

FINAL
BOTANICAL RESOURCES SURVEY REPORT
PROTOCOL-LEVEL RARE PLANT SURVEYS FOR
PACIFIC GAS AND ELECTRIC COMPANY'S MORAGA-OAKLAND X PROJECT
ALAMEDA AND CONTRA COSTA COUNTIES, CALIFORNIA



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Prepared for



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TABLE OF CONTENTS

List of Abbreviated Terms	iv
Section 1. Introduction	1
1.1. Purpose of the Report	1
Section 2. Study Methods	4
2.1. Data Resources	4
2.2. Regulatory Framework	5
2.3. Identification of Target Species	6
2.4. Personnel and Field Investigation	7
2.5. Resource Documentation and Mapping	8
2.6. Reference Sites and Herbarium Specimens	9
2.7. Limitations	11
Section 3. Environmental Setting	12
3.1. Setting	12
3.2. Vegetation Communities	17
Section 4. Results	45
4.1. Sensitive Natural Communities	45
4.2. Special Status Plants	46
4.3. Noxious/Invasive Weeds	58
Section 5. Summary	66
5.1. Summary	66
Section 6. References	68

LIST OF TABLES

Table 1. Target Species	7
Table 2. 2021 Survey Effort Details for Target Plant Species	8
Table 3. Reference Population Observation Details	10
Table 4. Herbaria Specimen Collection Dates and Correspondence of Survey Timing	10
Table 5. Geology Units in the Study Area	16
Table 6. Soil Mapping Units in the Study Area	16
Table 7. Land Cover Types in the Study Area	18
Table 8. Vegetation Community Classification Systems Comparison	20
Table 9. Sensitive Natural Communities the Study Area	45
Table 10. Occurrence Summary of Special status Plants Within the Study Area	46
Table 11. Pallid Manzanita Populations Recorded in 2021	47
Table 12. Oakland Star-Tulip Populations Recorded in 2021	52
Table 13. Jepson's Button Thistle Populations Recorded in 2021	55
Table 14. Locally Rare Plant Species Observed within the Study Area	57
Table 15. Non-Native Species with Elevated Threat Rankings Observed in the Study Area	59
Table 16. Summary of Sensitive Communities and Special Status Plants within the Study Area	66

LIST OF FIGURES

Figure 1. Location of the Study Area	2
Figure 2. Aerial Image of the Study Area.....	3
Figure 3. Local Precipitation and Temperature Against 30-Year Normals	15
Figure 4. Geology Units in the Study Area	A-1
Figure 5. Soil Mapping Units in the Study Area	A-14
Figure 6. Conservation Lands Network Vegetation Types in the Study Area	A-27
Figure 7. Land Cover Types as Mapped in the Study Area	A-36
Figure 8. Invasive Plants of Concern in the Study Area.....	A-49

LIST OF APPENDICES

APPENDIX A	Figures 4 - 8.....	A-1
APPENDIX B	Plant Species Observed On Site.....	B-1
APPENDIX C	California Natural Diversity Database Field Forms.....	C-1

LIST OF ABBREVIATED TERMS

°F	degrees Fahrenheit
CCH	Consortium of California Herbaria
CCH1	Consortium of California Herbaria Portal One
CCH2	Consortium of California Herbaria Portal Two
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CLN	Conservation Lands Network
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
EBMUD	East Bay Municipal Utility District
EONDX	Element Occurrence Index
EBRPD	East Bay Regional Park District
F.G.C.	California Fish and Game Code
FESA	federal Endangered Species Act
GPS	global positioning system
JFP	Jepson Flora Project
kV	kilovolts
MCV	<i>A Manual of California Vegetation</i> (Sawyer et al. 2009)
NOAA	National Oceanic and Atmospheric Administration
NPPA	Native Plant Protection Act
PG&E	Pacific Gas and Electric Company
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Section 1. INTRODUCTION

At the request of Pacific Gas and Electric Company (PG&E), Nomad Ecology, LLC (Nomad) conducted protocol-level surveys for sensitive botanical resources¹ within the Moraga-Oakland X Project (project) study area located in Alameda and Contra Costa counties, California. The study area generally runs southwest from Moraga Substation to the project's terminus just east of Interstate 580 at Oakland X Substation. The study area is largely contiguous east of Skyline Boulevard, west of which it is broken up into smaller fragments. Just west of Moraga Substation a network of access roads runs north to a staging area located at the southeastern end of the community of Wilder. Two isolated staging areas are located off Quarry Road within Sibley Volcanic Regional Preserve. West of Highway 13, the study area includes the area along Monterey Boulevard from near Park Boulevard south to Lincoln Avenue, southwest along Lincoln Avenue, then along MacArthur Boulevard and Excelsior Avenue, then northeast along Park Boulevard to its junction at Estates Drive. The study area is described more thoroughly in Section 3, but it includes a 130-foot buffer around the transmission line from Moraga Substation to Manzanita Drive, a 50-foot buffer around the transmission line and work areas between Manzanita Drive and Park Boulevard, a 50-foot buffer around each tower location between Park Boulevard and Oakland X Substation, a 25-foot buffer along proposed underground segments between Moraga Substation and Manzanita Drive, and a 25-foot buffer along access roads to the existing overhead segment between Moraga Substation and Manzanita Drive, totaling 247.0 acres and approximately 5 miles (Figures 1 and 2). These buffers were developed based on the extent of potential indirect effects to adjacent areas and proximity to adjacent private property and accessible areas. The study area lies within the San Francisco Bay Area and Central Coast subregions of the California Floristic Province (Baldwin et al. 2012).

1.1. PURPOSE OF THE REPORT

The purpose of this Botanical Resources Survey Report is to present the results of protocol-level botanical surveys that targeted 14 special status plant species² and 31 sensitive natural communities considered to have the potential to occur within the study area, in addition to any threats to sensitive natural resources presented by invasive species. Protocol-level botanical surveys were conducted within the study area by Nomad botanists in March, April, May, and July of 2021. Based on the results of these studies, further botanical surveys are not considered necessary within the study area as presented in this report.

This document provides: (1) a description of study methodologies; (2) a discussion of the regulatory context; (3) an assessment of the existing conditions and natural communities; (4) the results of protocol-level and floristic surveys for special status botanical resources including the numbers, size, condition, and photographs of all special status species occurrences observed; (5) a summary of potential threats and management considerations for these occurrences; (6) a brief discussion of risks posed by non-native plant species; (7) a comprehensive list of all vascular plants observed; and (8) maps that identify the locations of sensitive natural communities, special status plant species, and invasive plants of concern found on site.

¹ Sensitive botanical resources refers to sensitive natural communities and special status plant species.

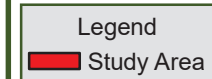
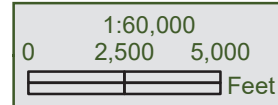
² Special status plant species are those considered listed as Endangered, Threatened, or Rare by the U.S. Fish and Wildlife Service (under the Federal Endangered Species Act) and/or the California Department of Fish and Wildlife (under the California Endangered Species Act and Native Plant Protection Act) as well as plant species included in the California Native Plant Society's *Inventory of Rare and Endangered Plants of California*.



December 2021

Botanical Resources Survey Report

Figure 1
Location of the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company





December 2021

Botanical Resources Survey Report

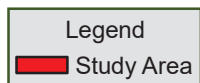
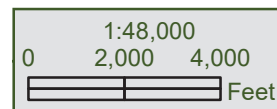


Figure 2
Aerial Image of the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Section 2. STUDY METHODS

2.1. DATA RESOURCES

Background information on potentially occurring endangered, threatened, and rare plant and sensitive natural communities was compiled through a review of the following resources:

U.S. Fish and Wildlife Service (USFWS):

- Endangered and Threatened Wildlife and Plants (USFWS 1999, 2014)
- Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in Alameda and Contra Costa Counties (USFWS 2021)

California Department of Fish and Wildlife (CDFW):

- California Natural Community List, from the Vegetation Classification and Mapping Program (CDFW 2021a)
- State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFW 2021b)
- Special Vascular Plants, Bryophytes, Lichens List (CDFW 2021c)
- California Natural Diversity Database (CNDDDB) Query for the Richmond, Briones Valley, Walnut Creek, Oakland West, Oakland East, Las Trampas Ridge, Hunters Point, San Leandro, and Hayward 7.5-minute U.S. Geological Survey (USGS) quadrangles (CDFW 2021d)

Other Sources:

- Annotated Checklist of the East Bay Flora (CNPS 2013)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2021)
- Consortium of California Herbaria Portal One (CCH1) (CCH 2021a)
- Consortium of California Herbaria Portal Two (CCH2) (CCH 2021b)
- Database of Rare, Unusual, and Significant Plants of Alameda and Contra Costa Counties (Lake 2021)
- Jepson eFlora Project (JFP 2021)
- Jepson Manual: Vascular Plants of California (Baldwin et al. 2012)

Botanical taxonomy and nomenclature conform to *The Jepson Manual* (Baldwin et al. 2012) with the exception of updates posted on the Jepson eFlora (JFP 2021) website. Common names of plant species are generally derived from the Calflora Database (Calflora 2021). Taxonomy and nomenclature for special status plant species conform to the *Inventory of Rare and Endangered Plants of California* (CNPS 2021) and *Special Vascular Plants, Bryophytes and Lichens List* (CDFW 2021c).

Vegetation communities described herein conform to *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), *California Vegetation* (Holland and Keil 1995), and/or *A Manual of California Vegetation* (Sawyer et al. 2009). Wetland and deepwater habitat classifications conform to *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979), where appropriate.

2.2. REGULATORY FRAMEWORK

The following section summarizes the regulatory framework related to botanical resources such as sensitive natural communities and special status plants.

2.2.1 SENSITIVE NATURAL COMMUNITIES

Sensitive Natural Communities are characterized as plant assemblages that are unique in constituent components, restricted in distribution, supported by distinctive edaphic (i.e., soil-related) conditions, considered locally rare, potentially support special status plant or wildlife species, and/or receive regulatory protection from municipal, county, state and/or federal entities. The regulatory framework that protects sensitive natural communities is derived from local, state, and federal laws and regulations including Section 10 of the federal Rivers and Harbors Act, Sections 401 and 404 of the federal Clean Water Act, Section 1600 et seq. of the California Fish and Game Code (F.G.C.), Section 15065 of the California Environmental Quality Act (CEQA) guidelines, and various other city or county codes. Implementation and enforcement of these regulations are conducted by their respective regulatory entities such as the U.S. Army Corps of Engineers, California Regional Water Quality Control Board, California Department of Fish and Wildlife, lead agency, and/or various cities or counties. Natural Communities with ranks of S1, S2, and S3 are considered Sensitive Natural Communities to be addressed in the environmental review processes of CEQA and its equivalents (CDFW 2021a).

2.2.2 SPECIAL STATUS PLANT SPECIES

Special status plant species are defined as those species included in the CNPS Inventory of Rare and Endangered Plants (CNPS 2021) as well as those species that are listed as endangered or threatened, are proposed or candidates for listing, or are designated as rare under one or more of the following regulatory statutes: Federal Endangered Species Act, as amended (FESA) (Code of Federal Regulations, Title 50, Section 17); California Endangered Species Act (CESA) (California Code of Regulations Title 14, Section 670.5); F.G.C. (Sections 1901, 2062, 2067), or the Native Plant Protection Act (NPPA) of 1977.

The rarity ranking contained in the CNPS Inventory is endorsed by the CDFW and effectively serves as its list of “candidate” plant species. The following identifies the definitions of the CNPS California Rare Plant Ranks (CRPRs):

- Rank 1A: Plants presumed to be extinct in California
- Rank 1B: Plants that are rare, threatened, or endangered in California and elsewhere
- Rank 2A: Plants presumed extirpated in California, but more common elsewhere
- Rank 2B: Plants that are rare, threatened, or endangered in California, but are more common elsewhere
- Rank 3: Plants about which more information is needed (a review list)
- Rank 4: Plants of limited distribution (a watch list)

CRPR 1B and 2 species are considered eligible for state listing as Endangered or Threatened pursuant to the F.G.C. As part of the CEQA process, such species should be fully considered, as they meet the definition of Threatened or Endangered under the NPPA and Sections 2062 and 2067 of the F.G.C. CRPR 3 and 4 species are either plants about which more information is needed or are uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state listing, and CNPS and CDFW recommend that these species be evaluated for consideration during the preparation of

CEQA documents (CNPS 2021), as some of these species may meet NPPA and CESA criteria as Threatened or Endangered.

The status of these species is based on their rarity and endangerment throughout all or portions of their range. Such species are referred to as special status species or “target species” herein.

2.2.3 LOCALLY RARE PLANT SPECIES

In addition to the designations described above, CEQA requires that impacts to “resources that are rare or unique to that region” be evaluated (CEQA Guidelines 15125[c]). This includes, but is not limited to, botanical resources that are peripheral populations, disjunct subpopulations, sensitive, declining, or have a restricted distribution. These are informal terms that refer to those species that might be declining or be in need of concentrated conservation actions to prevent decline or extirpation but have no legal protection of their own. Also, CEQA Guidelines Section 15380 states “a species not included in any listing...shall nevertheless be considered to be rare or Endangered if the species is likely to become Endangered within the foreseeable future throughout all or a significant portion of its range and may be considered Threatened as that term is used in the FESA.”

The East Bay chapter of CNPS since 1989 has developed and maintains a Database of Rare, Unusual, and Significant Plants of Alameda and Contra Costa Counties which tracks populations of locally rare and statewide rare plants which have limited distribution in Alameda and Contra Costa counties, including many that reach their range limit in these two counties (Lake 2021). The following identifies rarity rankings in the Database of Rare, Unusual, and Significant Plants of Alameda and Contra Costa Counties:

- *A: Species in Alameda and Contra Costa counties listed as rare, threatened or endangered statewide by federal or state agencies, or by state CNPS (includes *A1, *A1x, and *A2 species)
- A1: Species known from two or fewer botanical regions in Alameda and Contra Costa Counties, either currently or historically (includes *A1 and A1 species)
- A1x: Species previously known from Alameda or Contra Costa Counties, but now believed to have been extirpated, and no longer occurring here (includes *A1x and A1x species)
- A1?: Species possibly occurring in Alameda or Contra Costa counties but there are questions about their identification or location
- A2: Species currently known from three to five regions in the two counties, or, if more, meeting other important criteria such as rare statewide, small populations, stressed or declining populations, small geographical range, limited or threatened habitat, etc. (includes *A2 and A2 species)
- B: A High-Priority Watch List: Species currently known from 6 to 9 regions in the two counties, or, if more, meeting other important criteria as described above for A2
- C: A Second-Priority Watch List: Species currently known from 10 to 15 regions in the two counties, but potentially threatened if certain conditions persist such as over-development, water diversions, excessive grazing, and/or weed or insect invasions, etc.

All A-ranked species, both locally rare and statewide rare, should be considered for impact evaluation under CEQA guidelines.

2.3. IDENTIFICATION OF TARGET SPECIES

The identification of target species and sensitive natural communities for this protocol-level survey effort is based on a background review of available databases and literature (USFWS 1999, 2014, 2021; CDFW

2021a,b,c,d; CNPS 2021; CCH 2021a,b; Baldwin et al. 2012), Nomad's expertise with the regional flora, and habitats present within the study area. This background review resulted in the determination that 14 special status plant species, out of 64 known from the region, had the potential to occur within the study area based on the presence of suitable habitat.

All of the 14 target species have conservation status from the California Native Plant Society (CNPS 2021), while two of them are federally listed as Threatened under the FESA and Endangered under the CESA. The species in Table 1 were considered target species for the purposes of these protocol-level rare plant surveys.

Table 1. Target Species

SPECIES NAME	COMMON NAME	STATUS ¹
FEDERAL/STATE LISTED SPECIES		
<i>Arctostaphylos pallida</i>	pallid manzanita	FT, SE, 1B.1
<i>Holocarpha macradenia</i>	Santa Cruz tarplant	FT, SE, 1B.1
CALIFORNIA RARE PLANT RANK SPECIES		
<i>Amsinckia lunaris</i>	bent-flowered fiddleneck	1B.2
<i>Androsace elongata</i> subsp. <i>acuta</i>	California androsace	4.2
<i>Balsamorhiza macrolepis</i>	big-scale balsamroot	1B.2
<i>Calochortus umbellatus</i>	Oakland star-tulip	4.2
<i>Dirca occidentalis</i>	western leatherwood	1B.2
<i>Eryngium jepsonii</i>	Jepson's button thistle	1B.2
<i>Fritillaria liliacea</i>	fragrant fritillary	1B.2
<i>Helianthella castanea</i>	Mt. Diablo helianthella	1B.2
<i>Leptosiphon acicularis</i>	bristly leptosiphon	4.2
<i>Meconella oregana</i>	Oregon meconella	1B.1
<i>Micropus amphibolus</i>	Mt. Diablo cottonweed	3.2
<i>Streptanthus albidus</i> subsp. <i>peramoenus</i>	most beautiful jewelflower	1B.2

¹Explanation of Status Codes

U.S. Fish and Wildlife Service – Federal Endangered Species Act

FT Federally Threatened

California Department of Fish and Wildlife – California Endangered Species Act

SE California Endangered

California Rare Plant Rank (CRPR) codes:

1B Rare, threatened, or endangered in California and elsewhere

3 Plants about which more information is needed (a review list)

4 Plants of limited distribution – Watch list

CRPR Threat Codes:

.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2 Moderately threatened in California (20-80% occurrences threatened)

2.4. PERSONNEL AND FIELD INVESTIGATION

Protocol-level rare plant surveys were conducted by Nomad botanists Adam Chasey, Cody Ender, and Brian Peterson. These surveys were conducted during the months of March, April, May, and July of 2021. Table 2 details the dates, survey targets, and personnel for these studies. This report was prepared by Nomad Senior Botanist Heath Bartosh and Mr. Chasey.

Table 2. 2021 Survey Effort Details for Target Plant Species

SURVEY TIMING		TARGETS	PERSONNEL ¹
Month	Day(s)		
March	11, 12, 15	<i>Androsace elongata</i> subsp. <i>acuta</i> <i>Arctostaphylos pallida</i> <i>Dirca occidentalis</i> <i>Fritillaria liliacea</i> <i>Meconella oregana</i>	AC, CE
April	14	<i>Amsinckia lunaris</i> <i>Helianthella castanea</i> <i>Leptosiphon acicularis</i> <i>Micropus amphibolus</i>	AC, BP
	15, 16		AC, CE
May	17, 18	<i>Balsamorhiza macrolepis</i> <i>Calochortus umbellatus</i> <i>Eryngium jepsonii</i> <i>Streptanthus albidus</i> subsp. <i>peramoenus</i>	AC, CE
July	12, 13	<i>Holocarpha macradenia</i>	AC, CE

AC = Adam Chasey, BP = Brian Peterson, CE = Cody Ender

The purpose of these surveys was to conduct an inventory of vascular plants of the study area to document occurrences of rare, threatened or endangered species, invasive plant locations, and vegetation communities. All surveys generally began at 7:00 a.m. and concluded at approximately 3:00 p.m. each day (with short breaks for meals). All vegetation communities within the study area were visited and evaluated for their potential to support sensitive botanical resources. Surveys were conducted on foot and progressed from the Moraga Substation west in sections covering all habitats within the study area. All plant species in bloom, or otherwise recognizable, were identified to a level necessary (floristic) to determine their regulatory status. During these surveys, an inventory of plant species observed was recorded (Appendix B).

Botanical surveys were conducted in accordance with the *CNPS Botanical Survey Guidelines* (CNPS 2001a), CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018), and the USFWS's *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000).

2.5. RESOURCE DOCUMENTATION AND MAPPING

Field data, including locations of special status plant species, invasive plants, and/or vegetation communities, were collected using Backcountry Navigator Pro on an Android device, Gaia GPS on iPhone device, or hand-drawn on paper maps.

2.5.1 VEGETATION MAPPING

Vegetation communities were characterized and mapped based on *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), *California Vegetation* (Holland and Keil 1995), and/or *A Manual of California Vegetation* (Sawyer et al. 2009). Vegetation polygons were delineated in the field using a high quality color aerial photographs flown in 2020 and printed on field maps at

approximately 1:3,000 scale. These field maps were then heads-up digitized in-house (at 1:2,000 scale) using a desktop computer Geographic Information System (GIS) platform operating ESRI ArcGIS 10.7 for creating polygons and populating attribute tables. Minimum mapping units for vegetation communities are approximately 0.10 acre.

2.5.2 SPECIAL STATUS SPECIES OCCURRENCES

In the event special status plant populations are encountered they are recorded using CNDDDB Field Survey Forms (see Appendix C). A GPS data point is recorded for each occurrence.³ Populations of target species recorded as a part of this study are identified by a six- to ten-character alphanumeric code that is derived from the first three letters of the genus and species plus a population number. For example, a population of pallid manzanita (*Arctostaphylos pallida*) was given the code Arcpal1. Each subsequent new population is sequentially numbered, e.g. Arcpal2, Arcpal3, and so on.

2.5.3 HERBARIUM VOUCHERS

Where feasible, a voucher collection of an individual from a population of special status species was collected. In addition, voucher specimens of other plant species with regional significance were collected during the course of our study. Plant species considered as having regional significance include those not previously known as occurring in Alameda or Contra Costa Counties or that are uncommon species in the Counties. A GPS data point was recorded for each of these locations.

2.6. REFERENCE SITES AND HERBARIUM SPECIMENS

To ensure the timing of botanical surveys coincided with the flowering phenology of the target species, reference populations and collection dates of herbaria specimens were examined. Known populations of two target species were visited at reference sites with similar characteristics to the study area such as habitat, topography, and climate to determine appropriate survey timing. Table 3 depicts the details of reference population observations and provides an optimal survey timing by which surveys for the subject taxon should be completed, based on observed phenology. For the remaining target species for which reference populations were not visited, examination of herbaria specimens was performed using the CCH1 database (CCH 2021a). The purpose of this analysis was to ensure survey timing corresponds with flowering and reproductive maturation since plant species are typically collected at peak flowering phenology.

For target species that did not have accessible reference populations or were not visited, an estimation of blooming periods was attained by averaging the collection dates of herbarium specimens by month (CCH 2021a). Duplicate collections and specimens with label information lacking a collection month were not included in the averages. Herbaria specimen collection dates and corresponding survey timing are presented in Table 4. Due in large part to a poor rain year (see the Topography and Climate subsection of Section 3.1.2), many plants observed in the region shifted to an earlier phenology, meaning species with a peak phenology in May, in normal years, were instead observed in peak phenology in April. For species with peak collections which did not overlap with dates of surveys (e.g., Jepson's button thistle [*Eryngium jepsonii* J.M. Coult. and Rose]), vegetative material and early/late flowers would have been detectable in either May or July surveys. August/September surveys were conducted in late July due to an observed earlier blooming period for *Holocarpa macradenia*. Shrubby target species (e.g., *Arctostaphylos pallida*) with peak phenology outside of survey periods would have been detectable by vegetative material in March surveys.

³ Per the CNDDDB an occurrence (also referred to as population), is a single population or a series of colonies within one-quarter mile of each other (Bittman 2001). If individuals or colonies are great than a distance of 0.25-mile they are treated as separate occurrences (populations)

Table 3. Reference Population Observation Details

SPECIES NAME / COMMON NAME	DATE VISITED	LOCATION	CNDDDB OCCURRENCE (Y/N)	PRESENT (Y/N)	# OF INDIVIDUALS	TIMEFRAME TO CONDUCT SURVEY
FEDERAL/STATE LISTED SPECIES						
<i>Holocarpha macradenia</i> Santa Cruz tarplant	6/28/2021	Wildcat Regional Preserve	Yes (EONDX # 7419)	Yes	5,000-10,000: 50% in fruit, 45% in flower, 5% in bud	2 weeks
CALIFORNIA RARE PLANT RANK SPECIES						
<i>Amsinckia lunaris</i> bent-flowered fiddleneck	3/29/2021	Briones Regional Park	Yes (EONDX # 62471)	Yes	150: 80% flowering, 20% in bud	3 weeks
<i>Calochortus umbellatus</i> Oakland star-tulip	4/5/2021	Ring Mountain	N/A	Yes	100's: 70% in flower, 30% in fruit	2-3 weeks
<i>Dirca occidentalis</i> western leatherwood	2/19/2021	Seaview Trailhead – Tilden Regional Park	Yes (EONDX # 30005)	Yes	50: 25% in bud, 75% in flower	6 weeks
<i>Helianthella castanea</i> Mt. Diablo helianthella	3/29/2021	Briones Regional Park	Yes (EONDX # 14986)	Yes	100: 75% in bud, 25% vegetative	6 weeks
<i>Meconella oregana</i> Oregon meconella	3/15/2021	Vollmer Peak	Yes (EONDX # 52607)	Yes	75: 50% in flower, 25% in bud, 25% vegetative	2 weeks

Table 4. Herbaria Specimen Collection Dates and Correspondence of Survey Timing

SPECIES	HERBARIA SPECIMEN COLLECTIONS AVERAGED BY MONTH											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
FEDERAL/STATE LISTED SPECIES												
<i>Arctostaphylos pallida</i> pallid manzanita	22%	22%	18%	0%	0%	22%	2%	2%	2%	2%	4%	2%
CALIFORNIA RARE PLANT RANK SPECIES												
<i>Androsace elongata</i> subsp. <i>acuta</i> California androsace	1%	0%	30%	51%	14%	4%	0%	0%	0%	0%	0%	0%
<i>Balsamorhiza macrolepis</i> big-scale balsamroot	0%	0%	4%	38%	46%	12%	0%	0%	0%	0%	0%	0%
<i>Eryngium jepsonii</i> Jepson's button thistle	0%	0%	0%	16%	16%	37%	26%	0%	5%	0%	0%	0%
<i>Fritillaria liliacea</i> fragrant fritillary	0%	4%	60%	31%	0%	2%	2%	0%	0%	0%	0%	0%
<i>Leptosiphon acicularis</i> bristly leptosiphon	3%	0%	2%	39%	52%	2%	2%	0%	0%	0%	0%	0%
<i>Micropus amphibolus</i> Mt. Diablo cottonweed	2%	0%	11%	47%	38%	2%	0%	0%	0%	0%	0%	0%
<i>Streptanthus albidus</i> subsp. <i>peramoenus</i> most beautiful jewelflower	0%	0%	4%	30%	44%	19%	1%	0%	0%	0%	0%	0%

Note: **Shaded** areas indicate months when botanical surveys were conducted. **Bolded** numbers denote peak period(s) for survey. Species flowering phenology represented as a percent (%) by month, percentages are rounded; months where collection dates have not been reported are designated as 0%.

2.7. LIMITATIONS

Survey efforts were carefully designed to maximize the likelihood that the timing and effort of the surveys coincided with the optimum timing of flowering phenology and were conducted in suitable habitat for each of the target species. However, this subsection discusses the unavoidable limitations inherent in rare plant surveys, with respect to specifics of this effort.

Based on the timing of this assessment, a determination of presence for target species within the study area was possible for species with blooming periods or identifiable vegetative material corresponding to the March, April, May, and July 2021 surveys. Based on the timing of the surveys, all plant species possibly present within the study area may not have been observed due to varying flowering phenologies and life forms that may not emerge every growing season, such as bulbs, biennials, and annuals. These lifeforms, especially annuals, may be absent in some years due to annual variations in temperature and rainfall, which influence germination and plant phenology. Colonization of new populations or species within an area may also occur from year to year.

No information on vegetation communities, based on vegetation mapping and classification protocols, were collected during the field work. Detailed vegetation mapping would require a data collection methodology that was outside the scope of this work. Vegetation descriptions below are based on observations from a single year. Therefore, since vegetation descriptions and associated species are based on data samples from selected seasons or a single year, they may be subject to change in the event multi-year data are collected as species dominance, especially in regard to annuals, can vary depending on sample timing and duration. In the vegetation descriptions below, the phrase “in part” is used to signify the limitations inherent in these descriptions.

Some specific plant species identifications in this report may be tentative due to the absence of morphological characters that may be required to make species level determinations due to immature reproductive structures or seasonal desiccation; however, all plant species in bloom or otherwise recognizable were identified to a level necessary to determine their regulatory status. In these cases, *cf.* (compares to) is used to indicate provisional species identification based on gestalt, vegetative morphology, and/or its known range. It is highly unlikely that any of the provisional species identifications would be revised to recognize a sensitive taxon.

The proposed activities and work areas evaluated in this report are based on the study area provided by PG&E. Changes to the study area may warrant further analysis.

Section 3. ENVIRONMENTAL SETTING

3.1. SETTING

The approximately 247.0-acre study area follows approximately 5 miles of transmission line that spans from Moraga Substation to Oakland X Substation in Alameda and Contra Costa Counties. The study area is largely contiguous east of Skyline Boulevard, west of which it is broken up into smaller fragments. Just west of Moraga Substation a network of access roads runs north to a staging area located at the southeastern end of the community of Wilder. Two isolated staging areas are located off Quarry Road within East Bay Regional Park District's (EBRPD's) Sibley Volcanic Regional Preserve. West of Highway 13, the study area includes the area along Monterey Boulevard from near Park Boulevard south to Lincoln Avenue, southwest along Lincoln Avenue, then along MacArthur Boulevard and Excelsior Avenue, then northeast along Park Boulevard to its junction at Estates Drive. The study area was based on the following buffers as shown in Figures 1 and 2:

- A 130-foot buffer around the transmission line and work areas from Moraga Substation to Manzanita Drive. This buffer was used as these areas were accessible and the buffer would accommodate any small changes in work area placement and account for potential direct and indirect effects to plants in adjacent areas.
- A 50-foot buffer around the transmission line and work areas from Manzanita Drive to Park Boulevard excluding adjacent private property. This buffer was used as the PG&E right of way passes in between adjacent residences which constrain survey access and potential placement of work areas. There are several gaps in the survey buffer, and these correspond with areas where there will be no ground access or ground disturbing activities.
- A 50-foot buffer around each tower work location between Park Boulevard and Oakland X Substation. This buffer was used as only the tower locations would be accessed as part of the project, and access to adjacent areas is constrained by private property.
- A 25-foot buffer along proposed underground segments between Moraga Substation and Manzanita Drive.
- A 25-foot buffer along access roads to the existing overhead segment between Moraga Substation and Manzanita Drive.

The study area lies within the San Francisco Bay Area and Central Coast subregions of the California Floristic Province (Baldwin et al. 2012). According to the Public Land Survey System, it is located within Sections 9, 10, 14, 15, and 16, Township 1 south, Range 3 west of the Mount Diablo Baseline and Meridian, as well as the Laguna de los Palos Colorados and Rancho San Antonio land grants. It lies within the San Leandro Creek and Sausal Creek Watersheds and appears on the Oakland East (3712272) 7.5-minute USGS topographic quadrangle.

3.1.1 REGIONAL SETTING

A Manual of California Vegetation (Sawyer et al. 2009) (henceforth referred to as MCV) defines the currently recognized method of vegetation classification and mapping in California, which is accepted by CNPS and CDFW. This methodology is used to determine the rarity and endangerment of California vegetation types that can result in a sensitive natural community designation for specific vegetation types. The *Ecological Subregions of California, Section and Subsection Descriptions* (USDA 1997) are the basis

for describing regional variation in California alliance descriptions in the MCV. The study area is located in the East Bay Hills – Mount Diablo and East Bay Terraces and Alluvium subsections of the Central California Coast section (USDA 1997). These subsections are described in detail below.

East Bay Hills – Mount Diablo

The East Bay Hills – Mount Diablo subsection consists of Mount Diablo of the Diablo Range and steep hills west of Mount Diablo, between the Diablo Range and San Francisco Bay. It is bounded on the southwest by the Hayward Fault. This subsection is characterized by northwest trending hills with subequal summits, rounded ridges, steep sides, and narrow canyons. Elevation ranges from sea level to about 2,000 feet in the East Bay Hills and up to 3,849 feet on Mount Diablo. Cretaceous, Eocene, and Miocene marine and Pliocene nonmarine sedimentary rocks are predominant. These rocks and Pliocene volcanic rocks in the East Bay Hills are folded and faulted. Mass wasting and fluvial erosion are the main geomorphic processes (USDA 1997).

Mean annual precipitation is about 15 to 25 inches, practically all of which is rain although some snow falls on Mount Diablo. Mean annual temperature is about 54 to 60 degrees Fahrenheit (°F) and the mean freeze-free period is about 225 to 275 days. Runoff is rapid from the hills, but slow from the alluvial plains. All but the larger streams are dry through most of the summer and natural lakes are absent. There is moderate marine influence in the East Bay Hills, which diminishes toward Mount Diablo (USDA 1997).

East Bay Terraces and Alluvium

The East Bay Terraces and Alluvium subsection is on an alluvial plain located between the East Bay Hills and San Francisco Bay. It extends from San Pablo Bay southeast to the Santa Clara Valley. The Hayward Fault runs long its northeast edge. The alluvial plain is mostly gently sloping to nearly level alluvial fans. Hills projecting above the fans are steep to moderately steep and elevations range from sea-level to about 600 feet on hills along the Hayward Fault. Late Quaternary alluvium predominates in this subsection. A few small areas of Quaternary marine sediments exist and there are a few hills of Franciscan formation rocks, both along the Hayward and others surrounded by alluvium. Fluvial erosion is the main geomorphic process in this subsection. Fluvial deposition is an important process on recent floodplain and alluvial fans, but most of the stream sediments are washed across the alluvial plain to estuaries of the San Francisco – San Pablo Bay system (USDA 1997).

Mean annual precipitation is about 20 to 30 inches, practically all of which is rain. Mean annual temperatures range from 52° to 56°F and the mean freeze-free period is about 250 to 275 days. Runoff is rapid from the hills but slow across alluvial plains. All but the larger streams are dry through most of the summer and natural lakes are absent. This subsection is greatly modified by marine influence (USDA 1997)

3.1.2 LOCAL SETTING

The study area is located on fee and easement property, EBRPD lands, East Bay Municipal Utility District (EBMUD) land, and City of Oakland Parks land between Moraga Substation and Oakland X Substation as well as various access routes that pass through private property. It is accessed via multiple gates along surface roads and unpaved EBRPD and EBMUD roads along its length. From its origin at Moraga Substation, the study area runs west for approximately 0.4 mile before turning southwest for approximately 4.7 miles to its terminus at Oakland X Substation, crossing Pinehurst Road, Skyline Boulevard, and Highway 13 along its way. The study area traverses Huckleberry Botanic Regional Preserve, Shepherd Canyon Park, and Dimond Park, and there are two disjunct staging areas in Sibley Volcanic Regional Preserve approximately 2.2 miles west-northwest of Moraga Substation. Multiple access roads are present along the length of the study area. Near Moraga Substation, a network of access roads provide access to another staging area located approximately 0.7 mile to the northwest near the community of Wilder. West

of Highway 13, the study area follows approximately 4.3 miles of paved surface streets including portions of Monterey Boulevard, Lincoln Avenue, Park Boulevard, Excelsior Avenue, and Macarthur Road. The study area east of Manzanita Drive is predominantly open space, while west of Manzanita Drive it largely consists of residential areas that increase in density moving west.

Topography and Climate

The topography of the study area runs from the Moraga Substation up the gentle to moderately steep east-facing slope of Gudde Ridge in the Berkeley Hills. It then traverses rolling hills before crossing the deep southeast trending canyon of upper San Leandro Creek, crossing the creek's upper reaches. From Manzanita Drive, the study area drops down the west-facing slopes of the Berkeley Hills, roughly following Dimond Canyon. The staging areas in Sibley Volcanic Regional Preserve are located on the gentle rounded hills north of Round Top Peak. The east-facing slopes are dominated largely by grassland and oak woodland vegetation communities, while the shadier canyon bottoms support riparian communities. The residential areas west of Manzanita Drive are largely surrounded by oak woodland communities with scattered grasslands, with natural areas becoming increasingly fragmented by residences moving west. Elevation in the study area ranges from approximately 620 feet near the Moraga Substation to approximately 1,360 feet near Manzanita Drive and approximately 160 feet near the Oakland X Substation. The staging areas in Sibley Volcanic Regional Preserve are at approximately 1,300 feet in elevation.

The climate of the study area is characterized as hot and subhumid. Figure 3 shows total precipitation (inches) and average monthly temperature (°F) from August 2020 to July 2021 compared to 30-year normal from 1981-2010 (NOAA 2021). As shown below, precipitation levels in 2020-2021 are lower than 1981-2010 Normals across the entire precipitation year. Weather data were collected from the Oakland International Airport National Oceanic and Atmospheric Administration (NOAA) weather station which was the closest and most appropriate station that collects precipitation and temperature data.

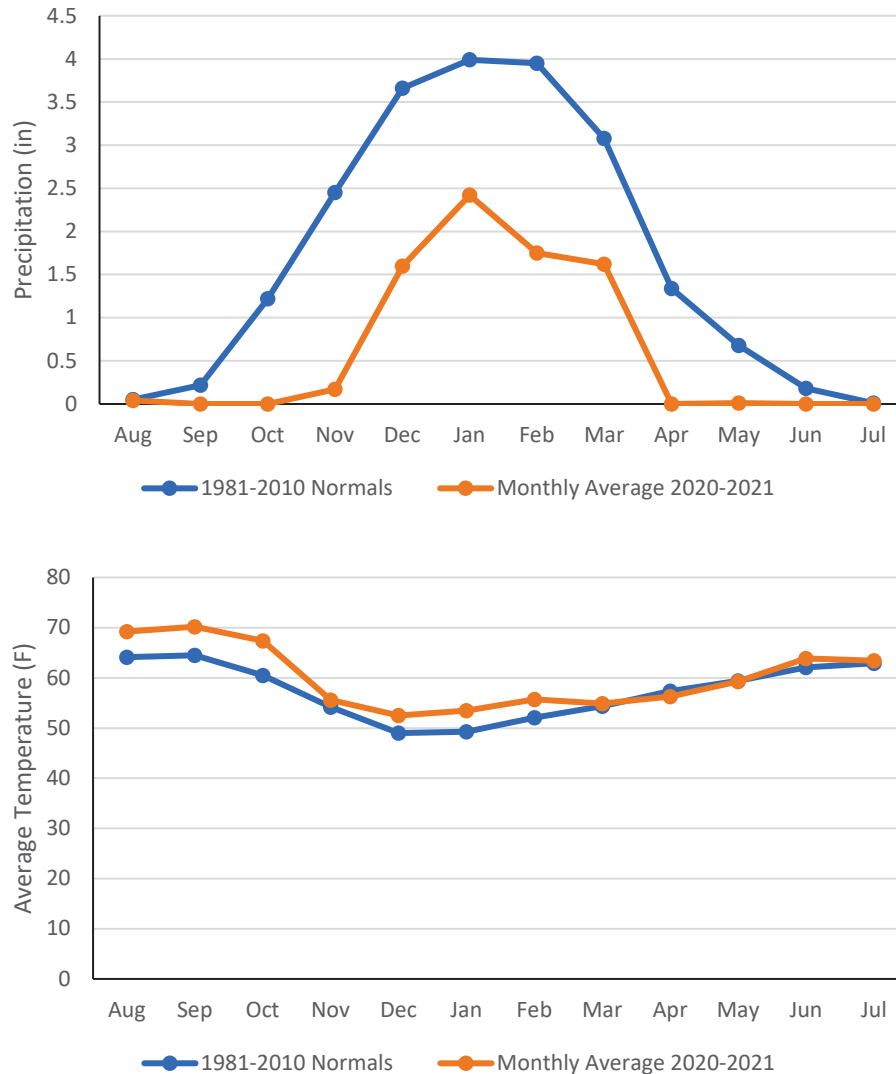


Figure 3. Local Precipitation and Temperature Against 30-Year Normals

Geology and Soils

The underlying geology is largely Quaternary alluvium with small areas of Quaternary marine sediments and small hills of Franciscan formation rocks, as well as Cretaceous, Eocene, and Miocene marine and Pliocene nonmarine sedimentary rocks (USDA 1997). A total of seven geology units are present in the study area; these units and the represented acreage in the study area are shown in Table 5. The rock type column in this table refers to the abbreviation for each rock type based on the geology map (California Geological Survey 2010). Their distribution in the study area is shown in Figure 4 (Appendix A). Franciscan Complex, Plio-Pleistocene and Pliocene loosely consolidated deposits, and Miocene Marine rocks make up a majority of underlying geology in the study area.

Table 5. Geology Units in the Study Area

ROCK TYPE	ROCK TYPE DESCRIPTION	ACREAGE
KJf	Franciscan Complex	39.8
MI	Miocene Marine rocks	44.7
Qoa	Older Quaternary alluvium and marine deposits	18.1
QPc	Plio-Pleistocene and Pliocene loosely consolidated deposits	112.2
Ti	Tertiary intrusive rocks	16.6
Tv	Tertiary volcanic flow rocks	2.5
um	Ultramafic rocks, chiefly Mesozoic	13.1
Total		247.0

A total of 15 soil mapping units are located within the study area (USDA 2021). These soil mapping units and the represented acreage in the study area are shown in Table 6 and their distribution are shown in Figure 5 (Appendix A). The Symbol column in Table 6 refers to the abbreviation for this soil type used in the soil survey (USDA 2021). Clay, loam, and clay loam make up a majority of the soils in the study area. Loam soils of the Maymen, Felton, and Millsholm soil series account for 26.7 percent of the study area, while clay soils of the Cropley and Diablo soil series account for 18.3 percent of the study area. Soils of the Los Osos clay loam series make up 23.6 percent of the study area (USDA 2021). Clay soils within the study area drive edaphic conditions that influence plant composition.

Table 6. Soil Mapping Units in the Study Area

SYMBOL	SOIL MAPPING UNIT	ACREAGE
126	Maymen loam, 30 to 75 percent slopes	29.2
127	Maymen-Los Gatos complex, 30 to 75 percent slopes, low precipitation	21.5
149	Urban land-Danville complex	0.3
150	Urban land-Tierra complex, 2 to 5 percent slopes	1.3
151	Urban land-Tierra complex, 5 to 15 percent slopes	4.6
152	Urban land-Tierra complex, 15 to 30 percent slopes	11.7
158	Xerorthents-Los Osos complex, 30 to 50 percent slopes	20.2
159	Xerorthents-Millsholm complex, 30 to 50 percent slopes	9.5
CkB	Cropley clay, 2 to 5 percent slopes	16.8
DdE	Diablo clay, 15 to 30 percent slopes	28.3
FaG	Felton loam, 50 to 75 percent slopes	5.1
LcF	Lodo clay loam, 30 to 50 percent slopes, very rocky	1.0
LhF	Los Osos clay loam, 30 to 50 percent slopes	58.3
MeG	Millsholm loam, 20 to 60 percent slopes, moist	31.9
Qa	Quarry	7.2
Total		247.0

Hydrology Characteristics

Hydrology onsite is influenced by precipitation, surface water runoff, geologic stratigraphy, topography, soil permeability, and plant cover. Although a formal wetland delineation was not included in the scope of work, it should be noted that a total of four intermittent drainages in the study area were identified on the 7.5-minute USGS topographic quad, including San Leandro Creek, Sausal Creek, Shepherd Creek, and one unnamed drainage immediately northeast of the Moraga Substation. The portion of the study area east of Gudde Ridge drains into the unnamed tributary, flowing southeast through Moraga Valley before entering San Leandro Reservoir to the southeast of the study area. San Leandro Creek drains the study area between Gudde Ridge and Manzanita Drive and flows south-southeast into San Leandro Reservoir. Shepherd Creek drains the upper Berkeley Hills east of Highway 13 via Shepherd Canyon and flows southwest into Sausal Creek at Highway 13. Sausal Creek flows south-southwest out of the Berkeley Hills through Dimond Canyon and ultimately drains into the Oakland Estuary near Alameda Island. San Leandro Creek, Sausal Creek, and the unnamed drainage all carried flow throughout the surveys.

Land-Use

The study area lies within a network of land uses including undeveloped EBRPD lands, EBMUD lands, Oakland Parks lands, Montclair Golf Enterprises driving range, Montera Middle School, Corpus Christi School, Zion Church, fee and easement lands, as well as private residential properties. Multiple paved surface streets cross the study area, the majority of which are located west of Manzanita Drive. The open space areas between Moraga Substation and Manzanita Drive, the staging areas in Sibley Volcanic Regional Preserve, Shepherd Canyon Park, and open space in Shepherd Canyon and Dimond Canyon are open to the public and recreational trails are often present. Active construction is ongoing at EBRPD Wilcox Station in Huckleberry Botanic Regional Preserve. Three active native plant restoration sites are present in the study area, two in Shepherd Canyon and one along the southern access route to Dimond Canyon. An unofficial BMX bike park is present in the study area near the towers immediately north of Oakland Fire Station No. 24 on Shepherd Canyon Road. Cattle graze in eastern portions of Huckleberry Botanic Regional Preserve.

3.2. VEGETATION COMMUNITIES

This subsection describes vegetation utilizing two vegetation classification systems developed by Holland (1986), Holland and Keil (1995), and Sawyer et al. (2009). Holland (1986) and Holland and Keil (1995) provide a generalized natural community-level description for natural communities present within the study area which include Non-Native Grassland, Native Grassland, Valley Needlegrass Grassland, Valley Wildrye Grassland, Central Coast Riparian Scrub, Northern Coyote Brush Scrub, Northern Maritime Chaparral, Ruderal, California Bay Forest, Coast Live Oak Woodland, Upland Redwood Forest, Urban Mix, and Freshwater Seep. Descriptions of these natural communities at this level provide an overview of the characteristics throughout their range while descriptions following the MCV (Sawyer et al. 2009) help provide more site-specific information on vegetation communities while conforming to a classification system that is recognized statewide.

Other undescribed, not included in Holland (1986) or Holland and Keil (1995) land cover types present in the study area include Construction Site, Park, Restoration Site, and Urban. The acreages of unpaved access roads are assigned to the vegetation community through which they cross, while paved surface streets are included in the Urban land cover type. These vegetation communities are described below.

As part of this assessment, a comparison is made between the natural communities as mapped during the 2021 survey effort and the vegetation types as mapped in the Conservation Lands Network (CLN) 2.0 Vegetation Map. The CLN 2.0 Vegetation Map is a coarse filter map with the goal of capturing ecological diversity at the local and regional scales in the San Francisco Bay Area (Bay Area Open Space Council 2019). Cover types as mapped in the CLN 2.0 Vegetation Map within a 1,000-foot buffer of the study area

are provided in Figure 6 (Appendix A). They are provided only as a rough comparison with those mapped during the 2021 survey effort. A total of sixteen cover types are mapped within the 1,000-foot buffer in the CLN 2.0 Vegetation Map including Blue Oak, California Bay, Coast Live Oak, Coastal Mixed Hardwood, Coyote Brush, Eucalyptus, Interior Mixed Hardwood, Moderate Grasslands, Non-Native/Ornamental Conifer/Hardwood, Non-Native/Ornamental Grass, Redwood, Riparian Mixed Hardwood, Serpentine Conifer, Serpentine Hardwood, Urban/Developed (General), and Warm Grasslands. There is a moderate level of agreement between the two mapping efforts, mostly with the larger more prevalent land cover types including grasslands, coast live oak woodland, and urban. The CLN 2.0 Vegetation Map fails to capture fine details as provided during the 2021 survey effort, including any of the Sensitive Natural Communities, often lumping them into larger, non-native vegetation types.

The location of land cover types, as defined in Holland (1986), were mapped in the study area during the 2021 field survey effort are shown in Figure 7 (Appendix A) and their acreages are shown in Table 7.

Table 7. Land Cover Types in the Study Area

LAND COVER*	ACREAGE
<u>Upland Herbaceous Dominated Vegetation Types</u>	
Non-Native Grassland	59.4
Native Grassland	0.3
Valley Needlegrass Grassland	1.9
Valley Wildrye Grassland	0.1
<u>Shrub Dominated Vegetation Types</u>	
Central Coast Riparian Scrub	0.3
Northern Coyote Brush Scrub	11.3
Northern Maritime Chaparral	2.1
Ruderal	0.1
<u>Woodland and Forest Vegetation Types</u>	
California Bay Forest	3.2
Coast Live Oak Woodland	67.5
Upland Redwood Forest	1.1
Urban Mix	8.4
<u>Wetland Herbaceous Dominated Vegetation Types</u>	
Freshwater Seep	0.1
<u>Other Cover Types</u>	
Construction Site	4.5
Park	3.3
Restoration Site	0.4
Urban	82.9
Total:	247.0

*Holland (1986)

Table 8 relates the vegetation types identified within the study area during the surveys performed for this project (based on the Holland [1986] classification system or the MCV [Sawyer et al. 2009]) to other commonly used vegetation classification systems including *A Manual of California Vegetation, Second edition* (Sawyer et al. 2009), *CNPS Inventory of Rare and Endangered Plants of California* (CNPS 2001b; 2021), and *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The codes used in Table 8 reflect those associated with Holland (1986) types (first column) and the

Vegetation Classification and Mapping Program List of California Vegetation Alliances (CDFW 2021a) (second column) which follows the MCV (Sawyer et al. 2009).

Table 8. Vegetation Community Classification Systems Comparison

VEGETATION COMMUNITY CLASSIFICATION SYSTEMS			
TERRESTRIAL COMMUNITIES ¹	CALIFORNIA VEGETATION ²	CNPS INVENTORY ³	WETLANDS AND DEEPWATER HABITATS ⁴
UPLAND HERBACEOUS DOMINATED VEGETATION TYPES			
Non-Native Grassland (42200)	<i>Avena</i> spp. and <i>Bromus</i> spp. Herbaceous Semi-Natural Alliance (Wild Oats and Annual Bromes Grassland) (42.027.00) <i>Brassica nigra</i> – <i>Centaurea</i> (<i>melitensis</i> , <i>solstitialis</i>) Herbaceous Semi-Natural Alliance (Upland Mustards or Star-Thistle Fields) (42.011.00) <i>Elymus caput-medusae</i> Semi-Natural Herbaceous Alliance (Medusahead Grassland) (42.020.00) <i>Festuca perennis</i> Herbaceous Semi-Natural Herbaceous Alliance (Perennial Rye Grass Fields) (41.321.00)	Valley and Foothill Grassland	Upland
Native Grassland (Holland and Keil 1995)	<i>Elymus glaucus</i> Herbaceous Alliance (Blue Wildrye Prairie) (41.131.000) S3	Valley and Foothill Grassland	Upland
Valley Needlegrass Grassland (42110)	<i>Stipa</i> spp. Herbaceous Alliance (Needle Grass Grassland) (41.140.00) S3	Valley and Foothill Grassland	Upland
Valley Wildrye Grassland (42140)	<i>Elymus triticoides</i> Herbaceous Alliance (Creeping Ryegrass Turfs) (41.081.00) S3	Valley and Foothill Grassland	Upland
SHRUB DOMINATED VEGETATION TYPES			
Central Coast Riparian Scrub (63200)	<i>Salix lasiolepis</i> Shrubland Association (Arroyo Willow Thickets) (61.201.01) S3	Riparian Scrub	Palustrine Forested or Shrub-scrub Wetland
Northern Coyote Brush Scrub (32110)	<i>Baccharis pilularis</i> Shrubland Alliance (Coyote Brush Scrub) (32.060.00)	Coastal Scrub Chaparral	Upland
Northern Maritime Chaparral (37C10)	<i>Arctostaphylos crustacea</i> Shrubland Alliance (Brittle Leaf Manzanita Chaparral) 37.308.00) S3 <i>Rubus</i> (<i>parviflorus</i> , <i>ursinus</i>) Shrubland Alliance (Berry Brambles) 63.901.00	Coastal Scrub Chaparral	Upland
Ruderal (Holland and Keil 1995)	<i>Genista monspessulana</i> Semi-Natural Shrubland Alliance (Broom Patches) (32.180.01)	Not Described	Upland

¹ Terrestrial Natural Communities of California (Holland 1986) and California Vegetation (Holland & Keil 1995)² A Manual of California Vegetation (Sawyer *et al.* 2009) and California Natural Community List (CDFW 2021a)³ CNPS Inventory of Rare and Endangered Plants of California Habitat Types (CNPS 2001b; 2021)⁴ Classification of Wetlands & Deepwater Habitats of the U.S. (Cowardin *et al.* 1979)

Table 8. Vegetation Community Classification Systems Comparison

VEGETATION COMMUNITY CLASSIFICATION SYSTEMS			
TERRESTRIAL COMMUNITIES ¹	CALIFORNIA VEGETATION ²	CNPS INVENTORY ³	WETLANDS AND DEEPWATER HABITATS ⁴
<u>WOODLAND AND FOREST DOMINATED VEGETATION TYPES</u>			
California Bay Forest (81200)	<i>Umbellularia californica</i> Forest Alliance (California Bay Forest) (74.100.00) S3	Cismontane Woodland Broadleaved Upland Forest Riparian Forest	Upland
Coast Live Oak Woodland (71160)	<i>Quercus agrifolia</i> Woodland Alliance (Coast Live Oak Woodland) (71.060.00)	Cismontane Woodland	Upland
Upland Redwood Forest (82320)	<i>Sequoia sempervirens</i> Forest Alliance (Redwood Forest) (86.100.00) S3	Broadleaved Upland Forest	Upland
Urban Mix (Holland and Keil 1995)	<i>Eucalyptus</i> spp. Woodland Semi-Natural Alliance (Eucalyptus Groves) (79.100.02) <i>Pinus radiata</i> Woodland Semi-Natural Alliance (Monterey Pine Plantations) (87.240.04)	Not Described	Upland
<u>WETLAND HERBACEOUS DOMINATED VEGETATION TYPES</u>			
Freshwater Seep (45400)	<i>Carex densa</i> Provisional Herbaceous Alliance (Dense Sedge Marshes) (45.165.00) S2?*	Meadows and Seeps	Palustrine non-persistent emergent wetlands
	<i>Erythranthe guttata</i> Herbaceous Alliance (Common Monkey Flower Seep) (44.111.00) S3		
	<i>Juncus balticus</i> Herbaceous Alliance (Baltic Rush Marshes) (45.562.00)		
<u>OTHER</u>			
Construction Site (Not Described)	Not Described	Not Described	Not Described
Park (Not Described)	Not Described	Not Described	Not Described
Restoration Site (Not Described)	Not Described	Not Described	Not Described
Urban (Not Described)	Not Described	Not Described	Not Described

Note:

* A question mark (?) denotes an inexact numeric rank because there are insufficient samples over the full expected range of the type, but existing information points to this rank.

3.2.1 UPLAND HERBACEOUS VEGETATION TYPES

Non-Native Grassland

Non-native grassland is dominated by a sparse to dense cover of non-native grasses and weedy annual and perennial forbs, primarily of Mediterranean origin, that have replaced native perennial grasslands as a result of human disturbance. However, where not completely outcompeted by weedy non-native plant species, scattered native wildflower species and native perennial grass species considered remnants of the original vegetation may also be common. This community occurs on fine-textured, usually clay soils, which are moist or waterlogged during the winter rainy season and very dry during the summer and fall. Germination occurs with the onset of the late fall rains while growth, flowering, and seed-set occur from winter through spring. With a few exceptions, the plants are dead through the summer and fall dry season, persisting as seeds. This community usually occurs below 3,000 feet but reaches 4,000 feet in the Tehachapi Mountains and interior San Diego County, and intergrades with coastal prairie along the Central Coast (Holland 1986).

Non-native grassland mostly occurs in the study area east of the San Leandro Creek canyon and at the staging areas in Sibley Volcanic Regional Preserve. Smaller polygons occur in a fragmented nature west of Manzanita Drive. Non-native grasslands readily intergrade with the understories of coast live oak woodland, northern coyote brush scrub, and urban mix communities in the study area. Some of the herbaceous species present in non-native grassland in the study area include soft chess (*Bromus hordeaceus**), slender wild oats (*Avena barbata**), wild oats (*A. fatua**), Italian wildrye (*Festuca perennis**), field madder (*Sherardia arvensis**), dogtail grass (*Cynosurus echinatus**), Medusahead (*Elymus caput-medusae**), rough cat's ear (*Hypochaeris radicata**), yarrow (*Achillea millefolium*), blue wildrye (*Elymus glaucus* subsp. *glaucus*), purple needlegrass (*Stipa pulchra*), Kellogg's yampah (*Perideridia kelloggii*), wild radish (*Raphanus sativus**), black mustard (*Brassica nigra**), and yellow star thistle (*Centaurea solstitialis**), among others. While generally dominated by non-native species, areas with moderate native integrity are present throughout this community. Coyote brush (*Baccharis pilularis* subsp. *consanguinea*) is invading many areas of non-native grassland in the study area.

Non-native grasslands in the study area are represented as at least four MCV alliances: *Avena* spp. – *Bromus* spp. Semi-Natural Herbaceous Stand, *Brassica nigra* – *Centaurea* (*melitensis*, *solstitialis*) Herbaceous Semi-Natural Alliance, *Elymus caput-medusae* Semi-Natural Herbaceous Alliance, and *Festuca perennis* Herbaceous Semi-Natural Herbaceous Alliance, described below.

* Throughout the rest of this document, an asterisk after a species name denotes a species not native to California.



Medusahead* in high cover in non-native grassland near the Moraga Substation.
Photo date: May 17, 2021.



Black mustard patch in non-native grassland on Gudde Ridge.
Photo date: May 17, 2021.



Non-native grassland with slender wild oats and smooth cat's ear near the staging by the community of Wilder. Photo date: July 12, 2021.

Avena spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance

This stand is described by Sawyer et al. (2009) with slender wild oats*, wild oats*, rattlesnake grass (*Briza maxima**), ripgut brome (*Bromus diandrus**), soft chess*, and/or foxtail barley (*Hordeum murinum**) as being dominant or co-dominant with other herbaceous nonnative species. Emergent trees and shrubs may be present at low cover. Herbs are generally less than 1.2 meters (3.9 feet) in height and cover is open to continuous. The membership rules for this alliance require wild oats and annual bromes to be greater than 50 percent relative cover individually or in combination. Some of the membership rules also require that native herbs be less than 10 percent relative cover or low or insignificant cover. Habitat for this alliance is foothills, waste places, rangelands, and openings in woodlands at all topographic settings below 2,200 meters (7,217.9 feet) (Sawyer et al 2009).

Brassica nigra – *Centaurea (melitensis, solstitialis)* Herbaceous Semi-Natural Alliance (Upland Mustards or Star-Thistle Fields)

This stand is described by Sawyer et al (2009) any of a variety of up mustard and thistle species or other ruderal forbs as being dominant in the herbaceous layer. Emergent trees and shrubs may be present at low cover. Herbs are generally less than 3 meters (9.8 feet) in height and cover is open to continuous. Membership rules for this alliance require that black mustard*, wild radish*, Italian thistle (*Carduus pycnocephalus* subsp. *pycnocephalus**), yellow star thistle*, or other non-native forbs make up more than 50 percent of relative cover in the herbaceous layer. Habitat for this alliance includes fallow fields, rangelands, grasslands, roadsides, levees, disturbed coastal scrub, riparian areas, cleared roadsides, and waste places. Soils are clays and clay loams. It occurs at elevations below 2,800 meters (9,186.4 feet) (Sawyer et al. 2009).

Elymus caput-medusae Herbaceous Semi-Natural Alliance (Medusahead Grassland)

This stand is described by Sawyer et al (2009) as Medusahead* being dominant or co-dominant with other non-natives in the herbaceous layer. Emergent shrubs may be present at low cover. Herbs are generally less than 1 meter (3.3 feet) in height and cover is open to continuous. Membership rules for this alliance require Medusahead* to be greater than 30 percent relative cover in the herbaceous layer. This alliance occurs in abandoned fields, eroded areas, overgrazed rangeland, road verges, waste places, foothills, and lower montane slopes at elevations below 2,200 meters (7,217.9 feet) (Sawyer et al. 2009).

Festuca perennis Herbaceous Semi-Natural Alliance (Perennial Rye Grass Fields)

This alliance is described by Sawyer et al (2009) as Italian wildrye* being dominant or co-dominant with a variety of other non-natives in the herbaceous layer. Emergent trees and shrubs may be present in low cover. Herbs are generally less than 1 meter (3.3 feet) in height and cover is intermittent to continuous. Membership rules for this alliance require that Italian wildrye be greater than 50 percent relative cover with native plants less than 15 percent relative cover. It occurs in lowlands with periodic flooding, disked fields, and uplands including serpentine substrates at elevations below 1,325 meters (4,347.1 feet) (Sawyer et al. 2009).

Native Grassland

Although listed as a vegetation community by Holland (1986), this reference does not provide a general narrative of characteristics, habitat, or range for this vegetation type. Generally, the specific native grassland types that are described are dominated by perennial tussock-forming grasses which are characteristic in the herbaceous layer. Both native and introduced annuals occur between the perennials, sometimes exceeding the native grasses in cover.

Native grassland is restricted to the eastern portion of the study area where it occurs near the staging area by the community of Wilder and on the east-facing slopes of Gudde Ridge. These areas are dominated by blue wildrye with other species present including hayfield tarweed (*Hemizonia congesta* var. *luzulifolia*), rough cat's ear*, California poppy (*Eschscholzia californica*), yarrow, bull thistle (*Cirsium vulgare**), teasel (*Dipsacus sativus**), and California plantain (*Plantago erecta*), among others. Shrub and tree layers are absent in this community.

Native grass grasslands within the study area are characterized as at least one MCV alliance, *Elymus glaucus* Herbaceous Alliance, described below.



Blue wildrye grassland near the staging area by the community of Wilder.
Photo date: March 11, 2021.

Elymus glaucus Herbaceous Alliance (Blue Wildrye Prairie)

As described in Sawyer et al. (2009), blue wildrye prairie is characterized by blue wildrye being dominant or co-dominant in the herbaceous layer with other native or non-native forbs. Emergent trees and shrubs may be present at low cover, including poison oak (*Toxicodendron diversilobum*). Herbs are generally less than 1 meter (3.3 feet) in height and cover is open to continuous. The shrub layer is sparse to open.

Membership rules for this alliance require blue wildrye be greater than 30 percent relative cover in the herbaceous layer. This alliance occurs in basins, terraces, dry floodplains, steep mesic slopes, and forest openings at elevations of 10 to 1,600 meters (32.8 to 5,249.3 feet) in elevation (Sawyer et al. 2009).

Blue wildrye prairie is considered of high inventory priority as it has a Subnational Conservation Rank of S3, indicating it is “Vulnerable” and at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2021).

Valley Needlegrass Grassland

Valley needlegrass grassland is a mid-height (≤ 2 feet) grassland dominated by perennial, tussock-forming needlegrass species (*Stipa* spp.), with native and introduced annual species occurring in the areas between needlegrass tussocks, often exceeding the bunchgrasses in cover. This community generally occurs on fine-textured (often clay) soils that are moist or even waterlogged during winter but very dry in summer. It can intermix with oak woodlands on moister, better drained sites. Historically extensive around the Sacramento, San Joaquin, and Salinas Valleys, as well as the Los Angeles Basin, it is now much reduced in both breadth and cover (Holland 1986).

Within the study area, valley needlegrass grasslands occur in a patchy distribution throughout the larger matrix of non-native grassland. They tend to be impacted by non-native species but retain moderate to high levels of native integrity and a characteristic dominance by purple needlegrass and nodding needlegrass (*Stipa cernua*). Dominant species include purple needlegrass and nodding needlegrass, with other herbaceous species present including California melic (*Melica californica*), California plantain, hayfield tarweed, slender tarweed (*Madia gracilis*), California poppy, rose clover (*Trifolium hirtum**), slender wild oats*, and bellardia (*Bellardia trixago**), among others. Low amounts of shrub cover including silver bush lupine (*Lupinus albifrons* var. *albifrons*) and coyote brush were observed in this community in the study area.

Valley needlegrass grasslands within the study area are characterized as at least one MCV alliance: *Stipa* spp. Herbaceous Grassland Alliance, described below.



Purple needlegrass grassland in the study area in Huckleberry Botanic Regional Preserve. Photo date: May 17, 2021.

Stipa spp. Herbaceous Grassland Alliance (Needle Grass Grassland)

As described in Sawyer et al. (2009) needlegrass species are dominant or characteristically present in the

herbaceous layer with other perennial grasses and herbs. Emergent trees and shrubs may be present at low cover. Herbs are generally less than 1 meter (3.3 feet) in height and cover is open to continuous. According to membership rules for grasslands to be classified as needlegrass grassland, needlegrass species must be characteristically present in the herbaceous layer with at least 2 percent absolute cover or have a clear presence in the stand with greater than 5 percent absolute cover in the herbaceous layer. Habitat for this vegetation community in California includes all aspects. Soils may be deep with high clay content, loamy, sandy, or silty soils derived from mudstone, sandstone, or serpentine substrates (Sawyer et al. 2009).

Needle grass grassland is considered of high inventory priority as it has a Subnational Conservation Rank of S3, indicating it is “Vulnerable” and at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2021).

Valley Wildrye Grassland

As described in Holland (1986), valley wildrye grassland is a dense sod prairie dominated by creeping wildrye (*Elymus triticoides*). It occurs in moist sites at low elevations, often in close proximity to stands of riparian forest or freshwater marsh. Sites are often characterized by subalkaline soils that can be seasonally overflowed. It has a scattered distribution throughout the Central Valley and surrounding foothills into the San Francisco Bay Area.

Within the study area, valley wildrye grassland is restricted to one occurrence just west of Moraga Substation on a gentle east-facing slope nestled against coast live oak woodland. The dominant species is creeping wildrye with other species present in lower numbers including Kellogg’s yampah, soaproot (*Chlorogalum pomeridianum* subsp. *pomeridianum*), and sapling coast live oak (*Quercus agrifolia* var. *agrifolia*), among others. Very sparse cover of sapling coast live oak and poison oak were observed in this community.

Valley wildrye grasslands within the study area are characterized as at least one MCV alliance: *Elymus triticoides* Herbaceous Alliance, described below.



Valley wildrye grassland near Moraga Substation with sapling coast live oak present. Photo date: May 17, 2021.

Elymus triticoides Herbaceous Alliance (Creeping ryegrass turfs)

As described in the MCV (Sawyer et al. 2009), creeping ryegrass is dominant or co-dominant in the

herbaceous layer with other native or non-native forbs and grasses. Emergent trees and shrubs may be present at low cover. Herbaceous species are less than 1.5 meters (4.9 feet) in height and cover is open to continuous (Sawyer et al. 2009). According to membership rules creeping ryegrass must comprise greater than 50 percent relative cover in the herbaceous layer. Habitat for this vegetation community in California includes poorly drained floodplains, playas, drainage and valley bottoms, mesic flat to sloping topography, and marsh margins at elevations below 3,000 meters (9,842.5 feet) (Sawyer et al. 2009).

Creeping ryegrass turfs is considered of high inventory priority as it has a Subnational Conservation Rank of S3, indicating it is “Vulnerable” and at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2021).

3.2.2 SHRUB DOMINATED VEGETATION TYPES

Central Coast Riparian Scrub

As described by Holland (1986), central coast riparian scrub is a scrubby streamside thicket, varying from open to impenetrable, dominated by any of several willow species (*Salix* spp.). This early seral community may succeed to any of several riparian woodland or forest types absent severe flooding disturbance. This community occurs on relatively fine-grained sand and gravel bars that are close to river channels and therefore close to groundwater. It is distributed along and at the mouths of most perennial and many intermittent streams of the South Coast ranges, from the Bay Area south to about Point Conception.

In the study area, this community is restricted to a mesic depression in Shepherd Canyon and an area where the access road to the staging area near Wilder crosses an ephemeral drainage. It is dominated by arroyo willow (*Salix lasiolepis*) in the shrub layer with poison oak present and low cover of California bay (*Umbellularia californica*). The herbaceous layer was largely absent although mugwort (*Artemisia douglasiana*), tall flatsedge (*Cyperus eragrostis*), Harding grass (*Phalaris aquatica**), and small amounts of creeping wildrye are present at the edges of this community.

Central coast riparian scrub within the study area is characterized as at least one MCV association: *Salix lasiolepis* Shrubland Association, described below.



Central coast riparian scrub in Shepherd Canyon. Photo date: May 18, 2021.

Salix lasiolepis Shrubland Association (Arroyo Willow Thickets)

Arroyo willow is dominant or co-dominant in the tall shrub or low tree canopy with mugwort, coyote brush, California rose (*Rosa californica*), California blackberry (*Rubus ursinus*), and/or other native shrubby species. As a shrubland, emergent trees may be present at low cover. Plants are less than 10 meters (32.8 feet) in height and the canopy is open to continuous, while the herbaceous layer is variable. The membership rules presented in the MCV are arroyo willow being more than 50 percent relative cover in the shrub or tree canopy and at least 25 percent absolute cover in the shrub or tree canopy. Within California, arroyo willow thickets alliance inhabits stream banks and benches, slope seeps, and stringers along drainages. It is known from the following Ecoregions: Central California Coast, Central California Coast Ranges, Great Valley, Klamath Mountains, Modoc Plateau, Mojave Desert, Mono, Northern California Coast, Northern California Coast Ranges, Northern California Interior Coast Ranges, Northwestern Basin and Range, Sierra Nevada, Sierra Nevada Foothills, Southeastern Great Basin, Southern California Coast, Southern California Mountains and Valleys, and Southern Cascades. It occurs at elevations below 2,170 meters (7,119.4 feet) (Sawyer et al. 2009).

Arroyo willow thickets are considered of high inventory priority as they have a Subnational Conservation Rank of S3, indicating they are “Vulnerable” and at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2021).

Northern Coyote Brush Scrub

As described by Holland (1986), northern coyote brush scrub is a cover type of northern coastal scrub based on the dominance of coyote brush. This community comprises low shrubs, usually 1.6 meters (5.3 feet) tall, typically dense but with scattered grassy openings. It occurs on windy, exposed sites with shallow, rocky soils and is patchily distributed from southern Oregon to Point Sur in Monterey County.

Northern coyote brush scrub is found in the study area east of the San Leandro Creek canyon as well as at the staging areas at Sibley Volcanic Regional Preserve. It is dominated by coyote brush in the shrub layer with other shrubby species present including poison oak, California sagebrush (*Artemisia californica*), California coffeeberry (*Frangula californica* subsp. *californica*), bush monkeyflower (*Diplacus aurantiacus*), and French broom (*Genista monspessulana**). The herbaceous layer varies from sparse to dense and includes California bee plant (*Scrophularia californica*), climbing bedstraw (*Galium porrigens* var. *porrigens*), California manroot (*Marah fabaceus*), soaproot, ladies tobacco (*Pseudognaphalium californicum*), common phacelia (*Phacelia distans*), hoary mustard (*Hirschfeldia incana**), and California broom (*Acmispon glaber* var. *glaber*), among others. In some areas it is co-dominant with California sagebrush and/or poison oak. Sapling coast live oak are often present in low numbers.

Northern coyote brush scrub within the study area is characterized as at least one MCV alliance: *Baccharis pilularis* Shrubland Alliance, described below.



Northern coyote brush scrub on an east-facing slope near Gudde Ridge in the eastern section of the study area. Photo date: May 17, 2021.



Northern coyote brush scrub on slopes in Sibley Volcanic Regional Preserve. Photo date: March 11, 2021.

Baccharis pilularis Shrubland Alliance (Coyote Brush Scrub)

Per Sawyer et al. (2009), coyote brush is dominant to co-dominant in the shrub canopy with other native shrub species including California broom, California sagebrush, California hazelnut (*Corylus cornuta* var. *californica*), bush monkeyflower, California coffeeberry, toyon (*Heteromeles arbutifolia*), oceanspray (*Holodiscus discolor*), California blackberry, and/or poison oak. Emergent trees may be present at low cover including coast live oak or California bay. The membership rules in MCV are coyote brush greater than 15 percent shrub cover over grassy understory and relative cover greater than 50 percent absolute cover in the shrub layer. Within California, coyote brush scrub inhabits river mouths, stream sides, terraces, stabilized dunes of coastal bars, spits along the coastline, coastal bluffs, open slopes, and ridges. Soils are variable, sandy to relatively heavy clay. This alliance is known from the Central California Coast, Central

California Coast Ranges, Great Valley, Northern California Coast, Northern California Coast Ranges, Sierra Nevada Foothills, Southern California Coast, and Southern California Mountains and Valleys ecoregions. It occurs below 1,500 meters (4,921.3 feet) in elevation (Sawyer et al. 2009).

Northern Maritime Chaparral

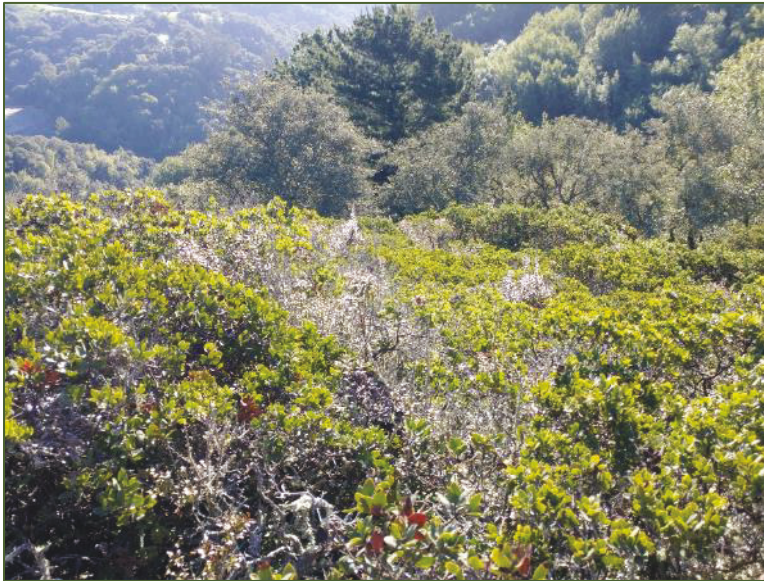
As described by Holland (1986), northern maritime chaparral is a fairly open chaparral that is dominated by several narrowly restricted manzanita (*Arctostaphylos* spp.) or ceanothus (*Ceanothus* spp.) species. It is often associated with sandy substrates within the zone of coastal fog incursion, usually on rolling to hilly terrain. Fire appears to be necessary for continued reproduction. This community is distributed from Santa Cruz County to Sonoma County near the coast, usually as islands in mixed evergreen forests of coast live oak, coast redwood (*Sequoia sempervirens*), and Douglas fir (*Pseudotsuga menziesii* var. *menziesii*), or adjacent to northern coastal scrub.

Within the study area, northern maritime chaparral is uncommon and is found only on east-facing slopes immediately east of Manzanita Drive where it often occurs as islands in the larger coast live oak woodland community. Where observed, it is dominated by brittle leaf manzanita (*Arctostaphylos crustacea* subsp. *crustacea*), pallid manzanita (*A. pallida*), California blackberry, oso berry (*Oemleria cerasiformis*), and California huckleberry (*Vaccinium ovatum*), with other native shrub species present including low numbers of jim brush (*Ceanothus oliganthus* var. *sorediatus*), coast silktassel (*Garrya elliptica*), and red flowering currant (*Ribes sanguineum* var. *glutinosum*). It varies in shrub density with manzanita species, when present, often forming impenetrable thickets with essentially no herbaceous layer. Immediately under the transmission lines east of Manzanita Drive, the shrub layer is more open, lacks manzanita species, and has a more robust herbaceous layer of climbing bedstraw, yerba 31 uena (*Clinopodium douglasii*), cow parsnip (*Heracleum maximum*), and sticky cinquefoil (*Drymocallis glandulosa* var. *glandulosa*), among others. Evidence of tree removal was observed in this area which may contribute to the persistence of this community. Emergent trees are present in low cover, often in the form of stump sprouts, and coast live oak, California bay, and bluegum (*Eucalyptus globulus*) were observed encroaching on this community.

Northern maritime chaparral within the study area is characterized as at least two MCV alliances: *Arctostaphylos crustacea* Shrubland Alliance and *Rubus* (*parviflorus*, *ursinus*) Shrubland Alliance, both described below.



Northern maritime chaparral with dense California huckleberry shrub cover and scattered manzanita species. Photo date: April 16, 2021.



Northern maritime chaparral with mix of pallid manzanita and brittle leaf manzanita. Photo date: March 12, 2021.



Northern maritime chaparral with California huckleberry, California blackberry, coast silktassel, and cow parsnip east of Manzanita Drive. Photo date: April 16, 2021.

Arctostaphylos crustacea Shrubland Alliance (Brittle Leaf Manzanita Chaparral)

Per the MCV, this vegetation type sometimes associates with pallid manzanita. Special stands are defined as specific patches of vegetation in the landscape that are unique from other patches, and they may appear structurally distinctive as well as be rare. The presence of specific CRPR plants typically define a type. All stands of pallid manzanita observed in the study area are here included in the *Arctostaphylos pallida* Provisional Special Stands nested under the brittle leaf manzanita chaparral alliance.

As described in Sawyer et al. (2009), brittle leaf manzanita or pallid manzanita is dominant, co-dominant, or characteristically present in the shrub canopy with native shrubs including other manzanita species (*Arctostaphylos* spp.), California sagebrush, coyote brush, bush chinquapin (*Chrysopsis chrysophylla* var. *minor*), California coffeeberry, toyon, and/or poison oak. Emergent trees may be present at low cover including coast live oak. Shrubs are generally less than 3 meters (9.8 feet) in height and the herbaceous layer is sparse. According to membership rules, brittle leaf manzanita must be greater than 30 percent relative cover in the shrub canopy. This community occurs on uplands near the coast or within maritime climatic influence including bluffs, dunes, mesas, outcrops, slopes, and terraces, with soils derived from many substrates and usually nutrient-poor sandstone, shale, sand deposits, and granitics. It occurs at elevations below 1,500 meters (4,921.3 feet) (Sawyer et al. 2009).

Brittle leaf chaparral is considered of high inventory priority as it has a Subnational Conservation Rank of S3, indicating it is “Vulnerable” and at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2021).

Rubus (parviflorus, ursinus) Shrubland Alliance (Berry Brambles)

As described in Sawyer et al. (2009), berry brambles consist of thimble berry (*Rubus parviflorus*) and/or California blackberry forming various mixtures in the shrub canopy with coyote brush, coast silktassel, cow parsnip, elderberry (*Sambucus nigra* subsp. *caerulea*), and California huckleberry. Emergent trees may be present at low cover. Shrubs are generally less than 2 meters (6.6 feet) in height with an intermittent to continuous canopy. The herbaceous layer is generally sparse. According to membership rules, thimble berry and/or California blackberry occur with comparable cover in the shrub layer. This community occurs on coastal bluffs, headlands, exposed slopes, and gaps in forest stands. It occurs at elevations ranging from 0 to 300 meters (0 to 984.3 feet) (Sawyer et al. 2009).

Ruderal

Ruderal communities are comprised of plants that thrive in waste areas, roadsides, or other disturbed sites in close proximity to urban areas (Holland and Keil 1995). These communities are difficult to characterize, are often temporary assemblages, and can contain ornamental species that have escaped cultivation. It is not uncommon for the majority of species in these communities to be introduced rather than native, although there may be remnant native species that intergrade with this vegetation community.

Within the study area, ruderal communities were uncommon and are represented by two polygons. Ruderal communities observed are dominated in the shrub layer by French broom* with small amounts of coyote brush and poison oak present. The herbaceous layer consists of mostly non-native annual grass species and other forbs including hedge parsley (*Torilis arvensis**), ladies tobacco, climbing bedstraw, and Pacific sanicle (*Sanicula crassicaulis*), among others. Emergent trees are often present in low cover. Where observed, these communities are invading grassland habitats and encroaching on adjacent coast live oak woodland and northern maritime chaparral communities.

Ruderal communities within the study area are characterized as at least one MCV alliance: *Genista monspessulana* Shrubland Semi-Natural Alliance, described below.



French broom* patch near Manzanita Drive. Photo date: May 17, 2021.

Genista monspessulana Shrubland Semi-Natural Alliance

As described in Sawyer et al. (2009), French broom* is dominant in the shrub canopy. Emergent trees may be present at low cover. According to MCV membership rules, French broom* must comprise greater than 15 percent absolute cover and greater than 60 percent relative cover in the shrub layer. Within California, this vegetation community occurs in roadsides, disturbed places, eroding slopes, riverbanks, disturbed grasslands, shrublands, and forest openings. It occurs at elevation below 1,000 meters (3,280.8 feet).

3.2.3 WOODLAND AND FOREST VEGETATION TYPES

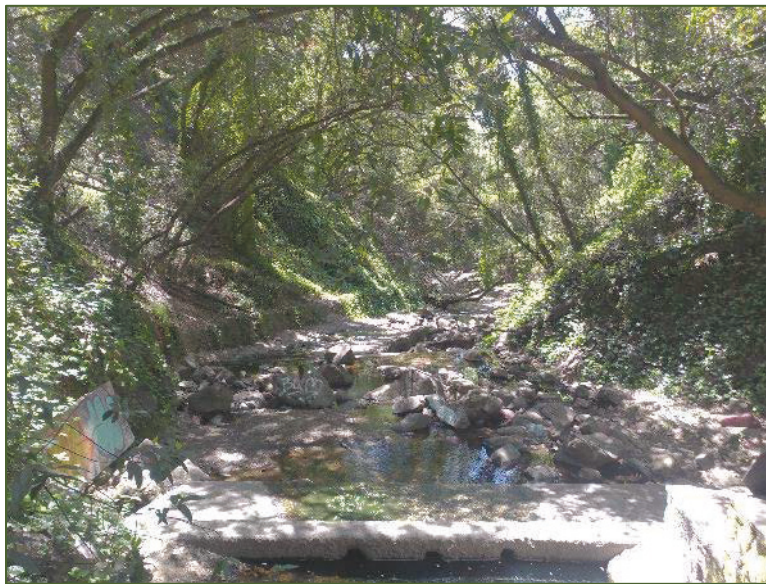
California Bay Forest

As described by Holland (1986) this community is similar to mixed evergreen forest, but typically consists entirely of California bay, a broadleaved sclerophyllous tree that grows up to 30 meters (98.4 feet) tall. It often forms dense, wind-pruned stands less than 10 meters (32.8 feet) tall on exposed coastal slopes. Even away from the coasts, stands are usually dense and support little to no understory. This is a moist community

that usually occurs on exposed slopes and ridges to the north of San Francisco Bay and on north-facing slopes further south. It is adapted to the sea winds of exposed coastal slopes and responds to fire by crown-sprouting. It is distributed in the Outer Coast Ranges from the Oregon border to northern San Luis Obispo County and is best developed away from the immediate coast to the north of San Francisco Bay and close to the coast south of the Bay.

Within the study area, California Bay Forest is present along the access roads leading to the community of Wilder, in the San Leandro Creek canyon bottom and banks, and in the Sausal Creek Canyon bottom and banks. Where present in the more mesic canyon bottoms, it is considered a riparian community. It is characterized by a dominance of California bay in the overstory. The shrub layer is sparse and consists of snowberry (*Symphoricarpos albus* subsp. *laevigata*), California hazelnut, California blackberry, poison oak, and English ivy (*Hedera helix**). Herbaceous layer is similarly sparse and consists of sword fern (*Polystichum munitum*), wood fern (*Dryopteris arguta*), giant trillium (*Trillium chloropetalum*), woodland madia (*Anisocarpus madioides*), woodland brome (*Bromus laevipes*), and California manroot. The stand in the Sausal Creek Canyon is heavily invaded by English ivy*, which comprises almost the entirety of understory cover.

California Bay Forest in the study area is represented by a single MCV alliance: *Umbellularia californica* Forest Alliance, described below.



Riparian California bay forest in the bottom of Sausal Creek canyon with heavy presence of English ivy in the understory. Photo date: May 18, 2021.



California bay forest on the western bank of the San Leandro Creek canyon with sparse herb and shrub layers. Photo date: April 16, 2021.

Umbellularia californica Forest Alliance (California Bay Forest)

This alliance is described in Sawyer et al. (2009) with California bay dominant or co-dominant in the tree canopy or tall shrub canopy with other native trees. Trees are less than 25 meters (82 feet) tall and the canopy ranges from intermittent to continuous. The shrub layer is open to intermittent and the herbaceous layer is sparse to abundant. The membership rules for this alliance state that California bay is greater than 30 percent relative cover in the tree canopy with conifers less than 30 percent relative cover. Habitat for this alliance is alluvial benches, streamsides, valley bottoms, coastal bluffs, inland ridges, steep north-facing slopes, and rocky outcrops on shallow to deep, sandy to clay loam soils below 1,200 meters (3,937 feet) in elevation (Sawyer et al. 2009).

California bay forest is considered of high inventory priority as it has a Subnational Conservation Rank of S3, indicating it is “Vulnerable” and at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2021).

Coast Live Oak Woodland

Coast live oak woodland is typically dominated by one tree species, coast live oak, which is evergreen and reaches 10 to 25 meters (32.8 to 82 feet). The shrub layer is poorly developed, but may include toyon, gooseberry (*Ribes* spp.), and blue elderberry. The herb component is continuous and dominated by non-native annual grasses. This community typically occurs on north-facing slopes and shaded ravines in the south and more exposed sites in the north. It also intergrades with coastal scrub and mixed chaparral communities on drier sites and with other oak and evergreen forests on moister sites. Coast live oak woodland is distributed throughout the outer south Coast Ranges and coastal slopes of the Transverse and Peninsular Ranges, usually below 1,219 meters (3,999.3 feet).

Coast live oak woodland is one of the most widespread community in the study area, with larger polygons occurring east of Manzanita Drive and more fragmented polygons west of Manzanita Drive. Tree canopy is largely dominated by coast live oak, with California bay, California buckeye (*Aesculus californica*), or other tree species often being co-dominant. Shrub layer varies from sparse to dense and includes poison oak, coyote brush, French broom*, snowberry, and California hazelnut, among others. Herbaceous layer varies from dense to open and includes species such as Pacific sanicle, soaproot, wood fern, rough

hedgenettle (*Stachys rigida* var. *quercetorum*), hedge parsley*, wood rush (*Luzula comosa* var. *comosa*), blue wildrye, as well as a variety of non-native annual grasses. West of Manzanita Drive, the residential areas classified as urban generally occur within a larger matrix of coast live oak woodland but are characterized by heavy anthropogenic influences including tree trimming, understory management, and landscaping.

Coast live oak woodland within the study area is characterized as at least one MCV alliance: *Quercus agrifolia* Woodland Alliance, described below.



Coast live oak woodland with sparse herb and shrub layer east of San Leandro Creek canyon. Photo date: March 12, 2021.

Quercus agrifolia Woodland Alliance (Coast Live Oak Woodland)

Coast live oak is dominant or co-dominant in the tree canopy with big leaf maple (*Acer macrophyllum*), California buckeye, madrone (*Arbutus menziesii*), and/or California bay. Trees are less than 30 meters (98.4 feet) in height and the canopy is open to continuous. Shrub layer is sparse to intermittent. The herbaceous layer is sparse or grassy. The membership rules in the MCV is coast live oak greater than 50 percent relative cover in the tree canopy. If California bay is present it must be less than 33 percent relative cover, otherwise the stand is placed in the California bay forest Alliance. Within California, coast live oak woodland inhabits alluvial terraces, canyon bottoms, stream banks, slopes, and flats. Soils are deep, sandy, or loamy, with high organic matter. It is known from the following Ecoregions: Central California Coast, Central California Coast Ranges, Great Valley, Northern California Coast, Northern California Coast Ranges, Northern California Interior Ranges, Southern California Coast, and Southern California Mountains and Valleys. It occurs at elevations below 1,200 meters (3,937 feet) in elevation (Sawyer et al. 2009).

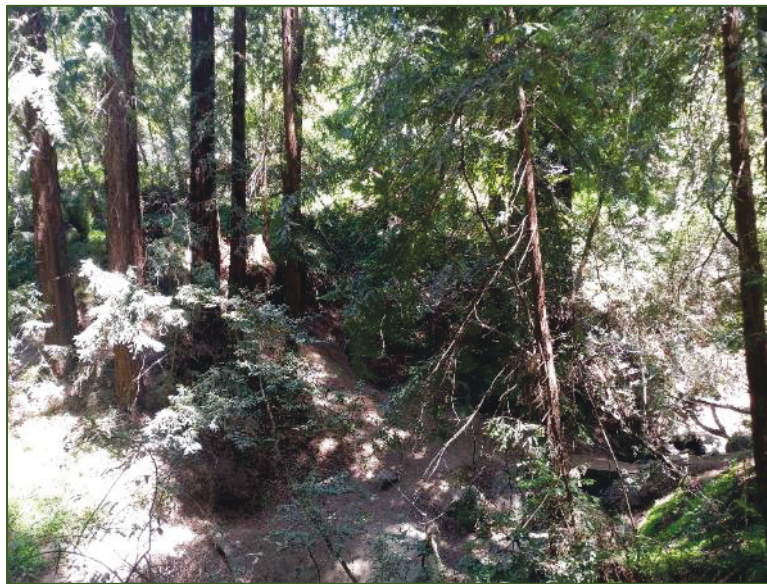
Upland Redwood Forest

Holland (1986) describes upland redwood forest as a moderately dense forest dominated by coast redwood usually around 80 meters (262.5 feet) in height. Growth is often limited by drought in summer and fall. This community grows within reach of summer fogs, with inland and upper altitudinal ranges possibly limited by this factor. It occurs on shallow, well-drained soils, often on steep slopes subject to erosion. It is confined to north exposures and canyon bottoms near the interior and southern margins of the range and is often subject to infrequent and devastating fires. It intergrades with Douglas fir forest, mixed evergreen forest, or Californian mixed chaparral toward the interior, at higher elevations, or on rockier, drier soils in

its range. This community is abundant and nearly continuous in the outer Coast Ranges from extreme southwestern Oregon to Sonoma County. It is abundant in southern Marin County, from southern San Mateo County through Santa Cruz County, and in coastal canyons of Monterey County south of Monterey nearly to the San Luis Obispo County line. Upland redwood forest extends inland about 35 miles near the headwaters of the Russian River, Mendocino County, and 45 miles inland in southeastern Napa County. Elevation range is from sea level to about 3,000 feet. The community is usually absent from exposed coastal headlands and the entire region of Cape Mendocino, Humboldt County.

Upland redwood forest is present in the study area in Dimond Canyon and Shepherd Canyon. It is dominated by coast redwood in the tree canopy with California bay and madrone present in the secondary canopy. The shrub layer is largely absent and where present is made up of sapling coast redwood and California bay. The herbaceous layer is sparse and includes redwood sorrel (*Oxalis oregana*), crimson woodsorrel (*Oxalis incarnata**), panic veldt grass (*Ehrharta erecta**), and sword fern. It is unclear if the upland redwood forest polygons in Shepherd Canyon are remnant native forest or historic plantings, but they retain aspects of native forest and are mapped as such here. In Dimond Canyon, outplantings of native herbaceous species including redwood sorrel and alum root (*Heuchera micrantha*) were observed in upland redwood forest.

Within the study area upland redwood forest is represented by a single MCV alliance: *Sequoia sempervirens* Forest Alliance, described below.



Redwood forest in Dimond Canyon with sparse understory. Redwood sorrel visible in bottom corners of photo. Photo date: May 18, 2021.

Sequoia sempervirens Forest Alliance (Redwood Forest)

Sawyer et al. (2009) describe this alliance with coast redwood being dominant or co-dominant in the tree canopy with big leaf maple, madrone, and California bay. Trees are less than 120 meters (393.7 feet) in height and the canopy is intermittent or continuous and may be two-tiered. Shrubs are infrequent or common, and the herbaceous layer is absent or abundant. Membership rules dictate that coast redwood must be greater than 50 percent relative cover in the tree canopy, or greater than 30 percent relative cover with other conifers or with a lower tier of hardwood trees. It occurs on raised stream terraces, ridges, or benches on all slopes and aspects. It occurs at elevations of 10 to 975 meters (32.8 to 3,198.8 feet) (Sawyer et al. 2009).

Redwood forest is considered of high inventory priority as it has a Subnational Conservation Rank of S3, indicating it is “Vulnerable” and at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2021).

Urban Mix

Urban mix is characterized as areas where non-native plants have either escaped or been ornamentally planted, for uses such as windrows, in areas around urban or residential developments (Holland and Keil 1995). In open areas surrounded by development it is not uncommon to find mixtures of non-native and native vegetation. Common examples of non-native plants found in urban mix include eucalyptus species (*Eucalyptus* spp.*), Monterey cypress (*Hesperocyparis macrocarpa*⁺), Monterey pine (*Pinus radiata*⁺), and acacias (*Acacia* spp.*), along with many non-native shrubs, perennials, and ornamental vines.

Within the study area, urban mix occurs along the ridge near Manzanita Drive, as well as in scattered polygons throughout Shepherd Canyon and Dimond Canyon. Most polygons are dominated by bluegum with Monterey pine, Monterey cypress, and acacia species present and often co-dominant. A monotypic stand of Monterey pine is located just south of Moraga Substation along the urban interface. The shrub layer varies from dense to open and consists of coyote brush, poison oak, snowberry, and French broom*. The herbaceous layer is sparse to continuous and consists of mostly non-native species including panic veldt grass*, slender wild oats*, ripgut brome*, hedge parsley*, and English plantain (*Plantago lanceolata**), although native species are often present including blue wildrye, soaproot, and Pacific sanicle. Pallid manzanita occurs in the understory of urban mix where it has encroached on northern maritime chaparral near The Hills Swim Club.

Urban mix groves within the study area are characterized as at least two MCV alliances: *Eucalyptus* spp. Woodland Semi-Natural Alliance and *Pinus radiata* Woodland Semi-Natural Alliance, described below.



Access road through urban mix community in Shepherd Canyon.
Photo date: March 12, 2021.

⁺ Denotes a species of native origin but not indigenous to the site.



Urban mix near The Hill Swim Club with pallid manzanita in understory.
Photo date: March 12, 2021.

Eucalyptus spp. Woodland Semi-Natural Alliance (Eucalyptus Groves)

Eucalyptus groves are described as eucalyptus (less than 50 meters [164 feet] tall) being dominant in the tree canopy. The canopy is in intermittent to continuous and the shrub layer and herbaceous layer is sparse to intermittent. The membership rules for this alliance require eucalyptus to be more than 80 percent relative cover in the tree layer. Within California, eucalyptus groves are known from the following Ecoregions: Central California Coast, Great Valley, Northern California Coast, Sierra Nevada Foothills, Southern California Coast, and Southern California Mountains and Valleys. It has been planted as individual trees, groves, and windbreaks, and is naturalized on uplands and stream courses (Sawyer et al. 2009). It occurs at elevations below 1,900 meters (6,233.6 feet) elevation (Sawyer et al. 2009).

Pinus radiata Woodland Semi-Natural Alliance (Monterey Pine Plantations)

Monterey pine plantations are dominated in the tree canopy by Monterey pine⁺. Shrub and herbaceous layers tend to be intermittent to open. Plantations of Monterey pine forest exist in the state and worldwide, but natural stands exist in only three disjunct areas in mainland California: near Año Nuevo, on the Monterey Peninsula, and at Cambria. Additional populations occur on Cedros and Guadalupe islands off central Baja California. Monterey pine is a fast-growing conifer that attains a height of 15 to 35 meters (49.2 to 114.8 feet) and an age of 80-100 years. Trees produce cones at 5-10 years of age. Cones are generally serotinous and open after a fire or on hot days. Trees have intermediate shade tolerance. Monterey pine is a CRPR 1B.1 species, but only in naturally occurring stands (CNPS 2021). It is difficult to differentiate between natural and planted tree regeneration in stands that have been reproducing along the coast of Central California.

3.2.4 WETLAND HERBACEOUS DOMINATED VEGETATION TYPES

Freshwater Seeps

As described in Holland (1986), freshwater seeps are comprised of mostly perennial herbs, namely sedges (*Carex* spp.) and grasses (Poaceae), often forming total cover. Plants are usually low-growing, but sometimes reach taller heights, and grow throughout the year in areas with mild winters. This community generally occurs on permanently moist or wet soil around freshwater seeps. Freshwater seeps are often

associated with grasslands or meadows. Although uncommon in the deserts, freshwater seeps are scattered through most regions of California, but are most commonly found in grassland habitats.

Within the study area, freshwater seeps are restricted to four small polygons, all located in the eastern portion of the study area. They all occur as small islands within larger non-native grassland, coast live oak woodland, and/or northern coyote brush scrub communities. Characteristic species include dense sedge (*Carex densa*), common monkeyflower (*Erythranthe guttata*), Baltic rush (*Juncus balticus* subsp. *ater*), Pacific rush (*Juncus effusus* subsp. *pacificus*), rabbitsfoot grass (*Polypogon monspeliensis**), Italian wildrye*, and tall flatsedge, among others. There is an overhanging tree layer present from adjacent oak woodland communities and encroaching coyote brush was present at two locations. Freshwater seeps observed in the study area were generally associated with springs and had saturated soil or standing water throughout the surveyed area.

Freshwater seeps within the study area are characterized as at least three MCV alliances: *Carex densa* Provisional Herbaceous Alliance, *Erythranthe guttata* Herbaceous Alliance, and *Juncus balticus* Herbaceous Alliance, described below.



Dense sedge marsh surrounded by non-native grassland on gentle slopes just west of the Moraga Substation. Photo date: April 16, 2021.



Common monkey flower seep present west of Gudde ridge in the eastern portion of the study area. Photo date: May 17, 2021.

Carex densa Provisional Herbaceous Alliance (Dense Sedge Marshes)

As described in Sawyer et al. (2009), dense sedge is dominant or co-dominant in the herbaceous layer with other mostly native, herbaceous species. Emergent shrubs may be present at low cover. Herbs are generally less than 1 meter (3.3 feet) in height and cover is continuous. Habitat for this vegetation community in California includes saturated bottomlands and flats, as well as freshwater seeps. Soils are silty to sandy, and seasonally or intermittently saturated (Sawyer et al. 2009).

Dense sedge marsh is considered of high inventory priority as it has a Subnational Conservation Rank of S2?, indicating it is “Imperiled” and at high risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors. (A question mark [?] denotes an inexact numeric rank because there are insufficient samples over the full expected range of the type, but existing information points to this rank [NatureServe 2021]).

Erythranthe guttata Herbaceous Alliance (Common Monkey Flower Seeps)

As described in Sawyer et al. (2009), common monkey flower is dominant or characteristically present in the herbaceous layer with other native or non-native forbs. Emergent shrubs may be present at low cover. Herbs are generally less than .5 meter (1.6 feet) in height and cover is sparse to continuous. Membership rules presented in Sawyer et al. (2009) indicate common monkey flower must be greater than 50 percent relative cover in the herbaceous layer. It occurs on vernal moist or saturated edges of small, steep-gradient streams, ephemeral cascades, ditches, fens, seeps, and springs. Soils are sandy or little-developed lithosols usually derived from metamorphic, serpentine, or volcanic substrates.

Common monkey flower seeps habitat is considered of high inventory priority as it has a Subnational Conservation Rank of S3?, indicating it is “Vulnerable” and at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors (NatureServe 2021).

Juncus balticus Herbaceous Alliance (Baltic Rush Marshes)

Baltic rush is dominant or co-dominant in the herbaceous layer with other mostly native, herbaceous species. Emergent trees and shrubs may be present at low cover. Herbs are generally less than 3.3 feet (1 meter) in height and cover is intermittent to continuous. According to membership rules, Baltic rush must

have either greater than 25 percent relative cover in the herbaceous layer or greater than 50 percent relative cover in the herbaceous layer. Habitat for this vegetation community in California includes wet and mesic meadows; along stream banks, rivers, lakes, ponds, fens, and sloughs; as well as freshwater, brackish, and alkaline marshes at elevations below 2,200 meters (7,217.9 feet) (Sawyer et al. 2009).

3.2.5 OTHER

Construction Site

Within the study area, the area north of Pinehurst Road at Wilcox Staging Area in Sibley Botanic Regional Preserve is undergoing active construction by EBRPD. Activities observed include excavation, drainage restructuring, building construction, and storage of heavy machinery and construction supplies. This area is currently not providing any natural habitat, does not conform to any of the vegetation communities described above, and as such is not included in any of them.

Parks

Parks consist of landscaped recreation areas where sod dominates and picnic tables, restrooms, or other publicly accessible services are available. They may contain ruderal weeds but provide little to no habitat in the study area. Within the study area, Shepherd Canyon Park, sports fields, and golf courses are classified as Parks.

Restoration Site

Two areas in Shepherd Canyon and one area in Dimond Canyon contain large community-sponsored native plant restoration sites. These areas are artificially high in native plant cover and likely provide valuable ecosystem services for wildlife. However, they provide little to no habitat for special status plant species due to their garden-like nature and as such are not included in adjacent habitat types described above.



Restoration site in Shepherd Canyon with planted native species and irrigation tubing visible. Photo date: March 12, 2021.

Urban

Urban communities consist largely of residential areas dominated by single family residences as well as paved areas including parking lots, surface streets, church grounds, and school grounds. In the study area,

urban land types are dominant east of Manzanita Drive. While some residential properties may retain small amounts of natural habitat, urban areas are characterized by homes and the surrounding landscapes which are often heavily landscaped. Although coast live oak trees are prevalent in urban areas between Manzanita Drive and Highway 13, they provide little to no natural habitat and as such are classified as urban in these locations.

Section 4. RESULTS

During this study, a total of 399 plant species were observed within the study areas. Of these species, 225 (56 percent) are considered native species and 174 (44 percent) are considered non-native species that have an origin outside of California. Generally, native species comprised higher cover and abundance than non-native species within the scrub, chaparral, woodland, forest, and native grassland habitats. Where non-native grasslands, urban mix communities, ruderal communities, or higher levels of disturbance are present, non-native species were more abundant. Due to the large amounts of urban landscapes in the study area, many species present are considered “waifs” in California and may not be present in more natural landscapes. A complete list of plant species observed within the study area is presented in Appendix B.

4.1. SENSITIVE NATURAL COMMUNITIES

During the 2021 surveys, a total of nine sensitive natural communities currently recognized by CDFW (2021a) were observed within the study area. These communities, their conservation status rank, as well as their acreage represented in the study area appear in Table 9. The locations of these communities are depicted in Figure 7 (Appendix A).

Table 9. Sensitive Natural Communities the Study Area

VEGETATION TYPE	CONSERVATION STATUS RANK	ACREAGE
<u>Upland Herbaceous</u>		
<i>Elymus glaucus</i> Herbaceous Alliance	S3	0.3
<i>Stipa</i> spp. Herbaceous Alliance	S3	1.9
<i>Elymus triticoides</i> Herbaceous Alliance	S3	0.1
<u>Scrub and Chaparral</u>		
<i>Arctostaphylos crustacea</i> Shrubland Alliance	S3	0.4
<i>Salix lasiolepis</i> Shrubland Association	S3	0.3
<u>Forest and Woodland</u>		
<i>Umbellularia californica</i> Forest Alliance	S3	3.2
<i>Sequoia sempervirens</i> Forest Alliance	S3.2	1.1
<u>Wetland</u>		
<i>Carex densa</i> Provisional Herbaceous Alliance	S2?	<0.1
<i>Erythranthe guttata</i> Herbaceous Alliance	S3	0.1
Total:		5.4

¹ Explanation of Status Codes

State Codes

S2 Imperiled

S3 Vulnerable

? A question mark (?) denotes an inexact numeric rank because there are insufficient samples over the full expected range of the type, but existing information points to this rank

4.2. SPECIAL STATUS PLANTS

Based on a review of available databases and literature (USFWS 1999, 2014, 2021; CDFW 2021b, 2021c, 2021d; CNPS 2021; Baldwin et al. 2012), familiarity with the regional flora, and presence of specific vegetation types, a total of 14 special status plant species were determined to be targets of the 2021 protocol-level rare plant surveys. Surveys for these 14 target species were conducted during the appropriate blooming periods in 2021. A summary of the survey results is presented in Table 10.

Table 10. Occurrence Summary of Special status Plants Within the Study Area

SPECIES NAME	COMMON NAME	STATUS ¹	RESULTS
FEDERAL/STATE LISTED SPECIES			
<i>Arctostaphylos pallida</i>	pallid manzanita	FT, SE, 1B.1	Observed
<i>Holocarpha macradenia</i>	Santa Cruz tarplant	FT, SE, 1B.1	Not observed
CALIFORNIA RARE PLANT RANK SPECIES			
<i>Amsinckia lunaris</i>	bent-flowered fiddleneck	1B.2	Not observed
<i>Androsace elongata</i> subsp. <i>acuta</i>	California androsace	4.2	Not observed
<i>Balsamorhiza macrolepis</i>	big-scale balsamroot	1B.2	Not observed
<i>Calochortus umbellatus</i>	Oakland star-tulip	4.2	Observed
<i>Dirca occidentalis</i>	western leatherwood	1B.2	Not observed
<i>Eryngium jepsonii</i>	Jepson's button thistle	1B.2	Observed
<i>Fritillaria liliacea</i>	fragrant fritillary	1B.2	Not observed
<i>Heliathella castanea</i>	Diablo helianthella	1B.2	Not observed
<i>Leptosiphon acicularis</i>	bristly leptosiphon	4.2	Not observed
<i>Meconella oregana</i>	Oregon meconella	1B.1	Not observed
<i>Micropus amphibolus</i>	Mt. Diablo cottonweed	3.2	Not observed
<i>Streptanthus albidus</i> subsp. <i>peramoenus</i>	most beautiful jewelflower	1B.2	Not observed

¹ **Explanation of State and Federal Listing Codes**

FT = federally threatened; SE = state endangered

California Rare Plant Rank codes:

- 1B Rare, Threatened, or Endangered in California and elsewhere
- 3 Plants about which more information is needed (a review list)
- 4 Plants of limited distribution – Watch list

California Rare Plant Rank threat codes:

- .1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
- .2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

4.2.1 FEDERAL- AND/OR STATE-LISTED SPECIES

One federal- and state-listed rare plant species was observed within the study area during the field investigations: pallid manzanita. A brief description of this species, its habitat requirements, occurrence information, and threats and management considerations are discussed below. A CNDDB field survey form for this occurrence is presented in Appendix C.

Pallid Manzanita (*Arctostaphylos pallida*)

Status, Distribution and Habitat Requirements

Pallid manzanita (*Arctostaphylos pallida* Eastw.⁹) is federally listed as Threatened and has a California Rare Plant Rank of 1B.1, indicating it is rare and seriously endangered in California (CNPS 2021). This is a shrubby perennial species of the heath family (Ericaceae). The type locality¹⁰ for this species is a 1902 Carruth collection located on “the summit of East Oakland Hills” in Alameda County (Eastwood 1933). The etymology of the genus *Arctostaphylos* is from the Greek for “bear berries” (Parker et al. 2012).

Pallid manzanita is an erect shrub from 2 to 4 meters (6.6 to 13.1 feet) tall with no burl and twigs that are densely short- and long-nonglandular hairy (Parker et al. 2012). Its leaves are overlapped, have petioles less than 2 millimeters (0.1 inch) in length, are generally ovate, glaucous-green, dull, glabrous, and with clasping bases. Its inflorescence consists of a three- to five-branched panicle with pendent densely short-nonglandular hairy nascent inflorescences and axes, and leaf-like bracts which are widely lanceolate and glandular hairy. The fruits measure 8 to 10 millimeters (0.3 to 0.4 inch) wide, are depressed spheric and sticky, and have free stones. It differs from other non-burled species of *Arctostaphylos* in having leaf-like inflorescence bracts and isofacial leaves which are glabrous, green, glaucous, and not boat-shaped (Parker et al. 2012). This taxon has a blooming period ranging from December through March (CNPS 2021).

Pallid manzanita is strongly associated with siliceous substrates that are sandy and/or gravelly in broadleafed upland forest, closed-cone forest, chaparral, cismontane woodland, and coastal scrub (CNPS 2021). It is a California endemic known from Alameda and Contra Costa counties between 605 and 1,525 feet in elevation (CNPS 2021).

Occurrence Data and Habitat Characteristics

During the 2021 survey, one population of pallid manzanita (Arcpal1) was observed within the study area (Table 11). This population is a previously known CNDDDB record (Occurrence # 4, EONDX¹¹ # 14045) that is specific and has been updated multiple times. Occurrence # 4 comprises multiple colonies, of which the four observed in the study area are the southernmost. This occurrence is associated with multiple collections dating from at least 1923 (CDFW 2021d). Records indicate that many individuals in this population were recorded as missing during a 2004 survey of the area. It is also noted that *Phytophthora cinnamomi*, a fungus-like organism that causes severe root rot and dieback on many woody species, has been confirmed in this population (CDFW 2021d).

Table 11. Pallid Manzanita Populations Recorded in 2021

POPULATION NUMBER	GENERAL LOCATION	CNDDDB # / PRECISION	NUMBER OF INDIVIDUALS
Arcpal1	Along and adjacent to Manzanita Drive and Huckleberry Botanic Regional Preserve	14045 / Specific	35

Population Arcpal1, also known as Occurrence # 4 (EONDX # 14045), comprised four colonies found along Manzanita Drive and in Huckleberry Botanic Regional Preserve on the east-facing slope just west of Manzanita Drive. The colonies observed occurred on siliceous shale substrates on slopes ranging from steep

⁹ In botanical literature binomial scientific names are followed immediately by the name of or the abbreviation for the publishing author(s) who validated the name. A scientific name is not strictly complete without the name(s) of the validating author(s) attached. Plant species that appear in this report that have regulatory significance are referred to by their binomial scientific name and author for nomenclatural relevance.

¹⁰ A type locality is the geographical location where the type specimen, which is used to describe a species for the first time, was originally found.

¹¹ EONDX is the Element Occurrence Index, a unique integer key for each element occurrence record in the CNDDDB.

to flat and on various aspects. They were occurring in coast live oak woodland, northern maritime chaparral, and urban mix communities growing in the shrub layer with coast live oak, bluegum*, brittle leaf manzanita, California huckleberry, California blackberry, poison oak, and bush monkeyflower, among others. The herbaceous layer was generally sparse. In total, Arcpal1 consisted of 35 individuals. It should be noted that the population count presented here represents only the number of individuals within the study area and should not be compared with CNDDB population totals which are representative of all individuals in the population, which extends outside of the study area.



Pallid manzanita in the study area with characteristic clasping and overlapped glaucous leaves. Photo date: March 12, 2021.



Pallid manzanita patch in Huckleberry Botanic Regional Preserve.
Photo date: March 12, 2021.



Pallid manzanita individual showing dieback from fungal infection.
Photo date: July 13, 2021.

Threats and Management Considerations

The CNPS Inventory indicates that this species is threatened by alteration of fire regimes, non-native plants, and road construction, and is possibly threatened by development, fungal infection, and hybridization (CNPS 2021). Within the study area, pallid manzanita is threatened by cutting, trampling, roadside maintenance, improper burning regime, invasive plants, as well as encroachment of urban mix and coast live oak woodland communities, which will eventually shade portions of this population. Many individuals

were observed to be severely impacted by *Phytophthora* and numerous dead and heavily diseased individuals were observed along Manzanita Drive and adjacent to The Hills Swim Club .

4.2.2 CALIFORNIA RARE PLANT RANK SPECIES

Based on the field investigations, review of available databases and literature, familiarity with local flora, and on-site habitat suitability, two California Rare Plant Rank species were observed within the study area: Oakland star-tulip (*Calochortus umbellatus* Alph. Wood) and Jepson's button thistle *Eryngium jepsonii* J.M. Coult. and Rose. One previously known CNDDDB record of western leatherwood (*Dirca occidentalis* A. Gray) in the study area was not observed. Brief descriptions of these species, their habitat requirements, occurrence information, and threats and management considerations are discussed below. CNDDDB field survey forms for these occurrences are found in Appendix C.

Oakland Star-Tulip (*Calochortus umbellatus*)

Status, Distribution and Habitat Requirements

Oakland star-tulip has a California Rare Plant Rank of 4.2 indicating it is of limited distribution and moderately threatened in California (CNPS 2021). It is a bulbiferous herb of the lily family (Liliaceae). The type locality for this species is from an undated Sanborn collection from Oakland, California (Wood 1868). The etymology of *Calochortus* is derived from the Greek for beautiful grass (Fiedler 2012).

Oakland star-tulip is an erect herb ranging from 8 to 25 centimeters (3.2 to 9.8 inches) tall that is generally two-branched and is absent of bulblets (Fiedler 2012). The basal leaves are persistent and measure 20 to 40 centimeters (7.9 to 15.8 inches) long, while there is generally one linear cauline leaf. The inflorescence is umbel-like and consists of 3 to 12 flowers, each subtended by two or more linear bracts measuring 1 to 6 centimeters (0.4 to 2.4 inches). The bell-shaped perianth is white or pale pink-lilac, generally has basal purple spots, and consists of lance-elliptic sepals 10 to 14 millimeters (0.4 to 0.6 inch) long, and widely wedge-shaped to obovate petals measuring 12 to 18 millimeters (0.5 to 0.7 inch) long that are generally glabrous with a nectary covered by a ciliate membrane and bordered above by short hairs. It is differentiated from other species of *Calochortus* by its erect flowers, nodding fruits, adaxially glabrous petals, presence of cauline leaves, and stem height (Fiedler 2012). This taxon has a blooming period extending from March to May (CNPS 2021).

Oakland star-tulip occurs in broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland, often on serpentine substrates (CNPS 2021). It is a California endemic having been recorded in Alameda, Contra Costa, Marin, San Mateo, and Santa Clara counties between 330 to 2,295 feet in elevation (CNPS 2021).



Oakland star-tulip showing lilac tinged perianth parts.
Photo date: April 14, 2021.



Occupied Oakland star-tulip habitat east of Highway 13. Photo date: April 14, 2021.

Occurrence Data and Habitat Characteristics

During the 2021 survey, one population of Oakland star-tulip (Calumb1) was observed within the study area (Table 12). It is unknown if this population has previously been recorded as spatial distribution of

CRPR list 4 species is not tracked by CNDDDB. The nearest collection of this species is a 2014 Machaka-Houri collection from Redwood Regional Park approximately 2.15 miles to the southeast (CCH2). Population Calumb1 is generally located in the middle of this taxon's range in Alameda and Contra Costa Counties.

Population Calumb1 was comprised of one colony growing in the opening near two transmission towers immediately east of Mountain Boulevard near the off-ramp to Highway 13. It was observed growing in valley needlegrass grassland on the upper slopes of a steep west-facing slope and on the flat areas at the top of the slope. Substrates may potentially be of serpentine parent material. It was growing with California poppy, bedstraw (*Galium aparine*), spring vetch (*Vicia sativa* subsp. *nigra* *), narrow leaved miner's lettuce (*Claytonia parviflora* subsp. *parviflora*), California fuschia (*Epilobium canum* subsp. *canum*), nodding needlegrass (*Stipa cernua*), and many-stemmed gilia (*Gilia achilleifolia* subsp. *multicaulis*), among others. There was no shrub or tree layer present. In total, Calumb1 totaled 73 individuals, of which approximately 60 percent were flowering and 40 percent were in fruit at the time of observation.

Table 12. Oakland Star-Tulip Populations Recorded in 2021

POPULATION NUMBER	GENERAL LOCATION	EONDX # / PRECISION	NUMBER OF INDIVIDUALS
Calumb1	Immediately east of Mountain Boulevard near Highway 13.	N/A	73
Total			73

Threats and Management Considerations

The CNPS Inventory indicates that this species is possibly threatened by recreation activities (CNPS 2021). Population Calumb1 is potentially susceptible to erosion on the steep slopes it inhabits. It is threatened by its proximity to public walking paths and unofficial bike trail on the slope. Some plants on the flat area may be threatened by work that occurs on the transmission towers.

Western Leatherwood (*Dirca occidentalis*)

Status, Distribution and Habitat Requirements

Western leatherwood has a California Rare Plant Rank of 1B.2, indicating that it is rare and moderately threatened in California (CNPS 2021). This is a deciduous woody species of the Daphne family (Thymelaeaceae). The type locality of this species is a collection from "California, on the Oakland hills (perhaps in ravines)" (Gray 1873). The etymology of *Dirca* is derived from Dirce, wife of Lycus, in Greek mythology (Nevling and Barringer 2012).

Western leatherwood is an erect, woody shrub that is poisonous and often ill-smelling (Nevling and Barringer 2012). Leaves are deciduous, broad-ovate to obovate, and the petioles cover the buds. The nodding inflorescence has minute yellow petals and short yellow calyx lobes which open with or before leaves. It measures 1 to 3 meters (3.3 to 9.8 feet) in height and has glabrous, yellow-green fruits measuring 8 to 19 millimeters (0.3 to 0.8 inches) in length. It is the only taxon of the Daphne family present in California (Nevling and Barringer 2012). This species blooms from January through March, sometimes into April (CNPS 2021).

Western leatherwood occurs in mesic areas of broadleaved upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, and riparian woodland (CNPS 2021). It is a California endemic and has been recorded in Alameda, Contra Costa, Marin, San Mateo, Santa Clara, and Sonoma Counties at elevations between 80 and 1,395 feet (CNPS 2021).

Occurrence Data and Habitat Characteristics

A single colony of an existing CNDDDB record (Occurrence 13, EONDX # 29968) of western leatherwood located in the study area on the east-facing slopes to the east of Manzanita Drive was not observed during 2021 survey efforts. This CNDDDB record consists of many polygons in Huckleberry Botanic Regional Preserve and Redwood Regional Preserve. This record is based on a variety of sources dating from as early as 1920 and specific information regarding the colony located in the study area is not available due to the large number of polygons and sources. Threats recorded in CNDDDB include trail maintenance, off-trail travel, and competitive exclusion, and records indicate some polygons may have been extirpated by development (CDFW 2021d). The immediate area surrounding the known record has been subject to clearing, and this colony may have been extirpated since it was observed or it may be based on an incorrect identification of western leatherwood.

Jepson's Button Thistle (*Eryngium jepsonii*)

Status, Distribution and Habitat Requirements

Jepson's button thistle has a California Rare Plant Rank of 1B.2 indicating it is rare and moderately threatened in California (CNPS 2021). This is a biennial to perennial species of the carrot family (Apiaceae). The type locality for this species is a W.L. Jepson collection near Orinda Park in Contra Costa County (Coulter and Rose 1900). The etymology of *Eryngium* is from an ancient Greek name used by Theophrastus (Preston et al. 2012).

Jepson's button thistle is an erect perennial herb with a glabrous stem measuring 2 to 8 decimeters (7.9 to 31.5 inches) tall with few to many branches (Preston et al. 2012). The leaf blades measure 10 to 30 centimeters (3.9 to 11.8 inches) in length, are narrowly oblanceolate, taper to an obscure petiole, and have serrated or spiny margins. Flower heads occur in spheric cymes that measure 5 to 15 millimeters (0.2 to 0.6 inches) and are subtended by outer bracts measuring 10 to 30 millimeters (0.4 to 1.2 inches) and inner bract measuring 4 to 10 millimeters (0.2 to 0.4 inch). It is differentiated from other *Eryngium* species by having bracts with margins not thickened, its erect and stout habit, leaf structure, as well as occupied habitat (Preston et al. 2012). This species blooms from April to August (CNPS 2021).

Jepson's button thistle occurs on clay substrates in vernal pools and valley and foothill grassland (CNPS 2021). It is a California endemic only having been recorded in Alameda, Contra Costa, Napa, San Mateo, Solano, and Yolo counties between 10 and 985 feet in elevation (CNPS 2021).



Jepson's button thistle in flower. Photo date: July 12, 2021.



Jepson's button thistle growth habit. Photo date: July 12, 2021.



Occupied habitat for Jepson's button thistle at ecotone of northern coyote brush scrub and non-native grassland. Photo date: July 12, 2021.

Occurrence Data and Habitat Characteristics

During the 2021 survey, one population of Jepson's button thistle (Eryjep1) was observed within the study area (Table 13). This represents a previously unrecorded population of Jepson's button thistle. It is located approximately 1.1 mile south of a known CNDDDB record (Occurrence #7, EODNX # 103678) which is a non-specific record with location given as Orinda Park and based on two 1895 W.L. Jepson Records (CDFW 2021d).

Population Eryjep1 consisted of one colony located approximately 0.14 mile west of Moraga Substation. Occupied habitat included clay soils in non-native grassland and bare areas at the ecotone of northern coyote brush scrub and non-native grassland. Terrain was flat to gentle east-facing slopes. Associated species included coyote brush (*Baccharis pilularis* subsp. *consanguinea*), poison hemlock (*Conium maculatum**), Kellogg's yampah (*Perideridia kelloggii*), Italian thistle (*Carduus pycnocephalus* subsp. *pycnocephalus**), California blackberry, bristly ox-tongue (*Helminthotheca echioides**), hedge parsley (*Torilis arvensis**), and a variety of senesced non-native annual grasses. Most herbaceous species were senesced during at time. Population Eryjep1 consisted of 69 individuals, the majority of which were flowering at the time of the survey.

Table 13. Jepson's Button Thistle Populations Recorded in 2021

POPULATION NUMBER	GENERAL LOCATION	EODNX # / PRECISION	NUMBER OF INDIVIDUALS
Eryjep1	Grassland west of Moraga Substation	N/A	69
Total			69

Threats and Management Considerations

The CNPS Inventory does not indicate any threats for this taxon (CNPS 2021). While this population is not immediately threatened by invasive plants, populations of Medusahead* and cardoon (*Cynara cardunculus* subsp. *flavescens**) are located nearby and other invasive plants are scattered throughout the non-native grassland. Other threats include encroachment by northern coyote brush scrub into the grassland habitat as well as maintenance of the powerline right-of-way.

4.2.3 LOCALLY RARE PLANT SPECIES

In accordance with CEQA's Article 9 and CEQA Guidelines Sections 15125(a) and 15380, which state that "special emphasis should be placed on environmental resources that are rare or unique to that region," and CNPS's goal of preserving plant biodiversity on a regional and local scale, this study also assessed the occurrence of locally significant plant species. Locally significant plant species are those considered to be at the outer limits of their known distribution, a range extension, a rediscovery, or rare or uncommon in a local context (CNPS 2001b). These species are not regarded as special-status species by the USFWS or CDFW and are therefore not tracked by these agencies. The East Bay chapter of CNPS since 1989 has developed and maintains a Database of Rare, Unusual, and Significant Plants of Alameda and Contra Costa Counties which tracks populations of locally rare and statewide rare plants which have limited distribution in Alameda and Contra Costa counties, including many that reach their range limit in these two counties.

Based on the results of the 2021 surveys a total of 54 locally rare plant species were observed within the study area, including 32 C-ranked species, 12 B-ranked species, and 10 A-ranked species. Local rarity rank information is included for all locally rare species on the plant list (Appendix B). All A-ranked species are described below and include narrow leaf onion (*Allium amplexans* Torr.), red alder (*Alnus rubra* Bong.), golden chinquapin, spotted coralroot (*Corallorhiza maculata* [Raf.] Raf. var. *maculata*), redwood sorrel, knobcone pine (*Pinus attenuata* Lemmon), and yellow beak owl's-clover (*Triphysaria versicolor* subsp. *faucibarbat* A. Gray). Pallid manzanita, Oakland star-tulip, and Jepson's button thistle are excluded here as a more in-depth discussion of them is provided above. Table 14 summarizes the general locations of locally rare taxa in the study area.

These species should be considered in local planning and management efforts; however, including them in environmental review documents is up to the discretion of the lead agency.

Narrow Leaf Onion (*Allium amplexans*)

Narrow leaf onion has a locally rare plant ranking of A2 indicating it is known from only three to five regions; has a small range or limited or threatened habitat; or has small, stressed, or declining populations in Alameda and Contra Costa counties (Lake 2021). This taxon is a perennial herb in the onion family (Alliaceae). Narrow leaf onion generally occurs on clay substrates including serpentine in open or wooded places below 1,800 meters (5,905.5 feet) (McNeal 2012). It has been collected throughout the California Floristic Province (Ibid.; JFP 2021).

This taxon is represented by one occurrence in open coast live oak woodland near Gudde Ridge.

Red Alder (*Alnus rubra*)

Red alder has a locally rare ranking of A2 indicating it is known from only three to five regions; has a small range or limited or threatened habitat; or has small, stressed, or declining populations in Alameda and Contra Costa counties (Lake 2021). This taxon is a moderately sized tree in the birch family (Betulaceae) known to occur in wet places, especially after logging, below 1,000 meters (3,280.8 feet) in elevation (Sawyer 2012). It occurs in the North Coast, Western Klamath Range, Outer North Coast Ranges, Central Coast, and San Francisco Bay subregions (Ibid.; JFP 2021).

This species is represented by two occurrences in the study area growing in the riparian California bay forest in the bottom of San Leandro Creek canyon along Pinehurst Road as well as in Dimond Canyon.

Table 14. Locally Rare Plant Species Observed within the Study Area

SCIENTIFIC NAME	COMMON NAME	LOCALLY RARE RANKING	GENERAL LOCATIONS
<i>Allium amplexans</i>	narrow leaf onion	A2	In coast live oak woodland near Gudde Ridge
<i>Alnus rubra</i>	red alder	A2	Riparian California bay forest in San Leandro Creek canyon and in Dimond Canyon
<i>Arctostaphylos pallida</i> (FT, SE, CRPR 1B.1)	pallid manzanita	*A1	See discussion in Section 4.2.1
<i>Calochortus umbellatus</i> (CRPR 4.2)	Oakland star-tulip	*A2	See discussion in Section 4.2.2
<i>Chrysolepis chrysophylla</i> var. <i>minor</i>	golden chinquapin	A2	Northern maritime chaparral east of Manzanita Drive
<i>Corallorhiza maculata</i> var. <i>maculata</i>	spotted coralroot	A2	East of San Leandro Creek canyon in coast live oak woodland.
<i>Eryngium jepsonii</i> (CRPR 1B.2)	Jepson's button thistle	*A2	See discussion in Section 4.2.2
<i>Oxalis oregana</i>	redwood sorrel	A1	Upland redwood forest west of Highway 13
<i>Pinus attenuata</i>	knobcone pine	A1	East of Manzanita Drive
<i>Triphysaria versicolor</i> subsp. <i>faucibarbata</i>	yellow beak owl's-clover	A2	In non-native grassland near Gudde Ridge

¹ **Explanation of Locally Rare Ranking**

A1: Species known from 2 or less botanical regions in Alameda and Contra Costa Counties, either currently or historically
A2: Species currently known from 3 to 5 regions in the two counties, or, if more, meeting other important criteria such as rare statewide, small populations, stressed or declining populations, small geographical range, limited or threatened habitat, etc.

*A: Species in Alameda and Contra Costa counties listed as rare, threatened, or endangered statewide by federal or state agencies, or by state CNPS (Includes *A1, *A1x, and *A2 species)

Golden Chinquapin (*Chrysolepis chrysophylla* var. *minor*)

Golden chinquapin has a locally rare ranking of A2, indicating it is known from only three to five regions; has a small range or limited or threatened habitat; or has small, stressed, or declining populations in Alameda and Contra Costa counties (Lake 2021). This taxon is a shrub to small tree in the oak family (Fagaceae) known to occur in conifer forest, closed-cone-pine forest, and chaparral at elevations below 1,800 meters (5,905.5 feet) (Tucker 2012). It occurs in the Northwest and Central Western subregions (Ibid.; JFP 2021).

This species is represented by one occurrence in the study area growing in northern maritime chaparral on the steep slopes west of Pinehurst Road downhill and east of Manzanita Drive.

Spotted Coralroot (*Corallorhiza maculata* var. *maculata*)

Spotted coralroot has a locally rare ranking of A2 indicating it is known from only three to five regions; has a small range or limited or threatened habitat; or has small, stressed, or declining populations in Alameda and Contra Costa counties (Lake 2021). This taxon is a perennial herb in the orchid family (Orchidaceae). Spotted coralroot is known to occur in shaded mixed-evergreen or coniferous forest in decomposing leaf litter below 2,800 meters (9,186.4 feet) (Coleman et al. 2012). It occurs in the Northwest, Cascade Range, Sierra Nevada, San Francisco Bay, Outer South Coast Range, San Gabriel, San Bernardino, Peninsular Range, Modoc Plateau, and Warner and White Mountain subregions (Ibid.; JFP 2021).

This species is represented by one occurrence in the study area growing in the understory of coast live oak woodland east of San Leandro Creek canyon.

Redwood Sorrel (*Oxalis oregana*)

Redwood sorrel has a locally rare ranking of A1 indicating it is known from 2 or less regions in Alameda and Contra Costa counties (Lake 2021). This taxon is a perennial herb in the oxalis family (Oxalidaceae) that is known to occur in moist evergreen forest at elevations below 1,000 meters (3,280.8 feet) (Preston and Ornduff 2012). It occurs in the North Coast, Western Klamath Range, Outer North Coast Ranges, Central Coast, and San Francisco Bay subregions (Ibid.; JFP 2021).

This species is represented by one occurrence in the study area growing in upland redwood forest just west of Monterey Boulevard. This occurrence may be part of restoration efforts in this area.

Knobcone Pine (*Pinus attenuata*)

Knobcone pine has a locally rare ranking of A1 indicating it is known from two or fewer regions in Alameda and Contra Costa counties (Lake 2021). This taxon is a moderately sized tree in the pine family (Pinaceae). Knobcone pine occurs in closed-cone forest and chaparral at elevations of 2,000 meters (6,561.7 feet) and below (Haller and Vivrette 2012). It has been collected in the Northwest, Cascade Range, Sierra Nevada, eastern San Francisco Bay, South Coast Range, San Bernardino, Peninsula Range, and Modoc Plateau subregions (Ibid.; JFP 2021).

This species is represented by one occurrence in the study area located on the edge of coast live oak woodland east of Manzanita Drive.

Yellow Beak Owl's Clover (*Triphysaria versicolor* subsp. *faucibarbata*)

Yellow beak owl's clover has a locally rare ranking of A2 indicating it is known from only 3 to 5 regions, has a small range, limited or threatened habitat, or has small, stressed, or declining populations in Alameda and Contra Costa counties (T.I. Chuang and Heckard 2012; Lake 2021). This taxon is an annual herb in the broomrape family (Orobanchaceae) known to occur in grassland habitats below 500 meters (1,640.4 feet) in elevation (Wethervax et al. 2012). It occurs in the North Coast Range, Sacramento Valley, Central Coast, and San Francisco Bay subregions (Ibid.; JFP 2021).

This species is represented by one occurrence in the study area near Gudde Ridge where it was growing in open, non-native grassland habitat near the transmission towers.

4.3. NOXIOUS/INVASIVE WEEDS

During the course of this study, 174 (44 percent) of the plant species observed within the study area were non-native plant species. A non-native plant species is defined as a species that is occurring outside of its native distributional range having arrived here by human activity. Some of the non-native plant species encountered in the study area are tracked by the California Department of Food and Agriculture (CDFA 2021) and the California Invasive Plant Council (Cal-IPC 2021) due to their noxious, invasive, or weedy traits. Species tracked by these organizations are given a certain rating based on criteria such as ecological impacts, treatment or eradication priority, and threats they pose to agricultural economics.

A total of 47 plant species with elevated threat rankings (i.e. Cal-IPC rating of Moderate or High, or on the California Department of Food and Agriculture [CDFA] California Noxious Weed List) were observed within the study area (Table 15). Non-native annual grasses of ubiquitous nature in the region are not included in the discussion below. Of the non-native plant species tracked by Cal-IPC and CDFA, the following discussion only includes those that pose a significant threat to sensitive botanical resources or have the potential to spread within the study area. These species are referred to as noxious/invasive plants of concern and their locations are depicted on Figure 8 (Appendix A). While other non-native plant species

with elevated Cal-IPC and CDFA threat rankings were observed within the study area and noted on the plant list (Appendix B), they were either too ubiquitous in the study area or do not currently pose enough of a threat to sensitive botanical resources to warrant discussion here.

Table 15. Non-Native Species with Elevated Threat Rankings Observed in the Study Area

SPECIES NAME	COMMON NAME	California Invasive Plant Council Rank (Cal-IPC 2021)*	California Department of Food and Agriculture Noxious Weed List (CDFA 2021)**
NOXIOUS/INVASIVE PLANTS OF CONCERN			
<i>Arundo donax</i>	giant reed	High	On List
<i>Centaurea solstitialis</i>	yellow star thistle	High	On List
<i>Conium maculatum</i>	poison hemlock	Moderate	---
<i>Cynara cardunculus</i> subsp. <i>flavescens</i>	cardoon	Moderate	---
<i>Delairea odorata</i>	Cape ivy	High	---
<i>Elymus caput-medusae</i>	Medusahead	High	On List
<i>Eucalyptus globulus</i>	bluegum	Moderate	---
<i>Foeniculum vulgare</i>	fennel	Moderate	---
<i>Genista monspessulana</i>	French broom	High	---
<i>Rubus armeniacus</i>	Himalayan blackberry	High	---
<i>Ulex europaeus</i>	gorse	High	---
<i>Vinca major</i>	periwinkle	Moderate	---
OTHER NON-NATIVE SPECIES WITH ELEVATED RANKINGS			
<i>Acacia dealbata</i>	silver wattle	Moderate	---
<i>Ageratina adenophora</i>	throughwort	Moderate	---
<i>Arctotheca prostrata</i>	prostrate cape weed	Moderate	On List
<i>Avena barbata</i>	slender oats	Moderate	---
<i>Avena fatua</i>	wild oats	Moderate	---
<i>Brachypodium distachyon</i>	false brome	Moderate	---
<i>Brassica nigra</i>	black mustard	Moderate	---
<i>Bromus diandrus</i>	ripgut brome	Moderate	---
<i>Bromus rubens</i>	foxtail chess	High	---
<i>Carduus pycnocephalus</i> subsp. <i>pycnocephalus</i>	Italian thistle	Moderate	On List
<i>Centaurea melitensis</i>	tocalote	Moderate	On List
<i>Cirsium vulgare</i>	bull thistle	Moderate	On List
<i>Convolvulus arvensis</i>	bindweed	---	On List
<i>Cortaderia jubata</i>	jubata grass	High	---
<i>Cotoneaster franchetii</i>	orange cotoneaster	Moderate	---
<i>Cotoneaster lacteus</i>	milkflower cotoneaster	Moderate	---
<i>Cotoneaster pannosus</i>	silverleaf cotoneaster	Moderate	---
<i>Cynodon dactylon</i>	Bermuda grass	Moderate	On List
<i>Cynosurus echinatus</i>	dogtail grass	Moderate	---
<i>Dipsacus sativus</i>	Indian teasel	Moderate	---
<i>Dittrichia graveolens</i>	stinkwort	Moderate	---
<i>Ehrharta erecta</i>	panic veldt grass	Moderate	---

Table 15. Non-Native Species with Elevated Threat Rankings Observed in the Study Area

SPECIES NAME	COMMON NAME	California Invasive Plant Council Rank (Cal-IPC 2021)*	California Department of Food and Agriculture Noxious Weed List (CDFA 2021)**
<i>Festuca myuros</i>	foxtail fescue	Moderate	---
<i>Festuca perennis</i>	Italian ryegrass	Moderate	---
<i>Geranium dissectum</i>	cut-leaf geranium	Moderate	---
<i>Hedera helix</i>	English ivy	High	---
<i>Hirschfeldia incana</i>	hoary mustard	Moderate	---
<i>Hordeum marinum</i> subsp. <i>gussoneanum</i>	Mediterranean barley	Moderate	---
<i>Hordeum murinum</i> subsp. <i>leporinum</i>	hare barley	Moderate	---
<i>Hypochaeris radicata</i>	rough cat's ear	Moderate	---
<i>Mentha pulegium</i>	pennyroyal	Moderate	---
<i>Oxalis pes-caprae</i>	bermuda buttercup	Moderate	---
<i>Phalaris aquatica</i>	Harding grass	Moderate	---
<i>Rumex acetosella</i>	sheep sorrel	Moderate	---
<i>Torilis arvensis</i>	hedge parsley	Moderate	---

*Cal-IPC Weed Ranking Definitions:

High: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate: These species have substantial and apparent - but generally not severe - ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited: These species are invasive, but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic (Cal-IPC 2021).

** Species considered a noxious weed by CDFA are listed on the California Noxious Weed List (CDFA 2021).

4.3.1 NOXIOUS/INVASIVE PLANTS OF CONCERN ON SITE

Giant reed (*Arundo donax**), yellow star thistle*, poison hemlock, cardoon, Cape ivy (*Delairea odorata**), Medusahead*, bluegum*, fennel (*Foeniculum vulgare**), French broom*, Himalayan blackberry (*Rubus armeniacus**), gorse (*Ulex europaeus**), and periwinkle (*Vinca major**) are weeds found on site that have the potential to cause significant impacts to sensitive natural resources. Below is a brief description of these species, their life history traits, and their general locations within the study area.

Giant Reed (*Arundo donax*)

General Information

Giant reed is a bamboo-like perennial with well-developed rhizomes in the grass family (Poaceae). Plants are typically terrestrial but tolerate periodic flooding. Giant reed has become problematic in riparian corridors throughout the state. Dense stands typically develop which often displace native vegetation, diminish wildlife habitat, and increase flooding and siltation in natural areas (DiTomaso and Healy 2007). Giant reed inhabits riparian areas, floodplains, and ditches, typically on sites with low slope. This species grows best in well-drained moist soils but tolerates some salinity and extended periods of drought (DiTomaso and Healy 2007).

Relevant Life History Traits

Giant reed reproduces vegetatively from rhizomes and rhizome and stem fragments. Fragments disperse with water, mud, and human activities. Viable seed has not been observed in North America (DiTomaso and Healy 2007).

Occurrence within the Study Area

A single patch of giant reed was observed in the study area near Manzanita Drive at the ecotone of northern maritime chaparral and coast live oak woodland communities. Although this species does not present an immediate threat, it is near colonies of pallid manzanita population Arcpal1 on Manzanita Drive.

Yellow Star Thistle (*Centaurea solstitialis*)*General Information*

Yellow star thistle is a winter annual and occasionally a biennial in the sunflower family (Asteraceae). Plants are highly competitive and typically develop dense, impenetrable stands that displace desirable vegetation in natural areas, rangelands, roadside, and other places. Yellow star thistle is considered one of the most serious rangeland weeds in the western United States. It contains an unidentified compound that causes chewing disease in horses. Yellow star thistle inhabits open disturbed sites, open hillsides, grassland, rangeland, open woodlands, fields, pastures, roadsides, waste places, and cultivated fields (DiTomaso and Healy 2007).

Relevant Life History Traits

Yellow star thistle reproduces by seed. Seed head production is highly variable and depends on a variety of factors including soil moisture and competition. Seeds fall near the parent plant and are dispersed short distances with wind, and to greater distances with human activities, animals, water, mud, and soil movement. Large flushes of seeds typically germinate after the first fall rains, but smaller germination flushes can occur in winters and early spring. Shaded conditions reduce flower production and root growth. Plants exist as basal rosettes through winter and early spring until flower stems develop in late spring or early summer (DiTomaso and Healy 2007).

Occurrence within the Study Area

While yellow star thistle was observed growing in low cover throughout non-native grasslands in the study area, only one dense patch with high cover was observed. This patch occurred in non-native grassland near Gudde Ridge.

Poison Hemlock (*Conium maculatum*)*General Information*

Poison hemlock is an erect biennial (sometimes annual or short-lived perennial) in the carrot family (Apiaceae) that is native to Europe. Plants exist as large basal rosettes of leaves during the first year. All plant parts are highly toxic to humans and animals when ingested. Most animals avoid eating poison hemlock when suitable forage is available. Poison hemlock inhabits fields, pastures, roadsides, ditches, riparian areas, cultivated fields, and other disturbed, often moist, sites (DiTomaso and Healy 2007).

Relevant Life History Traits

Poison hemlock reproduces by seed. Seeds fall near the parent plant but some may disperse to greater distances with human activities, water, soil movement, and animals. After dispersal most seeds can germinate almost immediately if conditions are favorable, but a small proportion remains dormant. Germination occurs with the first fall rains through early spring. Seeds can survive up to about three years under field conditions (DiTomaso and Healy 2007).

Occurrence within the Study Area

Poison hemlock was observed growing in low cover throughout the study area in a variety of habitats. Two noteworthy populations with high cover of poison hemlock were observed in the non-native grasslands near

the Moraga Substation. While they do not present an immediate threat, they are in proximity of Jepson's button thistle population Eryjep1.

Cardoon (*Cynara cardunculus* subsp. *flavescens*)

General Information

Cardoon is a large perennial in the sunflower family (Asteraceae) that usually invades disturbed grassland primarily in coastal regions. Dense colonies displace desirable vegetation and wildlife and can exclude livestock. Cardoon is native to the Mediterranean region. Cardoon inhabits disturbed, open sites in grassland, pasture, chaparral, coastal sage scrub, riparian areas, and abandoned agricultural fields (DiTomaso and Healy 2007).

Relevant Life History Traits

Cardoon reproduces primarily by seed. Less frequently it reproduces by root fragments, usually resulting from mechanical disturbance. Most seeds fall near the parent plant or are dispersed short distances with wind and to greater distances with human activities, water, mud, soil movement, and animals. Most seeds germinate after the first fall rains. Most seeds survive about five years in the soil under field conditions. Individual plants often live for many years (DiTomaso and Healy 2007).

Occurrence within the Study Area

Three populations of cardoon were observed growing in the study area, two in the eastern portion of the study area and one in non-native grassland habitat west of Dimond Canyon. Although not presenting an immediate threat, one population of cardoon is in proximity of Jepson's button thistle population Eryjep1.

Cape Ivy (*Delairea odorata*)

General Information

Cape ivy is a vigorous perennial vine in the sunflower family (Asteraceae). Cape ivy can invade various plant communities but it is especially noxious in coastal riparian areas. Vines grow over trees and shrubs and can form dense mats that smother underlying vegetation. Plant material in contact with water may cause fish kill. Cape ivy was introduced to the United States in the late 1800s as a house plant. It is native to the moist mountain forest of South Africa. It inhabits disturbed riparian sites, seasonal wetlands, coastal bluffs and scrub, moist canyons, oak woodlands, and coastal grasslands, as well as Monterey or Bishop pine, eucalyptus, and redwood forests. Most infestations are associated with urban areas or former human habitations. It grows in deep shade or under cloudy conditions but does not tolerate full sunlight. This species tolerates serpentine soils. Established plants can tolerate drought (DiTomaso and Healy 2007).

Relevant Life History Traits

Cape Ivy reproduces vegetatively from rhizomes, stolons, and fragments of rhizomes and stems, and in some locations, by seed. Stem fragments as small as 2.5 centimeters (1 inch) that include a node can generate a new plant. Stem fragments can dry and then resprout when moistened. Seeds disperse with water, wind, soil movement, and probably human activities (DiTomaso and Healy 2007).

Occurrence within the Study Area

Two noteworthy populations of Cape ivy were observed in the study area: at the edge of coast live oak woodland along Manzanita Drive, and in open coast live oak woodland in Shepherd Canyon. Although this species does not present an immediate threat, one infestation is near pallid manzanita population Arcpall1.

Medusahead (*Elymus caput-medusae*)

General Information

Medusahead is an ascending to erect winter annual in the grass family (Poaceae). Medusahead is a noxious rangeland weed. Dense stands displace desirable vegetation and wildlife and lower livestock carrying capacity on rangeland. Medusahead matures at least 2-4 weeks later in the season than most other annual grasses and is highly visible from a distance after other annual grasses turn brown. Medusahead contains

silica, which makes it unpalatable to livestock except during the early growth stages. The stiff awns and hard florets can injure the eyes, nostrils, and mouths of grazing animals. Senesced plants form a dense layer of thatch that takes 2 or more years to decompose. The thatch layer greatly reduces seed germination of other species and creates fuel for wildfires. It is native to Europe. It inhabits disturbed sites, grassland, rangeland, openings in chaparral, oak woodlands, and rarely, agronomic fields. The species grows best on clay soils or where deep soil moisture is available late in the growing season (DiTomaso and Healy 2007).

Relevant Life History Traits

Medusahead reproduces by seed. Seed production is usually prolific. Seeds disperse locally with wind and water and to greater distances with human activities, soil movement, mud, and by clinging to machinery, tires, shoes, clothing, and animals. Germination is typically rapid. Most seeds germinate in fall after the first rains but some seeds remain dormant and germinate in the winter or spring. Seeds can germinate in very high densities under low moisture conditions (DiTomaso and Healy 2007).

Occurrence within the Study Area

Medusahead was observed in the non-native grasslands east of Gudde Ridge where it is present in scattered patches, often in high cover. Some patches are in close proximity to Jepson's button thistle population Eryjep1.

Bluegum (*Eucalyptus globulus*)

General Information

Eucalyptus trees are fast-growing and common in California as ornamental escapees¹² or as wind breaks or failed historic plantations (*E. globulus*). These trees are in the myrtle family (Myrtaceae) and are native to Australia. Bluegum litter, fog and rain drip, and shading appear to create conditions that inhibit the growth of seedlings and most other plants in the understory. Eucalyptus trees can create a safety hazard in public places because they tend to drop limbs continually. Leaves and branches decompose very slowly. The trees inhabit disturbed places, especially in riparian areas and coastal grasslands and forests. Groves expand from perimeters into relatively intact adjacent areas of scrub, woodlands, or grasslands (DiTomaso and Healy 2007).

Relevant Life History Traits

Eucalyptus reproduces by seed. Most seeds are released from capsules while still attached to the tree. Seeds typically fall within 100 meters (328.1 feet) from the parent plant, although some may disperse to greater distances with water, soil movement, animals, and human activities. Under favorable conditions, seeds germinate a few weeks after release from capsules, usually late fall through spring, but if conditions are dry seeds may remain dormant for several years. Bluegum grows best on deep, well-drained soils where roots can tap deep soil moisture. Seedlings and juveniles are more sensitive to frost than mature trees (DiTomaso and Healy 2007).

Occurrence within the Study Area

Noteworthy patches of bluegum were observed near Gudde Ridge, along Manzanita Drive, and in Shepherd Canyon. Bluegum along Manzanita Drive is encroaching on colonies of pallid manzanita population Arcpal1 and are likely negatively impacting that population.

Fennel (*Foeniculum vulgare*)

General Information

Fennel is a perennial in the carrot family (Apiaceae) that is native to southern Europe. It invades open disturbed sites, roadsides, slopes, fields, grasslands, coastal scrub, riparian and wetland areas, and

¹² Plants commonly used as ornamental species in anthropogenic settings that have dispersed into wildland areas and are capable of reproduction in the wild.

agronomic crops, particularly in coastal regions of central and southern California. Established plants are competitive and soil disturbance facilitates the development of dense stands, which can exclude native vegetation in some areas. It tolerates drought and frost and grows in many soil types (DiTomaso and Healy 2007).

Relevant Life History Traits

Fennel reproduces by seed and sometimes vegetatively from root or crown fragments. Seed production is usually prolific. Seeds disperse with human activities, water, soil movement, animals, and as a seed contaminant. Most seeds germinate in the fall during the wet season but germination can occur year-round when conditions are favorable. Seeds appear to survive several years under field conditions. Fragmentation of roots and crowns may occur during flood events, mudslides, or agricultural operations. New shoots grow from the crown or lower portion of overwintering stems in mid-winter to early spring (DiTomaso and Healy 2007).

Occurrence within the Study Area

Two patches of dense fennel were observed growing in the study area near Gudde Ridge. They were observed in proximity to valley needlegrass grassland.

French Broom (*Genista monspessulana*)

General Information

French broom is an evergreen shrub in the pea family (Fabaceae) that was originally introduced as a landscape ornamental. French broom is widespread and aggressive in California. It forms dense stands that displace native vegetation and wildlife. French broom inhabits open disturbed sites, such as logged or burned sites, roadsides, and pastures, and also relatively undisturbed grasslands, coastal scrub, oak woodlands, riparian corridors, and open forests. It is native to the Mediterranean region and the Azores Islands (DiTomaso and Healy 2007).

Relevant Life History Traits

French broom flowers from March to May and reproduces by seed. Pods typically burst apart into spiral halves, ejecting seeds a short distance from the parent plant. Seeds disperse to greater distances with water, soil movement, vehicle tires, human activities, and animals. Seeds are hard-coated and long-lived under field conditions and can survive 30 years or more. Brooms can resprout from the crown when cut above. Fire appears to stimulate germination. Where seeds are present in the soil, a large flush of seedlings may emerge on newly burned sites. French broom is a prolific seeder and pods are often copiously produced (DiTomaso and Healy 2007).

Occurrence within the Study Area

French broom was observed in a patchy distribution in Shepherd Canyon, along Manzanita Drive, near Gudde Ridge, and in the staging areas in Sibley Volcanic Regional Preserve. The populations along Manzanita Drive are both adjacent to and intermixed with colonies of pallid manzanita population Arcpal1.

Himalayan Blackberry (*Rubus armeniacus*)

General Information

Himalayan blackberry is a mounded, climbing, and trailing shrub in the rose family (Rosaceae). Himalayan blackberry is a vigorous cultivar introduced from Eurasia and is the most common non-native bramble invading natural areas in California. It inhabits disturbed moist open sites, roadsides, fencerows, fields, canal and ditch banks, and riparian areas in many plant communities. It tolerates periodic flooding with brackish water (DiTomaso and Healy 2007).

Relevant Life History Traits

Himalayan blackberry reproduces by seed, root sprouts, and stem tip rooting. New shoots can grow from buds on the roots. Under favorable conditions, root fragments of root-sprouting species may develop into

new plants. Fruits typically disperse to greater distances with animals, especially birds. Seeds without the flesh may also disperse with water and soil movement. Seed germination occurs mainly in spring (DiTomaso and Healy 2007).

Occurrence within the Study Area

Himalayan blackberry was observed growing in at the edge of oak woodland near Moraga Substation and along Manzanita Drive. While not presenting an immediate threat, the patch along Manzanita Drive is near colonies of pallid manzanita population Arcpal1.

Gorse (*Ulex europaeus*)

General Information

Gorse is a spiny evergreen shrub in the pea family (Fabaceae). Gorse often forms dense impenetrable thickets that exclude desirable vegetation and increase fire risk. Gorse also produces abundant leaf litter that can acidify the upper soil layers. It is native to western Europe and introduced as an ornamental or hedge shrub. Gorse inhabits disturbed sites, sand dunes, coastal bluffs (especially where erosion is prevalent), fields, pastures, riparian corridors, logged areas, and burned sites, particularly in coastal areas where winters are mild and some moisture is available (DiTomaso and Healy 2007).

Relevant Life History Traits

Gorse flowers from November to July. Gorse reproduces by seed and plants produce abundant quantities of seed. Most seeds are ejected to within 5 meters (16.4 feet) of the parent shrub when pods snap open at maturity. Some seeds may disperse to greater distances with water, soil movement, human activities, animals, and ants. Seeds are hard-coated and long-lived under field conditions and can survive 30 years or more. Large soil seedbanks often accumulate. Scarification or heating stimulates germination when moisture is available. Shrubs can live for up to about 30 years (DiTomaso and Healy 2007).

Occurrence within the Study Area

Gorse was observed growing in the study area along access roads in Dimond Canyon.

Periwinkle (*Vinca major*)

General Information

Periwinkle is an herbaceous perennial with trailing sterile stems and erect flower-bearing stems in the dogbane family (Apocynaceae). It is commonly cultivated as an ornamental groundcover, but it has escaped cultivation in many places. Under favorable conditions, plants spread invasively and can develop a dense ground cover that out-competes other vegetation in natural areas. Some infestations around old homesteads have been present for many years. It is native to central Europe. This species inhabits riparian sites, old homesteads, moist woodlands, and roadsides. It is more abundant along the coast, grows best under moist shady conditions, and tolerates deep shade and poor soil (DiTomaso and Healy 2007).

Relevant Life History Traits

Periwinkle reproduces vegetatively from trailing stems that root at the tips and stem fragments and rarely by seed. Plants and stem fragments disperse with human activities. Under favorable conditions, stem cuttings left on the ground can take root. In riparian areas, water currents can fragment stems and carry them downstream where they can root if lodged in a suitable place. Fruits with viable seeds rarely develop on cultivated and naturalized plants in California (DiTomaso and Healy 2007).

Occurrence within the Study Area

One noteworthy patch of periwinkle was observed growing along the edge of coast live oak woodland along Manzanita Drive. While not presenting an immediate threat, it is near colonies of pallid manzanita population Arcpal1 along Manzanita Drive.

Section 5. SUMMARY

5.1. SUMMARY

Three special status species were observed during 2021 surveys in the study area. A total of nine sensitive natural communities were observed in the study area. Table 16 summarizes the results associated with the protocol-level botanical surveys for the Moraga – Oakland X study area.

Table 16. Summary of Sensitive Communities and Special Status Plants within the Study Area

SPECIES NAME/ COMMON NAME	STATUS ^{1,2}	NUMBER OF OCCURRENCES	NUMBER OF INDIVIDUALS	LOCATION IN THE STUDY AREA
<u>SENSITIVE NATURAL COMMUNITIES</u>				
<i>Elymus glaucus</i> Herbaceous Alliance	S3	4	N/A	Grasslands east of Gudde Ridge and near community of Wilder
<i>Stipa</i> spp. Herbaceous Alliance	S3	13	N/A	Scattered throughout non-native grasslands east of Manzanita Drive; single location just east of Highway 13
<i>Elymus triticoides</i> Herbaceous Alliance	S3	1	N/A	Grassland west of Moraga Substation
<i>Arctostaphylos crustacea</i> Shrubland Alliance	S3	3	N/A	East-facing slopes east of Manzanita Drive
<i>Salix lasiolepis</i> Shrubland Association	S3	2	N/A	Shepherd Canyon and near community of Wilder.
<i>Umbellularia californica</i> Forest Alliance	S3	3	N/A	Dimond Canyon, San Leandro Creek canyon, and west-northwest of Moraga Substation
<i>Sequoia sempervirens</i> Forest Alliance	S3.2	2	N/A	Dimond Canyon and Shepherd Canyon
<i>Carex densa</i> Provisional Herbaceous Alliance	S2?	1	N/A	Grasslands west of Moraga Substation
<i>Erythranthe guttata</i> Herbaceous Alliance	S3	2	N/A	Openings in coast live oak woodland west of Moraga Substation and west of Gudde Ridge
<u>SPECIAL STATUS PLANTS</u>				
<u>FEDERAL/STATE LISTED SPECIES</u>				
<i>Arctostaphylos pallida</i> pallid manzanita	FT, SE, CRPR 1B.1	1	35	Along Manzanita Drive and in Huckleberry Botanic Regional Preserve
<u>CALIFORNIA RARE PLANT RANK SPECIES</u>				
<i>Calochortus umbellatus</i> Oakland star-tulip	CRPR 4.2	1	73	Grassland area east of Highway 13
<i>Eryngium jepsonii</i> Jepson's button thistle	CRPR 1B.2	1	69	Grassland just west of Moraga Substation

¹ **Explanation of Sensitive Natural Communities Status**

Subnational Conservation Status Ranks (NatureServe 2021):

S2 "Imperiled"

S3 "Vulnerable"

? Denotes an inexact numeric rank due to insufficient samples over the full expected range of the type, but existing information points to this rank.

² **Explanation of Rare Plant Status**

Table 16. Summary of Sensitive Communities and Special Status Plants within the Study Area

SPECIES NAME/ COMMON NAME	STATUS ^{1,2}	NUMBER OF OCCURRENCES	NUMBER OF INDIVIDUALS	LOCATION IN THE STUDY AREA
U.S. Fish and Wildlife Service – Federal Endangered Species Act				
FT	Federally Threatened			
California Department of Fish and Wildlife – California Endangered Species Act				
SE	State Endangered			
California Rare Plant Ranks (CRPR)				
1B	Rare or endangered in California and elsewhere			
4	Plants with a limited distribution – Watch List			
CRPR Threat Codes:				
.1	Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)			
.2	Moderately threatened in California (20-80% occurrences threatened)			

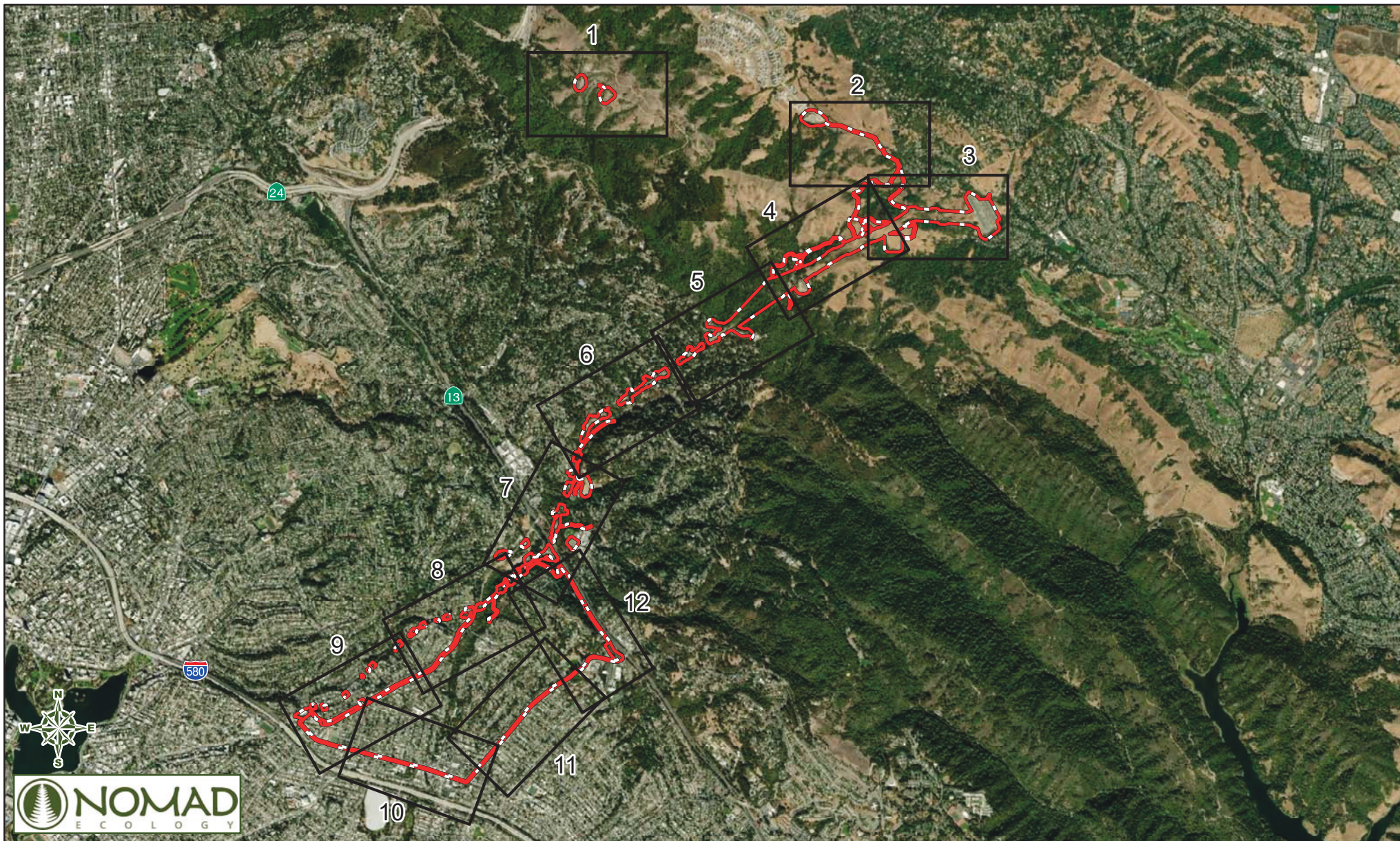
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APPENDIX A FIGURES 4 - 8



December 2021

Botanical Resources Survey Report

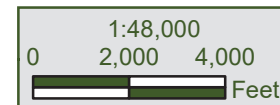
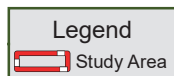


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Overview



December 2021

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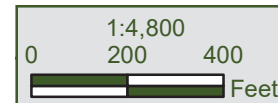
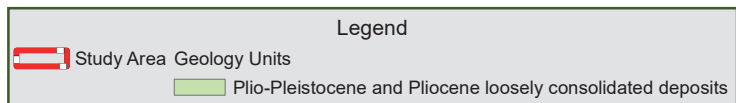
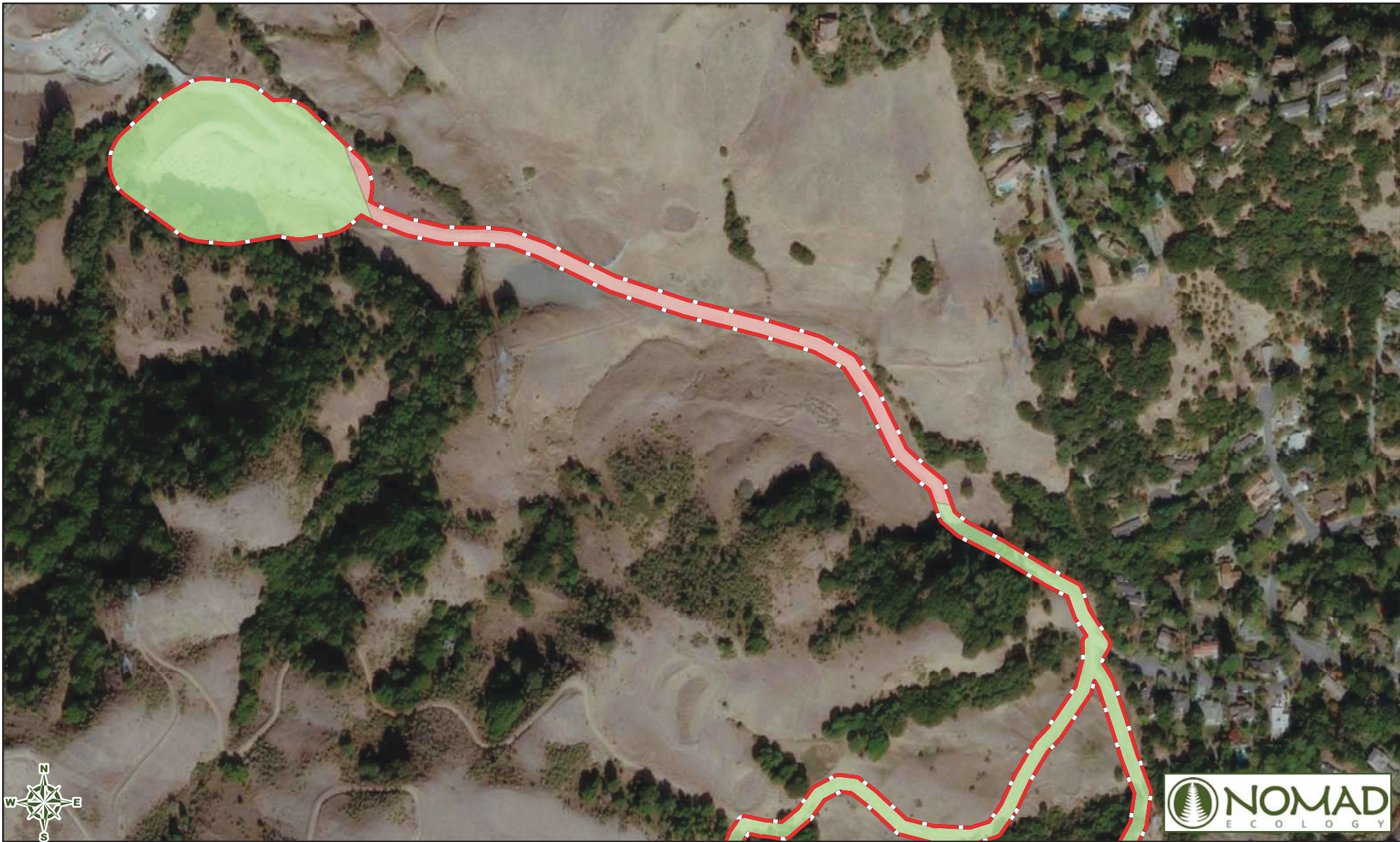


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
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Sheet 1 of 12



December 2021

Botanical Resources Survey Report

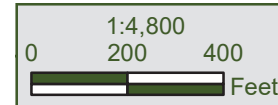
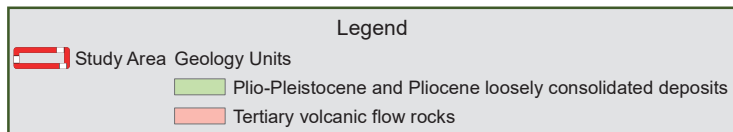


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 2 of 12



December 2021

Botanical Resources Survey Report

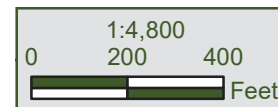
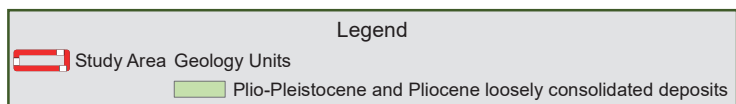
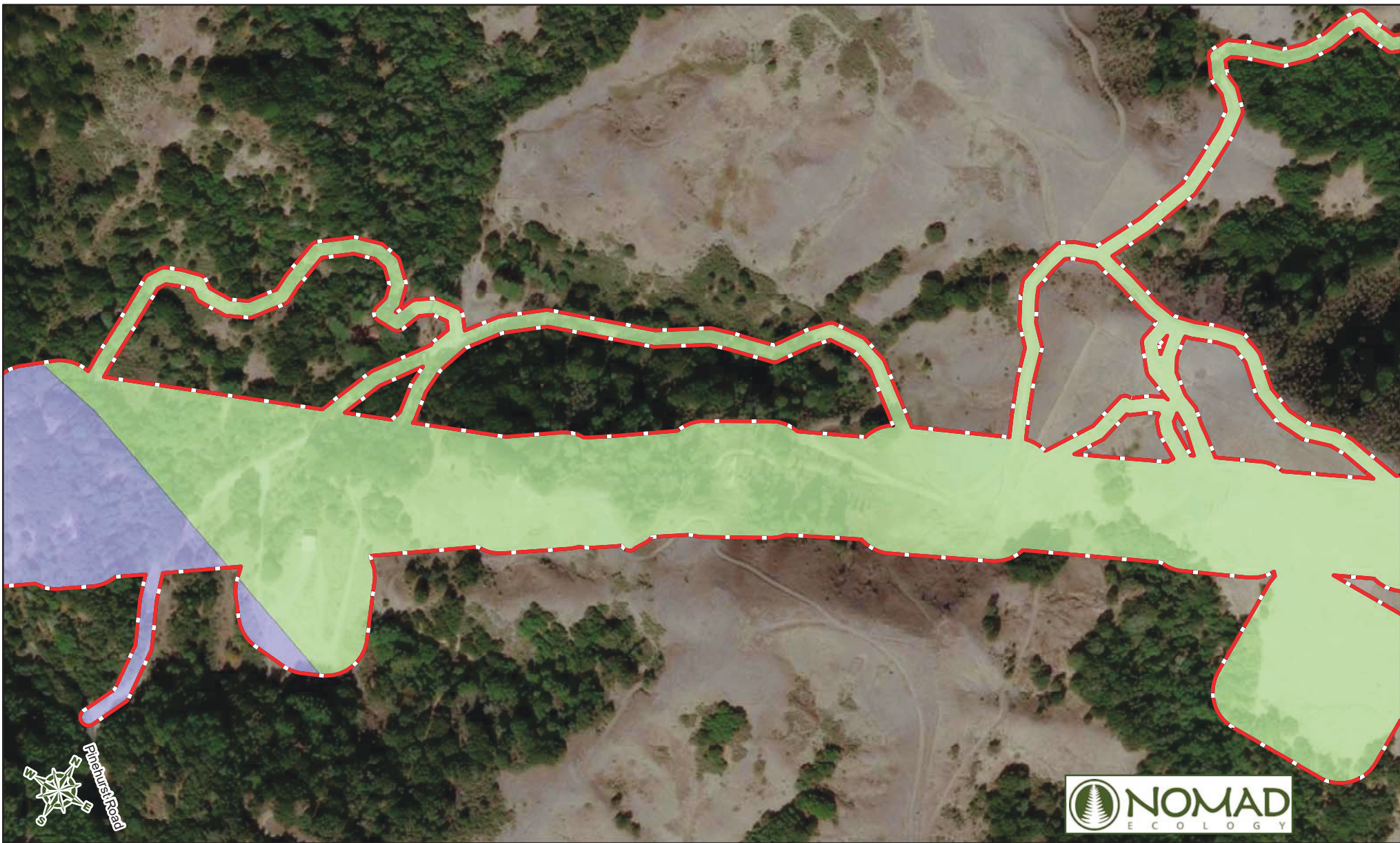


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
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Sheet 3 of 12



December 2021

Botanical Resources Survey Report

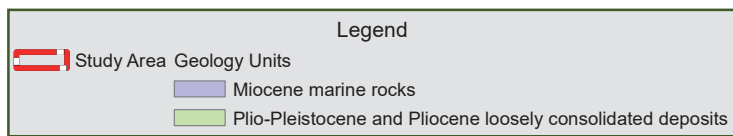
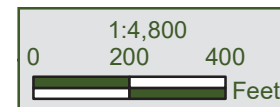


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
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Sheet 4 of 12



December 2021

Botanical Resources Survey Report

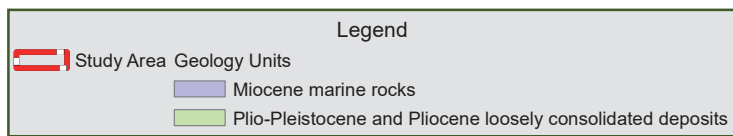
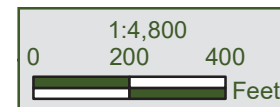
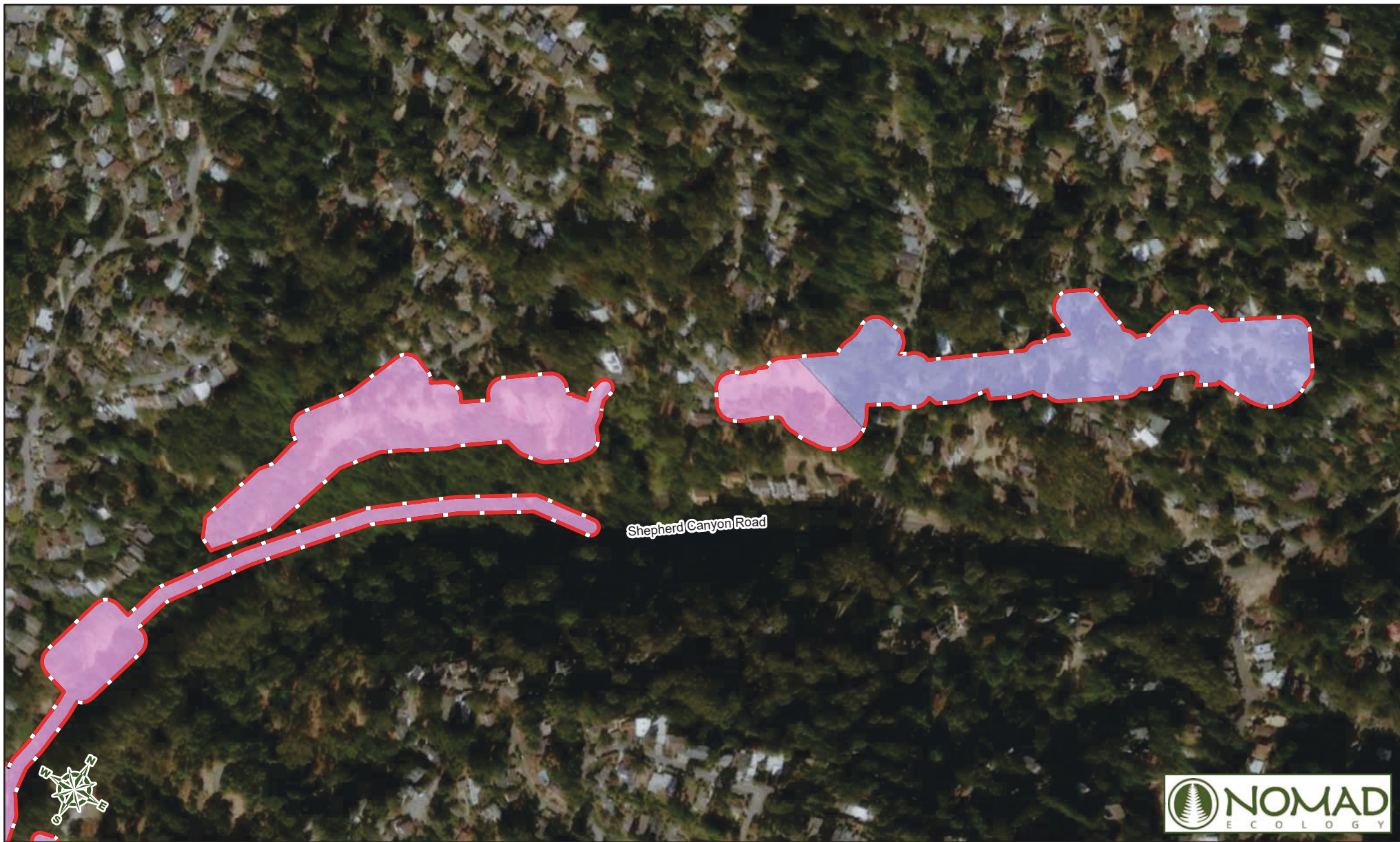


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 5 of 12



December 2021

Botanical Resources Survey Report

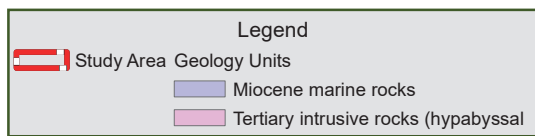
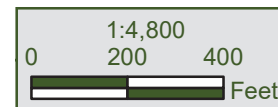


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
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Sheet 6 of 12



December 2021

Botanical Resources Survey Report

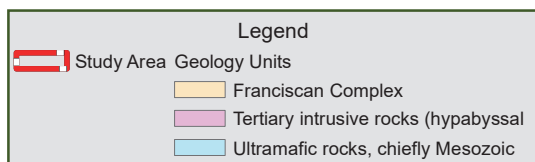
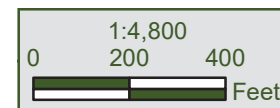


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 7 of 12



December 2021

Botanical Resources Survey Report

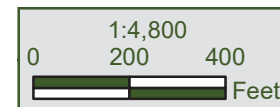
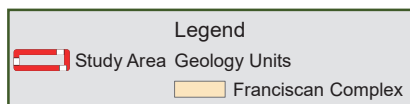


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 8 of 12



December 2021

Botanical Resources Survey Report

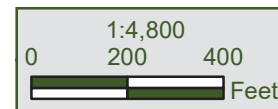
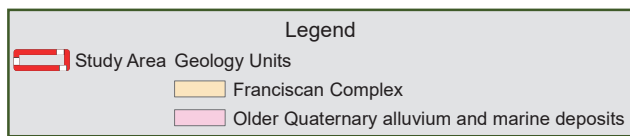
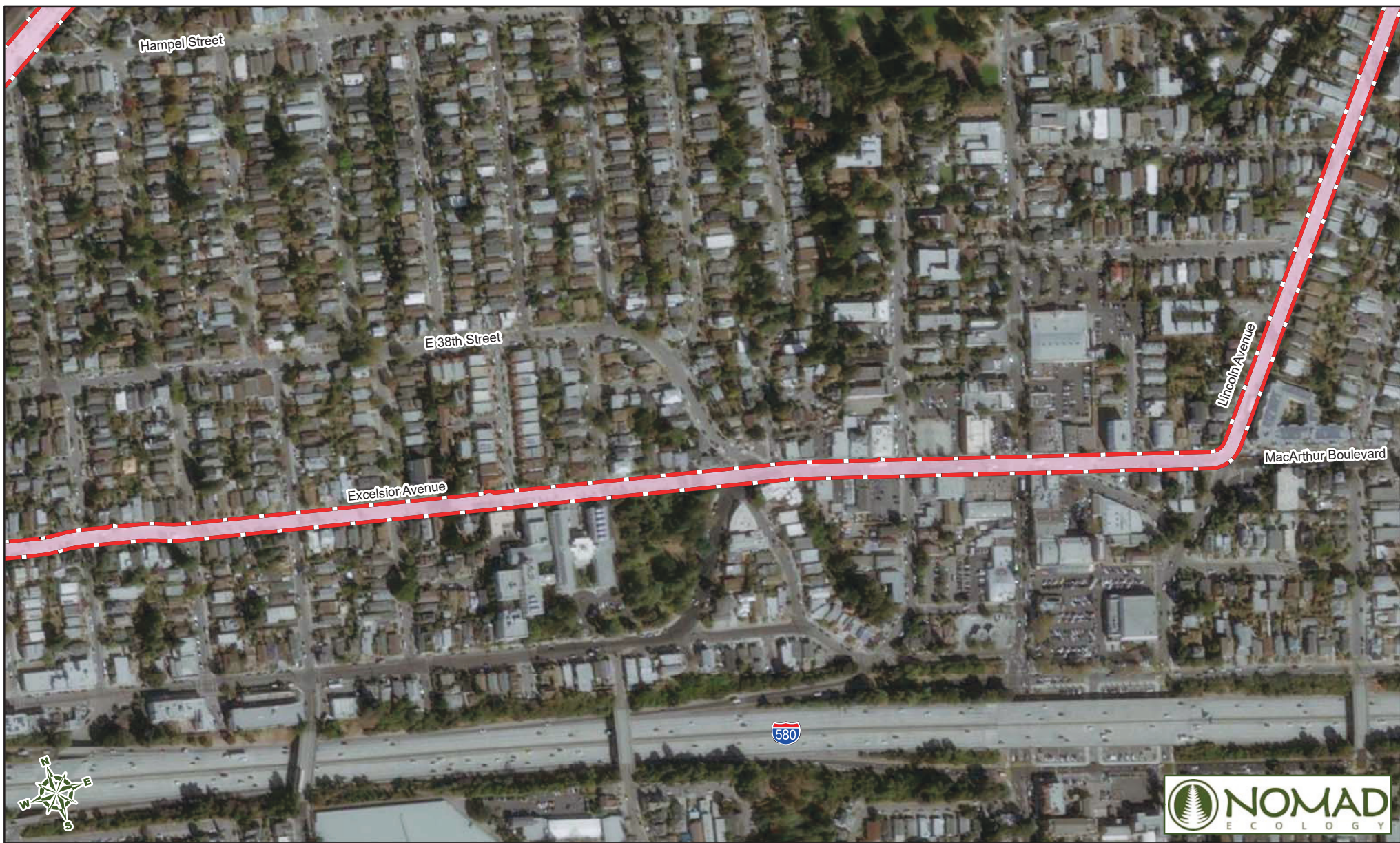


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
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Sheet 9 of 12



December 2021

Botanical Resources Survey Report

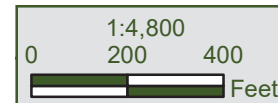
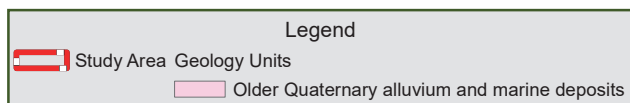


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 10 of 12



December 2021

Botanical Resources Survey Report

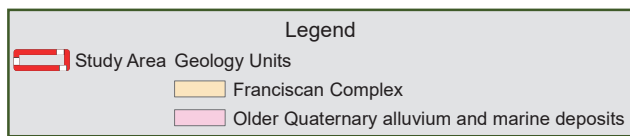
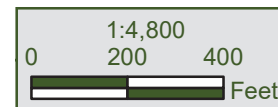
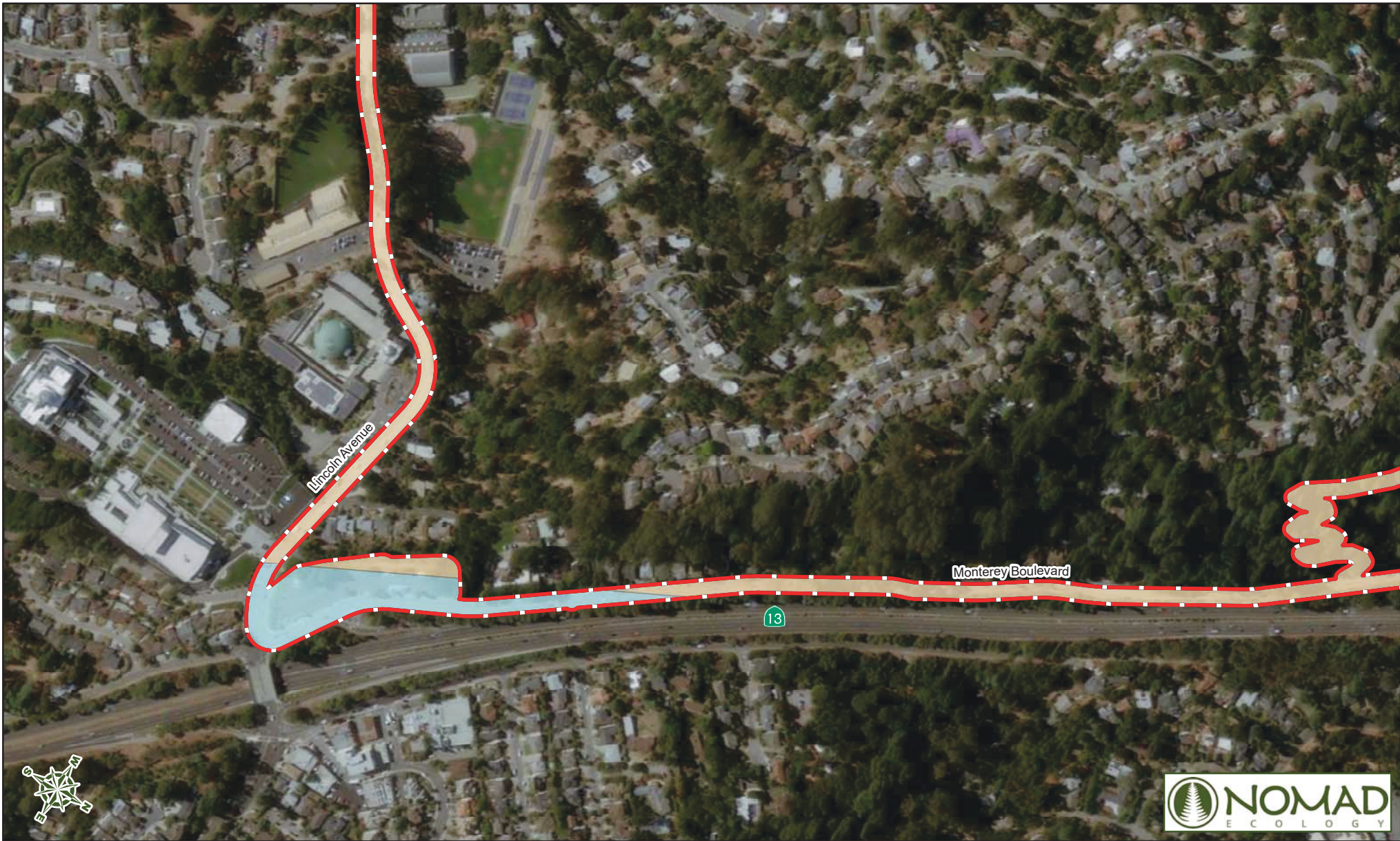


Figure 4
Geology Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 11 of 12



December 2021

Botanical Resources Survey Report

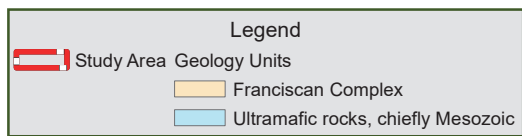
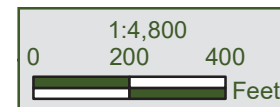
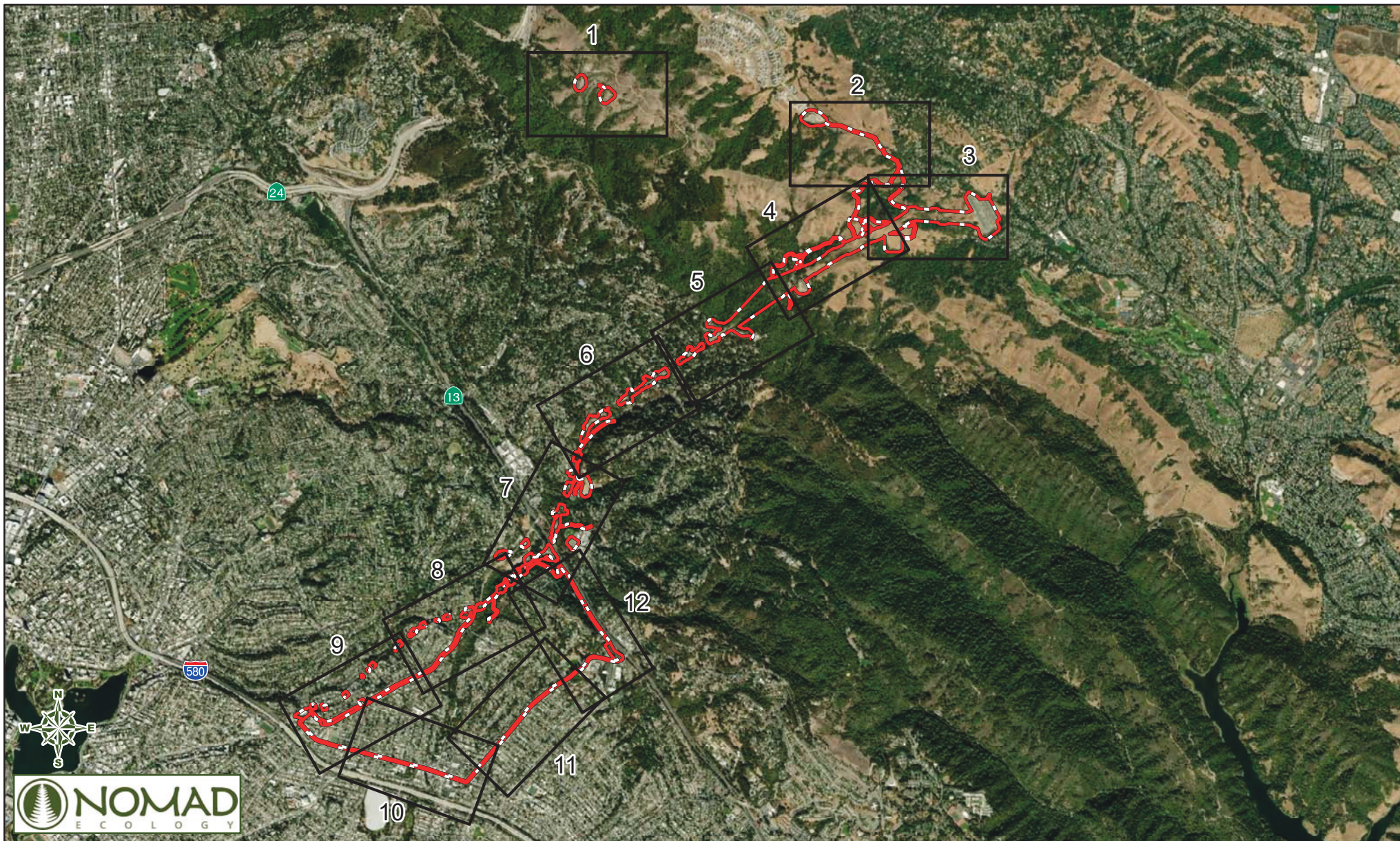


Figure 4
 Geology Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 12 of 12



December 2021

Botanical Resources Survey Report

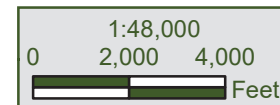
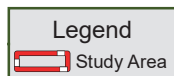


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Overview



December 2021

Botanical Resources Survey Report

Legend

 Study Area Soil Mapping Units

 Quarry

1:4,800

0 200 400

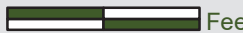
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Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 1 of 12



December 2021

Botanical Resources Survey Report

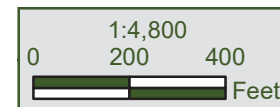
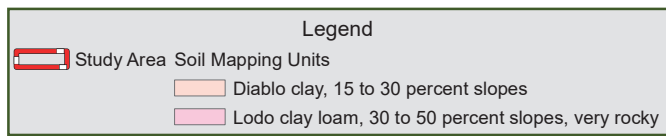


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 2 of 12



December 2021

Botanical Resources Survey Report

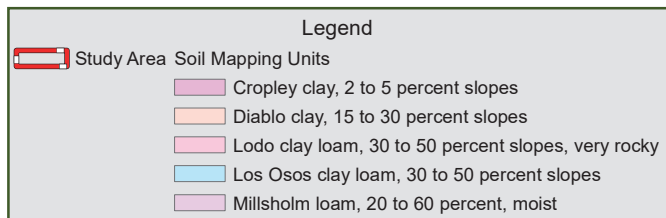
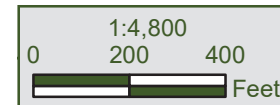
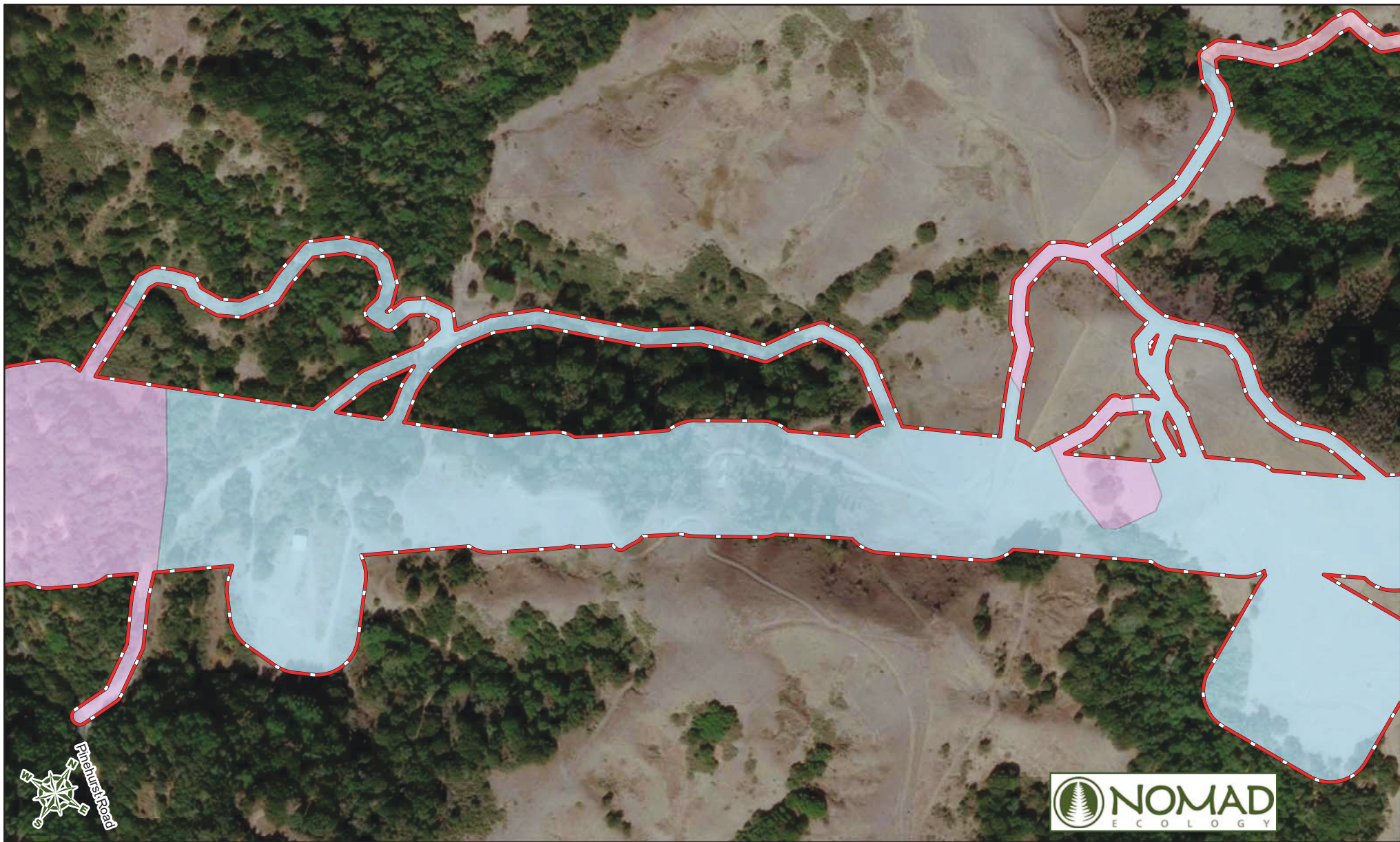


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 3 of 12



December 2021

Botanical Resources Survey Report

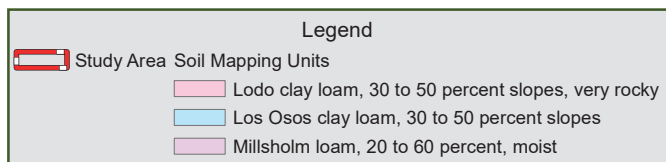
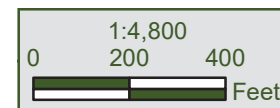
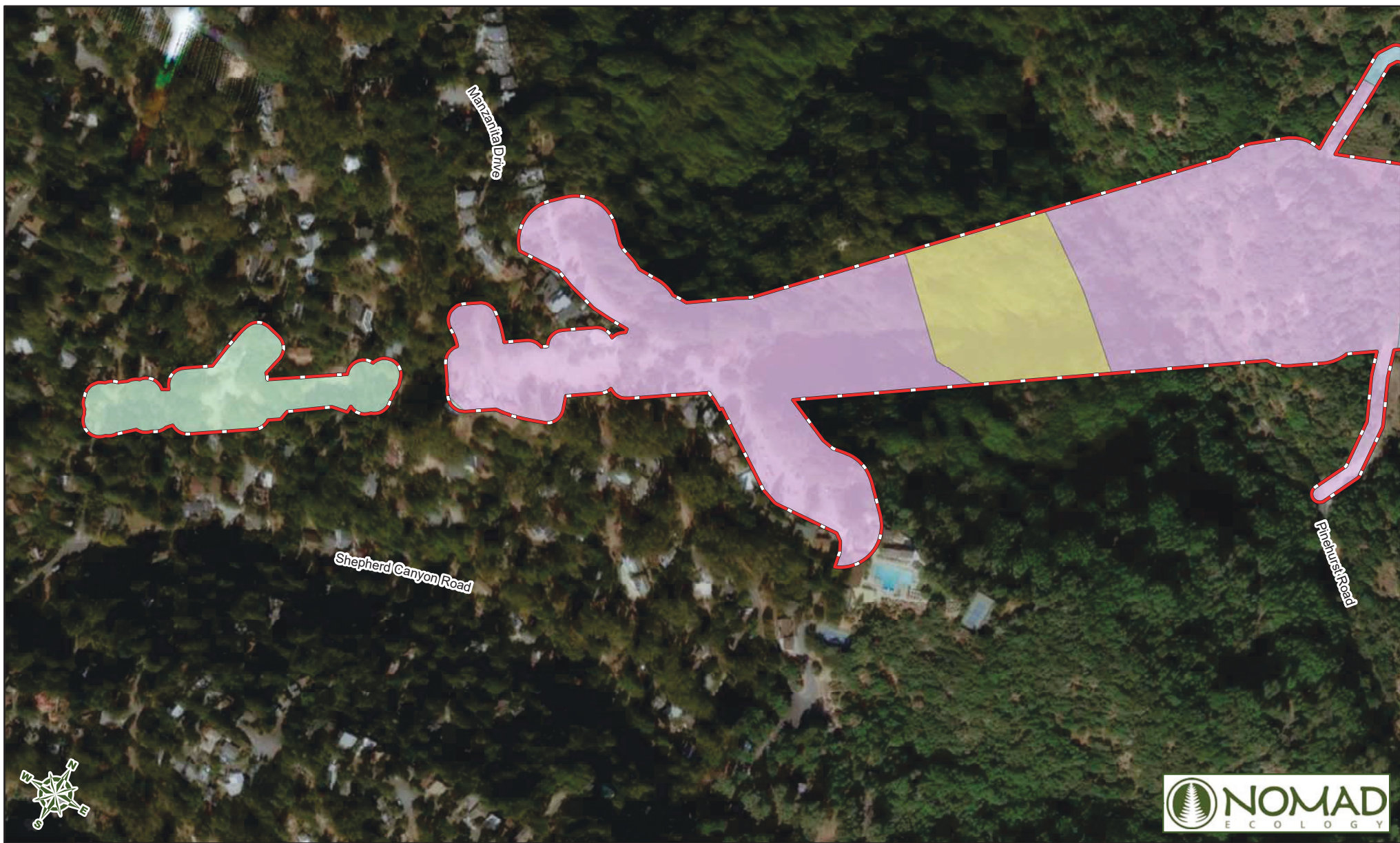


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 4 of 12

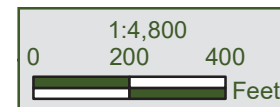


December 2021

Botanical Resources Survey Report

Legend	
	Study Area Soil Mapping Units
	Maymen loam, 30 to 75 percent slopes
	Felton loam, 15 to 30 percent slopes
	Los Osos clay loam, 30 to 50 percent slopes
	Millsholm loam, 20 to 60 percent, moist

Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 5 of 12



December 2021

Botanical Resources Survey Report

Legend	
	Study Area Soil Mapping Units
	Maymen loam, 30 to 75 percent slopes

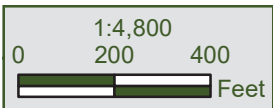


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



December 2021

Botanical Resources Survey Report

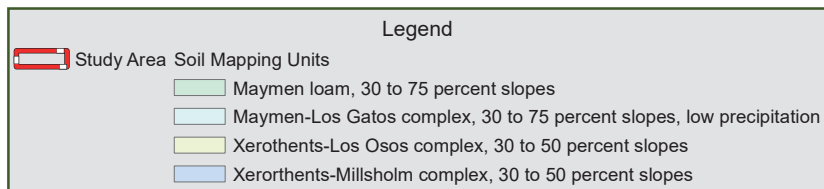
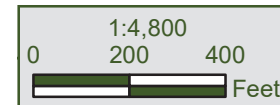


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 7 of 12



December 2021

Botanical Resources Survey Report

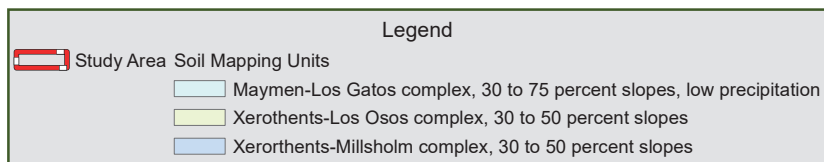
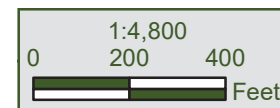


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 8 of 12

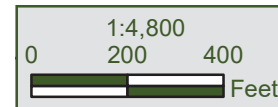


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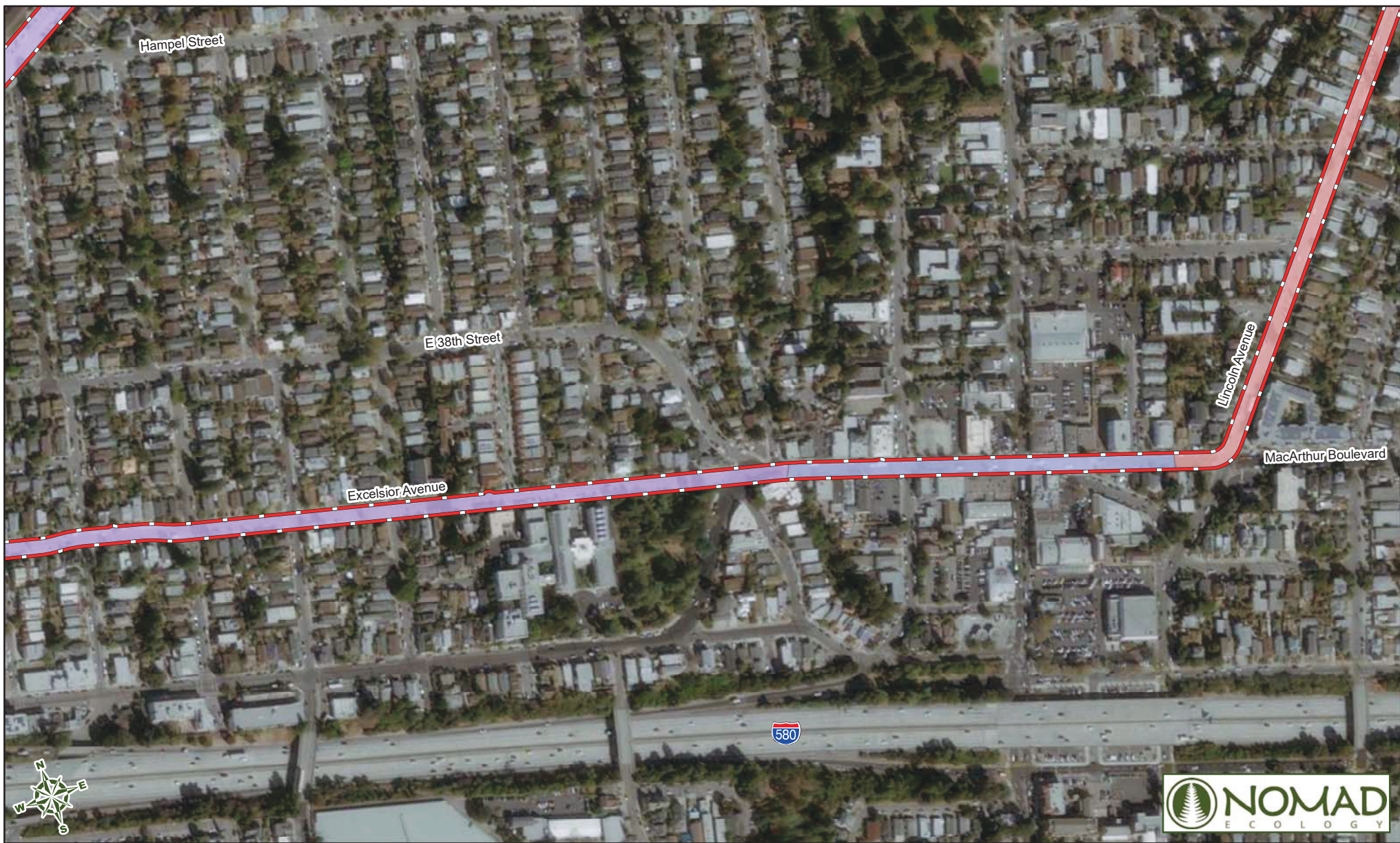
Botanical Resources Survey Report

Legend	
	Study Area Soil Mapping Units
	Maymen-Los Gatos complex, 30 to 75 percent slopes, low precipitation
	Urban land-Danville complex
	Urban land-Tierra complex, 15 to 30 percent slopes
	Xerothents-Los Osos complex, 30 to 50 percent slopes

Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 9 of 12



December 2021

Botanical Resources Survey Report

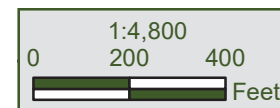
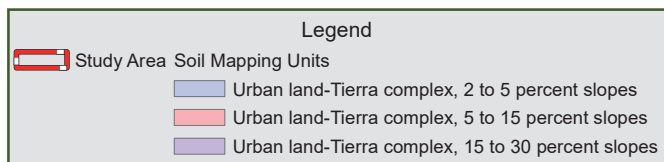


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 10 of 12



December 2021

Botanical Resources Survey Report

Study Area Soil Mapping Units

Urban land-Tierra complex, 5 to 15 percent slopes

Xerorthents-Millsholm complex, 30 to 50 percent slopes

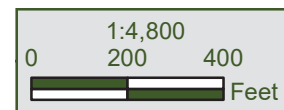
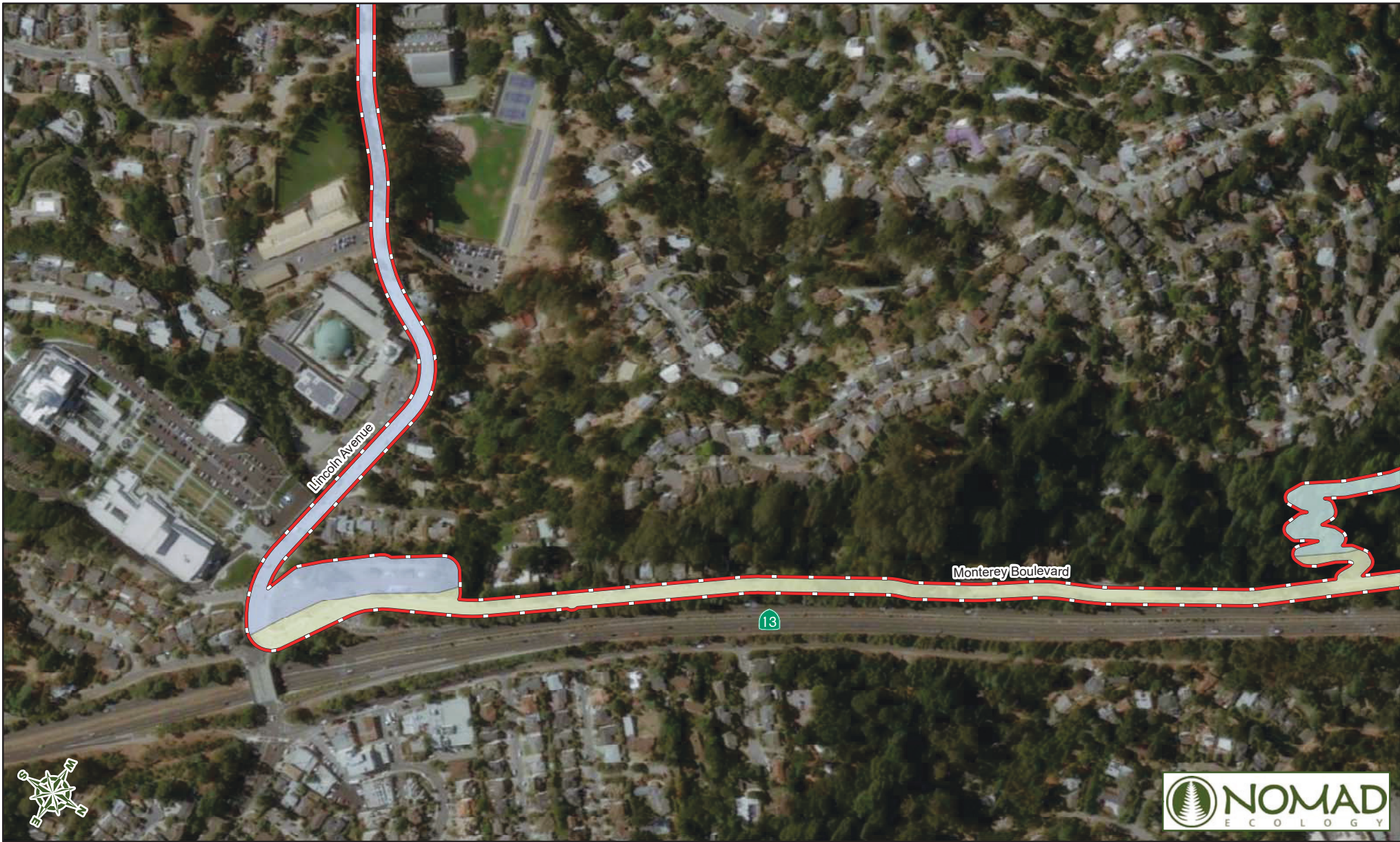


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 11 of 12



December 2021

Botanical Resources Survey Report

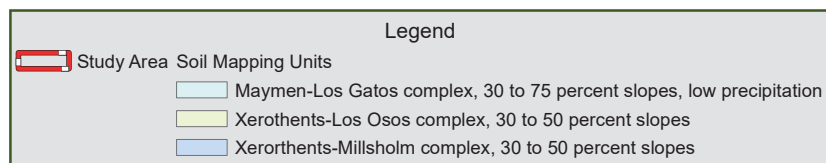
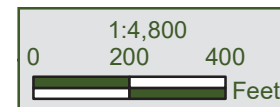
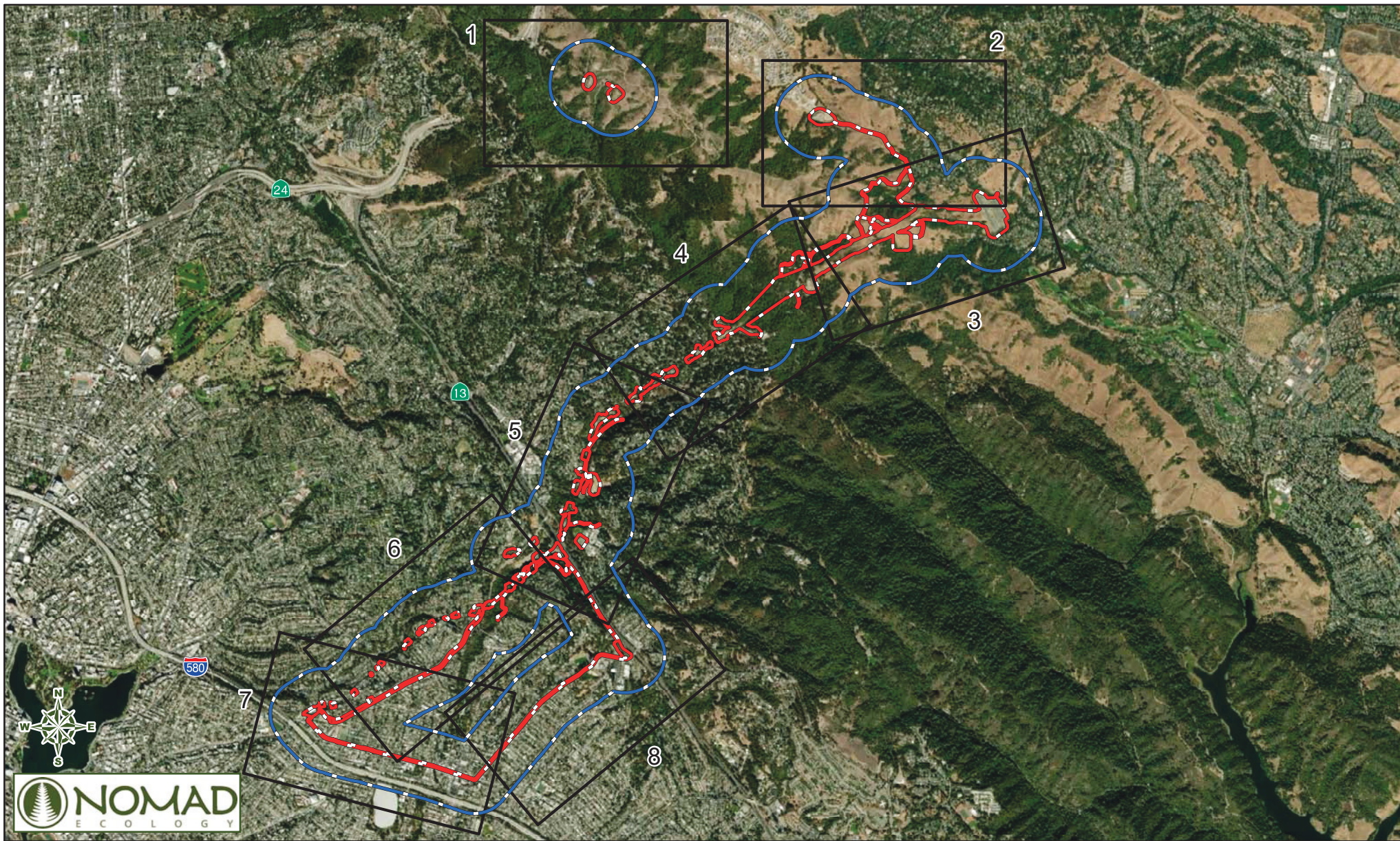


Figure 5
Soil Mapping Units in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 12 of 12



December 2021

Botanical Resources Survey Report

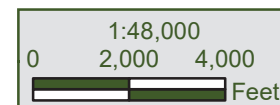
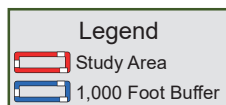
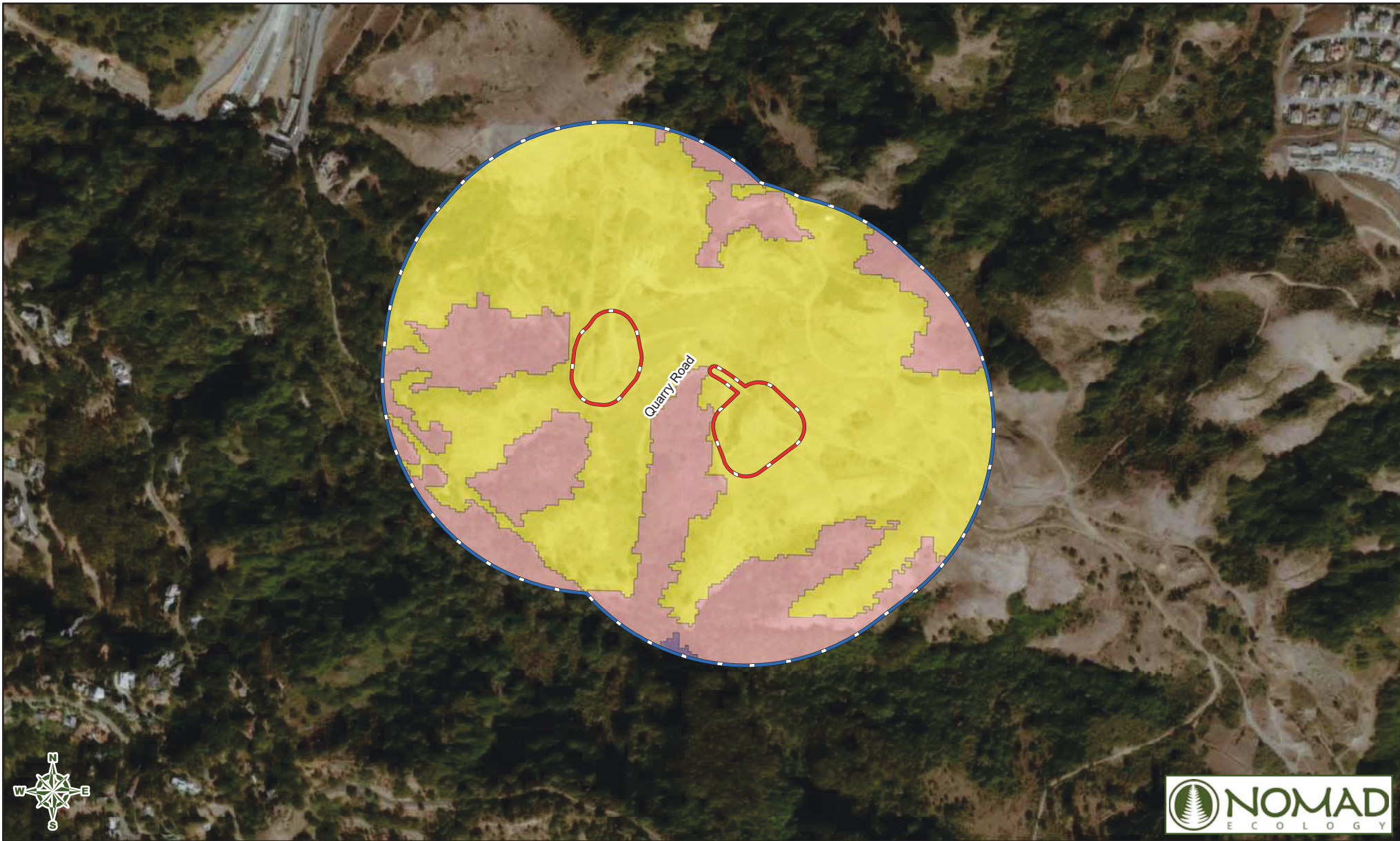


Figure 6
Conservation Lands Network Cover Types in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Overview



December 2021

Botanical Resources Survey Report

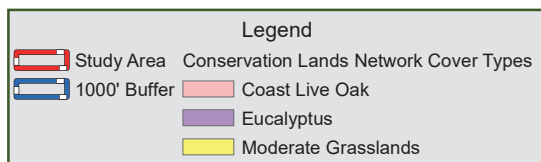
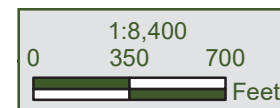
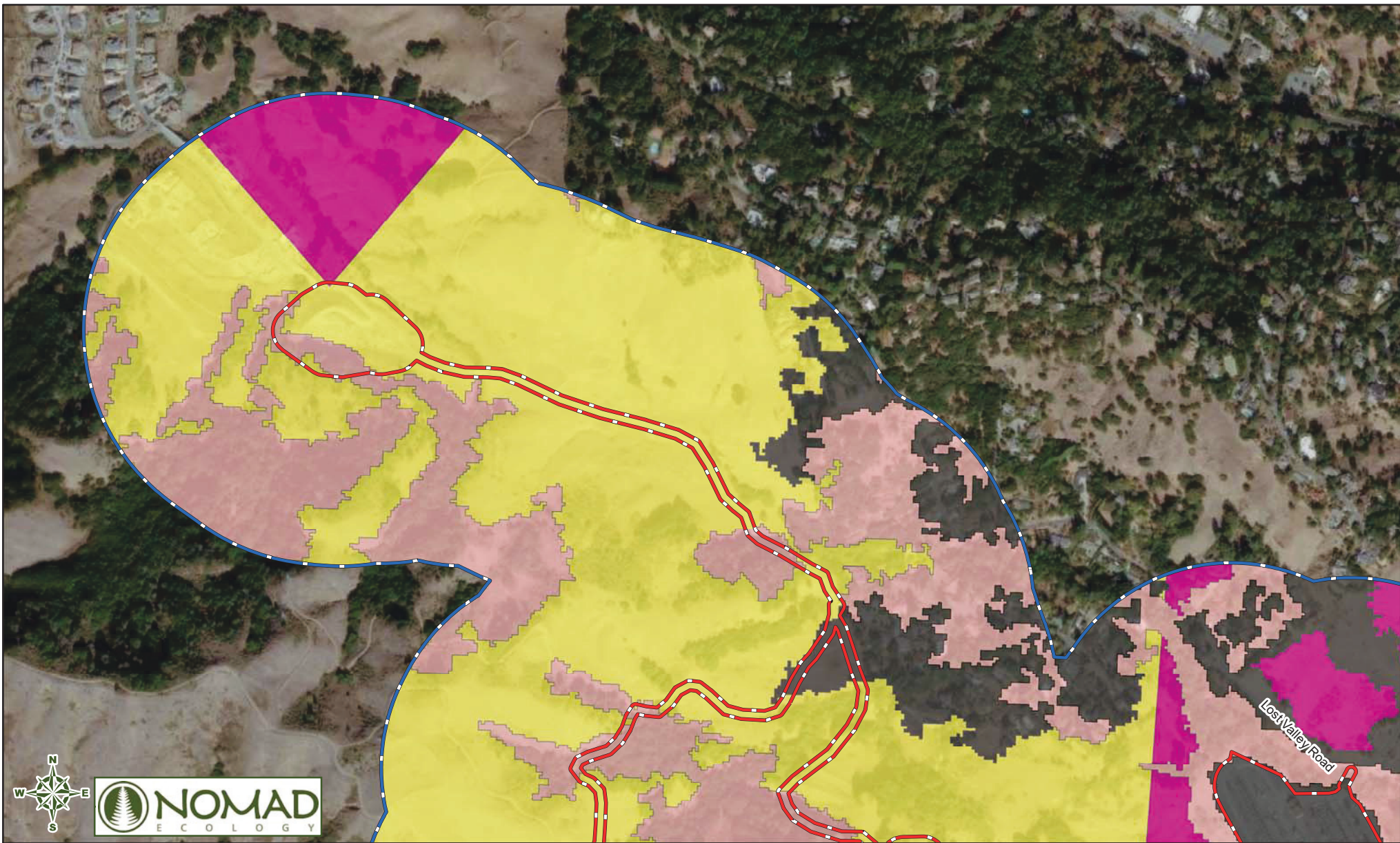


Figure 6
Conservation Lands Network Cover Types in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 1 of 8



December 2021

Botanical Resources Survey Report

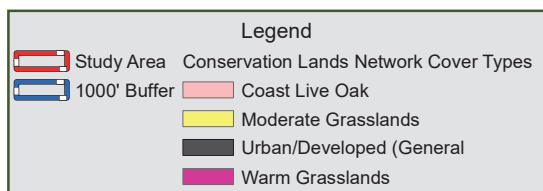
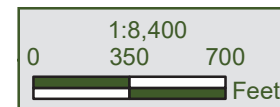
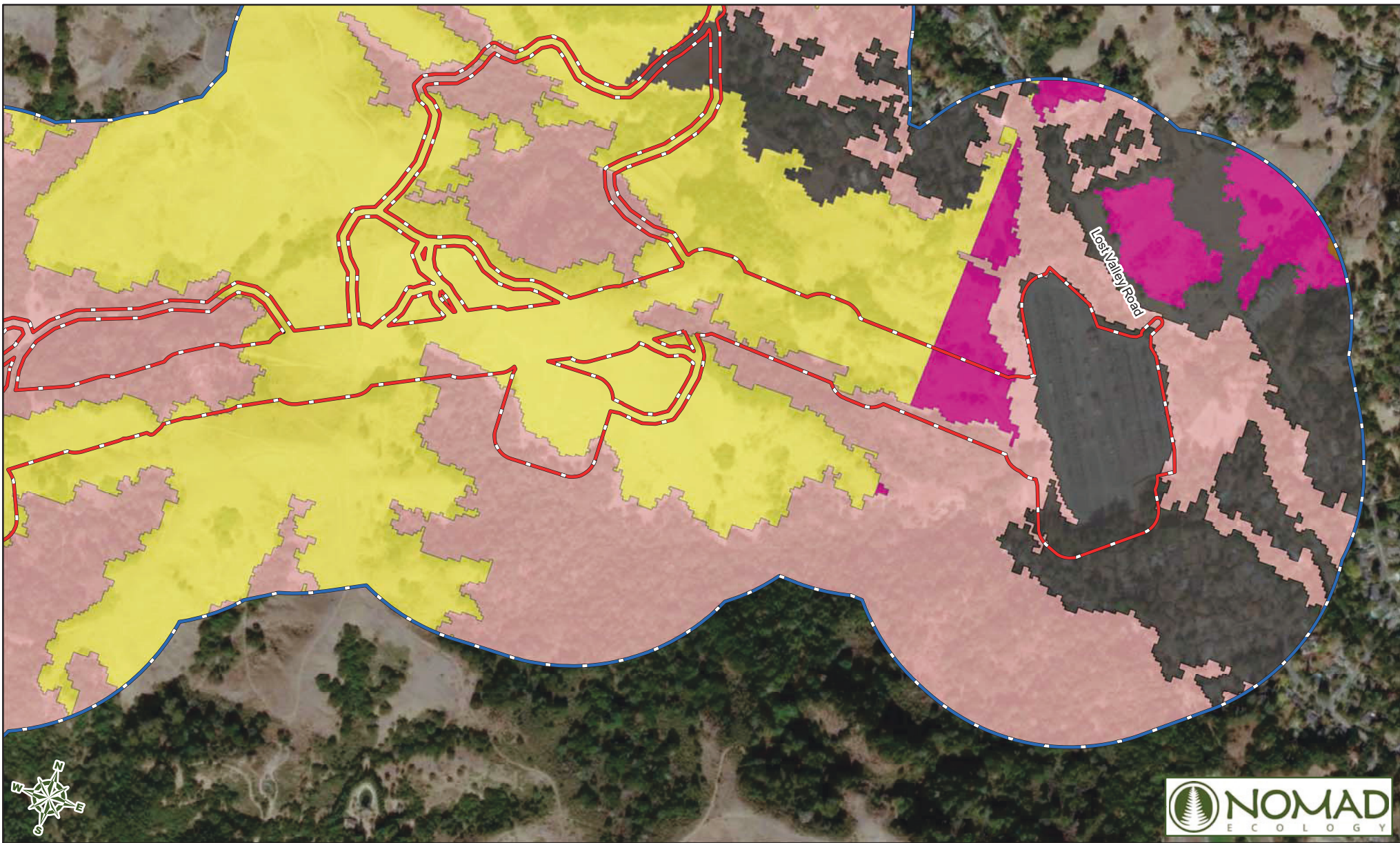


Figure 6
Conservation Lands Network Cover Types in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 2 of 8



December 2021

Botanical Resources Survey Report

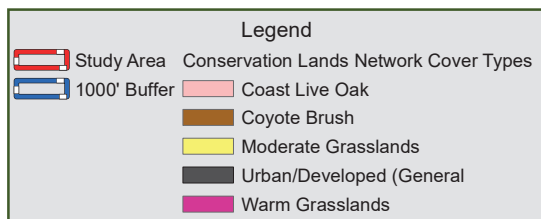
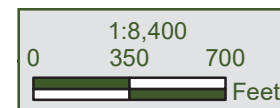
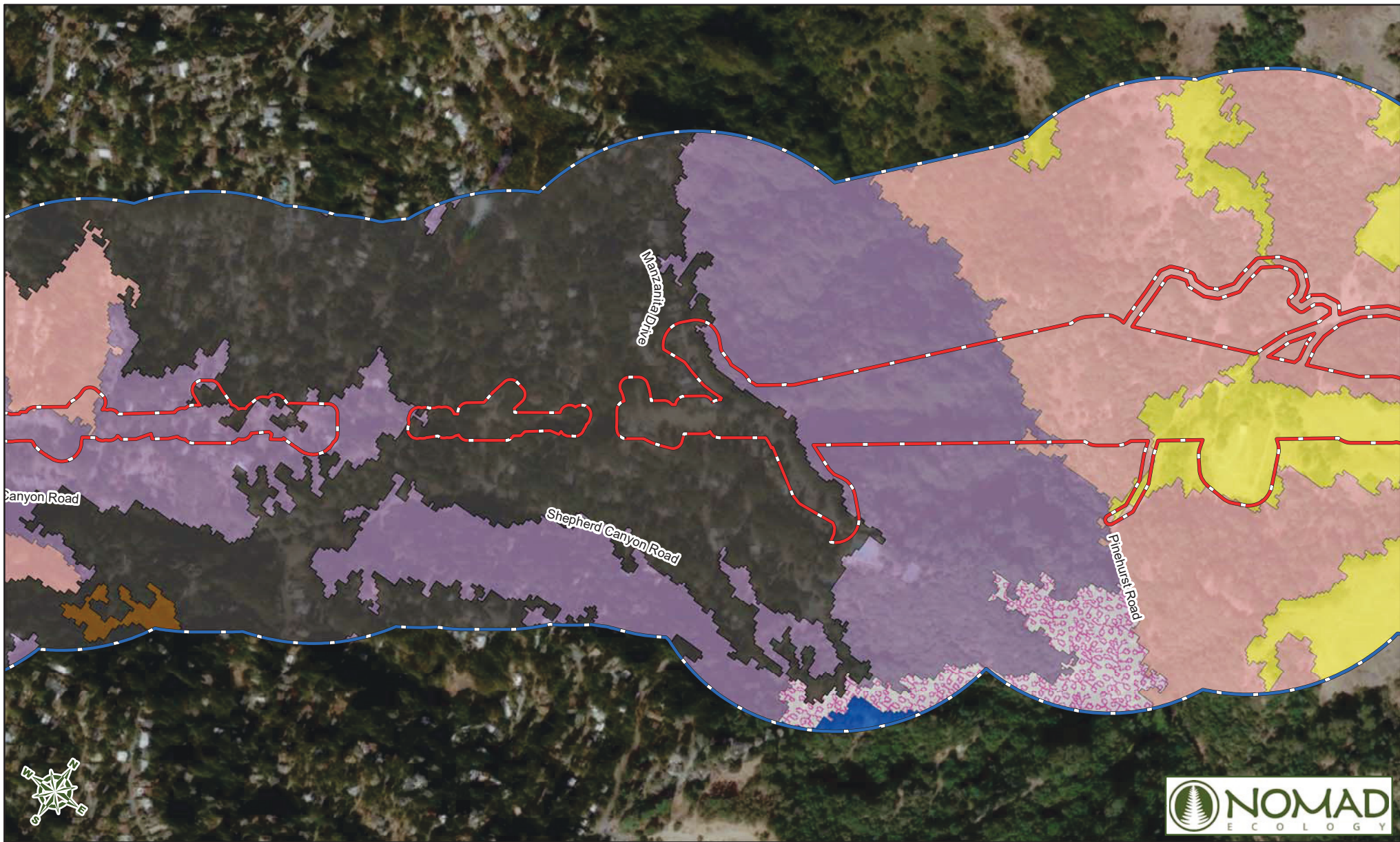


Figure 6
Conservation Lands Network Cover Types in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 3 of 8



December 2021

Botanical Resources Survey Report

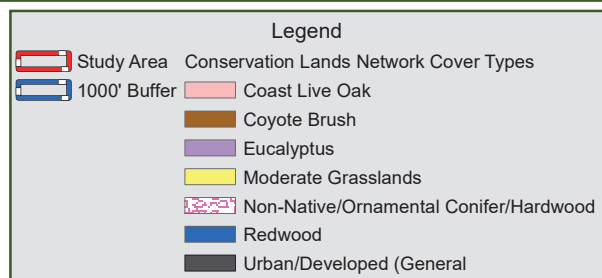
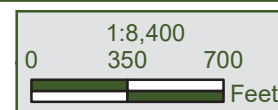
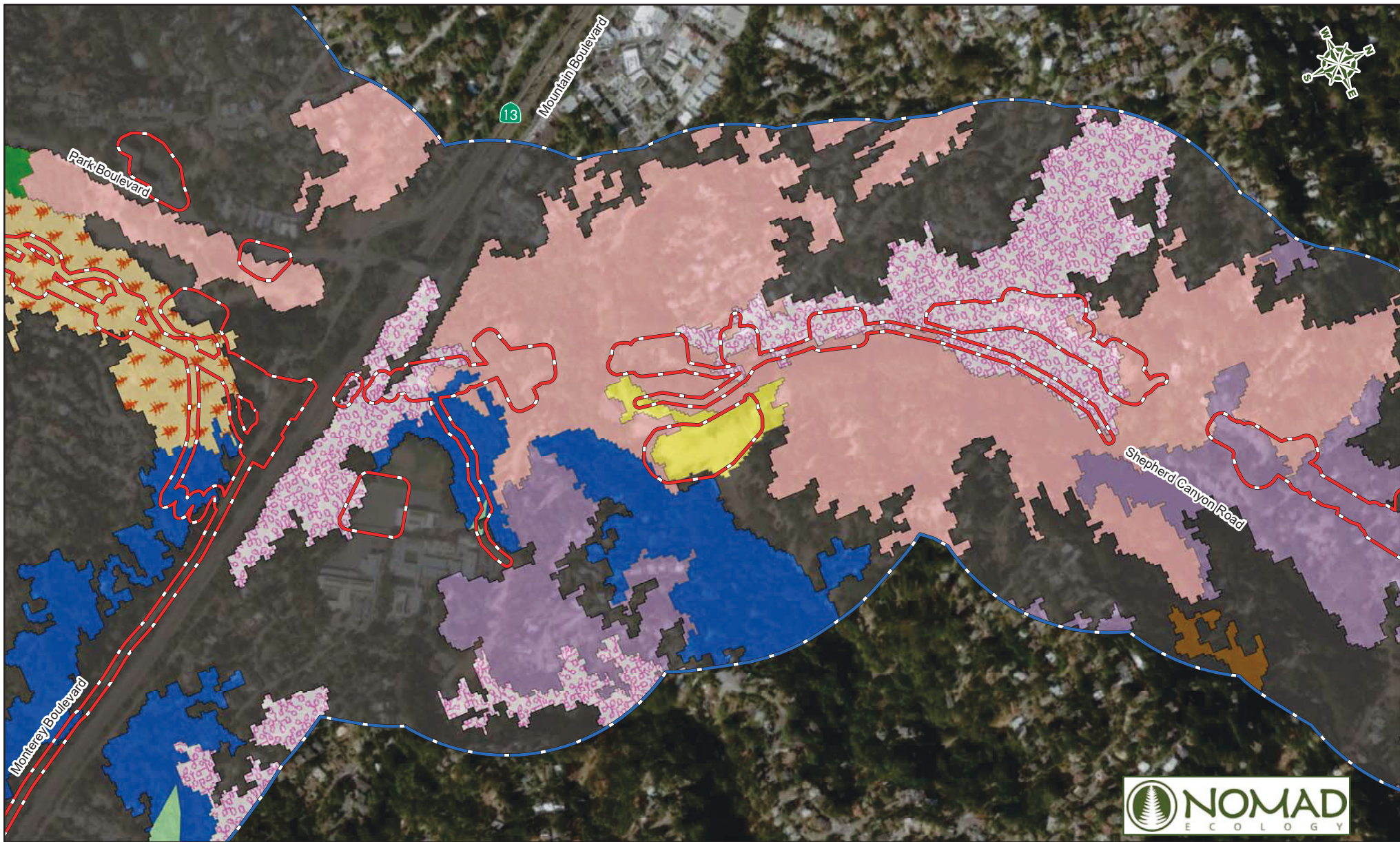


Figure 6
Conservation Lands Network Cover Types in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 4 of 8



December 2021

Botanical Resources Survey Report

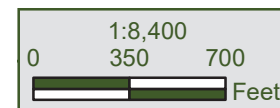
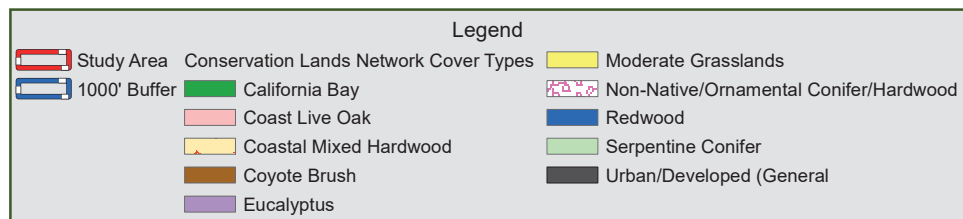
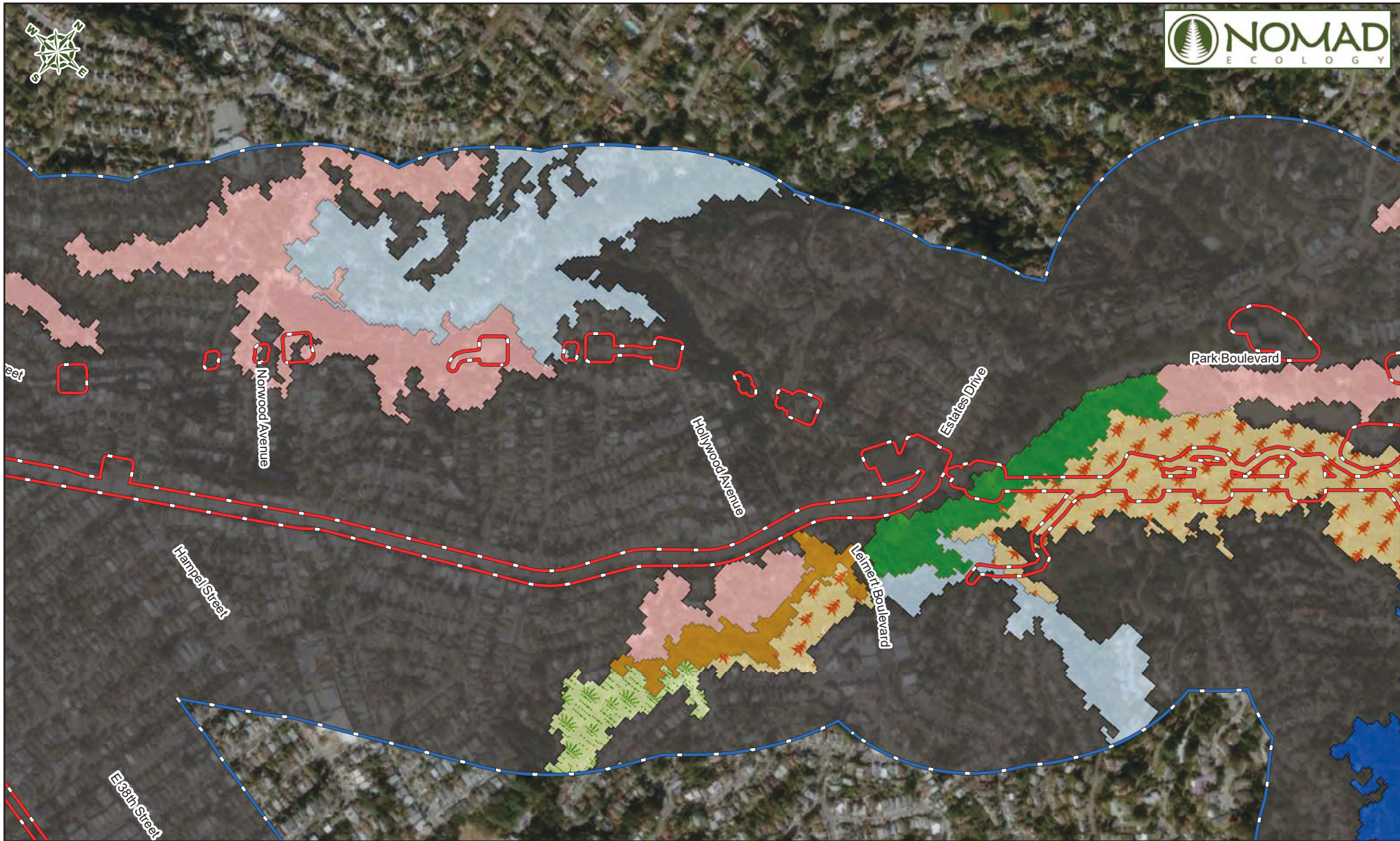


Figure 6
Conservation Lands Network Cover Types in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 5 of 8



December 2021

Botanical Resources Survey Report

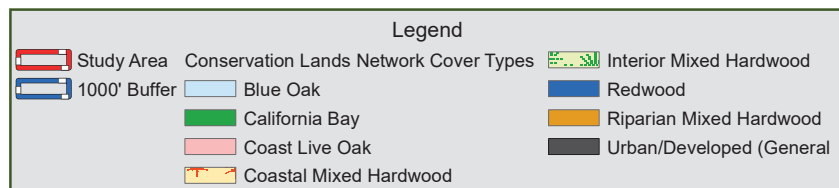
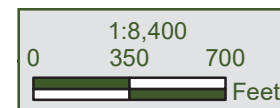


Figure 6
Conservation Lands Network Cover Types in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 6 of 8

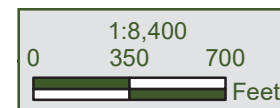


December 2021

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Figure 6
Conservation Lands Network Cover Types in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 7 of 8



December 2021

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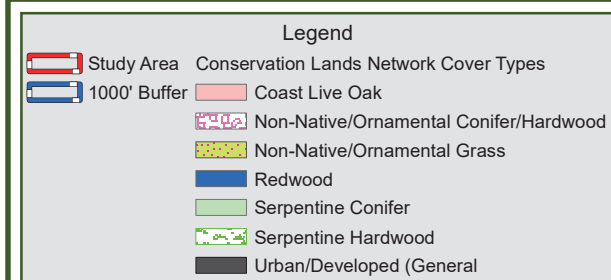
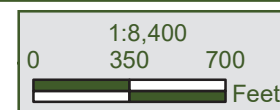
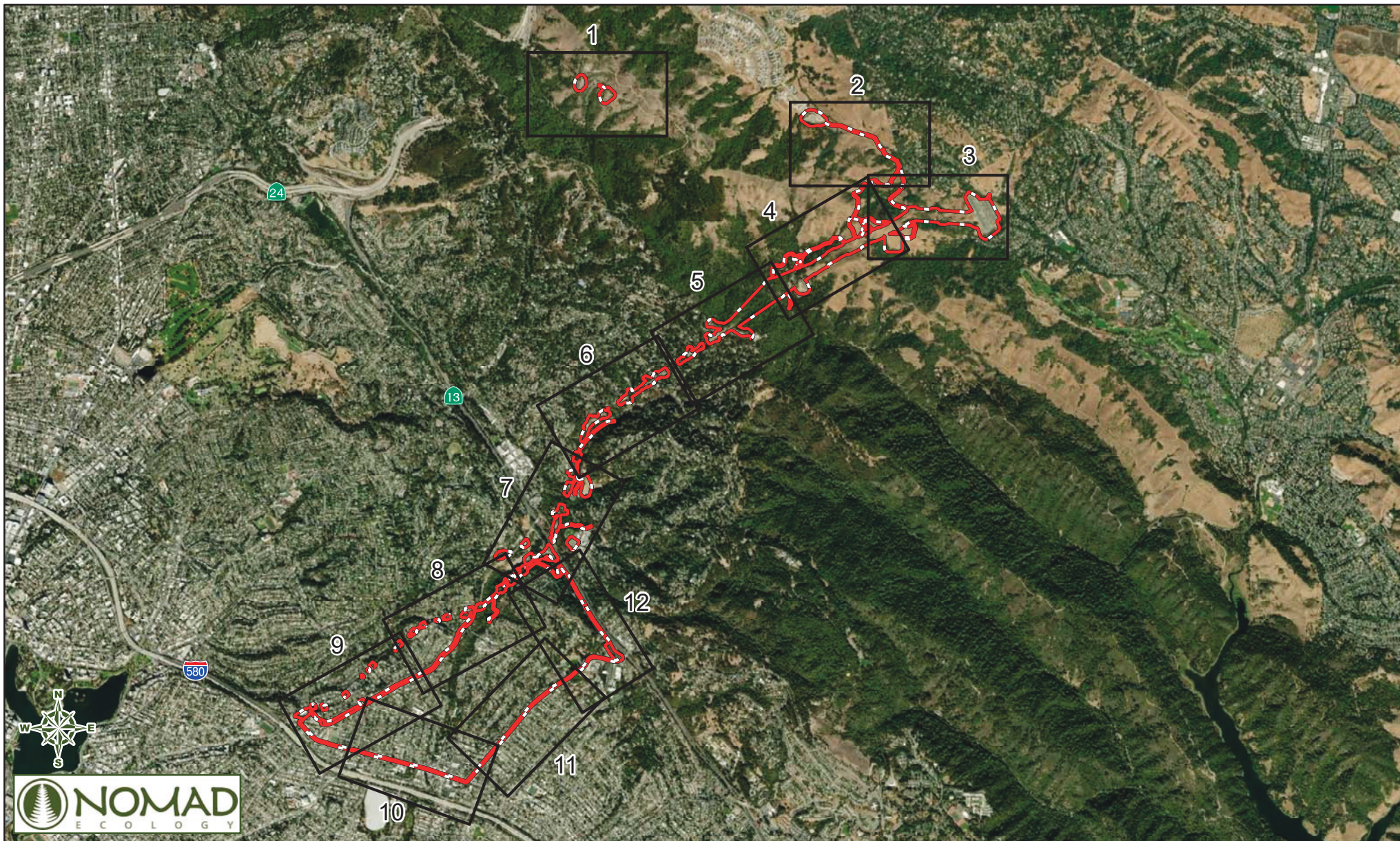


Figure 6
Conservation Lands Network Cover Types in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 8 of 8



December 2021

Botanical Resources Survey Report

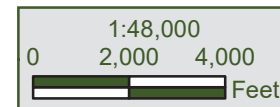
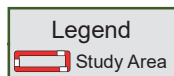
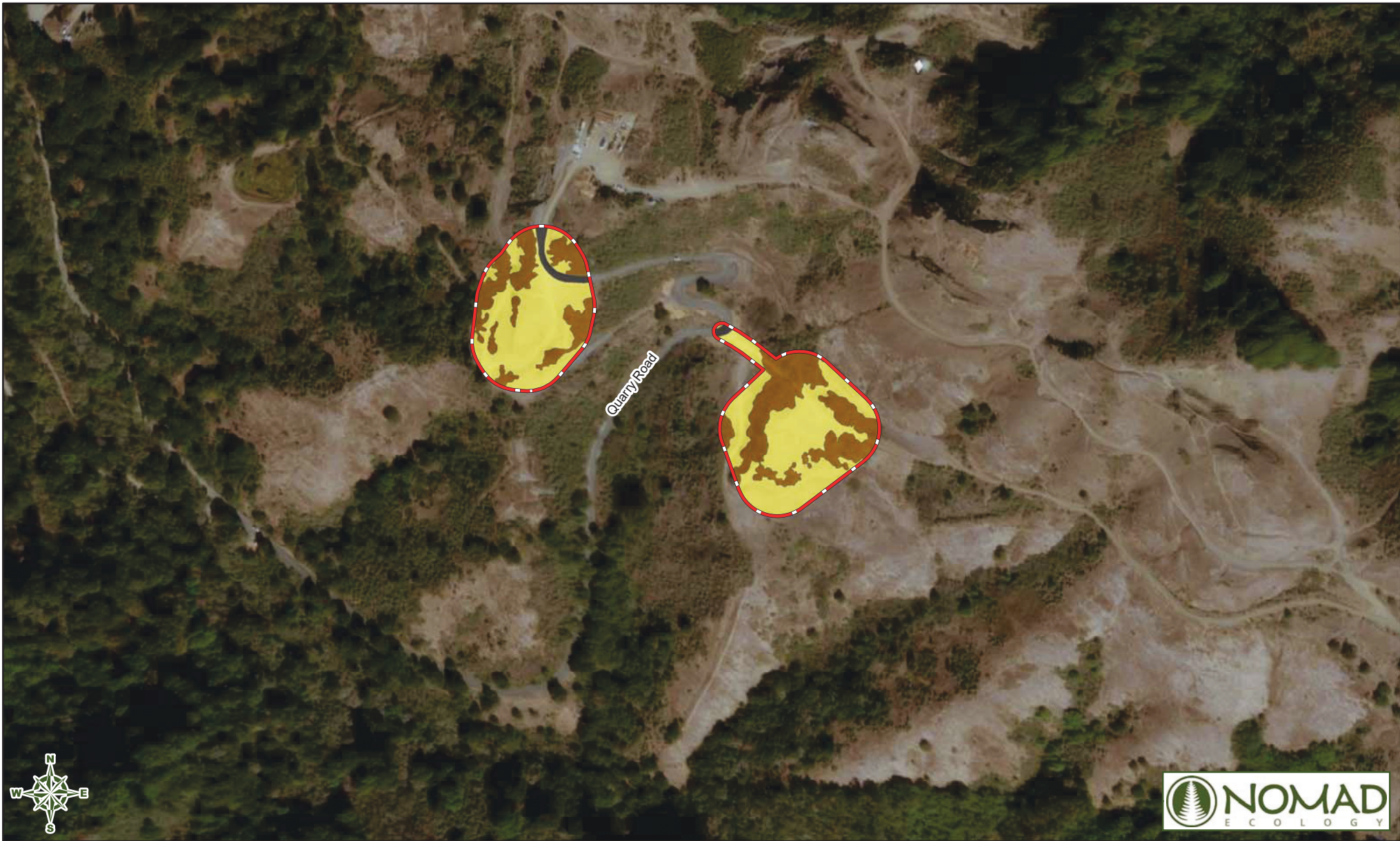


Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Overview



December 2021

Botanical Resources Survey Report

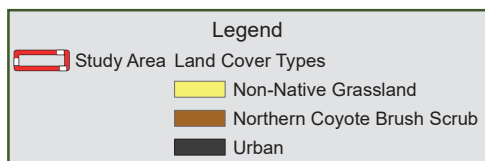
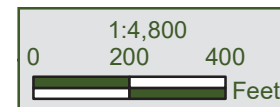


Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 1 of 12



December 2021

Botanical Resources Survey Report

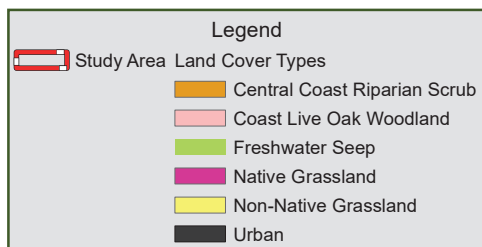
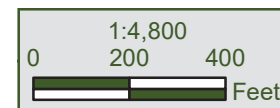
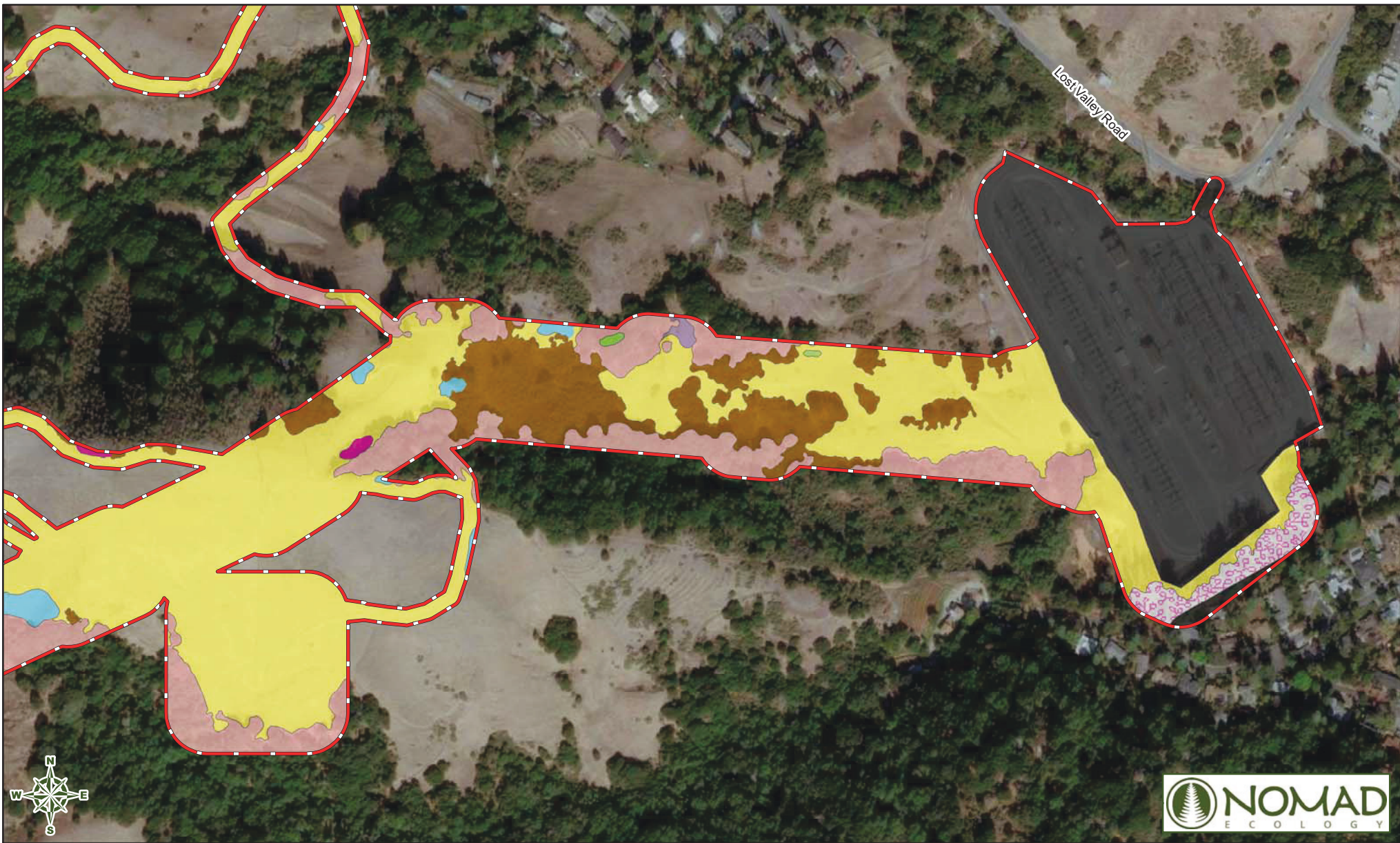


Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 2 of 12

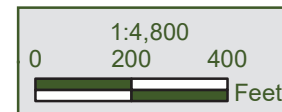


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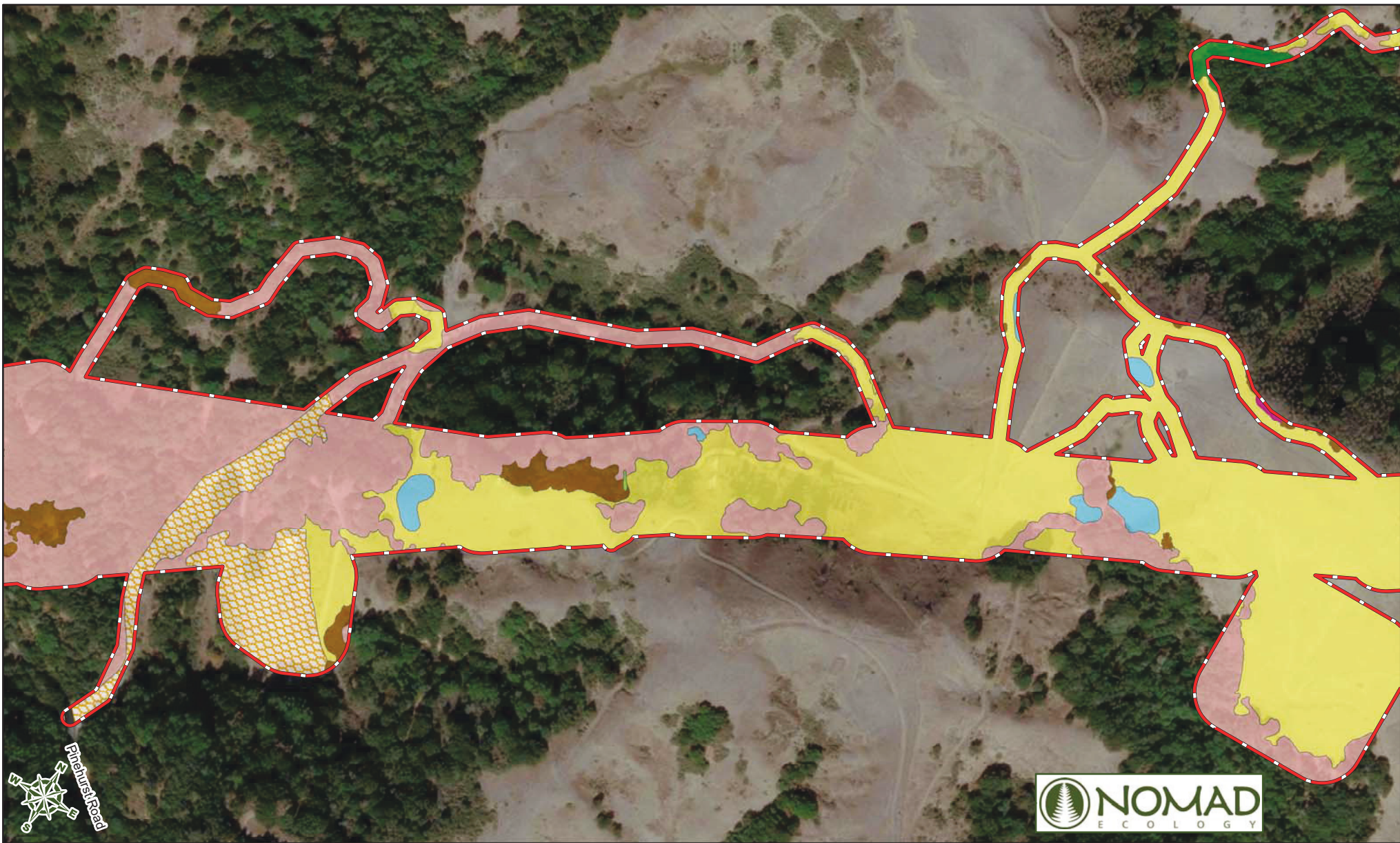
Botanical Resources Survey Report



Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 3 of 12

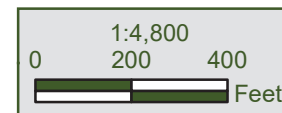


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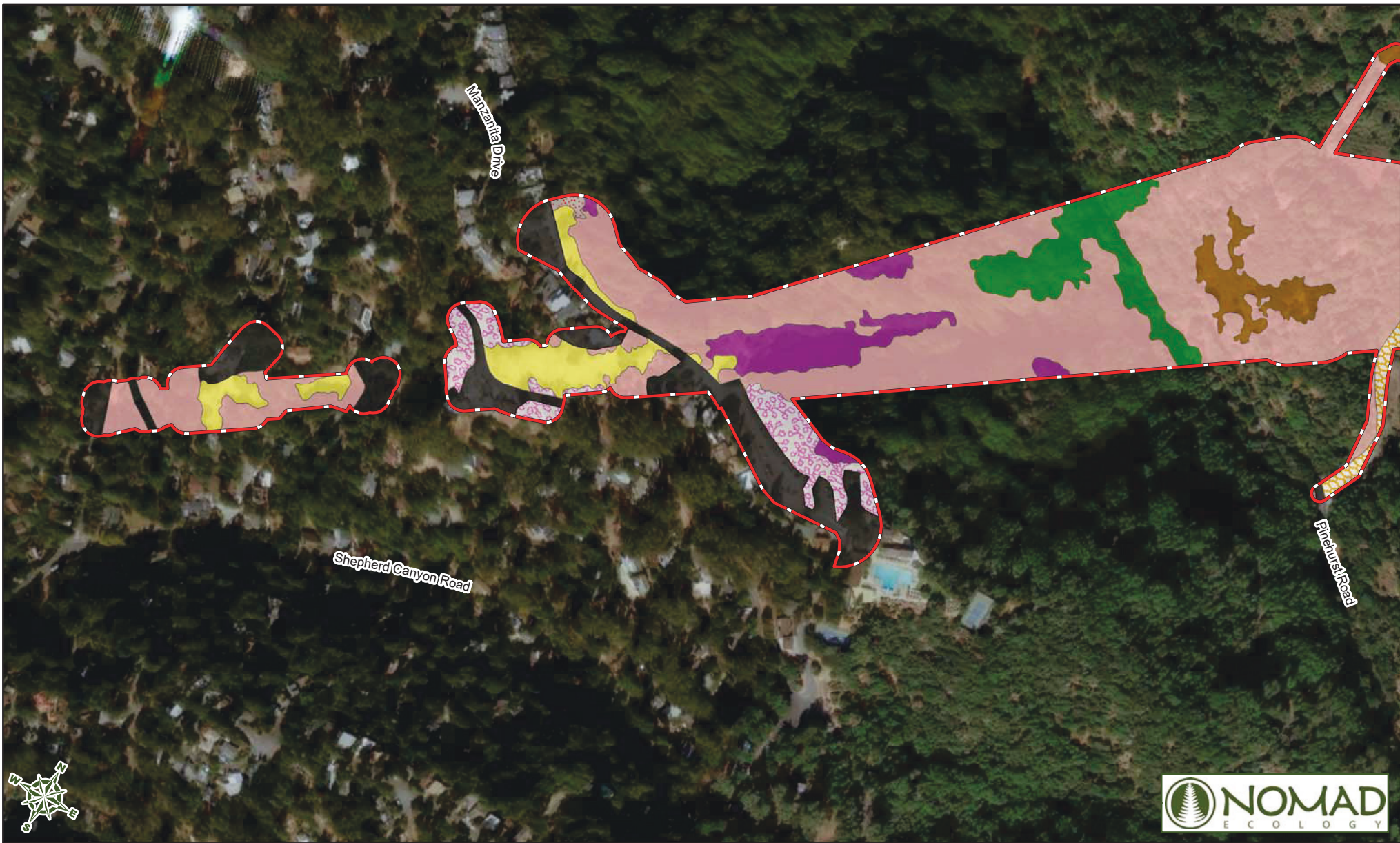
Botanical Resources Survey Report

Legend		
Study Area	Land Cover Types	
California Bay Forest	Non-Native Grassland	Native Grassland
Coast Live Oak Woodland	Northern Coyote Brush Scrub	Urban
Construction Site	Valley Needlegrass Grassland	
Freshwater Seep		

Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 4 of 12

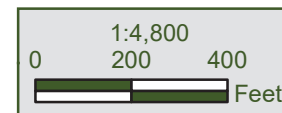


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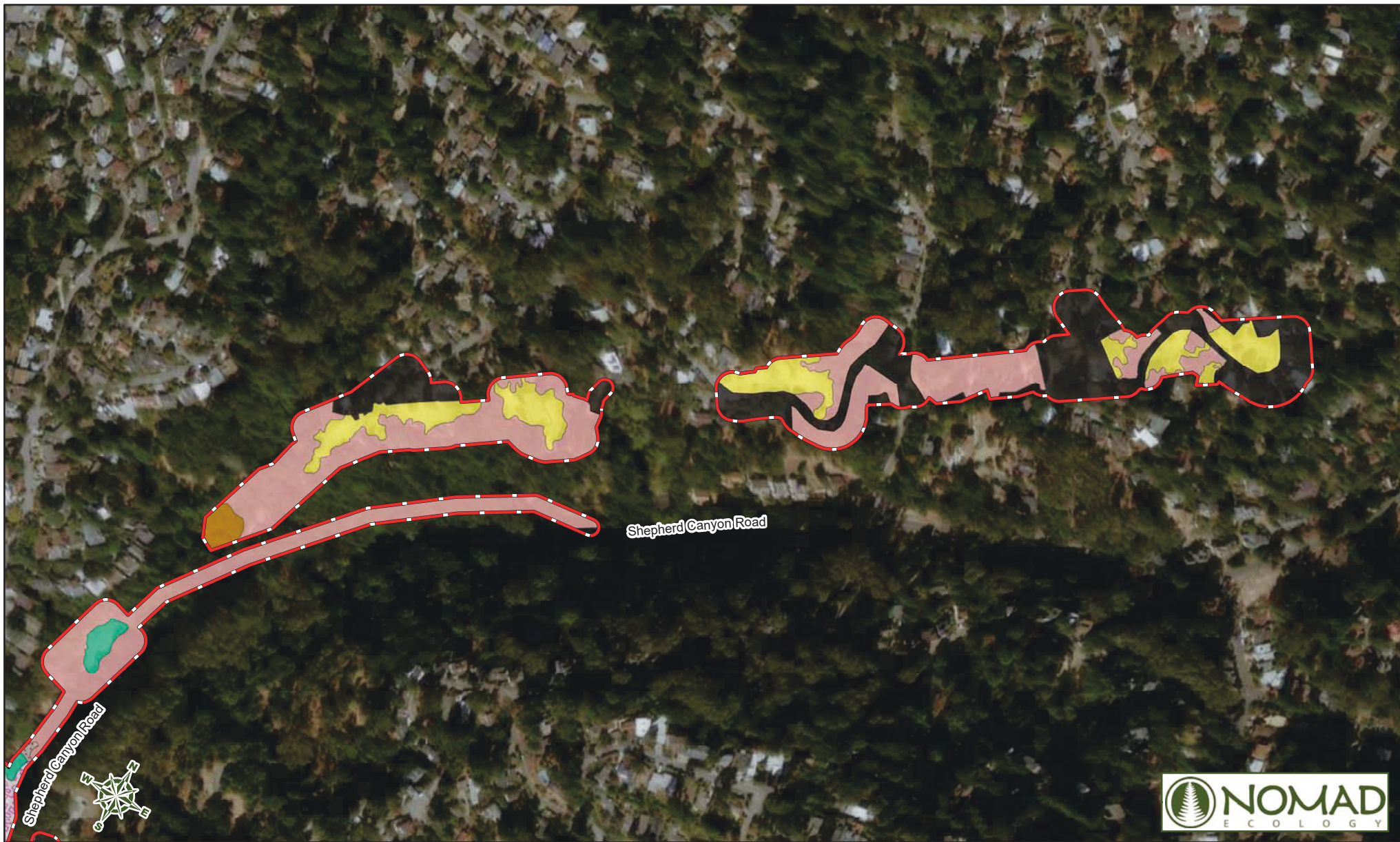
Botanical Resources Survey Report

Legend	
Study Area	Land Cover Types
California Bay Forest	Northern Coyote Brush Scrub
Coast Live Oak Woodland	Northern Maritime Chaparral
Construction Site	Ruderal
Non-Native Grassland	Urban
	Urban Mix

Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 5 of 12

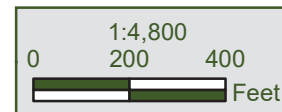


December 2021

Botanical Resources Survey Report



Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 6 of 12



December 2021

Botanical Resources Survey Report

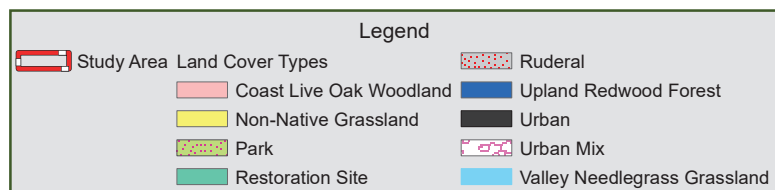
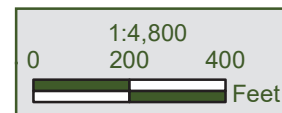


Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 7 of 12



December 2021

Botanical Resources Survey Report

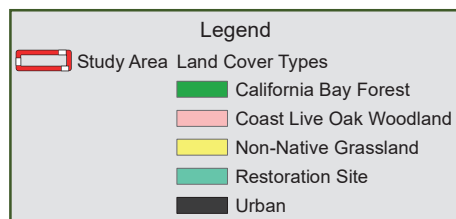
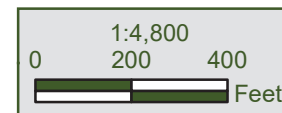
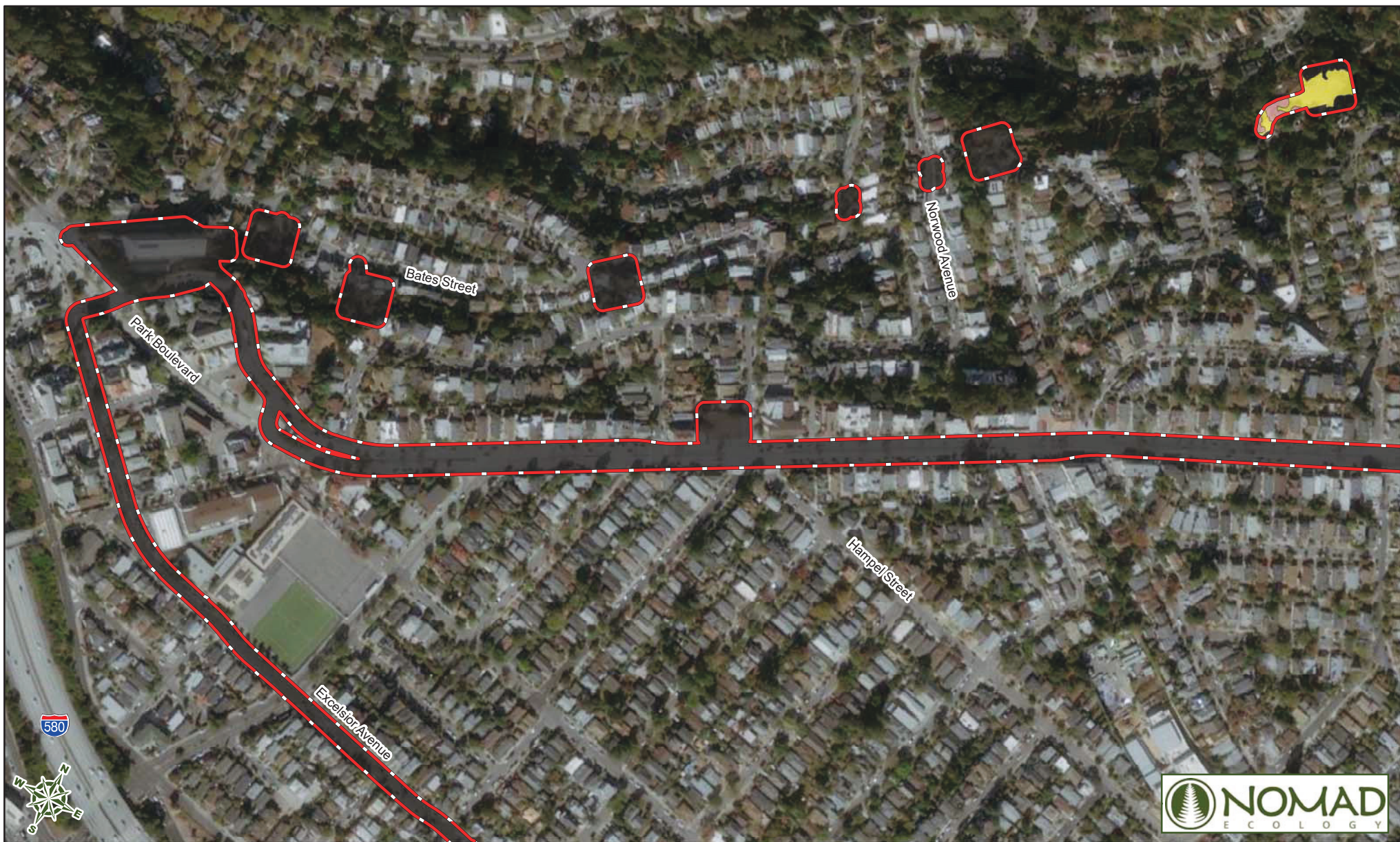


Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 8 of 12



December 2021

Botanical Resources Survey Report

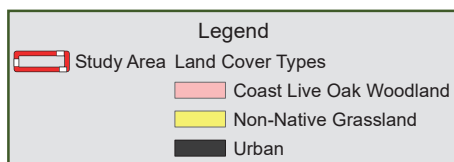
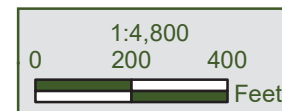
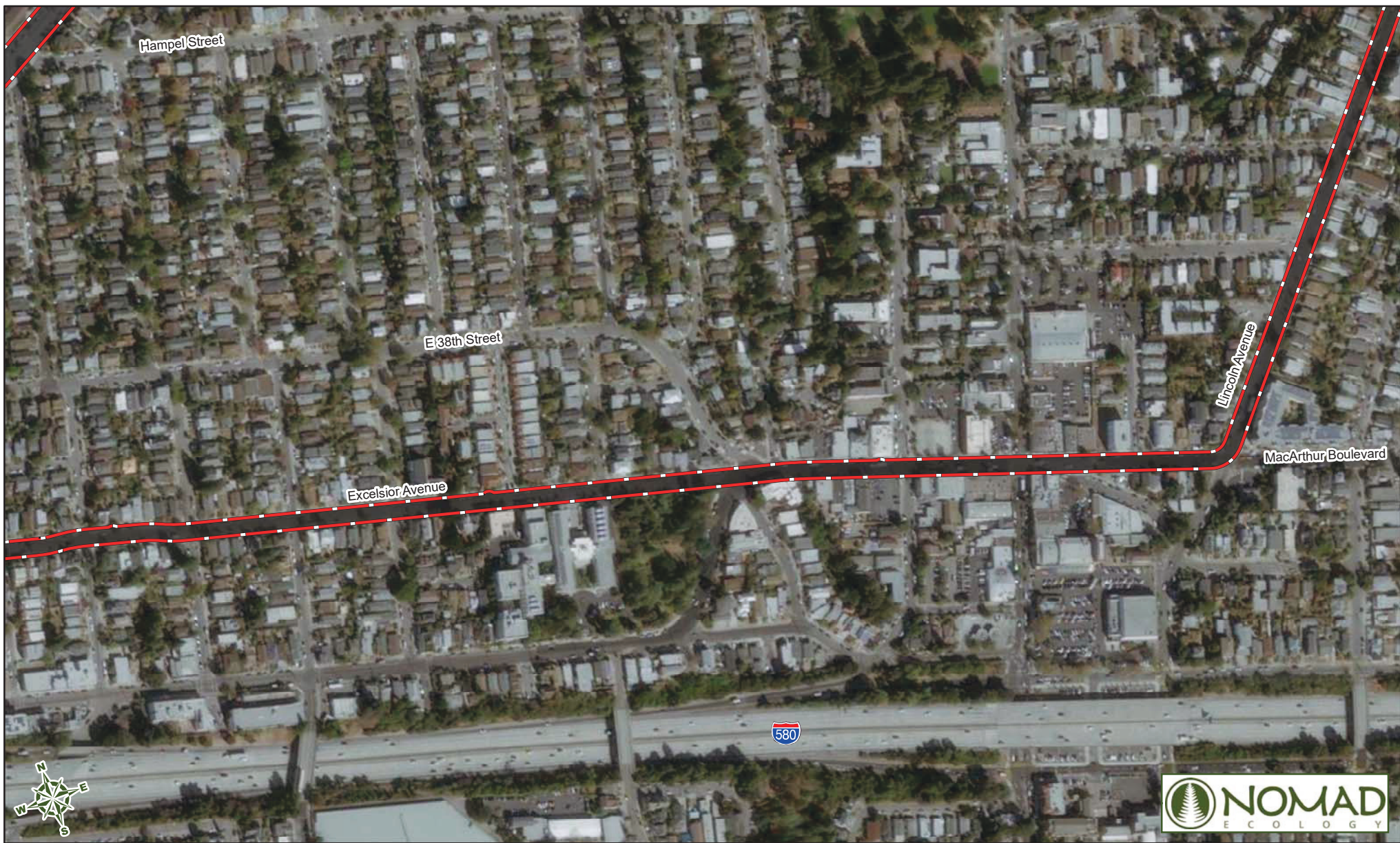


Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 9 of 12



December 2021

Botanical Resources Survey Report

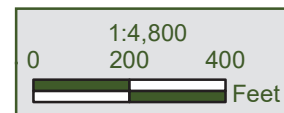
Legend

 Study Area

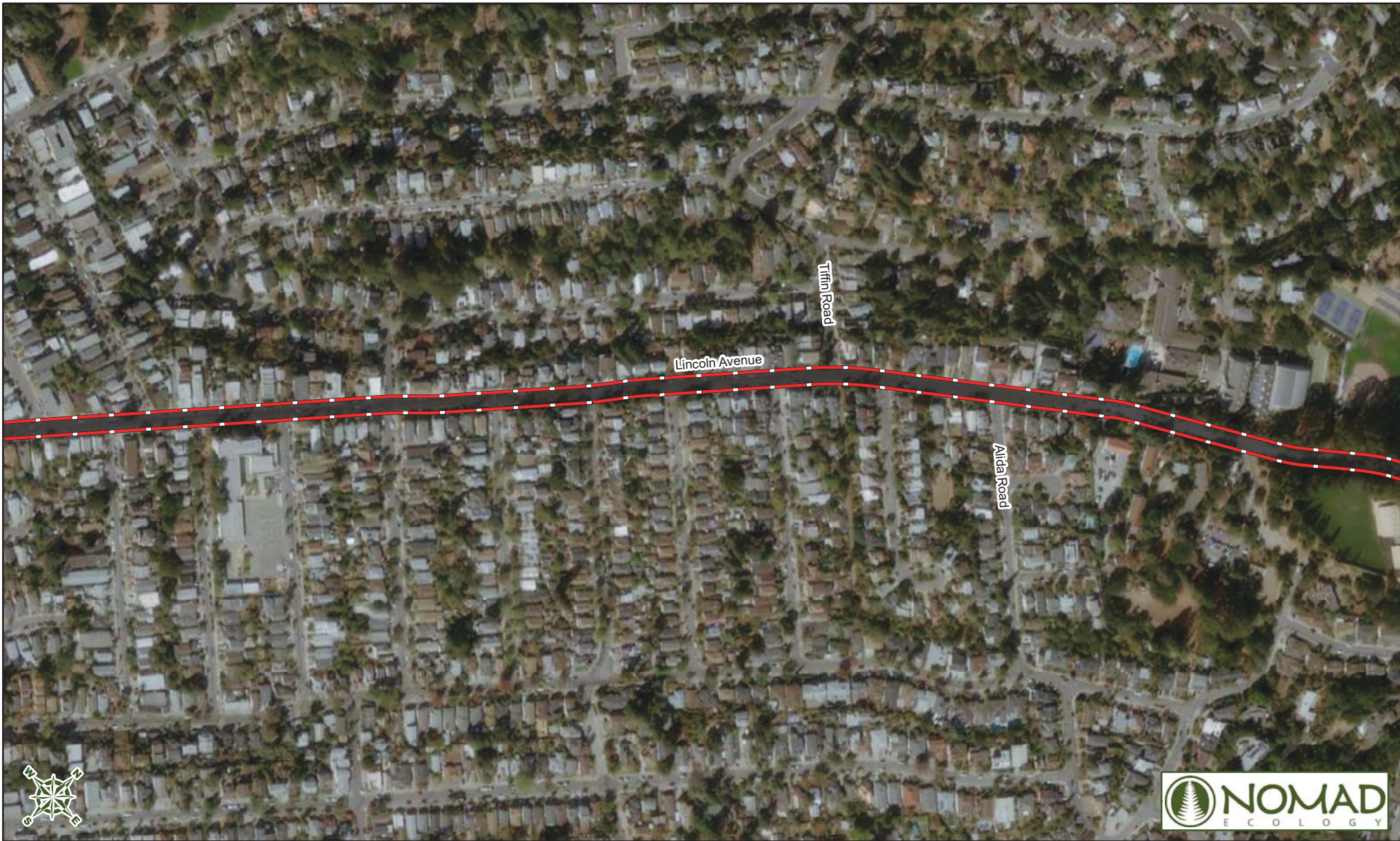
 Urban

Land Cover Types

Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 10 of 12



December 2021

Botanical Resources Survey Report

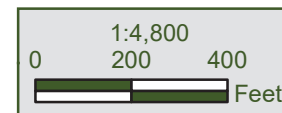
Legend

 Study Area

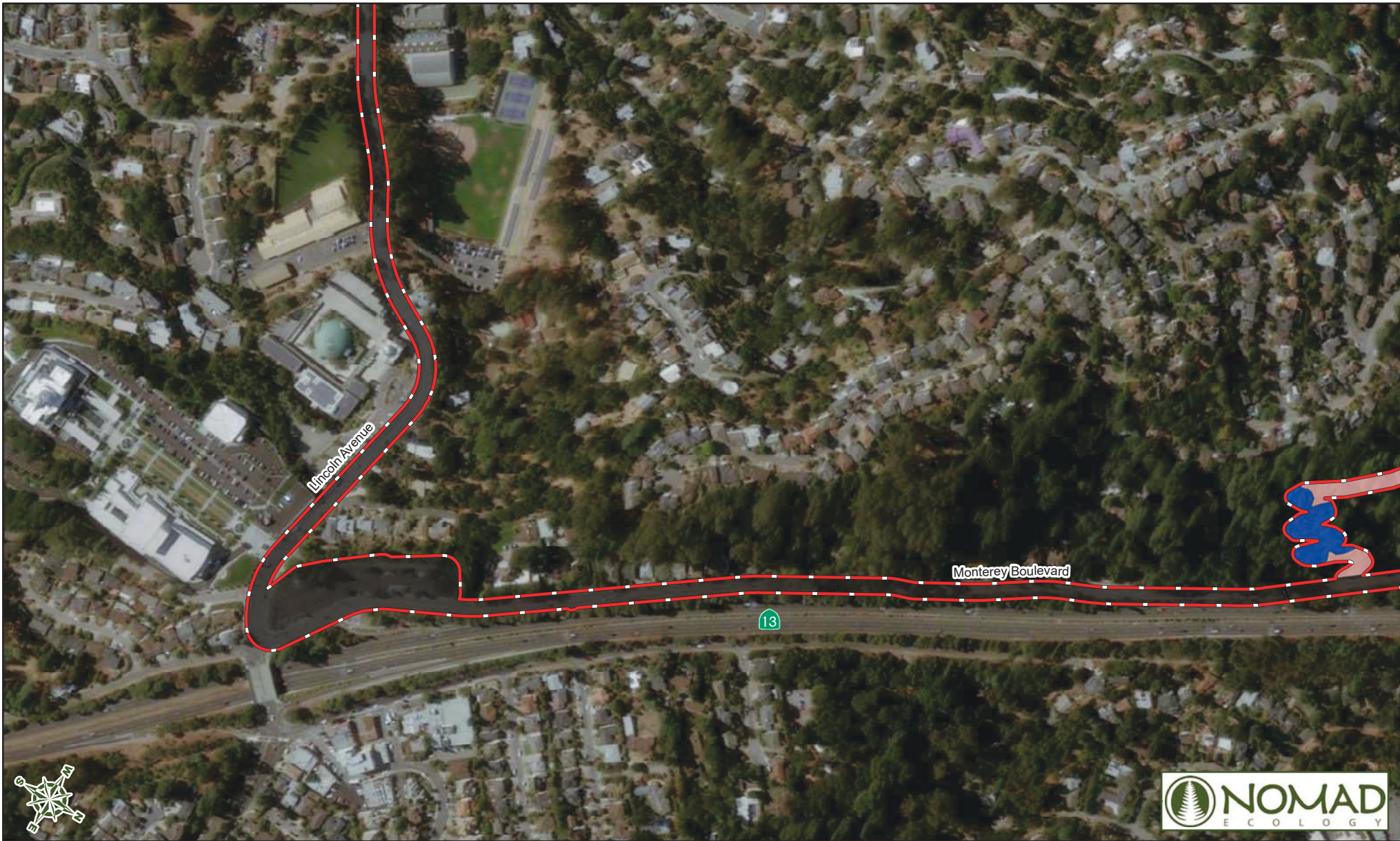
 Urban

Land Cover Types

Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 11 of 12



December 2021

Botanical Resources Survey Report

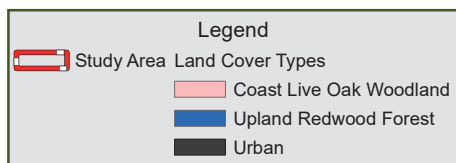
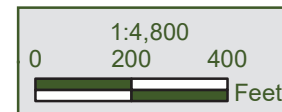
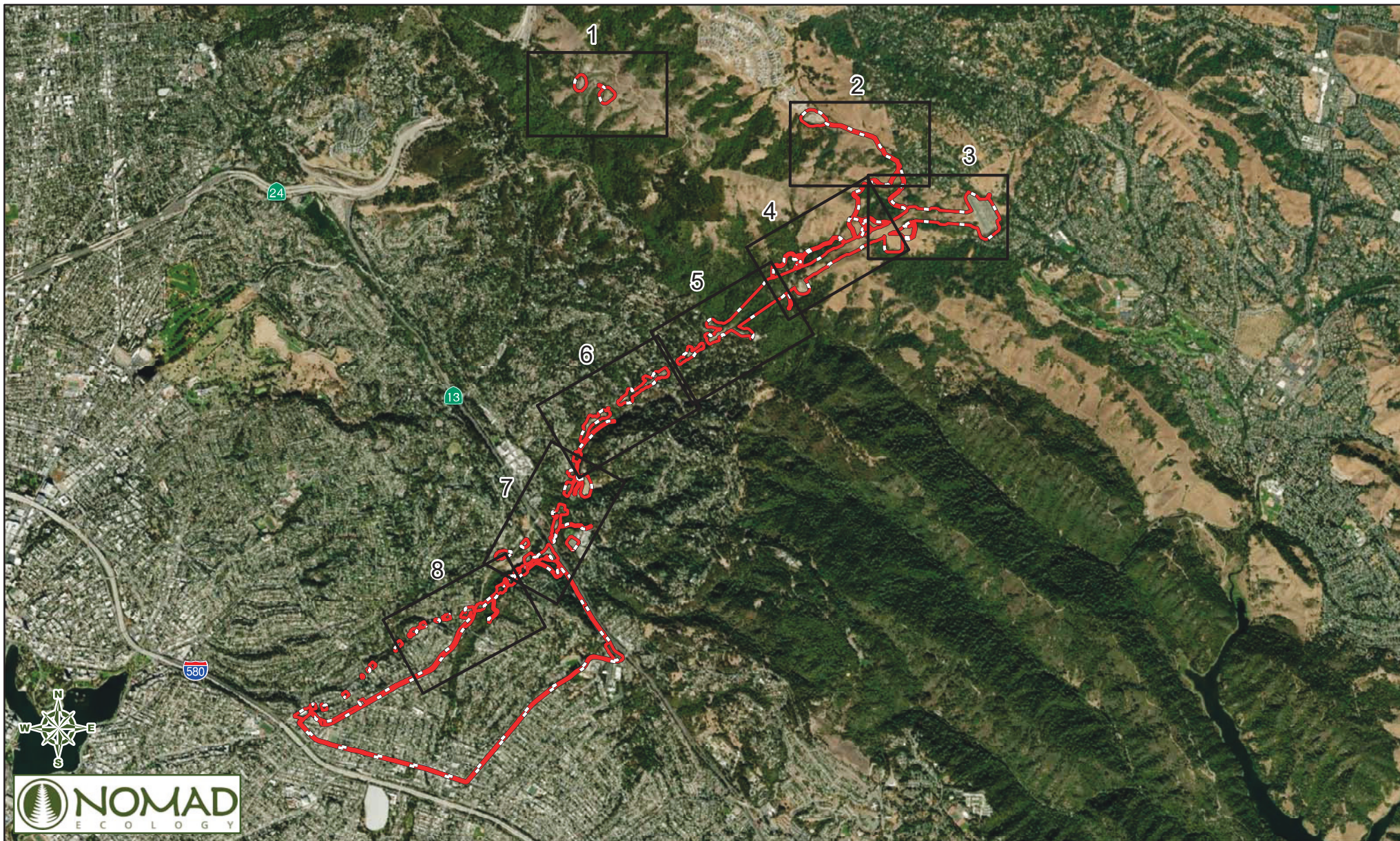


Figure 7
Land Cover Types as Mapped in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 12 of 12



December 2021

Botanical Resources Survey Report

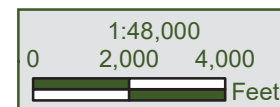
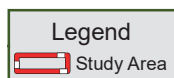


Figure 8
Invasive Plants of Concern in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Overview



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Legend	
	Study Area Invasive Plants of Concern
	French broom

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Figure 8
Invasive Plants of Concern in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 1 of 8



December 2021

Botanical Resources Survey Report

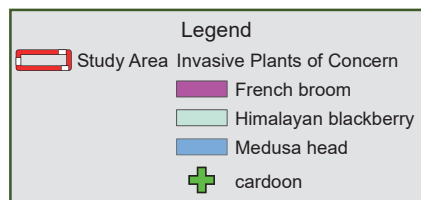
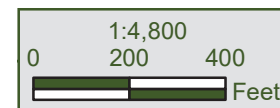


Figure 8
Invasive Plants of Concern in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 2 of 8



December 2021

Botanical Resources Survey Report

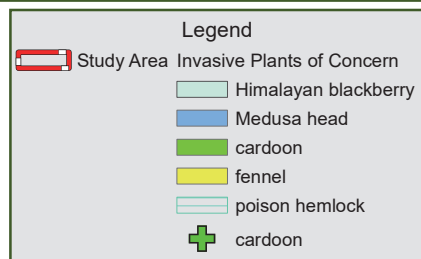
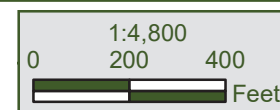


Figure 8
Invasive Plants of Concern in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 3 of 8

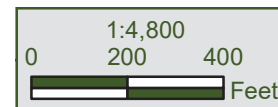


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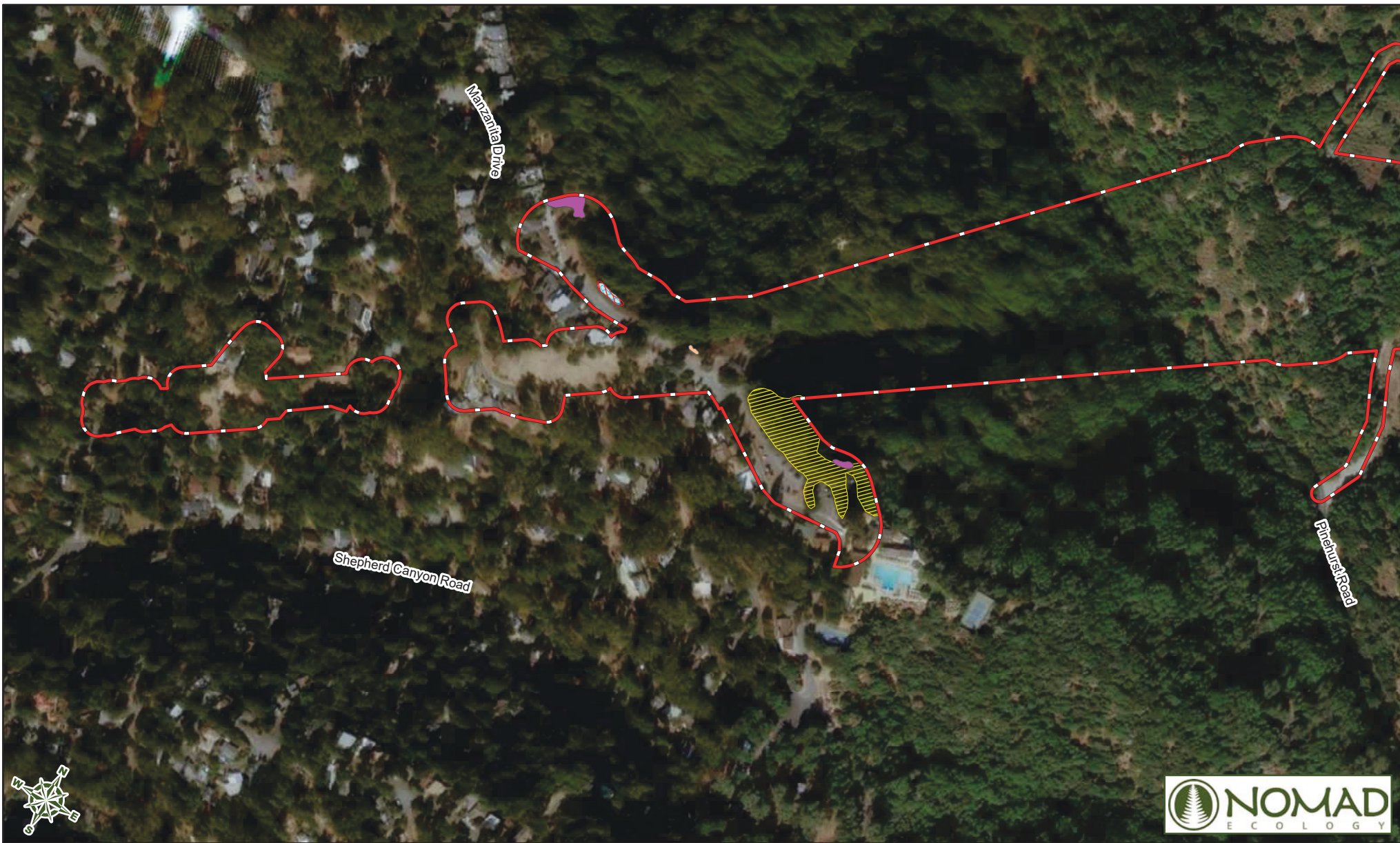
Botanical Resources Survey Report

Legend	
	Study Area
	Invasive Plants of Concern
	French broom
	Medusa head
	bluegum
	fennel
	poison hemlock
	yellow star thistle

Figure 8
Invasive Plants of Concern in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 4 of 8

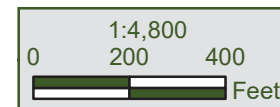


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Legend	
	Study Area
Invasive Plants of Concern	
	Cape ivy
	French broom
	Himalayan blackberry
	bluegum
	giant reed
	periwinkle

Figure 8
Invasive Plants of Concern in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 5 of 8



December 2021

Botanical Resources Survey Report

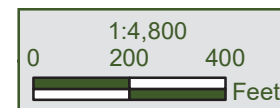


Figure 8
Invasive Plants of Concern in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 6 of 8



December 2021

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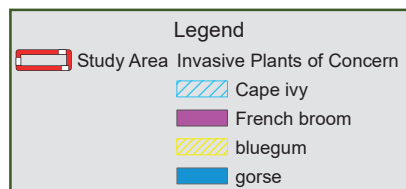
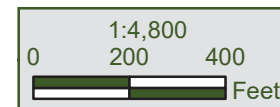


Figure 8
Invasive Plants of Concern in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company



Sheet 7 of 8



December 2021

Botanical Resources Survey Report

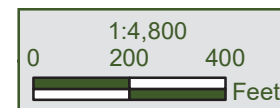
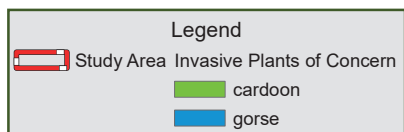


Figure 8
Invasive Plants of Concern in the Study Area
 Moraga - Oakland X Project
 Pacific Gas & Electric Company

Sheet 8 of 8

APPENDIX B PLANT SPECIES OBSERVED ON SITE

MORAGA-OAKLAND X PLANT LIST

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
FERNS						
Aspleniaceae – Spleenwort family						
<i>Woodwardia fimbriata</i>	giant chain fern	Native	---	---	---	---
Dryopteridaceae – Wood Fern Family						
<i>Dryopteris arguta</i>	wood fern	Native	---	---	---	---
<i>Polystichum munitum</i>	swordfern	Native	---	---	---	---
Equisetaceae – Horsetail Family						
<i>Equisetum telmateia</i> subsp. <i>braunii</i>	giant horsetail	Native	---	---	---	---
Polypodiaceae – Polypody Family						
<i>Polypodium calirhiza</i>	licorice fern	Native	---	---	---	---
Pteridaceae – Brake Family						
<i>Adiantum jordanii</i>	California maidenhair fern	Native	---	---	---	---
<i>Pellaea andromedifolia</i>	coffee fern	Native	---	---	---	---
<i>Pentagramma triangularis</i>	gold back fern	Native	---	---	---	---
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern	Native	---	---	---	---
Woodsiaceae – Cliff Fern Family						
<i>Athyrium filix-femina</i> var. <i>cyclosorum</i>	lady fern	Native	---	---	---	---
<i>Cystopteris fragilis</i>	fragile fern	Native	---	C	---	---
GYMNOSPERMS						
Cupressaceae – Cypress Family						
<i>Hesperocyparis macrocarpa</i> (planted)	Monterey cypress	Native	---	---	---	---
<i>Sequoia sempervirens</i>	coast redwood	Native	---	C	---	---
<i>Thuja plicata</i> (planted)	western red cedar	Native	---	---	---	---
Pinaceae – Pine Family						
<i>Pinus attenuata</i>	knobcone pine	Native	---	A1	---	---
<i>Pinus radiata</i>	Monterey pine	Native	---	---	---	---
MAGNOLIIDS						
Lauraceae – Laurel Family						
<i>Umbellularia californica</i>	California bay	Native	---	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
EUDICOTS						
Adoxaceae – Muskroot Family						
<i>Sambucus nigra</i> subsp. <i>caerulea</i>	blue elderberry	Native	---	---	---	---
Anacardiaceae – Sumac or Cashew Family						
<i>Toxicodendron diversilobum</i>	poison oak	Native	---	---	---	---
Apiaceae – Carrot Family						
<i>Angelica californica</i>	California angelica	Native	---	---	---	---
<i>Anthriscus caucalis</i>	burchevril	Non-Native	---	---	---	---
<i>Conium maculatum</i>	poison hemlock	Non-Native	---	---	Moderate	---
<i>Daucus pusillus</i>	wild carrot	Native	---	---	---	---
<i>Eryngium jepsonii</i> (CRPR 1B.2)	Jepson's button thistle	Native	---	*A2	---	---
<i>Foeniculum vulgare</i>	fennel	Non-Native	---	---	Moderate	---
<i>Heracleum maximum</i>	cow parsnip	Native	---	---	---	---
<i>Lomatium californicum</i>	California lomatium	Native	---	C	---	---
<i>Osmorhiza berteroi</i>	sweet cicely	Native	---	---	---	---
<i>Perideridia kelloggii</i>	Kellogg's yampah	Native	---	---	---	---
<i>Sanicula bipinnatifida</i>	purple sanicle	Native	---	---	---	---
<i>Sanicula crassicaulis</i>	Pacific sanicle	Native	---	---	---	---
<i>Scandix pecten-veneris</i>	Shepherd's needle	Non-Native	---	---	---	---
<i>Tauschia hartwegii</i>	Hartweg's tauschia	Native	---	C	---	---
<i>Torilis arvensis</i>	hedge parsley	Non-Native	---	---	Moderate	---
<i>Torilis nodosa</i>	knotted-hedge parsley	Non-Native	---	---	---	---
Apocynaceae – Dogbane Family						
<i>Vinca major</i>	periwinkle	Non-Native	---	---	Moderate	---
Araliaceae – Ginseng Family						
<i>Hedera helix</i>	English ivy	Non-Native	---	---	High	---
Asteraceae – Sunflower Family						
<i>Achillea millefolium</i>	yarrow	Native	---	---	---	---
<i>Achyrochaena mollis</i>	blow-wives	Native	---	---	---	---
<i>Ageratina adenophora</i>	thoroughwort	Non-Native	---	---	Moderate	---
<i>Anisocarpus madioides</i>	woodland tarweed	Native	---	B	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Anthemis cotula</i>	mayweed	Non-Native	---	---	---	---
<i>Arctotheca prostrata</i>	prostrate cape weed	Non-Native	---	---	Moderate	On List
<i>Arnica discoidea</i>	rayless arnica	Native	---	B	---	---
<i>Artemisia californica</i>	California sagebrush	Native	---	---	---	---
<i>Artemisia douglasiana</i>	mugwort	Native	---	---	---	---
<i>Baccharis pilularis</i> subsp. <i>consanguinea</i>	coyote brush	Native	---	---	---	---
<i>Bellis perennis</i>	English daisy	Non-Native	---	---	---	---
<i>Carduus pycnocephalus</i> subsp. <i>pycnocephalus</i>	Italian thistle	Non-Native	---	---	Moderate	On List
<i>Carduus tenuiflorus</i>	slender flowered thistle	Non-Native	---	---	Limited	On List
<i>Centaurea melitensis</i>	tocalote	Non-Native	---	---	Moderate	On List
<i>Centaurea solstitialis</i>	yellow star thistle	Non-Native	---	---	High	On List
<i>Cirsium brevistylum</i>	clustered thistle	Native	---	B	---	---
<i>Cirsium vulgare</i>	bull thistle	Non-Native	---	---	Moderate	On List
<i>Corethrogyne filaginifolia</i>	common sand aster	Native	---	---	---	---
<i>Cotula australis</i>	Australian cotula	Non-Native	---	---	---	---
<i>Cynara cardunculus</i> subsp. <i>flavescens</i>	cardoon	Non-Native	---	---	Moderate	On List
<i>Delairea odorata</i>	Cape ivy	Non-Native	---	---	High	On List
<i>Dittrichia graveolens</i>	stinkwort	Non-Native	---	---	Moderate	---
<i>Erigeron bonariensis</i>	asthmaweed	Non-Native	---	---	---	---
<i>Erigeron karvinskianus</i>	fleabane	Non-Native	---	---	---	---
<i>Erigeron sumatrensis</i>	tropical horseweed	Non-Native	---	---	---	---
<i>Eriophyllum confertiflorum</i> var. <i>confertiflorum</i>	golden-yarrow	Native	---	---	---	---
<i>Eurybia radulina</i>	roughleaf aster	Native	---	---	---	---
<i>Helenium puberulum</i>	sneezeweed	Native	---	---	---	---
<i>Helminthotheca echioides</i>	bristly ox-tongue	Non-Native	---	---	Limited	---
<i>Hemizonia congesta</i> subsp. <i>luzulifolia</i>	hayfield tarweed	Native	---	---	---	---
<i>Hesperis matronalis</i> var. <i>sparsiflora</i>	few-flowered evax	Native	---	---	---	---
<i>Heterotheca sessiliflora</i> subsp. <i>bolanderi</i>	Bolander's goldenaster	Native	---	C	---	---
<i>Hypochaeris glabra</i>	smooth cat's ear	Non-Native	---	---	Limited	---
<i>Hypochaeris radicata</i>	rough cat's ear	Non-Native	---	---	Moderate	---
<i>Lactuca saligna</i>	willowleaf lettuce	Non-Native	---	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Lactuca serriola</i>	prickly lettuce	Non-Native	---	---	---	---
<i>Lactuca virosa</i>	bitter lettuce	Non-Native	---	---	---	---
<i>Lagophylla ramosissima</i>	hare's ear	Native	---	---	---	---
<i>Logfia gallica</i>	narrowleaf cottonrose	Non-Native	---	---	---	---
<i>Madia gracilis</i>	slender tarweed	Native	---	---	---	---
<i>Madia sativa</i>	coast tarweed	Native	---	---	---	---
<i>Matricaria discoidea</i>	pineapple weed	Non-Native	---	---	---	---
<i>Microseris douglasii</i> subsp. <i>douglasii</i>	silver puffs	Native	---	---	---	---
<i>Pseudognaphalium beneolens</i>	fragrant everlasting	Native	---	C	---	---
<i>Pseudognaphalium californicum</i>	ladies tobacco	Native	---	---	---	---
<i>Pseudognaphalium luteoalbum</i>	cudweed	Non-Native	---	---	---	---
<i>Pseudognaphalium ramosissimum</i>	pink cudweed	Native	---	---	---	---
<i>Psilocarphus tenellus</i>	slender woolly marbles	Native	---	---	---	---
<i>Rafinesquia californica</i>	California chicory	Native	---	C	---	---
<i>Senecio aronicoides</i>	rayless ragwort	Native	---	C	---	---
<i>Senecio vulgaris</i>	groundsel	Non-Native	---	---	---	---
<i>Silybum marianum</i>	milk-thistle	Non-Native	---	---	Limited	---
<i>Solidago velutina</i> subsp. <i>californica</i>	California goldenrod	Native	---	---	---	---
<i>Soliva sessilis</i>	common soliva	Non-Native	---	---	---	---
<i>Sonchus asper</i> subsp. <i>asper</i>	prickly sowthistle	Non-Native	---	---	---	---
<i>Sonchus oleraceus</i>	common sowthistle	Non-Native	---	---	---	---
<i>Symphyotrichum chilense</i>	Pacific aster	Native	---	---	---	---
<i>Taraxacum officinale</i>	dandelion	Non-Native	---	---	---	---
<i>Tragopogon porrifolius</i>	purple salsify	Non-Native	---	---	---	---
<i>Uropappus lindleyi</i>	silverpuffs	Native	---	---	---	---
<i>Urospermum picroides</i>	prickly goldenfleece	Non-Native	---	---	---	---
<i>Wyethia angustifolia</i>	narrowleaf mule ears	Native	---	---	---	---
<i>Wyethia helenioides</i>	woollyleaf mule ears	Native	---	---	---	---
Balsaminaceae – Balsam Family						
<i>Impatiens balfourii</i>	Kashmir balsam	Non-Native	---	---	---	---
Betulaceae – Birch Family						
<i>Alnus rhombifolia</i>	white alder	Native	---	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Alnus rubra</i>	red alder	Native	---	A2	---	---
<i>Corylus cornuta</i> subsp. <i>californica</i>	California hazelnut	Native	---	---	---	---
Boraginaceae – Borage or Waterleaf Family						
<i>Amsinckia intermedia</i>	common fiddleneck	Native	---	---	---	---
<i>Cynoglossum grande</i>	hound's tongue	Native	---	---	---	---
<i>Echium candicans</i>	pride of Madeira	Non-Native	---	---	Limited	---
<i>Myosotis latifolia</i>	forget me not	Non-Native	---	---	---	---
<i>Nemophila heterophylla</i>	canyon nemophila	Native	---	---	---	---
<i>Phacelia californica</i>	California phacelia	Native	---	---	---	---
<i>Phacelia distans</i>	common phacelia	Native	---	---	---	---
<i>Phacelia imbricata</i> subsp. <i>imbricata</i>	imbricate phacelia	Native	---	---	---	---
<i>Plagiobothrys bracteatus</i>	bracted popcorn flower	Native	---	---	---	---
<i>Plagiobothrys nothofulvus</i>	popcorn flower	Native	---	---	---	---
Brassicaceae – Mustard Family						
<i>Athysanus pusillus</i>	common sandweed	Native	---	---	---	---
<i>Barbarea orthoceras</i>	American wintercress	Native	---	---	---	---
<i>Brassica nigra</i>	black mustard	Non-Native	---	---	Moderate	---
<i>Capsella bursa-pastoris</i>	shepherd's purse	Non-Native	---	---	---	---
<i>Cardamine californica</i>	milk maids	Native	HB	---	---	---
<i>Cardamine oligosperma</i>	bitter cress	Native	---	---	---	---
<i>Caulanthus lasiophyllus</i>	California mustard	Native	---	---	---	---
<i>Hirschfeldia incana</i>	hoary mustard	Non-Native	---	---	Moderate	---
<i>Lepidium didymum</i>	lesser swine cress	Non-Native	---	---	---	---
<i>Lepidium nitidum</i>	shining peppergrass	Native	---	---	---	---
<i>Lunaria annua</i>	annual moonwort	Non-Native	---	---	---	---
<i>Nasturtium officinale</i>	water cress	Native	---	---	---	---
<i>Raphanus raphanistrum</i>	jointed charlock	Non-Native	---	---	---	---
<i>Sinapis arvensis</i>	charlock	Native	---	---	Limited	---
<i>Sisymbrium officinale</i>	hedge mustard	Non-Native	---	---	---	---
Caprifoliaceae – Honeysuckle Family						
<i>Lonicera hispidula</i>	California honeysuckle	Native	---	---	---	---
<i>Lonicera involucrata</i> var. <i>ledebourii</i>	coast twinberry	Native	---	C	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	snowberry	Native	---	---	---	---
<i>Symphoricarpos mollis</i>	creeping snowberry	Native	---	---	---	---
Caryophyllaceae – Pink Family						
<i>Cerastium glomeratum</i>	mouse-ear chickweed	Non-Native	---	---	---	---
<i>Polycarpon tetraphyllum</i>	fourleaf manyseed	Non-Native	---	---	---	---
<i>Sagina apetala</i>	annual pearlwort	Native	---	---	---	---
<i>Silene gallica</i>	windmill pink	Non-Native	HB	---	---	---
<i>Spergularia rubra</i>	sandspurrey	Non-Native	---	---	---	---
<i>Stellaria media</i>	common chickweed	Non-Native	---	---	---	---
Convolvulaceae – Morning-Glory Family						
<i>Calystegia purpurata</i> subsp. <i>purpurata</i>	purple western morning glory	Native	---	---	---	---
<i>Calystegia subacaulis</i> subsp. <i>subacaulis</i>	hill morning glory	Native	---	---	---	---
<i>Convolvulus arvensis</i>	bindweed	Non-Native	---	---	---	On List
<i>Cuscuta subinclusa</i>	canyon dodder	Native	---	B	---	---
Crassulaceae – Stonecrop Family						
<i>Crassula connata</i>	pygmy weed	Native	---	---	---	---
<i>Crassula ovata</i>	jade plant	Non-Native	---	---	---	---
Cucurbitaceae – Gourd Family						
<i>Marah fabacea</i>	California man-root	Native	---	---	---	---
<i>Marah oregana</i>	coast man-root	Native	---	C	---	---
Dipsacaceae – Teasel Family						
<i>Dipsacus sativus</i>	teasel	Non-Native	---	---	Moderate	---
Ericaceae – Heath Family						
<i>Arbutus menziesii</i>	Pacific madrone	Native	---	B	---	---
<i>Arctostaphylos crustacea</i> subsp. <i>crustacea</i>	brittle leaf manzanita	Native	---	C	---	---
<i>Arctostaphylos pallida</i> (CRPR 1B.1, SE, FT)	pallid manzanita	Native	---	*A2	---	---
<i>Vaccinium ovatum</i>	California huckleberry	Native	---	C	---	---
Euphorbiaceae – Spurge Family						
<i>Euphorbia characias</i>	Albanian spurge	Non-Native	---	---	---	---
<i>Euphorbia oblongata</i>	eggleaf spurge	Non-Native	---	---	Limited	On List
<i>Euphorbia peplus</i>	petty spurge	Non-Native	---	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
Fabaceae – Pea Family						
<i>Acacia dealbata</i>	silver wattle	Non-Native	---	---	Moderate	---
<i>Acacia melanoxylon</i>	blackwood acacia	Non-Native	---	---	Limited	---
<i>Acacia saligna</i>	orange wattle	Non-Native	---	---	Watch	---
<i>Acacia verticillata</i>	star acacia	Non-Native	---	---	---	---
<i>Acmispon americanus</i> var. <i>americanus</i>	Spanish clover	Native	---	---	---	---
<i>Acmispon glaber</i> var. <i>glaber</i>	California broom	Native	---	---	---	---
<i>Acmispon parviflorus</i>	hill lotus	Native	---	---	---	---
<i>Acmispon wrangelianus</i>	calf lotus	Native	---	---	---	---
<i>Astragalus gambelianus</i>	Gambel's dwarf milk vetch	Native	---	---	---	---
<i>Genista monspessulana</i>	French broom	Non-Native	---	---	High	On List
<i>Lathyrus vestitus</i> var. <i>vestitus</i>	pacific pea	Native	---	---	---	---
<i>Lotus corniculatus</i>	birdfoot trefoil	Non-Native	---	---	---	---
<i>Lupinus albus</i> var. <i>albus</i>	silver bush lupine	Native	---	---	---	---
<i>Lupinus albus</i> var. <i>collinus</i>	silver bush lupine	Native	---	---	---	---
<i>Lupinus bicolor</i>	dove lupine	Native	---	---	---	---
<i>Lupinus succulentus</i>	succulent lupine	Native	---	---	---	---
<i>Medicago arabica</i>	spotted clover	Non-Native	---	---	---	---
<i>Medicago polymorpha</i>	burclover	Non-Native	---	---	Limited	---
<i>Melilotus indicus</i>	sourclover	Non-Native	---	---	---	---
<i>Rupertia physodes</i>	California tea	Native	---	---	---	---
<i>Trifolium bifidum</i> var. <i>decipiens</i>	pinhole clover	Native	---	---	---	---
<i>Trifolium ciliolatum</i>	tree clover	Native	---	---	---	---
<i>Trifolium dubium</i>	shamrock clover	Non-Native	---	---	---	---
<i>Trifolium fragiferum</i>	strawberry clover	Non-Native	---	---	---	---
<i>Trifolium fucatum</i>	sour clover	Native	---	C	---	---
<i>Trifolium glomeratum</i>	clustered clover	Non-Native	---	---	---	---
<i>Trifolium hirtum</i>	rose clover	Non-Native	---	---	Limited	---
<i>Trifolium incarnatum</i>	crimson clover	Non-Native	---	---	---	---
<i>Trifolium microcephalum</i>	hairy clover	Native	---	---	---	---
<i>Trifolium microdon</i>	thimble clover	Native	---	---	---	---
<i>Trifolium repens</i>	white clover	Non-Native	---	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Trifolium resupinatum</i>	reversed clover	Non-Native	AC	---	---	---
<i>Trifolium subterraneum</i>	subterranean clover	Non-Native	---	---	---	---
<i>Trifolium tomentosum</i>	woolly clover	Non-Native	---	---	---	---
<i>Trifolium willdenovii</i>	tomcat clover	Native	---	---	---	---
<i>Ulex europaeus</i>	common gorse	Non-Native	---	---	High	---
<i>Vicia americana</i> subsp. <i>americana</i>	American vetch	Native	---	---	---	---
<i>Vicia gigantea</i>	giant vetch	Native	---	---	---	---
<i>Vicia sativa</i> subsp. <i>nigra</i>	spring vetch	Non-Native	---	---	---	---
<i>Vicia sativa</i> subsp. <i>sativa</i>	spring vetch	Non-Native	---	---	---	---
<i>Vicia villosa</i> subsp. <i>varia</i>	smooth vetch	Non-Native	---	---	---	---
Fagaceae – Oak Family						
<i>Chrysolepis chrysophylla</i> var. <i>minor</i>	golden chinquapin	Native	---	A2	---	---
<i>Quercus agrifolia</i> var. <i>agrifolia</i>	coast live oak	Native	---	---	---	---
<i>Quercus berberidifolia</i>	inland scrub oak	Native	---	C	---	---
<i>Quercus chrysolepis</i>	canyon live oak	Native	---	B	---	---
Garryaceae – Silk Tassel Family						
<i>Garrya elliptica</i>	coast silktassel	Native	---	B	---	---
Geraniaceae – Geranium Family						
<i>Erodium botrys</i>	long-beaked filaree	Non-Native	---	---	---	---
<i>Erodium brachycarpum</i>	foothill filaree	Non-Native	---	---	---	---
<i>Erodium cicutarium</i>	red-stemmed filaree	Non-Native	---	---	Limited	---
<i>Erodium moschatum</i>	white-stem filaree	Non-Native	---	---	---	---
<i>Geranium dissectum</i>	cut-leaf geranium	Non-Native	---	---	Moderate	---
<i>Geranium molle</i>	dovefoot geranium	Non-Native	---	---	---	---
<i>Geranium purpureum</i>	geranium	Non-Native	---	---	---	---
<i>Geranium robertianum</i>	Robert's geranium	Non-Native	---	---	---	---
<i>Geranium rotundifolium</i>	round leaved geranium	Non-Native	---	---	---	---
Grossulariaceae – Gooseberry Family						
<i>Ribes californicum</i> var. <i>californicum</i>	California gooseberry	Native	---	---	---	---
<i>Ribes menziesii</i> var. <i>menziesii</i>	canyon gooseberry	Native	---	---	---	---
<i>Ribes sanguineum</i> var. <i>glutinosum</i>	red flowering currant	Native	---	C	---	---
Lamiaceae – Mint Family						

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Clinopodium douglasii</i>	yerba buena	Native	---	---	---	---
<i>Lamium amplexicaule</i>	henbit	Non-Native	---	---	---	---
<i>Melissa officinalis</i>	lemon balm	Non-Native	---	---	---	---
<i>Mentha pulegium</i>	pennyroyal	Non-Native	---	---	Moderate	---
<i>Monardella villosa</i> subsp. <i>villosa</i>	coyote mint	Native	---	---	---	---
<i>Pogogyne serpylloides</i>	thymeleaf mesa mint	Native	---	---	---	---
<i>Prunella vulgaris</i> var. <i>lanceolata</i>	self heal	Native	---	B	---	---
<i>Rosemarinus officinalis</i>	rosemary	Non-Native	---	---	---	---
<i>Stachys rigida</i> var. <i>quercetorum</i>	hedge nettle	Native	---	---	---	---
Linaceae – Flax Family						
<i>Linum bienne</i>	flax	Non-Native	---	---	---	---
Malvaceae – Mallow Family						
<i>Malva parviflora</i>	cheeseweed	Non-Native	---	---	---	---
<i>Sidalcea malviflora</i> subsp. <i>laciniata</i>	checkermallow	Native	---	C	---	---
Montiaceae – Miner’s Lettuce Family						
<i>Calandrinia menziesii</i>	red maids	Native	---	---	---	---
<i>Claytonia parviflora</i> subsp. <i>parviflora</i>	narrow leaved miner's lettuce	Native	---	---	---	---
<i>Claytonia perfoliata</i> subsp. <i>perfoliata</i>	miner's lettuce	Native	---	---	---	---
Myrsinaceae – Myrsine Family						
<i>Lysimachia arvensis</i>	scarlet pimpernel	Non-Native	---	---	---	---
<i>Lysimachia latifolia</i>	starflower	Native	---	---	---	---
Myrtaceae – Myrtle Family						
<i>Eucalyptus citriodora</i>	lemon scented gum	Non-Native	---	---	---	---
<i>Eucalyptus globulus</i>	bluegum	Non-Native	---	---	Moderate	---
Oleaceae – Olive Family						
<i>Olea europaea</i>	olive	Non-Native	---	---	Limited	---
Onagraceae – Evening Primrose Family						
<i>Clarkia rubicunda</i>	farewell to spring	Native	---	---	---	---
<i>Epilobium brachycarpum</i>	tall annual willow-herb	Native	---	---	---	---
<i>Epilobium canum</i> subsp. <i>canum</i>	California fuschia	Native	---	---	---	---
<i>Epilobium ciliatum</i> subsp. <i>ciliatum</i>	fringed willowherb	Native	---	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Taraxia ovata</i>	sun cup	Native	---	---	---	---
Orobanchaceae – Broomrape Family						
<i>Bellardia trixago</i>	bellardia	Non-Native	---	---	Limited	---
<i>Castilleja attenuata</i>	valley tassels	Native	---	---	---	---
<i>Castilleja exserta</i> subsp. <i>exserta</i>	purple owl's clover	Native	---	---	---	---
<i>Triphysaria pusilla</i>	dwarf owl's clover	Native	---	---	---	---
<i>Triphysaria versicolor</i> subsp. <i>faucibarbata</i>	yellow beak owl's-clover	Native	HB	A2	---	---
Oxalidaceae – Oxalis Family						
<i>Oxalis incarnata</i>	crimson woodsorrel	Non-Native	---	---	---	---
<i>Oxalis oregana</i>	redwood sorrel	Native	---	A1	---	---
<i>Oxalis pes-caprae</i>	bermuda buttercup	Non-Native	---	---	Moderate	---
Papaveraceae – Poppy Family						
<i>Eschscholzia californica</i>	California poppy	Native	---	---	---	---
<i>Fumaria capreolata</i>	white ramping fumitory	Non-Native	---	---	---	---
Phrymaceae – Lopseed Family						
<i>Diplacus aurantiacus</i>	bush monkeyflower	Native	---	---	---	---
<i>Erythranthe guttata</i>	common monkeyflower	Native	---	---	---	---
Pittosporaceae – Pittosporum Family						
<i>Pittosporum undulatum</i>	Victorian box	Non-Native	---	---	Watch	---
Plantaginaceae – Plantain Family						
<i>Collinsia sparsiflora</i> var. <i>collina</i>	hillside collinsia	Native	HB	C	---	---
<i>Digitalis purpurea</i>	purple foxglove	Non-Native	---	---	Limited	---
<i>Plantago coronopus</i>	buckhorn plantain	Non-Native	---	---	---	---
<i>Plantago erecta</i>	dwarf plantain	Native	---	---	---	---
<i>Plantago lanceolata</i>	English plantain	Non-Native	---	---	Limited	---
<i>Plantago major</i>	common plantain	Non-Native	---	---	---	---
<i>Veronica americana</i>	American brooklime	Native	---	C	---	---
<i>Veronica arvensis</i>	speedwell	Non-Native	---	---	---	---
Polemoniaceae – Phlox Family						
<i>Gilia achilleifolia</i> subsp. <i>multicaulis</i>	many-stemmed gilia	Native	---	---	---	---
<i>Navarretia squarrosa</i>	skunkweed	Native	---	---	---	---
Polygonaceae – Buckwheat Family						

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Eriogonum nudum</i> var. <i>auriculatum</i>	naked-stem buckwheat	Native	---	---	---	---
<i>Polygonum aviculare</i> subsp. <i>depressum</i>	common knotweed	Non-Native	---	---	---	---
<i>Pterostegia drymarioides</i>	fairy mist	Native	---	---	---	---
<i>Rumex acetosella</i>	sheep sorrel	Non-Native	---	---	Moderate	---
<i>Rumex conglomeratus</i>	green dock	Non-Native	---	---	---	---
<i>Rumex crispus</i>	curly dock	Non-Native	---	---	---	---
<i>Rumex obtusifolius</i>	bitter dock	Non-Native	---	---	---	---
<i>Rumex pulcher</i>	fiddle dock	Non-Native	---	---	---	---
Primulaceae – Primrose Family						
<i>Primula hendersonii</i>	shooting stars	Native	---	---	---	---
Ranunculaceae – Buttercup Family						
<i>Aquilegia formosa</i>	columbine	Native	---	C	---	---
<i>Ranunculus californicus</i> var. <i>californicus</i>	California buttercup	Native	---	---	---	---
<i>Ranunculus muricatus</i>	spiny buttercup	Non-Native	---	---	---	---
<i>Thalictrum fendleri</i> var. <i>polycarpum</i>	meadow-rue	Native	---	---	---	---
Rhamnaceae – Buckthorn Family						
<i>Ceanothus oliganthus</i> var. <i>sorediatus</i>	jim brush	Native	---	---	---	---
<i>Frangula californica</i> subsp. <i>californica</i>	coffeeberry	Native	---	---	---	---
Rosaceae – Rose Family						
<i>Aphanes occidentalis</i>	Lady's mantle	Native	---	---	---	---
<i>Cercocarpus betuloides</i> var. <i>betuloides</i>	mountain mahogany	Native	---	C	---	---
<i>Cotoneaster franchettii</i>	orange cotoneaster	Non-Native	---	---	Moderate	---
<i>Cotoneaster lacteus</i>	milkflower cotoneaster	Non-Native	---	---	Moderate	---
<i>Cotoneaster pannosus</i>	silverleaf cotoneaster	Non-Native	---	---	Moderate	---
<i>Drymocallis glandulosa</i> var. <i>glandulosa</i>	sticky cinquefoil	Native	---	---	---	---
<i>Eriobotrya japonica</i>	loquat	Non-Native	---	---	---	---
<i>Fragaria vesca</i>	California strawberry	Native	---	---	---	---
<i>Heteromeles arbutifolia</i>	toyon	Native	---	---	---	---
<i>Holodiscus discolor</i> var. <i>discolor</i>	ocean spray	Native	---	---	---	---
<i>Oemleria cerasiformis</i>	oso berry	Native	---	---	---	---
<i>Physocarpus capitatus</i>	ninebark	Native	---	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Prunus cerasifera</i>	cherry plum	Non-Native	---	---	Limited	---
<i>Pyracantha angustifolia</i>	firethorn	Non-Native	---	---	Limited	---
<i>Rosa californica</i>	California wild rose	Native	---	---	---	---
<i>Rosa gymnocarpa</i> var. <i>gymnocarpa</i>	wood rose	Native	---	---	---	---
<i>Rosa spithamea</i>	ground rose	Native	---	C	---	---
<i>Rubus armeniacus</i>	Himalayan blackberry	Non-Native	---	---	High	---
<i>Rubus parviflorus</i>	thimble berry	Native	---	---	---	---
<i>Rubus ursinus</i>	California blackberry	Native	---	---	---	---
Rubiaceae – Madder Family						
<i>Galium aparine</i>	bedstraw	Native	---	---	---	---
<i>Galium californicum</i> subsp. <i>californicum</i>	California bedstraw	Native	---	C	---	---
<i>Galium murale</i>	tiny bedstraw	Non-Native	---	---	---	---
<i>Galium porrigens</i> var. <i>porrigens</i>	climbing bedstraw	Native	---	---	---	---
<i>Galium triflorum</i>	sweet-scented bedstraw	Native	---	B	---	---
<i>Sherardia arvensis</i>	field madder	Non-Native	---	---	---	---
Salicaceae – Willow Family						
<i>Salix laevigata</i>	red willow	Native	---	---	---	---
<i>Salix lasiolepis</i>	arroyo willow	Native	---	---	---	---
Sapindaceae – Soapberry Family						
<i>Acer macrophyllum</i>	big leaf maple	Native	---	---	---	---
<i>Aesculus californica</i>	California buckeye	Native	---	---	---	---
Saxifragaceae – Saxifrage Family						
<i>Heuchera micrantha</i>	alum root	Native	---	---	---	---
<i>Lithophragma affine</i>	woodland star	Native	---	---	---	---
<i>Lithophragma heterophyllum</i>	hillside star	Native	---	---	---	---
<i>Tellima grandiflora</i>	fringe cups	Native	---	C	---	---
Scrophulariaceae – Figwort Family						
<i>Scrophularia californica</i>	bee plant	Native	---	---	---	---
Solanaceae – Nightshade Family						
<i>Solanum americanum</i>	American black nightshade	Native	---	---	---	---
<i>Solanum umbelliferum</i>	blue witch	Native	---	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
Tropaeolaceae – Nasturtium Family						
<i>Tropaeolum majus</i>	garden nasturtium	Non-Native	---	---	---	---
Urticaceae – Nettle Family						
<i>Urtica dioica</i> subsp. <i>holosericea</i>	hoary nettle	Native	---	---	---	---
Valerianaceae – Valerian Family						
<i>Centranthus ruber</i>	Jupiter's beard	Non-Native	---	---	---	---
MONOCOTS						
Agavaceae – Agave Family						
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	soap plant	Native	---	---	---	---
Alliaceae – Onion or Garlic Family						
<i>Allium amplexans</i>	narrow leaf onion	Native	HB	A2	---	---
<i>Allium cepa</i>	garden onion	Non-Native	---	---	---	---
<i>Allium triquetrum</i>	whiteflowered onion	Non-Native	---	---	---	---
<i>Allium unifolium</i>	one leaf onion	Native	---	C	---	---
Amaryllidaceae – Amaryllis Family						
<i>Narcissus pseudonarcissus</i>	daffodil	Non-Native	---	---	---	---
Araceae – Arum Family						
<i>Arum italicum</i>	Italian lords and ladies	Non-Native	---	---	---	---
<i>Lemna minuta</i>	duckweed	Native	---	---	---	---
<i>Zantedeschia aethiopica</i>	calla lilly	Non-native	---	---	Limited	---
Asphodelaceae – Asphodel Family						
<i>Kniphofia uvaria</i>	redhot poker	Non-Native	---	---	Watch	---
Cyperaceae – Sedge Family						
<i>Carex densa</i>	dense sedge	Native	---	B	---	---
<i>Carex subbracteata</i>	small bract sedge	Native	---	B	---	---
<i>Cyperus eragrostis</i>	tall flatsedge	Native	---	---	---	---
Iridaceae – Iris Family						
<i>Chasmanthe floribunda</i>	African cornflag	Non-Native	---	---	Watch	---
<i>Iris foetidissima</i>	coral iris	Non-Native	---	---	---	---
<i>Sisyrinchium bellum</i>	blue-eyed grass	Native	---	---	---	---
Juncaceae – Rush Family						
<i>Juncus balticus</i> subsp. <i>ater</i>	Baltic rush	Native	---	---	---	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Juncus bufonius</i> var. <i>bufonius</i>	toad rush	Native	---	---	---	---
<i>Juncus effusus</i> subsp. <i>pacificus</i>	Pacific rush	Native	---	---	---	---
<i>Juncus patens</i>	common rush	Native	---	---	---	---
<i>Juncus xiphioides</i>	iris-leaved rush	Native	---	---	---	---
<i>Luzula comosa</i> var. <i>comosa</i>	wood rush	Native	---	---	---	---
Liliaceae – Lily Family						
<i>Agapanthus africanus</i>	lily of the nile	Non-Native	---	---	---	---
<i>Calochortus umbellatus</i> (CRPR 4.2)	Oakland star-tulip	Native	---	*A2	---	---
<i>Fritillaria affinis</i>	checker lily	Native	---	---	---	---
<i>Prosartes hookeri</i>	drops of gold	Native	---	---	---	---
Melanthiaceae – False-Hellebore Family						
<i>Toxicoscordion fremontii</i>	death camas	Native	---	---	---	---
<i>Trillium chloropetalum</i>	giant trillium	Native	---	C	---	---
Orchidaceae – Orchid Family						
<i>Corallorhiza maculata</i> var. <i>maculata</i>	spotted coralroot	Native	---	A2	---	---
<i>Epipactis helleborine</i>	helleborine	Non-Native	---	---	---	---
Poaceae – Grass Family						
<i>Agrostis stolonifera</i>	creeping bentgrass	Non-Native	---	---	Limited	---
<i>Aira caryophyllea</i>	silver hairgrass	Non-Native	---	---	---	---
<i>Arundo donax</i>	giant reed	Non-Native	---	---	High	On List
<i>Avena barbata</i>	slender oats	Non-Native	---	---	Moderate	---
<i>Avena fatua</i>	wild oats	Non-Native	---	---	Moderate	---
<i>Brachypodium distachyon</i>	false brome	Non-Native	---	---	Moderate	---
<i>Briza maxima</i>	rattlesnake grass	Non-Native	---	---	Limited	---
<i>Briza minor</i>	little quaking grass	Non-Native	---	---	---	---
<i>Bromus catharticus</i> subsp. <i>elatus</i>	Chilean brome	Non-Native	---	---	---	---
<i>Bromus diandrus</i>	ripgut brome	Non-Native	---	---	Moderate	---
<i>Bromus hordeaceus</i>	soft chess	Non-Native	---	---	Limited	---
<i>Bromus laevipes</i>	woodland brome	Native	---	---	---	---
<i>Bromus madritensis</i>	foxtail chess	Non-Native	---	---	---	---
<i>Bromus racemosus</i>	smooth brome	Non-Native	---	---	---	---
<i>Bromus rubens</i>	foxtail chess	Non-Native	---	---	High	---

Appendix B Plant Species Observed on Site

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Bromus sitchensis</i> var. <i>carinatus</i>	California brome	Native	---	---	---	---
<i>Cortaderia jubata</i>	jubata grass	Non-Native	---	---	High	---
<i>Cynodon dactylon</i>	Bermuda grass	Non-Native	---	---	Moderate	On List
<i>Cynosurus echinatus</i>	dogtail grass	Non-Native	---	---	Moderate	---
<i>Dactylis glomerata</i>	orchard grass	Non-Native	---	---	Limited	---
<i>Danthonia californica</i>	California oat grass	Native	---	C	---	---
<i>Ehrharta erecta</i>	panic veldt grass	Non-Native	---	---	Moderate	---
<i>Elymus caput-medusae</i>	medusahead grass	Non-Native	---	---	High	On List
<i>Elymus glaucus</i> subsp. <i>glaucus</i>	blue wildrye	Native	---	---	---	---
<i>Elymus triticoides</i>	creeping wildrye	Native	---	---	---	---
<i>Festuca bromoides</i>	brome fescue	Non-Native	---	---	---	---
<i>Festuca microstachys</i>	Eastwood fescue	Native	---	---	---	---
<i>Festuca myuros</i>	foxtail fescue	Non-Native	---	---	Moderate	---
<i>Festuca perennis</i>	Italian ryegrass	Non-Native	---	---	Moderate	---
<i>Gastridium phleoides</i>	nit grass	Non-Native	---	---	---	---
<i>Hordeum brachyantherum</i> subsp. <i>brachyantherum</i>	meadow barley	Native	---	---	---	---
<i>Hordeum marinum</i> subsp. <i>gussoneanum</i>	Mediterranean barley	Non-Native	---	---	Moderate	---
<i>Hordeum murinum</i> subsp. <i>leporinum</i>	hare barley	Non-Native	---	---	Moderate	---
<i>Melica californica</i>	California melic	Native	---	C	---	---
<i>Melica imperfecta</i>	small flowered melica	Native	---	---	---	---
<i>Melica torreyana</i>	Torrey's melic grass	Native	---	---	---	---
<i>Phalaris aquatica</i>	Harding grass	Non-Native	---	---	Moderate	---
<i>Phalaris paradoxa</i>	Hood canary grass	Non-Native	---	---	---	---
<i>Phyllostachys</i> sp.	bamboo	Non-Native	---	---	---	---
<i>Poa annua</i>	annual bluegrass	Non-Native	---	---	---	---
<i>Poa bulbosa</i> subsp. <i>vivipara</i>	bulbous bluegrass	Native	---	---	---	---
<i>Polypogon monspeliensis</i>	rabbitsfoot grass	Non-Native	---	---	Limited	---
<i>Rytidosperma penicillatum</i>	purple awned wallaby grass	Non-Native	---	---	Limited	---
<i>Stipa cernua</i>	nodding needlegrass	Native	---	C	---	---
<i>Stipa lepida</i>	foothill needlegrass	Native	---	C	---	---
<i>Stipa miliacea</i> var. <i>miliacea</i>	smilo grass	Non-Native	---	---	Limited	---

SPECIES NAME	COMMON NAME	ORIGIN	COLLECTION	LOCALLY RARE	CAL-IPC RATING	CDFA RATING
<i>Stipa pulchra</i>	purple needlegrass	Native	---	C	---	---
Ruscaceae – Butcher's-Broom Family						
<i>Maianthemum racemosum</i>	false solomon's seal	Native	---	---	---	---
<i>Maianthemum stellatum</i>	false lily of the valley	Native	---	---	---	---
Themidaceae – Brodiaea Family						
<i>Brodiaea elegans</i> subsp. <i>elegans</i>	harvest brodiaea	Native	---	---	---	---
<i>Dichelostemma congestum</i>	ookow	Native	---	---	---	---
<i>Dipterostemon capitatus</i> subsp. <i>capitatus</i>	blue dicks	Native	---	---	---	---
<i>Triteleia laxa</i>	Ithuriel's spear	Native	---	---	---	---

APPENDIX C CALIFORNIA NATURAL DIVERSITY DATABASE FIELD FORMS

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDDB@wildlife.ca.gov

For Office Use Only

Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 03/12/2021

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Arctostaphylos pallida* (Arcpal1)

Common Name: pallid manzanita

Species Found? ☒ Yes ☐ No If not found, why?

Total No. Individuals: 35 Subsequent Visit? ☐ Yes ☒ No

Is this an existing NDDDB occurrence? 14045 ☐ No ☐ Unk.
Yes, Occ. #

Collection? If yes: _____
Number Museum / Herbarium

Reporter: Nomad Ecology

Address: 822 Main Street
Martinez, CA

E-mail Address: hbartosh@nomadecology.com

Phone: 925-228-3027

Plant Information

Phenology:

100 0 0
% vegetative % flowering % fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Huckleberry Preserve and adjacent private lands in the Oakland Hills east of Skyline Boulevard, along Manzanita Drive, and on east-facing slope west of Manzanita Drive.

County: Alameda Landowner / Mgr: East Bay Regional Parks, Private

Quad Name: Oakland East Elevation: 1200-1400 feet

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: LG V20

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒ Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☒

Coordinates: 37.838259, -122.187168

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

On gravelly shale soils under canopy of Quercus agrifolia var. agrifolia / Umbellularia californica woodland, in maritime chaparral, under canopy of Eucalyptus globulus forest, and in open areas along residential yards and right of way. Individuals occur on steep to flat slopes on various aspects. Many dead individuals are present and some individuals show signs of cutting. Many show signs of Phytophthora impacts. Associated species include Vaccinium ovatum, Arctostaphylos crustacea ssp. crustacea, Toxicodendron diversilobum, Diplacus aurantiacus, Q agrifolia var. agrifolia, among others.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☒ Poor

Immediate AND surrounding land use: Private property, recreation, PG&E right of way, motor vehicle driving/parking.

Visible disturbances: Cutting, trampling, roadside maintenance and erosion, Phytophthora infection

Threats: Shading out, Phytophthora infection, roadside maintenance, improper burning regime, invasive plants, trampling.

Comments: Information here is only for individuals within study area. More individuals are present outside of study area. Plants near Manzanita Drive are in poor shape and many dead individuals are present along Manzanita Drive and near parking lot of The Hills Swim Club. Colony within Huckleberry Preserve is much healthier.

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Baldwin et al. 2012
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☒
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ☒ yes ☐ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDDB@wildlife.ca.gov

For Office Use Only

Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 04/14/2021

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Calochortus umbellatus* (Calumb1)

Common Name: Oakland star tulip

Species Found? ☒ Yes ☐ No If not found, why? _____

Total No. Individuals: 73 Subsequent Visit? ☐ Yes ☒ No

Is this an existing NDDDB occurrence? ☐ No ☒ Unk. Yes, Occ. # _____

Collection? If yes: _____ Number _____ Museum / Herbarium _____

Reporter: Nomad Ecology

Address: 822 Main Street
Martinez, CA

E-mail Address: hbartosh@nomadecology.com

Phone: 925-228-3027

Plant Information

Phenology:

0 60 40
% vegetative % flowering % fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

In Oakland Hills just east of Highway 13. Approximately 100 feet upslope from Mountain Boulevard and 40 feet downslope of powerline towers west of Montera Middle School.

County: Alameda Landowner / Mgr: Private

Quad Name: Oakland East Elevation: 577 feet

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: iPhone

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒ Horizontal Accuracy: 16 feet _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☒

Coordinates: 37.82138, -122.20542

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Grassy areas on top 1/3rd of steep west-facing slope and on flat above. Substrates potentially serpentine. Growing with *Eschscholzia californica*, *Galium aparine*, *Vicia sativa* subsp. *nigra*, *Claytonia parviflora* subsp. *parviflora*, *Epilobium canum* subsp. *canum*, *Stipa cernua*, and *Gilia achillefolia* subsp. *multicaulis*, among others.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: PG&E right of way, open space

Visible disturbances: None

Threats: PG&E tower work, erosion, trampling

Comments: Steep slopes susceptible to erosion and near public walking path. Most plants on slope below towers, but some on flat that could be impacted by tower work. Social bike trail is dug out of soil near individuals.

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Baldwin et al. 2012
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☒
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☒

May we obtain duplicates at our expense? ☒ yes ☐ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDDB@wildlife.ca.gov

For Office Use Only

Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 03/12/2021

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Dirca occidentalis*

Common Name: western leatherwood

Species Found? ☐ Yes ☒ No If not found, why?

Total No. Individuals: 0 Subsequent Visit? ☒ Yes ☐ No

Is this an existing NDDDB occurrence? 29968 ☐ No ☐ Unk.
Yes, Occ. #

Collection? If yes: _____
Number Museum / Herbarium

Reporter: Nomad Ecology

Address: 822 Main Street
Martinez, CA

E-mail Address: hbartosh@nomadecology.com

Phone: 925-228-3027

Plant Information

Phenology:

0 0 0
% vegetative % flowering % fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Huckleberry Preserve in the Oakland Hills on steep east-facing slope east of Manzanita Drive.

County: Alameda Landowner / Mgr: East Bay Regional Parks

Quad Name: Oakland East Elevation: 1200 feet

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: LG V20

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒ Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☒

Coordinates: 37.838259, -122.187168

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In center of steep, east-facing slope of PG&E right of way. Cleared Quercus agrifolia var. agrifolia / Umbellularia californica woodland regenerating to maritime chaparral. Species growing in area of Dirca occidentalis polygon include U. californica stump resprouts, Q. agrifolia var. agrifolia saplings and seedlings, Oemleria cerasiformis, Carduus pycnocephalus subsp. pycnocephalus, Scrophularia californica, among others.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use: Recreation, PG&E right of way.

Visible disturbances: Right of way maintenance.

Threats: Non-native species, improper cutting regime, removal of surrounding canopy.

Comments: Form only pertains to single colony located at coordinates given above. No Dirca occidentalis observed at point. Potential misidentification, inaccurate location details, or absence due to degradation of habitat by right of way clearing.

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Baldwin et al. 2012
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☒
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ☒ yes ☐ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDDB@wildlife.ca.gov

For Office Use Only

Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): _____

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: Eryngium jepsonii (Eryjep1)

Common Name: Jepson's button thistle

Species Found? ☒ Yes ☐ No _____
If not found, why?

Total No. Individuals: 69 Subsequent Visit? ☐ Yes ☒ No

Is this an existing NDDDB occurrence? ☒ No ☐ Unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Nomad Ecology

Address: 822 Main Street
Martinez, CA

E-mail Address: hbartosh@nomadecology.com

Phone: 925-228-3027

Plant Information

Phenology:

5 95 0
% vegetative % flowering % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown _____
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Approximately 0.14 miles west of Moraga Substation, south of powerlines. On margin of cleared right of way.

County: Alameda Landowner / Mgr: Private

Quad Name: Oakland East Elevation: 750 feet

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model: iPhone

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒ Horizontal Accuracy: 16 feet meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☒

Coordinates: 377.84702, -122.116441

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In bare spots on clay soils in non-native grassland and at margin of non-native grassland and Baccharis pilularis subsp. consanguinea scrubland. Gentle to flat east facing slopes. Associated species include Baccharis pilularis subsp. consanguinea, Conium maculatum, Carduus pycnocephalus subsp. pycnocephalus, Rubus ursinus, Helminthotheca echinoides, Torilis arvensis, Avena spp., among others. Most herbaceous species are senesced and bare ground is visible.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use: PG&E right of way

Visible disturbances: None

Threats: Non-native species, scrub encroachment, power line maintenance.

Comments: 3 distinct colonies spread out in area.

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Baldwin et al. 2012
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☒
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ☒ yes ☐ no