf rot, and signs of insect damage. For the trunk, the arborist inspected the trunk for mechanical and biological damage, rot, notches and fungi, and peeling bark, as well as insect bore holes. Using a combination of observed factors, the arborist assigned a numerical value to each of the trees, numbered 1 to 5. A tree listed as a “1” was determined to be in extreme deterioration and poor health, where a tree listed as a “5” was considered to be in generally perfect health.

### 3.3 Total Tree Height

When determining the total tree height, the arborist calculated the tallest section of the canopy and the base of the tree using a Suunto PM-5 Clinometer. The arborist stood approximately 20 feet from the trunk of the tree, and total tree height was then assessed by calculating the difference between the tallest point of the canopy and lowest point (base) of the tree.

### 3.4 Canopy Spread

When assessing the tree canopy spread, the arborist calculated the distance between the narrowest driplines and the longest driplines. Measuring tape was used by running through both driplines of the widest and narrowest points. These two measurements were then averaged and halved to find the crown spread. Crown spread measurements represent the maximum, or widest, crown spread.

### 3.5 Root Zone Interaction

The root zone was assessed by checking the status of roots including inspection of the length of small absorbing roots, root zone measurements from the trunk flare-root zone interface, presence of above ground roots, and stem-choking roots associated with lack of water and/or compaction. In addition, the arborist inspected all oak trees for signs of sudden oak death (*Phytophthora* spp.).

Some measurements for trees could not be physically accessed due to poison oak (*Toxicodendron diversilobum*) and Himalayan blackberry (*Rubus armeniacus*) and were therefore visually estimated. Data for overall condition of trunk, root, or canopy health was estimated and noted during the inventory.



## 4.0 RESULTS

### 4.1 Tree Descriptions

A total of 30 trees and five unique species of trees were identified and assessed within the survey area (Figure 2; Appendix A). Tree species on the project site consists of native and non-native trees of various diameters ranging from 1.5 to 53 inches. Of the 30 trees in the survey area, one was found to be dead as a result of unknown causes and several trees were located on private property and measurements/assessments were estimated from the right-of-way using high-powered binoculars.

An exhibit illustrating results of the tree inventory is provided in Appendix A. The complete tree inventory including common name, species name, DBH (inches), TTH, CS, recommendations, and assessment can be found in Appendix B. Representative site photographs are included in Appendix C.

## 5.0 RECOMMENDATIONS

This tree inventory and assessment focused on an evaluation of all trees that could be impacted by project-related activities. General impact assessments due to potential project-related activities are not considered in this report; however, tree impacts, including but not limited to unintended damage to trees should be assessed prior to and during construction, and all impacts should be avoided to the extent practicable. In order to protect trees during work activities, general precautions are recommended to preserve tree health, as provided below.

### 5.1 Cutting and Limbing

Prior to project commencement, any limbs that are hanging over work zones or located close to the ground should be limbed to mitigate accidental damage. Damage to roots, stems, or branches creates access points for pathogens resulting in infection. When cutting the limbs, the arborist or biologist on site must determine the amount of work in the area and determine which limbs will be necessary to remove. Larger limbs (25 inches or more) should sparingly be removed from any one tree. Removing one large limb could remove more than 75% of a large tree's energy. When performing pruning, sharp non-anvil type loppers or sharpened gas or electric chainsaws should be used to cut the branches. The branch cut should be done as close to trunk, but cuts should not be flush with the trunk, but just outside the branch collar. All tools and materials used to should be sterilized with an alcohol or bleach solution prior to working on any oak species.

### 5.2 Root Exclusion Zone

Trees that have been determined to remain in the work zone should be properly protected via establishment of a tree protection zone (TPZ) and critical root zone (CRZ). A TPZ and CRZ should be implemented and installed around all the trees and root zones around the trees that will remain on site. The TPZ is created by assessing the CRZ of the tree. This zone is defined as "an area equal to 1-foot radius from the base of the tree's trunk for each 1 inch of the tree's diameter at 4.5 feet above grade"



(Oregon State University 2009<sup>1</sup>). For example, a tree with a 6-inch DBH would have radius of 6 feet for the CRZ and a total of a 13.5-foot diameter for the TPZ.

Fencing should be installed around the entire TPZ using highly visible material. High visibility snow fencing is the primary fencing type typically used. T-posts should be used to support the fence line and should be spaced at a distance that will allow for greatest stability; normally 3 to 5 feet apart. Care should be taken when installing t-posts, as impacting exposed surface roots will damage the tree's overall health and could allow for infection and disease to enter the tree. Fencing should be secured on the t-posts with wire or zip-ties. Exclusion signage should be installed on the fence to notify workers of the exclusion zone. No construction activities, parking, or equipment storage should occur within the TPZ.

## 6.0 CONCLUSION

These arborist guidelines and assessment of trees are a general understanding of all variables on site at the time prior to project commencement. The views of the arborist satisfy the understanding that tree health is a priority prior to and during project-related activities. If at any time the views of the arborist need to be revisited, the arborist may be contacted, and information may be updated to best avoid work slow-down and to prevent unnecessary harm and/or death of trees. Tree protection is the goal of the arborist and buffers around impact zones should be adhered to. If the zones must be adjusted to help guide work, the arborist will be contacted, and adjustments will be made at the arborist's recommendation.

If you have any questions or concerns, please do not hesitate to contact us at the emails or phone numbers listed below. Thank you for the opportunity to support you on this project.

Sincerely,

**Andrew Ford | ISA-Certified Arborist (WE-13284A), CNPS-Certified Consulting Botanist (CCB 0029)**

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<sup>1</sup> University of Oregon. 2009. Tree Protection on Construction and Development Sites: A Best Management Practices Guidebook for the Pacific Northwest. Website:  
<http://www.seattle.gov/Documents/Departments/SDCI/Codes/TreeProtectionConstructionDevelopmentSites.pdf>



## **Appendix A.**

# **Tree Inventory Exhibit**





## **Appendix B.**

### **Tree Assessment Table**



OBJECT ID	Tree ID	Common Name	Species Name	DBH	Tree Health	Total Canopy (ft.)	Height Estimate (ft.)	Tree Coordinates	Notes
1	001	coast live oak	<i>Quercus agrifolia</i>	1.8	5	20	3	38.299735, -122.667339	
2	002	blackwood acacia	<i>Acacia melanoxylon</i>	1.7	4	18	8	38.299745, -122.667378	
3	003	pine sp.	<i>Pinus sp.</i>	2.8	Dead	14	60	38.299692, -122.667987	
4	004	coast live oak	<i>Quercus agrifolia</i>	5.7	4	18.5	30	38.299849, -122.667791	multi-stemmed codominance
5	005	coast live oak	<i>Quercus agrifolia</i>	1.6	5	8	28	38.299867, -122.667689	
6	006	coast live oak	<i>Quercus agrifolia</i>	13.7	5	30	90	38.299844, -122.667552	multi-stemmed codominance
7	007	coast live oak	<i>Quercus agrifolia</i>	0.9	3	5	8	38.299864, -122.667384	
8	008	California black oak	<i>Quercus kelloggii</i>	7.5	4	30.5	80	38.299891, -122.667008	
9	009	acacia sp.	<i>Acacia sp.</i>	3.5	4	16.5	20	38.300320, -122.666608	
10	010	elm sp.	<i>Ulmus sp.</i>	9.3	5	30	25	38.300436, -122.666632	multi-stemmed codominance
11	011	blackwood acacia	<i>Acacia melanoxylon</i>	0.5	5	10	10	38.299888, -122.666210	
12	012	blackwood acacia	<i>Acacia melanoxylon</i>	1.5	5	12	25	38.299914, -122.666085	
13	013	coast live oak	<i>Quercus agrifolia</i>	11.7	5	43	28	38.299899, -122.665889	multi-stemmed codominance



OBJECT ID	Tree ID	Common Name	Species Name	DBH	Tree Health	Total Canopy (ft.)	Height Estimate (ft.)	Tree Coordinates	Notes
14	014	coast live oak	<i>Quercus agrifolia</i>	7.6	5	27.5	40	38.299886, -122.665793	multi-stemmed codominance
15	015	coast live oak	<i>Quercus agrifolia</i>	12	5	27	40	38.299811, -122.665747	multi-stemmed codominance
16	016	coast live oak	<i>Quercus agrifolia</i>	12.6	5	11	30	38.299899, -122.665739	multi-stemmed codominance
17	017	coast live oak	<i>Quercus agrifolia</i>	2.1	5	5	7	38.299886, -122.665793	multi-stemmed codominance
18	018	coast live oak	<i>Quercus agrifolia</i>	5.6	5	30	31	38.299904, -122.665602	
19	019	coast live oak	<i>Quercus agrifolia</i>	2.6	5	12	10	38.299904, -122.665496	
20	020	coast live oak	<i>Quercus agrifolia</i>	14.4	5	20	35	38.299886, -122.665464	
21	021	coast live oak	<i>Quercus agrifolia</i>	8.8	5	22.5	40	38.299883, -122.665392	
22	022	coast live oak	<i>Quercus agrifolia</i>	10	5	32.5	45	38.299870, -122.665325	
23	023	coast live oak	<i>Quercus agrifolia</i>	6.7	5	30	40	38.299875, -122.665297	multi-stemmed codominance
24	024	coast live oak	<i>Quercus agrifolia</i>	9	5	55	45	38.299834, -122.665270	
25	025	California black oak	<i>Quercus kelloggii</i>	0.8	3	15	13	38.299723, -122.665392	



OBJECT ID	Tree ID	Common Name	Species Name	DBH	Tree Health	Total Canopy (ft.)	Height Estimate (ft.)	Tree Coordinates	Notes
26	026	coast live oak	<i>Quercus agrifolia</i>	7.25	5	25	26	38.299745, -122.665529	
27	027	California black oak	<i>Quercus kelloggii</i>	4.1	4	17.5	15	38.299723, -122.665535	
28	028	coast live oak	<i>Quercus agrifolia</i>	3.8	5	25	17	38.299729, -122.665564	
29	029	coast live oak	<i>Quercus agrifolia</i>	3.9	5	20	20	38.299743, -122.665681	multi-stemmed codominance
30	030	coast live oak	<i>Quercus agrifolia</i>	13.5	5	60	26	38.299725, -122.665790	multi-stemmed codominance



## Appendix C.

### Photo Log



**Photograph 1.** View of dense stands of coast live oaks located along each side of Adobe Road east of intersection with Main Street.



**Photograph 2.** View of row of trees along school property on Adobe Road west of intersection with Main Street.



**Photograph 3.** View of Main Street facing south of intersection with Adobe Road.



**Photograph 4.** View of stands of coast live oak and California live oak along Adobe Road east of intersection with Main Street.