Appendix D
Biological Resources Data

Appendix D1
Biological Qualifications

Qualified biologists from Environmental Science Associates (ESA) conducted a variety of biological resources surveys within the Innovation Park Planned Unit Development (PUD) (project area) on August 31 and October 1, 2015; April 2, 2019; and August 16, 17, 18, 20, and 23, 2021. **Table D1-1** summarizes the biological resources surveys conducted for the project by date and biologist.

TABLE D1-1
BIOLOGICAL RESOURCES SURVEYS CONDUCTED FOR THE PROJECT

Survey Date(s)	Personnel	
	Name	**Type of Survey**
August 31, 2015	Joshua Boldt, Biologist	Special-status species habitat assessments, wildlife habitat and vegetation mapping, mapping of state and federally protected waters
October 1, 2015	Joshua Boldt, Biologist	Special-status species habitat assessments, wildlife habitat and vegetation mapping, mapping of state and federally protected waters
April 2 and 24, 2019	Kelly Bayne, Biologist/ Certified Arborist Jessica Orsolini, Biologist/ Certified Arborist	Special-status species habitat assessments, giant garter snake habitat assessment, black-crowned night-heron rookery assessment
August 10, 11, 13, and 23, 2021	Kelly Bayne, Biologist/ Certified Arborist Jessica Orsolini, Biologist/ Certified Arborist Julie McNamara, Biologist/ Certified Arborist	Arborist surveys on the site of the proposed California Northstate University Medical Center
August 20, 2021	Kelly Bayne, Biologist/ Certified Arborist	Special-status species habitat assessments, giant garter snake habitat assessment, black-crowned night-heron rookery assessment, pond and riparian woodland assessment

SOURCE: Data compiled by Environmental Science Associates in 2015, 2019, and 2021

The qualifications of the biologists who conducted the project surveys are as follows:

- Joshua Boldt is a biologist with 20 years of experience specializing in special-status species habitat assessments, aquatic resource delineations, and special-status plant surveys throughout Northern California.
- Kelly Bayne is a biologist with 16 years of experience conducting special-status species habitat assessments, aquatic resource delineations, arborist surveys, and special-status wildlife and plant surveys throughout Northern California.
- Jessica Orsolini is a biologist with 17 years of experience conducting special-status species habitat assessments, aquatic resource delineations, arborist surveys, and special-status wildlife and plant surveys throughout Northern California.
- Julie McNamara is a biologist with four years of experience conducting special-status species habitat assessments, arborist surveys, and special-status wildlife and plant surveys throughout Northern California.

Appendix D2
Arborist Report

ESA

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memorandum

date	September 7, 2021
to	Jeff Dorso (Sacramento Kings) Andrea Matarazzo and Jay Harris (Pioneer Law Group) Philip Sun (California Northstate University)
from	Kelly Bayne, Managing Associate / Senior Biologist (ESA) Christina Erwin, Project Manager (ESA)
subject	Innovation Park Planned Unit Development / CNU Medical Center – Arborist Survey and Report

Environmental Science Associates (ESA) prepared this memorandum to document arborist services provided for the Innovation Park Planned Unit Development (PUD) / CNU Medical Center project in Sacramento, California. The area surveyed for this tree inventory encompasses the CNU Medical Center site and a 50-foot buffer area around the CNU Medical Center site. This geographic area is referred to as "project site" throughout this memorandum. This memorandum summarizes the methodology and results of the tree inventories conducted within the project site.

Methodology

ESA Certified Arborists Julie McNamara (WE-11439A) and Kelly Bayne (WE-7741A) conducted tree inventories on August 10 and 11, 2021. ESA Certified Arborist Jessica Orsolini (WE-7845A) and Ms. McNamara conducted a tree inventory on August 13, 2021. Ms. Bayne and Ms. Orsolini conducted a tree inventory on August 23, 2021.

City of Sacramento City Arborist Jodi Carlson recommended that all trees located on the project site be inventoried.[1] Attributes recorded for each tree include: tag identification, species, diameter at standard height (DSH), and protection status. Private protected trees include all native oaks, sycamores, and buckeyes that are 12 inches or greater in DSH, and all other species that have a DSH greater than 24 inches that are located on private property.[2] Tree vitality ratings were given for all protected and non-protected trees (**Table 1**). Additional details on tree structure and condition were provided for protected trees.

[1] Guidance provided by City of Sacramento City Arborist Jodi Carlson to Kelly Bayne (ESA), telephone conversation, July 15, 2021.
[2] Sacramento City Code, Section 12.56.020.

TABLE 1
TREE HEALTH DESCRIPTION AND RATINGS

Tree Vitality Rating	Rating	Description
0	Dead	Dead.
1	Very Poor	Tree in severe decline, dieback of scaffold branches and/or trunk and most of foliage from epicormics; extensive structural defects that cannot be abated. Tree nearing the end of life.
2	Poor	Tree in decline, epicormic growth, extensive dieback of medium to large branches, and significant structural defects that may be able to be mitigated for with extensive care.
3	Moderate	Tree with moderate vigor, moderate twig and small branch dieback, thinning of crown, poor leaf color, and moderate structural defects that might be mitigated with regular care.
4	Good	Tree with slight decline in vigor, small amount of twig dieback, and minor structural defects that could be corrected.
5	Excellent	A healthy, vigorous tree, reasonably free of signs and symptoms of diseases, with good structure and form typical of the species.

ESA inventoried all single-stemmed trees 6 inches or greater DSH or multi-trunk trees with at least one stem diameter greater than 6 inches DSH. All inventoried trees were affixed with a numeric aluminum tag on the south side of the trunk with flagging, to the extent feasible. Six trees did not receive a tag due to access issues; this is noted in the comments in **Table 2**. Tree locations were recorded using an ESRI Collector application with an iOS cellular device. Therefore, actual locations may vary from 5 to 20 feet.

TABLE 2
COUNT OF TREES INVENTORIED

Common Name	Scientific Name	Count
Maple	*Acer* sp.	1
Tree of Heaven	*Ailanthus altissima*	1
Deodar Cedar	*Cedrus deodara*	63
Chinese Hackberry	*Celtis sinensis*	131
Camphor Tree	*Cinnamomum camphora*	55
Maidenhair Tree	*Ginkgo biloba*	2
Honey Locust	*Gleditsia triacanthos*	6
Chinese Flame Tree	*Koelreuteria bipinnata*	16
Sweetgum	*Liquidambar styraciflua*	121
Coast Redwood	*Sequoia sempervirens*	89
London Plane Tree	*Platanus* x *acerifolia*	6
Blue Spruce	*Picea pungens*	1
Chinese Pistache	*Pistacia chinensis*	152
Purple Leaf Plum	*Prunus cerasifera*	92
Bradford Pear	*Pyrus calleryana*	3
Southern Magnolia	*Magnolia grandiflora*	58
Oleander	*Nerium oleander*	4
Coast Live Oak	*Quercus agrifolia*	80
Valley Oak	*Quercus lobata*	91
Cork Oak	*Quercus suber*	6
Willow sp.	*Salix* sp.	1
Mexican Fan Palm	*Washingtonia robusta*	3
Queen Palm	*Syagrus romanzoffiana*	5
TOTAL	~	**987**
Tag Range	1 – 6 (no tag) 1001 – 1983 2000 – 2099	~

Results

A total of 987 trees were inventoried (see Table 2 for summary, and appended Tree Inventory Table). Of the 987 trees, there were 23 different species (Table 2). There are 111 private protected trees. Of these, one is dead and 8 are rated as very poor. It is recommended that these 9 protected trees are not counted in mitigation requirements should they be proposed for removal. A comprehensive list of all of the trees and their data are provided in **Attachment 1**. The locations of the 987 trees are illustrated in **Attachment 2**. Figure 1 provides an overview of the project site. Figures 1a through 1e provide zoomed in views of the project site.

Attachment 1
Tree Inventory Table

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1	Camphor Tree	*Cinnamomum camphora*	20	Not Protected	no tag	3 Moderate	
2	Camphor Tree	*Cinnamomum camphora*	20	Not Protected	no tag	2 Poor	
3	Camphor Tree	*Cinnamomum camphora*	12	Not Protected	no tag	2 Poor	
4	Camphor Tree	*Cinnamomum camphora*	10	Not Protected	no tag	1 Very Poor	
5	Chinese Pistache	*Pistacia chinensis*	10	Not Protected	no tag	3 Moderate	
6	Chinese Hackberry	*Celtis sinensis*	16	Not Protected	no tag	2 Poor	
1001	Southern Magnolia	*Magnolia grandiflora*	10	Not Protected		1 Very Poor	
1002	Chinese Flame Tree	*Koelreuteria bipinnata*	17	Not Protected		3 Moderate	
1003	Valley Oak	*Quercus lobata*	16	Protected	Codominant Leader at 11ft, included bark, epicormic sprouts, small dead wood, Narrow angle attachments, Fair leaf surface	2 Poor	
1004	Valley Oak	*Quercus lobata*	22	Protected	Mechanical damage at 3ft, Codominant Leader at 9, 11ft, included bark, trunk torsion, Narrow angle attachments, epicormic sprouts, dead wood 1-3in, Fair leaf surface	2 Poor	
1005	Valley Oak	*Quercus lobata*	17	Protected	Codominant Leader at 9ft "U-shaped", Narrow angle attachments, epicormic sprouts, dead wood 1-2in, Fair leaf surface	3 Moderate	
1006	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		4 Good	
1007	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		0 Dead	
1008	Sweetgum	*Liquidambar styraciflua*	13	Not Protected		3 Moderate	
1009	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1010	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	
1011	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1012	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1013	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		3 Moderate	
1014	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		3 Moderate	
1015	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1016	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		2 Poor	
1017	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1018	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	
1019	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		3 Moderate	
1020	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		3 Moderate	
1021	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		3 Moderate	
1022	Sweetgum	*Liquidambar styraciflua*	5	Not Protected		1 Very Poor	
1023	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1024	Valley Oak	*Quercus lobata*	18	Protected	Codominant Leader 10ft, included bark, Narrow angle attachments, epicormic sprouts, old pruning cuts, No callus, dead wood 1-3in, Poor leaf surface	2 Poor	
1025	Valley Oak	*Quercus lobata*	10	Not Protected		2 Poor	
1026	Valley Oak	*Quercus lobata*	16	Protected	Codominant Leader at 8ft, included bark, Narrow angle attachments, epicormic sprouts, old pruning cuts, dead wood 1-3in, Poor leaf surface	2 Poor	
1027	Valley Oak	*Quercus lobata*	13	Protected	Codominant Leader at 8ft, included bark, suppressed, epicormic sprouts, small dead wood, Poor leaf surface	2 Poor	
1028	Valley Oak	*Quercus lobata*	13	Protected	Codominant Leader at 9ft ,12ft "U-shaped", small dead wood, epicormic sprouts, small dead wood, trunk torsion	2 Poor	
1029	Valley Oak	*Quercus lobata*	12	Protected	Codominant Leader at 10ft, included bark, dead wood 1-2in, epicormic sprouts, small dead wood, old pruning cuts with complete callus, Poor leaf surface	2 Poor	
1030	Valley Oak	*Quercus lobata*	12	Protected	Codominant Leader at 10ft, included bark, epicormic sprouts, small dead wood, Good leaf surface	3 Moderate	
1031	Valley Oak	*Quercus lobata*	16	Protected	Codominant Leader at 10ft into many, Narrow angle attachments, dead wood 1-2in, old pruning cuts with complete callus included bark, Good leaf surface	3 Moderate	
1032	Chinese Flame Tree	*Koelreuteria bipinnata*	12	Not Protected		3 Moderate	
1033	Chinese Flame Tree	*Koelreuteria bipinnata*	10	Not Protected		3 Moderate	
1034	Chinese Flame Tree	*Koelreuteria bipinnata*	10	Not Protected		2 Poor	
1035	Southern Magnolia	*Magnolia grandiflora*	10	Not Protected		3 Moderate	
1036	Southern Magnolia	*Magnolia grandiflora*	10	Not Protected		2 Poor	
1037	Chinese Flame Tree	*Koelreuteria bipinnata*	11	Not Protected		2 Poor	
1038	Chinese Flame Tree	*Koelreuteria bipinnata*	9	Not Protected		2 Poor	
1039	Chinese Flame Tree	*Koelreuteria bipinnata*	9	Not Protected		1 Very Poor	
1040	Chinese Flame Tree	*Koelreuteria bipinnata*	9	Not Protected		2 Poor	
1041	Chinese Flame Tree	*Koelreuteria bipinnata*	8	Not Protected		2 Poor	
1042	Chinese Flame Tree	*Koelreuteria bipinnata*	9	Not Protected		3 Moderate	
1043	Chinese Flame Tree	*Koelreuteria bipinnata*	12	Not Protected		1 Very Poor	
1044	Chinese Flame Tree	*Koelreuteria bipinnata*	9	Not Protected		1 Very Poor	
1045	Chinese Flame Tree	*Koelreuteria bipinnata*	15	Not Protected		2 Poor	
1046	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		1 Very Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1047	Valley Oak	*Quercus lobata*	17	Protected	Codominant Leader at 11,11,14 ft, included bark, epicormic sprouts, Narrow angle attachments, dead wood 1-3in, Poor leaf surface	3 Moderate	
1048	Valley Oak	*Quercus lobata*	16	Protected	Codominant Leader at 12ft, included bark, Large lateral, Narrow angle attachments, limb tip die back, epicormic sprouts, large dead wood 3-4in, Fair leaf surface	2 Poor	
1049	Valley Oak	*Quercus lobata*	10	Not Protected		1 Very Poor	
1050	Valley Oak	*Quercus lobata*	21	Protected	Codominant Leader at 12 into many, included bark, Narrow angle attachments, epicormic sprouts, dead wood 1-3, Poor leaf surface, old pruning cuts with complete to semi callus: Good leaf surface	3 Moderate	
1051	Valley Oak	*Quercus lobata*	21	Protected	Codominant Leader at 9, 12, and 14 ft, small dead wood 1-3in, included bark, Narrow angle attachments, epicormic sprouts, Good leaf surface	3 Moderate	
1052	Chinese Hackberry	*Celtis sinensis*	19	Not Protected		2 Poor	
1053	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1054	Chinese Hackberry	*Celtis sinensis*	15	Not Protected		3 Moderate	
1055	Maple sp.	*Acer sp.*	6	Not Protected		1 Very Poor	
1056	Coast Live Oak	*Quercus agrifolia*	16	Protected	Codominant Leader 9-10ft, included bark, old pruning cuts with callus, epicormic sprouts, Good leaf surface	3 Moderate	
1057	Chinese Hackberry	*Celtis sinensis*	15	Not Protected		2 Poor	
1058	Chinese Pistache	*Pistacia chinensis*	15	Not Protected		3 Moderate	
1059	Chinese Hackberry	*Celtis sinensis*	20	Not Protected		3 Moderate	
1060	Camphor Tree	*Cinnamomum camphora*	19	Not Protected		3 Moderate	
1061	Camphor Tree	*Cinnamomum camphora*	12	Not Protected		3 Moderate	
1062	Chinese Hackberry	*Celtis sinensis*	19	Not Protected		3 Moderate	
1063	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1064	Coast Live Oak	*Quercus agrifolia*	9	Not Protected		3 Moderate	
1065	Coast Live Oak	*Quercus agrifolia*	9	Not Protected		0 Dead	
1066	Coast Live Oak	*Quercus agrifolia*	10	Not Protected		2 Poor	
1067	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		2 Poor	
1068	Coast Live Oak	*Quercus agrifolia*	10	Not Protected		2 Poor	
1069	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		1 Very Poor	
1070	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		2 Poor	
1071	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		1 Very Poor	
1072	Chinese Pistache	*Pistacia chinensis*	19	Not Protected		3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1073	Valley Oak	*Quercus lobata*	12	Protected	Codominant Leader at 15ft, "u-shaped" crotch, epicormic sprouts, Narrow angle attachments, included bark, dead wood 1-3in, Poor leaf surface	2 Poor	
1074	Valley Oak	*Quercus lobata*	15	Protected	Codominant Leader at 15ft, included bark, epicormic sprouts, Narrow angle attachments: included bark, de 1-4	2 Poor	
1075	Valley Oak	*Quercus lobata*	14	Protected		2	
1076	Valley Oak	*Quercus lobata*	16	Protected	Root collar buried, Codominant Leader at 9ft, included bark, old pruning cuts with callus, dead wood 1-3in, Narrow angle attachments, Fair leaf surface		
1077	Valley Oak	*Quercus lobata*	16	Protected	Codominant Leader at 10 inches into many, included bark, Sparse Canopy	2 Poor	
1078	Valley Oak	*Quercus lobata*	14	Protected	Codominant Leader 14 into many, included bark, old pruning cuts with callus, dead wood 1-3in, Narrow angle attachments, Fair leaf surface, root collar buried	2 Poor	
1079	Valley Oak	*Quercus lobata*	18	Protected	Codominant Leader 14 and 16ft, included bark, old pruning cuts with callus, dead wood 1-3in, Narrow angle attachments, Fair leaf surface, root collar buried	3 Moderate	
1080	Valley Oak	*Quercus lobata*	15	Protected	Codominant Leader 14 and 16ft, included bark, old pruning cuts w callus, dead wood 1-3, Narrow angle attachments, Fair leaf surface, root collar buried	3 Moderate	
1081	Chinese Flame Tree	*Koelreuteria bipinnata*	10	Not Protected		1 Very Poor	
1083	Chinese Flame Tree	*Koelreuteria bipinnata*	10	Not Protected		2 Poor	
1084	Chinese Flame Tree	*Koelreuteria bipinnata*	14	Not Protected		3 Moderate	
1085	Southern Magnolia	*Magnolia grandiflora*	11	Not Protected		2 Poor	
1086	Southern Magnolia	*Magnolia grandiflora*	10	Not Protected		2 Poor	
1087	Southern Magnolia	*Magnolia grandiflora*	6	Not Protected		1 Very Poor	
1088	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		2 Poor	
1089	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1090	Chinese Hackberry	*Celtis sinensis*	15	Not Protected		1 Very Poor	
1091	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		3 Moderate	
1092	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1093	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1094	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		3 Moderate	
1095	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1096	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		3 Moderate	
1097	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1098	Cork Oak	*Quercus suber*	14	Protected	Codominant Leader 14ft, old pruning cuts with callus, dead wood	3 Moderate	
1099	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		3 Moderate	
1100	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1101	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		2 Poor	
1102	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		2 Poor	
1103	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		2 Poor	
1104	Coast Live Oak	*Quercus agrifolia*	9	Not Protected		1 Very Poor	
1105	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		1 Very Poor	
1106	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1107	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		1 Very Poor	
1108	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		1 Very Poor	
1109	Camphor Tree	*Cinnamomum camphora*	13	Not Protected		2 Poor	
1110	Camphor Tree	*Cinnamomum camphora*	15	Not Protected		2 Poor	
1111	Camphor Tree	*Cinnamomum camphora*	21	Not Protected		2 Poor	
1112	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1113	Chinese Hackberry	*Celtis sinensis*	16	Not Protected		3 Moderate	
1114	Chinese Pistache	*Pistacia chinensis*	17	Not Protected		3 Moderate	
1115	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1116	Chinese Hackberry	*Celtis sinensis*	20	Not Protected		3 Moderate	
1117	Chinese Pistache	*Pistacia chinensis*	17	Not Protected		3 Moderate	
1118	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		3 Moderate	
1119	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	
1120	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		3 Moderate	
1121	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		2 Poor	
1122	Chinese Hackberry	*Celtis sinensis*	18	Not Protected		2 Poor	
1123	Southern Magnolia	*Magnolia grandiflora*	6	Not Protected		2 Poor	
1124	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		2 Poor	
1125	Southern Magnolia	*Magnolia grandiflora*	9	Not Protected		2 Poor	
1126	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1127	Chinese Hackberry	*Celtis sinensis*	15	Not Protected		1 Very Poor	
1128	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		2 Poor	
1129	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1130	Chinese Pistache	*Pistacia chinensis*	18	Not Protected		3 Moderate	
1131	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		3 Moderate	
1132	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1133	Chinese Hackberry	*Celtis sinensis*	16	Not Protected		3 Moderate	
1134	Chinese Pistache	*Pistacia chinensis*	15	Not Protected		3 Moderate	
1135	Cork Oak	*Quercus suber*	16	Protected	Codominant Leader at 6ft into many, old pruning cuts with complete callus, epicormic sprouts, dead wood, Fair leaf surface	3 Moderate	
1136	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	
1137	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		2 Poor	
1138	Chinese Pistache	*Pistacia chinensis*	15	Not Protected		3 Moderate	
1139	Chinese Hackberry	*Celtis sinensis*	16	Not Protected		2 Poor	
1140	Chinese Hackberry	*Celtis sinensis*	16	Not Protected		2 Poor	
1141	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		3 Moderate	
1142	Southern Magnolia	*Magnolia grandiflora*	11	Not Protected			
1143	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected			
1144	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		2 Poor	
1145	Oleander	*Nerium oleander*	7 at 2ft	Not Protected		2 Poor	
1146	Oleander	*Nerium oleander*	11 at 2ft	Not Protected		2 Poor	
1147	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		2 Poor	
1148	Sweetgum	*Liquidambar styraciflua*	17	Not Protected		3 Moderate	
1149	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		0 Dead	
1150	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		2 Poor	
1151	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		2 Poor	
1152	Sweetgum	*Liquidambar styraciflua*	13	Not Protected		3 Moderate	
1153	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1154	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1155	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		0 Dead	
1156	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1157	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		2 Poor	
1158	Sweetgum	*Liquidambar styraciflua*	14	Not Protected		2 Poor	
1159	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		2 Poor	
1160	Sweetgum	*Liquidambar styraciflua*	14	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1161	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		2 Poor	
1162	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1163	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		3 Moderate	
1164	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	
1165	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1166	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		3 Moderate	
1167	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1168	Cork Oak	*Quercus suber*	12	Protected	Codominant Leader at 6ft into 3, included bark, dead wood, epicormic sprouts, Poor leaf surface	2 Poor	
1169	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		3 Moderate	
1170	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		2 Poor	
1171	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		2 Poor	
1172	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		2 Poor	
1173	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		2 Poor	
1174	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		2 Poor	
1175	Chinese Hackberry	*Celtis sinensis*	20	Not Protected		3 Moderate	
1176	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		2 Poor	
1177	Camphor Tree	*Cinnamomum camphora*	12	Not Protected		1 Very Poor	
1178	Camphor Tree	*Cinnamomum camphora*	15	Not Protected		2 Poor	
1179	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		1 Very Poor	
1180	Deodar Cedar	*Cedrus deodara*	11	Not Protected		3 Moderate	
1181	Deodar Cedar	*Cedrus deodara*	17	Not Protected		3 Moderate	
1182	Deodar Cedar	*Cedrus deodara*	13	Not Protected		3 Moderate	
1183	Deodar Cedar	*Cedrus deodara*	14	Not Protected		3 Moderate	
1184	Deodar Cedar	*Cedrus deodara*	12	Not Protected		3 Moderate	
1185	Deodar Cedar	*Cedrus deodara*	19	Not Protected		3 Moderate	nest in tree
1186	Deodar Cedar	*Cedrus deodara*	19	Not Protected		3 Moderate	
1187	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		1 Very Poor	
1188	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		1 Very Poor	
1189	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1190	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		3 Moderate	
1191	Chinese Pistache	*Pistacia chinensis*	16	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1192	Chinese Hackberry	*Celtis sinensis*	6	Not Protected		2 Poor	
1193	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		1 Very Poor	
1194	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		2 Poor	
1195	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		1 Very Poor	
1196	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1197	Oleander	*Nerium oleander*	9 at 2	Not Protected		2 Poor	
1198	Oleander	*Nerium oleander*	9 at 2	Not Protected		2 Poor	
1199	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		2 Poor	
1300	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		1 Very Poor	
1301	Chinese Pistache	*Pistacia chinensis*	16	Not Protected		3 Moderate	
1302	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		0 Dead	
1303	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	
1304	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		2 Poor	
1305	Coast Live Oak	*Quercus agrifolia*	7	Not Protected		1 Very Poor	
1306	Coast Live Oak	*Quercus agrifolia*	14	Protected	old pruning cuts with partial callus, Codominant Leader at 7ft, limb tip die back, epicormic sprouts	2 Poor	
1307	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		1 Very Poor	
1308	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		1 Very Poor	
1309	Valley Oak	*Quercus lobata*	9	Not Protected		2 Poor	
1310	Valley Oak	*Quercus lobata*	11	Not Protected		2 Poor	
1311	Valley Oak	*Quercus lobata*	15	Protected	epicormic sprouts, Codominant Leader at 14ft, included bark, dead wood	3 Moderate	
1312	Valley Oak	*Quercus lobata*	9	Not Protected		2 Poor	
1313	Valley Oak	*Quercus lobata*	18	Protected	epicormic sprouts, Codominant Leader at 10, 11, 17ft , small dead wood 1-3in,old pruning cuts with some callus, Fair leaf surface, included bark	3 Moderate	
1314	Valley Oak	*Quercus lobata*	12	Protected	epicormic sprouts, Codominant Leader at 12ft, small dead wood 1-2in, old pruning cuts no callus, Poor leaf surface, included bark	2 Poor	
1315	Valley Oak	*Quercus lobata*	10	Not Protected		1 Very Poor	
1316	Valley Oak	*Quercus lobata*	9	Not Protected		2 Poor	
1317	Valley Oak	*Quercus lobata*	6	Not Protected		1 Very Poor	
1318	Valley Oak	*Quercus lobata*	8	Not Protected		2 Poor	
1319	Valley Oak	*Quercus lobata*	8	Not Protected		2 Poor	
1320	Valley Oak	*Quercus lobata*	10	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1321	Valley Oak	*Quercus lobata*	6	Not Protected		1 Very Poor	
1322	Valley Oak	*Quercus lobata*	11	Not Protected		2 Poor	
1323	Coast Live Oak	*Quercus agrifolia*	10	Not Protected		1 Very Poor	
1324	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		1 Very Poor	
1325	Coast Live Oak	*Quercus agrifolia*	11	Not Protected		3 Moderate	
1326	Coast Live Oak	*Quercus agrifolia*	10	Not Protected		3 Moderate	
1327	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		1 Very Poor	
1328	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		0 Dead	
1329	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		1 Very Poor	
1330	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1331	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		3 Moderate	
1332	Camphor Tree	*Cinnamomum camphora*	13	Not Protected		2 Poor	
1333	Sweetgum	*Liquidambar styraciflua*	13	Not Protected		4 Good	
1334	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		2 Poor	
1335	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		2 Poor	
1336	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1337	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1338	Coast Live Oak	*Quercus agrifolia*	12	Protected	epicormic sprouts, Codominant Leader at 12ft, small dead wood 1-2in, old pruning cuts, no callus to some partial callus, lion tail, Good leaf surface	3 Moderate	
1339	Coast Live Oak	*Quercus agrifolia*	12	Protected	epicormic sprouts, Codominant Leader at 14ft, included bark, small dead wood 1-3in, old pruning cuts partial callus, lion tail, Fair leaf surface, Narrow angle attachments	3 Moderate	
1340	Valley Oak	*Quercus lobata*	11	Not Protected		2 Poor	
1341	Valley Oak	*Quercus lobata*	10	Not Protected		2 Poor	
1342	Valley Oak	*Quercus lobata*	13	Not Protected		1 Very Poor	
1343	Valley Oak	*Quercus lobata*	10	Not Protected		1 Very Poor	
1344	Valley Oak	*Quercus lobata*	18	Protected	epicormic sprouts, Codominant Leader at 13 and 14ft, included bark, small dead wood 1-5in, old pruning cuts partial callus, Fair leaf surface, Narrow angle attachments	2 Poor	
1345	Valley Oak	*Quercus lobata*	11	Not Protected		2 Poor	
1346	Valley Oak	*Quercus lobata*	7	Not Protected		1 Very Poor	
1347	Valley Oak	*Quercus lobata*	6	Not Protected		1 Very Poor	
1348	Coast Live Oak	*Quercus agrifolia*	11	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1349	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	
1350	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		2 Poor	
1351	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1352	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		2 Poor	
1353	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		2 Poor	
1354	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1355	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		2 Poor	
1356	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		2 Poor	
1357	Sweetgum	*Liquidambar styraciflua*	13	Not Protected		4 Good	
1358	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		0 Dead	
1359	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		0 Dead	
1360	Coast Redwood	*Sequoia sempervirens*	14	Not Protected		1 Very Poor	
1361	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		1 Very Poor	
1362	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		1 Very Poor	
1363	Coast Redwood	*Sequoia sempervirens*	13	Not Protected		1 Very Poor	
1364	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		1 Very Poor	
1365	Coast Redwood	*Sequoia sempervirens*	14	Not Protected		1 Very Poor	
1366	Coast Redwood	*Sequoia sempervirens*	12	Not Protected		1 Very Poor	
1367	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		1 Very Poor	
1368	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		1 Very Poor	
1369	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		1 Very Poor	
1370	Coast Redwood	*Sequoia sempervirens*	13	Not Protected		1 Very Poor	
1371	Coast Redwood	*Sequoia sempervirens*	14	Not Protected		2 Poor	
1372	Deodar Cedar	*Cedrus deodara*	16	Not Protected		3 Moderate	
1373	Deodar Cedar	*Cedrus deodara*	17	Not Protected		3 Moderate	
1374	Deodar Cedar	*Cedrus deodara*	17	Not Protected		3 Moderate	
1375	Deodar Cedar	*Cedrus deodara*	17	Not Protected		3 Moderate	
1376	Deodar Cedar	*Cedrus deodara*	17	Not Protected		3 Moderate	
1377	Deodar Cedar	*Cedrus deodara*	12	Not Protected		3 Moderate	
1378	Deodar Cedar	*Cedrus deodara*	15	Not Protected		3 Moderate	
1379	Deodar Cedar	*Cedrus deodara*	15	Not Protected		3 Moderate	
1380	Deodar Cedar	*Cedrus deodara*	16	Not Protected		3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1381	Deodar Cedar	*Cedrus deodara*	17	Not Protected		3 Moderate	
1382	Deodar Cedar	*Cedrus deodara*	21	Not Protected		3 Moderate	
1383	Deodar Cedar	*Cedrus deodara*	20	Not Protected		3 Moderate	
1384	Deodar Cedar	*Cedrus deodara*	15	Not Protected		3 Moderate	
1385	Purple Leaf Plum	*Prunus cerasifera*	9	Not Protected		1 Very Poor	
1386	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		2 Poor	
1387	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		1 Very Poor	
1388	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		2 Poor	
1389	Chinese Pistache	*Pistacia chinensis*	7	Not Protected		0 Dead	
1390	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1391	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1392	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		2 Poor	
1393	Chinese Hackberry	*Celtis sinensis*	8	Not Protected		1 Very Poor	
1394	Coast Live Oak	*Quercus agrifolia*	6	Not Protected		2 Poor	
1395	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		1 Very Poor	
1396	Coast Live Oak	*Quercus agrifolia*	6	Not Protected		1 Very Poor	
1397	Coast Live Oak	*Quercus agrifolia*	12	Protected	epicormic sprouts, Codominant Leader at 13ft, included bark, small dead wood 1-3in, old pruning cuts no callus and some partial callus, Fair leaf surface, Narrow angle attachments, abnormal bulge at base	2 Poor	
1398	Coast Live Oak	*Quercus agrifolia*	13	Protected	epicormic sprouts, Codominant Leader at 9ft into 4, included bark, small dead wood 1-4in, old Codominant Leader removed, epicormic sprouts, Narrow angle attachments, Very Poor leaf surface,	1 Very Poor	
1399	Coast Live Oak	*Quercus agrifolia*	13	Protected	epicormic sprouts, Codominant Leader at 8ft, included bark, small dead wood, old Codominant Leader removed partial callus, old pruning cuts no callus, epicormic sprouts, Good leaf surface	2 Poor	
1400	Coast Live Oak	*Quercus agrifolia*	11	Not Protected		1 Very Poor	
1401	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		1 Very Poor	
1402	Coast Live Oak	*Quercus agrifolia*	9	Not Protected		1 Very Poor	
1403	Coast Live Oak	*Quercus agrifolia*	7	Not Protected		2 Poor	
1404	Coast Live Oak	*Quercus agrifolia*	6	Not Protected		2 Poor	
1405	Coast Live Oak	*Quercus agrifolia*	11	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1406	Coast Live Oak	*Quercus agrifolia*	16	Protected	root collar buried, epicormic sprouts, Codominant Leader at 8 and 9ft, included bark, small dead wood 1-2in, old pruning cuts no callus, epicormic sprouts, Fair leaf surface	2 Poor	
1407	Coast Live Oak	*Quercus agrifolia*	14	Protected	epicormic sprouts, Codominant Leader at 11 and 13ft, included bark, dead wood 1-4in, epicormic sprouts, Fair leaf surface	2 Poor	
1408	Coast Live Oak	*Quercus agrifolia*	12	Protected	epicormic sprouts, Codominant Leader at 16 and 13ft, included bark, dead wood 1-3in, epicormic sprouts, Fair leaf surface, Narrow angle attachments, 6in Codominant Leader dead	2 Poor	
1409	Coast Live Oak	*Quercus agrifolia*	11	Not Protected		2 Poor	
1410	Coast Live Oak	*Quercus agrifolia*	13	Protected	epicormic sprouts, Codominant Leader at 13ft, "u-shaped" crotch, dead wood 1-2in, epicormic sprouts, Good leaf surface, Narrow angle attachments	3 Moderate	
1411	Valley Oak	*Quercus lobata*	9	Not Protected		2 Poor	
1412	Valley Oak	*Quercus lobata*	9	Not Protected		1 Very Poor	
1413	Valley Oak	*Quercus lobata*	9	Not Protected		1 Very Poor	
1414	Valley Oak	*Quercus lobata*	12	Protected	Root collar buried, Codominant Leader at 13 ft, "u-shaped" crotch, dead wood 1-2in, epicormic sprouts, old pruning cuts with callus, fair leaf surface, Narrow angle attachments	2 Poor	
1415	Valley Oak	*Quercus lobata*	9	Not Protected		1 Very Poor	
1416	Valley Oak	*Quercus lobata*	9	Not Protected		1 Very Poor	
1417	Coast Live Oak	*Quercus agrifolia*	10	Not Protected		1 Very Poor	
1418	Coast Live Oak	*Quercus agrifolia*	7	Not Protected		0 Dead	
1419	Coast Live Oak	*Quercus agrifolia*	6	Not Protected		2 Poor	
1420	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		1 Very Poor	
1421	Valley Oak	*Quercus lobata*	7	Not Protected		1 Very Poor	
1422	Valley Oak	*Quercus lobata*	10	Not Protected		2 Poor	
1423	Valley Oak	*Quercus lobata*	6	Not Protected		1 Very Poor	
1424	Valley Oak	*Quercus lobata*	11	Not Protected		2 Poor	
1425	Valley Oak	*Quercus lobata*	9	Not Protected		1 Very Poor	
1426	Valley Oak	*Quercus lobata*	6	Not Protected		0 Dead	
1427	Valley Oak	*Quercus lobata*	9	Not Protected		1 Very Poor	
1428	Valley Oak	*Quercus lobata*	12	Protected	Codominant Leader at 13ft, included bark, dead wood 1-3in, epicormic sprouts, old pruning cuts no callus, fair leaf surface	2 Poor	
1429	Valley Oak	*Quercus lobata*	14	Protected	Codominant Leader at 11 and 18 ft, included bark, dead wood 1in, epicormic sprouts, old pruning cuts with partial callus, Fair leaf surface, buried root collar	1 Very Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1429	Valley Oak	*Quercus lobata*	14	Protected	Codominant Leader at 11 and 18, in, dead wood 1, epicormic sprouts: old pruning cuts partial callus, Fair leaf surface, broot collar	1 Very Poor	
1430	Valley Oak	*Quercus lobata*	9	Not Protected		0 Dead	
1431	Valley Oak	*Quercus lobata*	15	Protected	Codominant Leader at 8, 10, 12 ft, dead wood 1-4in, epicormic sprouts, Fair leaf surface, slightly buried root collar	3 Moderate	
1432	Valley Oak	*Quercus lobata*	14	Protected	Codominant Leader at 12ft, dead wood 1-2in, epicormic sprouts, Fair leaf surface, buried root collar, Narrow angle attachments	3 Moderate	
1433	Valley Oak	*Quercus lobata*	12	Protected	Codominant Leader at 11, 12ft, included bark, dead wood 1-3in, epicormic sprouts, Fair leaf surface, buried root collar, Narrow angle attachments, old pruning cuts with partial callus	2 Poor	
1434	Valley Oak	*Quercus lobata*	8	Not Protected		2 Poor	
1435	Valley Oak	*Quercus lobata*	8	Not Protected		2 Poor	
1436	Valley Oak	*Quercus lobata*	7	Not Protected		1 Very Poor	
1437	Valley Oak	*Quercus lobata*	6	Not Protected		0 Dead	
1438	Valley Oak	*Quercus lobata*	9	Not Protected		2 Poor	
1439	Valley Oak	*Quercus lobata*	10	Not Protected		2 Poor	
1440	Valley Oak	*Quercus lobata*	7	Not Protected		2 Poor	
1441	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1442	Chinese Pistache	*Pistacia chinensis*	8	Not Protected		3 Moderate	
1443	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		3 Moderate	
1444	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		3 Moderate	
1445	Chinese Pistache	*Pistacia chinensis*	6	Not Protected		0 Dead	
1446	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1447	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		0 Dead	
1448	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1449	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		0 Dead	
1450	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	Nest
1451	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	Nest
1452	Chinese Pistache	*Pistacia chinensis*	15	Not Protected		2 Poor	
1453	Chinese Hackberry	*Celtis sinensis*	20	Not Protected		2 Poor	
1454	Chinese Pistache	*Pistacia chinensis*	18	Not Protected		3 Moderate	
1455	Camphor Tree	*Cinnamomum camphora*	12	Not Protected		3 Moderate	
1456	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		1 Very Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1457	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		1 Very Poor	
1458	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		1 Very Poor	
1459	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1460	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		0 Dead	
1461	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1462	Chinese Pistache	*Pistacia chinensis*	7	Not Protected		0 Dead	
1463	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		2 Poor	Nest
1464	Chinese Hackberry	*Celtis sinensis*	8	Not Protected		1 Very Poor	Nest
1465	Chinese Pistache	*Pistacia chinensis*	8	Not Protected		3 Moderate	
1466	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		1 Very Poor	Nest
1467	Chinese Pistache	*Pistacia chinensis*	8	Not Protected		3 Moderate	
1468	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1469	Chinese Pistache	*Pistacia chinensis*	7	Not Protected		0 Dead	
1470	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		1 Very Poor	
1471	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		1 Very Poor	
1472	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		1 Very Poor	
1473	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		2 Poor	
1474	Chinese Pistache	*Pistacia chinensis*	6	Not Protected		3 Moderate	
1475	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1476	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		1 Very Poor	
1477	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		2 Poor	
1478	Chinese Pistache	*Pistacia chinensis*	7	Not Protected		1 Very Poor	
1479	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1480	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		1 Very Poor	
1481	Chinese Hackberry	*Celtis sinensis*	15	Not Protected		3 Moderate	
1482	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	
1483	Camphor Tree	*Cinnamomum camphora*	8	Not Protected		1 Very Poor	
1484	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		1 Very Poor	
1485	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1486	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		2 Poor	
1487	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1488	Chinese Hackberry	*Celtis sinensis*	7	Not Protected		1 Very Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1489	Chinese Pistache	*Pistacia chinensis*	7	Not Protected		2 Poor	
1490	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		2 Poor	
1491	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1492	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1493	Chinese Hackberry	*Celtis sinensis*	8	Not Protected		1 Very Poor	
1494	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1495	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		2 Poor	
1496	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1497	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1498	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1499	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1500	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		2 Poor	
1501	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		2 Poor	
1502	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1503	Chinese Pistache	*Pistacia chinensis*	15	Not Protected		3 Moderate	
1504	Coast Live Oak	*Quercus agrifolia*	10	Not Protected		1 Very Poor	
1505	Chinese Pistache	*Pistacia chinensis*	16	Not Protected		3 Moderate	
1506	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1507	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		3 Moderate	
1508	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1509	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		2 Poor	
1510	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		2 Poor	
1511	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		1 Very Poor	
1512	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1513	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		3 Moderate	
1514	Chinese Pistache	*Pistacia chinensis*	15	Not Protected		2 Poor	
1515	Chinese Pistache	*Pistacia chinensis*	6	Not Protected		0 Dead	
1516	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	
1517	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1518	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		2 Poor	
1519	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1520	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1521	Chinese Pistache	*Pistacia chinensis*	8	Not Protected		3 Moderate	
1522	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		3 Moderate	
1523	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		2 Poor	
1524	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		2 Poor	
1525	Chinese Pistache	*Pistacia chinensis*	8	Not Protected		2 Poor	
1526	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		1 Very Poor	
1527	Chinese Hackberry	*Celtis sinensis*	15	Not Protected		2 Poor	
1528	Chinese Pistache	*Pistacia chinensis*	7	Not Protected		3 Moderate	
1529	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		1 Very Poor	
1530	Camphor Tree	*Cinnamomum camphora*	10	Not Protected		1 Very Poor	
1531	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		2 Poor	
1532	Camphor Tree	*Cinnamomum camphora*	7	Not Protected		1 Very Poor	
1533	Camphor Tree	*Cinnamomum camphora*	8	Not Protected		1 Very Poor	
1534	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		3 Moderate	
1535	Chinese Pistache	*Pistacia chinensis*	8	Not Protected		2 Poor	
1536	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		1 Very Poor	
1537	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1538	Chinese Hackberry	*Celtis sinensis*	8	Not Protected		1 Very Poor	
1539	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1540	Chinese Hackberry	*Celtis sinensis*	8	Not Protected		1 Very Poor	
1541	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		3 Moderate	
1542	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		1 Very Poor	
1543	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		2 Poor	
1544	Chinese Hackberry	*Celtis sinensis*	16	Not Protected		2 Poor	
1545	Chinese Pistache	*Pistacia chinensis*	8	Not Protected		2 Poor	
1546	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		2 Poor	
1547	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		2 Poor	
1548	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1549	Chinese Pistache	*Pistacia chinensis*	15	Not Protected		3 Moderate	
1550	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		1 Very Poor	
1551	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1552	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1553	Chinese Hackberry	*Celtis sinensis*	7	Not Protected		1 Very Poor	
1554	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1555	Chinese Hackberry	*Celtis sinensis*	7	Not Protected		0 Dead	
1556	Coast Live Oak	*Quercus agrifolia*	11	Not Protected		3 Moderate	
1557	Coast Live Oak	*Quercus agrifolia*	13	Protected	Codominant Leader at 11ft and 12ft into many, "u-shaped" crotch, buried root collar, included bark, old pruning cuts none to partial callus	3 Moderate	
1558	Coast Live Oak	*Quercus agrifolia*	12	Protected	Codominant Leader at 12 and 16ft into many, "u-shaped" crotch, buried root collar, included bark, old pruning cuts nneo to partial callus	3 Moderate	
1559	Coast Live Oak	*Quercus agrifolia*	14	Protected	Codominant Leader at 12 and 16ft into many, "u-shaped" crotch, buried root collar, included bark, old pruning cuts none to partial callus, epicormic sprouts, Codominant Leader removed at 12, some callus	3 Moderate	
1560	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		1 Very Poor	
1561	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1562	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		1 Very Poor	
1563	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1564	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1565	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1566	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		3 Moderate	
1567	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		3 Moderate	
1568	Camphor Tree	*Cinnamomum camphora*	7	Not Protected		0 Dead	
1569	Camphor Tree	*Cinnamomum camphora*	6	Not Protected		0 Dead	
1570	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		1 Very Poor	
1571	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		0 Dead	
1572	Camphor Tree	*Cinnamomum camphora*	8	Not Protected		0 Dead	
1573	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		4 Good	
1574	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		1 Very Poor	
1575	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		4 Good	
1576	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		2 Poor	
1577	Chinese Pistache	*Pistacia chinensis*	6	Not Protected		2 Poor	
1578	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1579	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1580	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		2 Poor	
1581	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		4 Good	
1582	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		1 Very Poor	
1583	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		2 Poor	
1584	Coast Live Oak	*Quercus agrifolia*	12	Protected	Codominant Leader at 8ft, included bark, epicormic sprouts, Narrow angle attachments, Good leaf surface, buried root collar	3 Moderate	
1585	Coast Live Oak	*Quercus agrifolia*	12	Protected	Codominant Leader at 7 and 8ft, included bark, epicormic sprouts, Narrow angle attachments, Good leaf surface	4 Good	
1586	Coast Live Oak	*Quercus agrifolia*	22	Protected	Codominant Leader at 10ft into many, included bark, epicormic sprouts, Narrow angle attachments, Good leaf surface	4 Good	
1587	Coast Live Oak	*Quercus agrifolia*	14	Protected	Codominant Leader at 9ft into many, included bark, epicormic sprouts, Narrow angle attachments, Good leaf surface, Narrow angle attachments	4 Good	
1588	Coast Live Oak	*Quercus agrifolia*	14	Protected	Codominant Leader at 9ft into many, included bark, epicormic sprouts, Narrow angle attachments, Good leaf surface, Narrow angle attachments	3 Moderate	
1589	Coast Live Oak	*Quercus agrifolia*	12	Protected	Codominant Leader at 9ft, included bark, old Codominant Leader removed, lion tail, epicormic sprouts, Narrow angle attachments, Good leaf surface, Narrow angle attachments	2 Poor	
1590	Tree of Heaven	*Ailanthus altissima*	16 at 2	Not Protected		1 Very Poor	Invasive sp
1591	Coast Live Oak	*Quercus agrifolia*	12	Protected	Codominant Leader at 8ft, included bark, epicormic sprouts, Good leaf surface, old pruning cuts partial callus	3 Moderate	
1592	Coast Live Oak	*Quercus agrifolia*	13	Protected	Codominant Leader at 8 and 9ft, included bark, epicormic sprouts, Poor leaf surface, old pruning cuts partial callus	2 Poor	
1593	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		2 Poor	
1594	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1595	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		2 Poor	
1596	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1597	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1598	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		2 Poor	
1599	Chinese Hackberry	*Celtis sinensis*	16	Not Protected		3 Moderate	
1600	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		4 Good	
1601	Cork Oak	*Quercus suber*	16	Protected	buried root collar, Codominant Leader 8ft, Good leaf surface, "u-shaped" crotch	3 Moderate	
1602	Cork Oak	*Quercus suber*	13	Protected	buried root collar, Codominant Leader 8ft , Good leaf surface, bulge at base, old pruning cuts with callus, included bark	3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1603	Cork Oak	*Quercus suber*	11	Not Protected		2 Poor	
1604	Coast Live Oak	*Quercus agrifolia*	18	Protected	epicormic sprouts, Codominant Leader at 12, and 13ft, "u-shaped" crotch, dead wood 1-3in, epicormic sprouts, Good leaf surface	4 Good	
1605	Purple Leaf Plum	*Prunus cerasifera*	10 at 2	Not Protected		1 Very Poor	
1606	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		2 Poor	
1607	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		3 Moderate	
1608	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		3 Moderate	
1609	Coast Live Oak	*Quercus agrifolia*	16	Protected	Codominant Leader at 9, 11ft, included bark, epicormic sprouts		
1610	Coast Live Oak	*Quercus agrifolia*	17	Protected	Codominant Leader at 11ft into many, included bark, epicormic sprouts	4 Good	
1611	Purple Leaf Plum	*Prunus cerasifera*	12 at 3	Not Protected		1 Very Poor	
1612	Purple Leaf Plum	*Prunus cerasifera*	12 at 3	Not Protected		1 Very Poor	
1613	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		3 Moderate	
1614	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1615	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		2 Poor	
1616	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		2 Poor	
1617	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1618	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		2 Poor	
1619	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		2 Poor	
1620	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		2 Poor	
1621	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		2 Poor	
1622	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		3 Moderate	
1623	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		2 Poor	
1624	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		3 Moderate	
1625	Sweetgum	*Liquidambar styraciflua*	13	Not Protected		2 Poor	
1626	Sweetgum	*Liquidambar styraciflua*	13	Not Protected		4 Good	
1627	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		3 Moderate	
1628	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1629	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		2 Poor	
1630	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		0 Dead	
1631	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		0 Dead	
1632	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		0 Dead	
1633	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		0 Dead	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1634	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		1 Very Poor	
1635	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		1 Very Poor	
1636	Sweetgum	*Liquidambar styraciflua*	13	Not Protected		3 Moderate	
1637	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1638	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		3 Moderate	
1639	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1640	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		3 Moderate	
1641	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	
1642	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1643	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		0 Dead	
1644	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1645	Sweetgum	*Liquidambar styraciflua*	12	Not Protected		2 Poor	
1646	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	
1647	Sweetgum	*Liquidambar styraciflua*	14	Not Protected		4 Good	
1648	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1649	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		2 Poor	
1650	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		2 Poor	
1651	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1652	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		2 Poor	
1653	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1654	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		2 Poor	
1655	Sweetgum	*Liquidambar styraciflua*	6	Not Protected		1 Very Poor	
1656	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		3 Moderate	
1657	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	
1658	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		3 Moderate	
1659	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		2 Poor	
1660	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	
1661	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		2 Poor	
1662	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		2 Poor	
1663	Camphor Tree	*Cinnamomum camphora*	10	Not Protected		2 Poor	
1664	Camphor Tree	*Cinnamomum camphora*	9	Not Protected		1 Very Poor	
1665	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		1 Very Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1666	Camphor Tree	*Cinnamomum camphora*	6	Not Protected		0 Dead	
1667	Camphor Tree	*Cinnamomum camphora*	10	Not Protected		1 Very Poor	
1668	Camphor Tree	*Cinnamomum camphora*	10	Not Protected		3 Moderate	
1669	Camphor Tree	*Cinnamomum camphora*	6	Not Protected		1 Very Poor	
1670	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		2 Poor	
1671	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		2 Poor	
1672	Coast Live Oak	*Quercus agrifolia*	12	Protected	Codominant Leader 8ft, included bark, epicormic sprouts, small dead wood, Fair leaf surface, old pruning cuts with partial callus	3 Moderate	
1673	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		2 Poor	
1674	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1675	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1676	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1677	Chinese Hackberry	*Celtis sinensis*	7	Not Protected		1 Very Poor	
1678	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		3 Moderate	
1679	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		0 Dead	
1680	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	
1681	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1682	Coast Live Oak	*Quercus agrifolia*	9	Not Protected		2 Poor	
1683	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		1 Very Poor	
1684	Coast Live Oak	*Quercus agrifolia*	10	Not Protected		2 Poor	
1685	Coast Live Oak	*Quercus agrifolia*	14	Protected	Codominant Leader at 8ft, included bark, old Codominant Leader removed with partial callous, epicormic sprouts, old pruning cuts with callous, Good leaf surface	3 Moderate	
1686	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		2 Poor	
1687	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		2 Poor	
1688	Coast Live Oak	*Quercus agrifolia*	16	Protected	root collar buried, Codominant Leader at 8ft, included bark, epicormic sprouts, old pruning cuts with partial callous, Narrow angle attachments, Fair leaf surface	2 Poor	
1689	Coast Live Oak	*Quercus agrifolia*	13	Protected	root collar buried, Codominant Leader at7ft, included bark, epicormic sprouts, old Codominant Leader removed partial callous, old pruning cuts with partial callous, Narrow angle attachments, Good leaf surface	2 Poor	
1690	Coast Live Oak	*Quercus agrifolia*	19	Protected	root collar buried, Codominant Leader at 8ft into many, epicormic sprouts, old pruning cuts with complete callous, Narrow angle attachments, Good leaf surface	3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1691	Coast Live Oak	*Quercus agrifolia*	13	Protected	Codominant Leader at 9ft, included bark, epicormic sprouts, old pruning cuts with partial callous, Narrow angle attachments, Good leaf surface	2 Poor	
1692	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1693	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		3 Moderate	
1694	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		0 Dead	
1695	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1696	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		2 Poor	
1697	Chinese Pistache	*Pistacia chinensis*	12	Not Protected		3 Moderate	
1698	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		2 Poor	
1699	Coast Live Oak	*Quercus agrifolia*	13	Protected	root collar buried, old pruning cuts with complete callous, epicormic sprouts, trunk bows canopy corrected, Narrow angle attachments, Good leaf surface	3 Moderate	
1700	Coast Live Oak	*Quercus agrifolia*	13	Protected	Codominant Leader at 9 and 11ft, included bark, epicormic sprouts, Narrow angle attachments, Good leaf surface, old pruning cuts with partial callous	3 Moderate	
1701	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		1 Very Poor	
1702	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		0 Dead	
1703	Coast Live Oak	*Quercus agrifolia*	15	Protected	root collar buried, Codominant Leader at 9ft, "u-shaped" crotch, old Codominant Leader removed partial callous, epicormic sprouts, old pruning cuts partial callous, Fair leaf surface, small dead wood	2 Poor	
1704	Chinese Hackberry	*Celtis sinensis*	17	Not Protected		3 Moderate	
1705	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		2 Poor	
1706	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		1 Very Poor	
1707	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		1 Very Poor	
1708	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		1 Very Poor	
1709	Sweetgum	*Liquidambar styraciflua*	6	Not Protected		2 Poor	
1710	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		2 Poor	
1711	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		3 Moderate	
1712	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		3 Moderate	
1713	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		2 Poor	
1714	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		2 Poor	
1715	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		0 Dead	
1716	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1717	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	
1718	Purple Leaf Plum	*Prunus cerasifera*	12@2	Not Protected		2 Poor	
1719	Purple Leaf Plum	*Prunus cerasifera*	13@2 ft	Not Protected		1 Very Poor	
1720	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		2 Poor	
1721	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		2 Poor	
1722	Coast Live Oak	*Quercus agrifolia*	9	Not Protected		2 Poor	
1723	Coast Live Oak	*Quercus agrifolia*	13	Protected	Codominant Leader at 9ft into 3 included bark, old pruning cuts with complete callous, epicormic sprouts, Narrow angle attachments, small dead wood, Fair leaf surface	2 Poor	
1724	Coast Live Oak	*Quercus agrifolia*	14	Protected	Codominant Leader at 8ft into 3 included bark, old pruning cuts with complete callous, epicormic sprouts, Narrow angle attachments, small dead wood, Fair leaf surface	2 Poor	
1725	Chinese Hackberry	*Celtis sinensis*	7	Not Protected		1 Very Poor	
1726	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		3 Moderate	
1727	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	
1728	Coast Live Oak	*Quercus agrifolia*	11	Not Protected		1 Very Poor	
1729	Coast Live Oak	*Quercus agrifolia*	11	Not Protected		2 Poor	
1730	Coast Live Oak	*Quercus agrifolia*	11	Not Protected		2 Poor	
1731	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1732	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1733	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1734	Chinese Hackberry	*Celtis sinensis*	15	Not Protected		2 Poor	
1735	Coast Live Oak	*Quercus agrifolia*	17	Protected	Codominant Leader at 9ft, included bark, old pruning cuts with complete callous, epicormic sprouts, Narrow angle attachments, Good leaf surface	4 Good	
1736	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		3 Moderate	
1737	Southern Magnolia	*Magnolia grandiflora*	6	Not Protected		3 Moderate	
1738	Chinese Hackberry	*Celtis sinensis*	13	Not Protected		3 Moderate	
1739	Chinese Pistache	*Pistacia chinensis*	13	Not Protected		3 Moderate	
1740	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		0 Dead	
1741	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1742	Chinese Hackberry	*Celtis sinensis*	10	Not Protected		1 Very Poor	
1743	Coast Live Oak	*Quercus agrifolia*	7	Not Protected		1 Very Poor	
1744	Coast Live Oak	*Quercus agrifolia*	8	Not Protected		1 Very Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1745	Coast Live Oak	*Quercus agrifolia*	10	Not Protected		2 Poor	
1746	Coast Live Oak	*Quercus agrifolia*	7	Not Protected		1 Very Poor	
1747	Chinese Pistache	*Pistacia chinensis*	15	Not Protected		3 Moderate	
1748	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
1749	Chinese Pistache	*Pistacia chinensis*	15	Not Protected		1 Very Poor	
1750	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		2 Poor	
1751	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		3 Moderate	
1752	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		2 Poor	
1753	Southern Magnolia	*Magnolia grandiflora*	9	Not Protected		1 Very Poor	
1754	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		2 Poor	
1755	Coast Redwood	*Sequoia sempervirens*	9	Not Protected		3 Moderate	
1756	Purple Leaf Plum	*Prunus cerasifera*	7"@2'	Not Protected		3 Moderate	
1757	Purple Leaf Plum	*Prunus cerasifera*	8"@2'	Not Protected		3 Moderate	
1758	Purple Leaf Plum	*Prunus cerasifera*	9"@2'	Not Protected		3 Moderate	
1759	Purple Leaf Plum	*Prunus cerasifera*	10"@2'	Not Protected		3 Moderate	
1760	Bradford pear	*Pyrus calleryana*	8	Not Protected		2 Poor	
1761	Bradford pear	*Pyrus calleryana*	6	Not Protected		1 Very Poor	
1762	Bradford pear	*Pyrus calleryana*	8	Not Protected		1 Very Poor	
1763	Coast Redwood	*Sequoia sempervirens*	11	Not Protected		3 Moderate	
1764	Coast Redwood	*Sequoia sempervirens*	8	Not Protected		2 Poor	
1765	Coast Redwood	*Sequoia sempervirens*	13	Not Protected		3 Moderate	
1766	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		3 Moderate	
1767	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		2 Poor	
1768	Southern Magnolia	*Magnolia grandiflora*	6	Not Protected		2 Poor	
1769	Mexican Fan Palm	*Washingtonia robusta*	11	Not Protected		4 Good	
1770	Mexican Fan Palm	*Washingtonia robusta*	10	Not Protected		4 Good	
1771	Southern Magnolia	*Magnolia grandiflora*	10	Not Protected		1 Very Poor	
1772	Southern Magnolia	*Magnolia grandiflora*	11	Not Protected		3 Moderate	
1773	Chinese Pistache	*Pistacia chinensis*	17	Not Protected		3 Moderate	
1774	Chinese Hackberry	*Celtis sinensis*	12	Not Protected		1 Very Poor	
1775	Chinese Pistache	*Pistacia chinensis*	8	Not Protected		3 Moderate	
1776	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1777	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1778	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		2 Poor	
1779	Camphor Tree	*Cinnamomum camphora*	8	Not Protected		1 Very Poor	
1780	Camphor Tree	*Cinnamomum camphora*	10	Not Protected		2 Poor	
1781	Camphor Tree	*Cinnamomum camphora*	7	Not Protected		1 Very Poor	
1782	Chinese Pistache	*Pistacia chinensis*	8	Not Protected		3 Moderate	
1783	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		3 Moderate	
1784	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		4 Good	
1785	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
1786	Chinese Hackberry	*Celtis sinensis*	14	Not Protected		1 Very Poor	
1787	Chinese Pistache	*Pistacia chinensis*	7	Not Protected		2 Poor	
1788	Chinese Pistache	*Pistacia chinensis*	10	Not Protected		3 Moderate	
1789	Camphor Tree	*Cinnamomum camphora*	8	Not Protected		1 Very Poor	
1790	Camphor Tree	*Cinnamomum camphora*	7	Not Protected		1 Very Poor	
1791	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		2 Poor	
1792	Deodar Cedar	*Cedrus deodara*	13	Not Protected		3 Moderate	
1793	Deodar Cedar	*Cedrus deodara*	13	Not Protected		3 Moderate	Nest in canopy
1794	Deodar Cedar	*Cedrus deodara*	11	Not Protected		2 Poor	
1795	Deodar Cedar	*Cedrus deodara*	17	Not Protected		4 Good	
1796	Deodar Cedar	*Cedrus deodara*	14	Not Protected		3 Moderate	
1797	Deodar Cedar	*Cedrus deodara*	11	Not Protected		1 Very Poor	
1798	Deodar Cedar	*Cedrus deodara*	9	Not Protected		2 Poor	
1799	Deodar Cedar	*Cedrus deodara*	13	Not Protected		3 Moderate	
1800	Purple Leaf Plum	*Prunus cerasifera*	7" @3'	Not Protected		3 Moderate	
1801	Purple Leaf Plum	*Prunus cerasifera*	6	Not Protected		2 Poor	
1802	Valley Oak	*Quercus lobata*	12	Protected	Mechanical damage at base with partial callous, epicormic sprouts, old pruning cuts with complete callous, Codominant Leader at 15ft included bark, Narrow angle attachments, dead wood 1-3in, Poor leaf surface	2 Poor	
1803	Valley Oak	*Quercus lobata*	12	Protected	epicormic sprouts, old pruning cuts with complete callous, Codominant Leader at 15ft, included bark, Narrow angle attachments, dead wood 1-3in, Poor leaf surface	2 Poor	
1804	Purple Leaf Plum	*Prunus cerasifera*	6	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1805	Valley Oak	*Quercus lobata*	14	Protected	epicormic sprouts, old pruning cuts with complete callous, Narrow angle attachments, dead wood 1-3in, Fair leaf surface	2 Poor	
1806	Valley Oak	*Quercus lobata*	14	Protected	Codominant Leader at 17ft, included bark, epicormic sprouts, old pruning cuts with complete callous, Narrow angle attachments, dead wood 1-3in, Fair leaf surface	2 Poor	
1807	Valley Oak	*Quercus lobata*	15	Protected	epicormic sprouts, old pruning cuts with complete callous, Narrow angle attachments, dead wood 1-3in, Fair leaf surface	2 Poor	
1808	Valley Oak	*Quercus lobata*	12	Protected	epicormic sprouts, old pruning cuts with complete callous, Narrow angle attachments, dead wood 1-3in, Very Poor leaf surface	1 Very Poor	
1809	Valley Oak	*Quercus lobata*	15	Protected	epicormic sprouts, old pruning cuts with complete callous, Narrow angle attachments, dead wood 1-3in, Good leaf surface	2 Poor	
1810	Valley Oak	*Quercus lobata*	15	Protected	epicormic sprouts, old pruning cuts with complete callous, Narrow angle attachments, dead wood 1-3in, Good leaf surface	2 Poor	
1811	Coast Redwood	*Sequoia sempervirens*	14	Not Protected		1 Very Poor	
1812	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		1 Very Poor	
1813	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		1 Very Poor	
1814	Southern Magnolia	*Magnolia grandiflora*	6	Not Protected		1 Very Poor	
1815	Southern Magnolia	*Magnolia grandiflora*	6	Not Protected		2 Poor	
1816	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		2 Poor	
1817	Southern Magnolia	*Magnolia grandiflora*	9	Not Protected		2 Poor	
1818	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		2 Poor	nest in canopy
1819	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		2 Poor	
1820	Southern Magnolia	*Magnolia grandiflora*	9	Not Protected		1 Very Poor	
1821	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		1 Very Poor	
1822	Southern Magnolia	*Magnolia grandiflora*	10	Not Protected		1 Very Poor	
1823	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		1 Very Poor	
1824	Southern Magnolia	*Magnolia grandiflora*	9	Not Protected		1 Very Poor	
1825	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		3 Moderate	
1826	Queen Palm	*Syagrus romanzoffiana*	13	Not Protected		3 Moderate	
1827	Queen Palm	*Syagrus romanzoffiana*	14	Not Protected		3 Moderate	
1828	Queen Palm	*Syagrus romanzoffiana*	11	Not Protected		3 Moderate	
1829	Queen Palm	*Syagrus romanzoffiana*	10	Not Protected		2 Poor	
1830	Queen Palm	*Syagrus romanzoffiana*	10	Not Protected		2 Poor	
1831	Purple Leaf Plum	*Prunus cerasifera*	10"@3'	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1832	Purple Leaf Plum	*Prunus cerasifera*	10"@3'	Not Protected		2 Poor	
1833	Purple Leaf Plum	*Prunus cerasifera*	8"@2'	Not Protected		2 Poor	
1834	Purple Leaf Plum	*Prunus cerasifera*	9"@3'	Not Protected		2 Poor	
1835	Coast Redwood	*Sequoia sempervirens*	24	Protected	Mostly dead	1 Very Poor	
1836	Coast Redwood	*Sequoia sempervirens*	24	Protected	Mostly dead	1 Very Poor	
1837	Coast Redwood	*Sequoia sempervirens*	28	Protected	dead wood 1-3in, declining	3 Moderate	
1838	Purple Leaf Plum	*Prunus cerasifera*	9	Not Protected		2 Poor	
1839	Purple Leaf Plum	*Prunus cerasifera*	9	Not Protected		1 Very Poor	
1840	Purple Leaf Plum	*Prunus cerasifera*	9	Not Protected		2 Poor	
1841	Purple Leaf Plum	*Prunus cerasifera*	9"@3'	Not Protected		2 Poor	
1842	Purple Leaf Plum	*Prunus cerasifera*	10	Not Protected		3 Moderate	
1843	Purple Leaf Plum	*Prunus cerasifera*	10	Not Protected		3 Moderate	
1844	Purple Leaf Plum	*Prunus cerasifera*	11	Not Protected		3 Moderate	
1845	Purple Leaf Plum	*Prunus cerasifera*	10"@3'	Not Protected		3 Moderate	
1846	Purple Leaf Plum	*Prunus cerasifera*	11	Not Protected		3 Moderate	
1847	Purple Leaf Plum	*Prunus cerasifera*	9	Not Protected		3 Moderate	
1848	London Plane Tree	*Platanus x acerifolia*	18	Protected	Surface roots exposed, old pruning cuts complete to partial callous, epicormic sprouts, small dead wood, Good leaf surface	4 Good	
1849	Southern Magnolia	*Magnolia grandiflora*	9	Not Protected		3 Moderate	
1850	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		3 Moderate	
1851	Southern Magnolia	*Magnolia grandiflora*	12	Not Protected		4 Good	
1852	Coast Redwood	*Sequoia sempervirens*	21	Not Protected		3 Moderate	
1853	Coast Redwood	*Sequoia sempervirens*	20	Not Protected		3 Moderate	
1854	Coast Redwood	*Sequoia sempervirens*	17	Not Protected		3 Moderate	
1855	Coast Redwood	*Sequoia sempervirens*	18	Not Protected		0 Dead	
1856	Coast Redwood	*Sequoia sempervirens*	22	Not Protected		1 Very Poor	
1857	Coast Redwood	*Sequoia sempervirens*	19	Not Protected		1 Very Poor	
1858	Coast Redwood	*Sequoia sempervirens*	25	Protected	declining	2 Poor	
1859	Coast Redwood	*Sequoia sempervirens*	25	Protected	declining, dead wood 1-2in	2 Poor	
1860	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		3 Moderate	
1861	Purple Leaf Plum	*Prunus cerasifera*	8	Not Protected		1 Very Poor	
1862	Purple Leaf Plum	*Prunus cerasifera*	9	Not Protected		1 Very Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1863	Purple Leaf Plum	*Prunus cerasifera*	7	Not Protected		2 Poor	
1864	Purple Leaf Plum	*Prunus cerasifera*	14	Not Protected		3 Moderate	
1865	Coast Redwood	*Sequoia sempervirens*	20	Not Protected		2 Poor	
1866	Blue Spruce	*Picea pungens*	8, 9, 8, 22	Protected	large laterals at 2, 3, and 4 ft, included bark, old pruning cuts with no callous and decay, dead wood 1-3in, Narrow angle attachments, Fair leaf surface	3 Moderate	
1867	Coast Redwood	*Sequoia sempervirens*	21	Not Protected		2 Poor	
1868	Coast Redwood	*Sequoia sempervirens*	24	Protected	epicormic sprouts, declining, small dead wood	2 Poor	
1869	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		2 Poor	
1870	Coast Redwood	*Sequoia sempervirens*	14	Not Protected		2 Poor	
1871	Coast Redwood	*Sequoia sempervirens*	18	Not Protected		2 Poor	
1872	Purple Leaf Plum	*Prunus cerasifera*	11"@3'	Not Protected		2 Poor	
1873	Purple Leaf Plum	*Prunus cerasifera*	12"@3'	Not Protected		2 Poor	
1874	Purple Leaf Plum	*Prunus cerasifera*	12"@3'	Not Protected		1 Very Poor	
1875	Purple Leaf Plum	*Prunus cerasifera*	10"@3'	Not Protected		1 Very Poor	
1876	Purple Leaf Plum	*Prunus cerasifera*	13"@3'	Not Protected		1 Very Poor	
1877	Willow sp.	*Salix sp.*	28	Protected	epicormic sprouts, Codominant Leader at 12ft, included bark, large rip out with some callous, dead wood 1-5in, Narrow angle attachments, Fair leaf surface	2 Poor	
1878	Coast Redwood	*Sequoia sempervirens*	18	Not Protected		3 Moderate	
1879	Coast Redwood	*Sequoia sempervirens*	22	Not Protected		2 Poor	
1880	Coast Redwood	*Sequoia sempervirens*	22	Not Protected		3 Moderate	nest in canopy
1881	Coast Redwood	*Sequoia sempervirens*	22	Not Protected		3 Moderate	
1882	Coast Redwood	*Sequoia sempervirens*	21	Not Protected		3 Moderate	
1883	Coast Redwood	*Sequoia sempervirens*	13	Not Protected		1 Very Poor	
1884	Maidenhair Tree	*Ginkgo biloba*	9	Not Protected		3 Moderate	
1885	Coast Redwood	*Sequoia sempervirens*	26	Protected	epicormic sprouts, small dead wood	3 Moderate	
1886	Coast Redwood	*Sequoia sempervirens*	25	Protected	epicormic sprouts, small dead wood	3 Moderate	
1887	Coast Redwood	*Sequoia sempervirens*	24	Protected	epicormic sprouts, small dead wood	3 Moderate	
1888	Coast Redwood	*Sequoia sempervirens*	24	Protected	epicormic sprouts, small dead wood	3 Moderate	
1889	Coast Redwood	*Sequoia sempervirens*	21	Not Protected		3 Moderate	
1890	Maidenhair Tree	*Ginkgo biloba*	12	Not Protected		2 Poor	
1891	Deodar Cedar	*Cedrus deodara*	15	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1892	Deodar Cedar	*Cedrus deodara*	14	Not Protected		3 Moderate	
1893	Deodar Cedar	*Cedrus deodara*	8	Not Protected		0 Dead	
1894	Deodar Cedar	*Cedrus deodara*	15	Not Protected		2 Poor	
1895	Purple Leaf Plum	*Prunus cerasifera*	5, 6	Not Protected		2 Poor	
1896	Purple Leaf Plum	*Prunus cerasifera*	11" @3'	Not Protected		2 Poor	
1897	Purple Leaf Plum	*Prunus cerasifera*	9" @2'	Not Protected		2 Poor	
1898	Sweetgum	*Liquidambar styraciflua*	13	Not Protected		3 Moderate	
1899	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		2 Poor	
1900	Sweetgum	*Liquidambar styraciflua*	11	Not Protected		3 Moderate	
1901	Sweetgum	*Liquidambar styraciflua*	9	Not Protected		2 Poor	
1902	Purple Leaf Plum	*Prunus cerasifera*	10"@2'	Not Protected		1 Very Poor	
1903	Valley Oak	*Quercus lobata*	11	Not Protected		2 Poor	
1904	Purple Leaf Plum	*Prunus cerasifera*	10"@3'	Not Protected		2 Poor	
1905	Purple Leaf Plum	*Prunus cerasifera*	7	Not Protected		0 Dead	
1906	Purple Leaf Plum	*Prunus cerasifera*	10"@2'	Not Protected		2 Poor	
1907	Purple Leaf Plum	*Prunus cerasifera*	9"@3'	Not Protected		3 Moderate	
1908	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		0 Dead	
1909	Purple Leaf Plum	*Prunus cerasifera*	9"@3'	Not Protected		2 Poor	
1910	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		2 Poor	
1911	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		2 Poor	
1912	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		2 Poor	
1913	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		2 Poor	
1914	Coast Redwood	*Sequoia sempervirens*	14	Not Protected		1 Very Poor	
1915	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		1 Very Poor	
1916	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		2 Poor	
1917	Coast Redwood	*Sequoia sempervirens*	18	Not Protected		1 Very Poor	
1918	Purple Leaf Plum	*Prunus cerasifera*	8"@3'	Not Protected		2 Poor	
1919	Purple Leaf Plum	*Prunus cerasifera*	8"@3'	Not Protected		2 Poor	
1920	Purple Leaf Plum	*Prunus cerasifera*	9"@3'	Not Protected		2 Poor	
1921	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		1 Very Poor	
1922	Southern Magnolia	*Magnolia grandiflora*	6	Not Protected		0 Dead	
1924	Coast Redwood	*Sequoia sempervirens*	17	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1925	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		2 Poor	
1926	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		2 Poor	
1927	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		0 Dead	
1928	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		3 Moderate	
1928	Purple Leaf Plum	*Prunus cerasifera*	9"@3'	Not Protected		2 Poor	
1929	Purple Leaf Plum	*Prunus cerasifera*	9"@3'	Not Protected		1 Very Poor	
1930	Purple Leaf Plum	*Prunus cerasifera*	7"@3'	Not Protected		2 Poor	
1931	Purple Leaf Plum	*Prunus cerasifera*	8"@2'	Not Protected		2 Poor	
1932	Purple Leaf Plum	*Prunus cerasifera*	7"@2'	Not Protected		2 Poor	
1933	Purple Leaf Plum	*Prunus cerasifera*	8"@2'	Not Protected		2 Poor	
1934	Deodar Cedar	*Cedrus deodara*	13	Not Protected		3 Moderate	
1935	Deodar Cedar	*Cedrus deodara*	15	Not Protected		3 Moderate	
1936	Deodar Cedar	*Cedrus deodara*	11	Not Protected		0 Dead	
1937	Deodar Cedar	*Cedrus deodara*	9	Not Protected		2 Poor	
1938	Deodar Cedar	*Cedrus deodara*	12	Not Protected		3 Moderate	
1939	Deodar Cedar	*Cedrus deodara*	13	Not Protected		3 Moderate	
1940	Deodar Cedar	*Cedrus deodara*	16	Not Protected		3 Moderate	
1941	Deodar Cedar	*Cedrus deodara*	26	Protected	dead wood 1-3in, pruning cuts with partial callous, mild resinosus	3 Moderate	
1942	Deodar Cedar	*Cedrus deodara*	16	Not Protected		3 Moderate	
1943	Deodar Cedar	*Cedrus deodara*	18	Not Protected		3 Moderate	
1944	Deodar Cedar	*Cedrus deodara*	9	Not Protected		3 Moderate	
1945	Deodar Cedar	*Cedrus deodara*	13	Not Protected		3 Moderate	
1946	Deodar Cedar	*Cedrus deodara*	13	Not Protected		3 Moderate	
1947	Deodar Cedar	*Cedrus deodara*	16	Not Protected		3 Moderate	
1948	Honey Locust	*Gleditsia triacanthos*	10	Not Protected		2 Poor	
1949	Honey Locust	*Gleditsia triacanthos*	12	Not Protected		2 Poor	
1950	Deodar Cedar	*Cedrus deodara*	9	Not Protected		3 Moderate	
1951	Deodar Cedar	*Cedrus deodara*	8	Not Protected		0 Dead	
1952	Deodar Cedar	*Cedrus deodara*	14	Not Protected		3 Moderate	
1953	Deodar Cedar	*Cedrus deodara*	14	Not Protected		3 Moderate	nest in tree
1954	Deodar Cedar	*Cedrus deodara*	14	Not Protected		3 Moderate	
1955	Deodar Cedar	*Cedrus deodara*	13	Not Protected		3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
1956	Deodar Cedar	*Cedrus deodara*	7	Not Protected		3 Moderate	
1957	Purple Leaf Plum	*Prunus cerasifera*	10"@2'	Not Protected		3 Moderate	
1958	Purple Leaf Plum	*Prunus cerasifera*	11"@2'	Not Protected		3 Moderate	
1959	Purple Leaf Plum	*Prunus cerasifera*	8"@2'	Not Protected		3 Moderate	
1960	Deodar Cedar	*Cedrus deodara*	10	Not Protected		3 Moderate	
1961	Deodar Cedar	*Cedrus deodara*	16	Not Protected		3 Moderate	
1962	Purple Leaf Plum	*Prunus cerasifera*	9"@2'	Not Protected		1 Very Poor	
1963	Purple Leaf Plum	*Prunus cerasifera*	9"@3'	Not Protected		2 Poor	
1964	Purple Leaf Plum	*Prunus cerasifera*	12"@2'	Not Protected		3 Moderate	
1965	Purple Leaf Plum	*Prunus cerasifera*	9"@3'	Not Protected		2 Poor	
1966	Purple Leaf Plum	*Prunus cerasifera*	12"@2'	Not Protected		3 Moderate	
1967	Purple Leaf Plum	*Prunus cerasifera*	10"@3'	Not Protected		3 Moderate	
1968	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		3 Moderate	
1969	Sweetgum	*Liquidambar styraciflua*	10	Not Protected		4 Good	
1970	Sweetgum	*Liquidambar styraciflua*	8	Not Protected		0 Dead	
1971	Sweetgum	*Liquidambar styraciflua*	7	Not Protected		3 Moderate	
1972	Deodar Cedar	*Cedrus deodara*	24	Protected	reinosus, pruning cuts with complete callous	4 Good	
1973	Deodar Cedar	*Cedrus deodara*	16	Not Protected		3 Moderate	
1974	Deodar Cedar	*Cedrus deodara*	17	Not Protected		4 Good	
1975	Deodar Cedar	*Cedrus deodara*	15	Not Protected		2 Poor	nest in tree
1976	Deodar Cedar	*Cedrus deodara*	10	Not Protected		0 Dead	
1977	Deodar Cedar	*Cedrus deodara*	16	Not Protected		4 Good	
1978	Deodar Cedar	*Cedrus deodara*	18	Not Protected		4 Good	
1979	Honey Locust	*Gleditsia triacanthos*	10	Not Protected		2 Poor	
1980	Honey Locust	*Gleditsia triacanthos*	10	Not Protected		2 Poor	
1981	Honey Locust	*Gleditsia triacanthos*	15	Not Protected		3 Moderate	
1982	Honey Locust	*Gleditsia triacanthos*	12	Not Protected		3 Moderate	
1983	Deodar Cedar	*Cedrus deodara*	12	Not Protected		3 Moderate	
2000	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		2 Poor	
2001	Purple Leaf Plum	*Prunus cerasifera*	12 at 2	Not Protected		2 Poor	
2002	Purple Leaf Plum	*Prunus cerasifera*	11 at 2	Not Protected		1 Very Poor	
2003	Coast Redwood	*Sequoia sempervirens*	19	Not Protected		1 Very Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
2004	Coast Redwood	*Sequoia sempervirens*	22	Not Protected		2 Poor	
2005	Coast Redwood	*Sequoia sempervirens*	25	Protected	small dead wood, epicormic sprouts, Fair leaf surface	2 Poor	
2006	Coast Redwood	*Sequoia sempervirens*	26	Protected	small dead wood, epicormic sprouts, Fair leaf surface	2 Poor	
2007	Purple Leaf Plum	*Prunus cerasifera*	12	Not Protected		2 Poor	
2008	Purple Leaf Plum	*Prunus cerasifera*	10	Not Protected		2 Poor	
2009	Purple Leaf Plum	*Prunus cerasifera*	11 at 4	Not Protected		1 Very Poor	
2010	Purple Leaf Plum	*Prunus cerasifera*	11 at 4	Not Protected		2 Poor	
2011	Purple Leaf Plum	*Prunus cerasifera*	12 at 4	Not Protected		1 Very Poor	
2012	Purple Leaf Plum	*Prunus cerasifera*	11	Not Protected		2 Poor	
2013	Purple Leaf Plum	*Prunus cerasifera*	10 at 2	Not Protected		2 Poor	
2014	Purple Leaf Plum	*Prunus cerasifera*	11 at 2	Not Protected		2 Poor	
2017	Purple Leaf Plum	*Prunus cerasifera*	11 at 2	Not Protected		2 Poor	
2018	Purple Leaf Plum	*Prunus cerasifera*	11 at 2	Not Protected		1 Very Poor	
2019	Purple Leaf Plum	*Prunus cerasifera*	10 at 2	Not Protected		1 Very Poor	
2020	Coast Redwood	*Sequoia sempervirens*	19	Not Protected		1 Very Poor	
2021	Coast Redwood	*Sequoia sempervirens*	20	Not Protected		1 Very Poor	
2022	Coast Redwood	*Sequoia sempervirens*	20	Not Protected		1 Very Poor	
2023	Coast Redwood	*Sequoia sempervirens*	18	Not Protected		0 Dead	
2024	Coast Redwood	*Sequoia sempervirens*	17	Not Protected		1 Very Poor	
2025	Coast Redwood	*Sequoia sempervirens*	20	Not Protected		1 Very Poor	
2026	Coast Redwood	*Sequoia sempervirens*	19	Not Protected		1 Very Poor	
2027	Coast Redwood	*Sequoia sempervirens*	17	Not Protected		0 Dead	
2028	Coast Redwood	*Sequoia sempervirens*	20	Not Protected		0 Dead	
2029	Purple Leaf Plum	*Prunus cerasifera*	10 at 2	Not Protected		2 Poor	
2030	Purple Leaf Plum	*Prunus cerasifera*	9 at 2	Not Protected		1 Very Poor	
2031	Purple Leaf Plum	*Prunus cerasifera*	9 at 2	Not Protected		1 Very Poor	
2032	London Plane Tree	*Platanus x acerifolia*	16	Protected	old pruning cuts with complete callus, Fair leaf surface, small dead wood 1-2"	3 Moderate	
2033	London Plane Tree	*Platanus x acerifolia*	17	Protected	old pruning cuts with complete callus, Fair leaf surface, small dead wood 1-2in, epicormic sprouts	3 Moderate	
2034	London Plane Tree	*Platanus x acerifolia*	18	Protected	old pruning cuts with complete callus, good leaf surface, small dead wood 1-2in	3 Moderate	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
2035	London Plane Tree	*Platanus x acerifolia*	12	Protected	old pruning cuts with complete callus, Fair leaf surface, small dead wood 1-2in, Codominant Leader at 9ft, "u-shaped" crotch	3 Moderate	
2036	London Plane Tree	*Platanus x acerifolia*	16	Protected	old pruning cuts with complete callus, Good leaf surface, small dead wood 1-2in, Codominant Leader at 8, "u-shaped" crotch	3 Moderate	
2037	Mexican Fan Palm	*Washingtonia robusta*	12	Not Protected		3 Moderate	
2038	Coast Redwood	*Sequoia sempervirens*	14	Not Protected		2 Poor	
2039	Coast Redwood	*Sequoia sempervirens*	13	Not Protected		2 Poor	
2040	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		2 Poor	
2041	Coast Redwood	*Sequoia sempervirens*	14	Not Protected		2 Poor	
2042	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		2 Poor	
2043	Coast Redwood	*Sequoia sempervirens*	17	Not Protected		2 Poor	
2044	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		2 Poor	
2045	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		2 Poor	
2046	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		0 Dead	
2047	Coast Redwood	*Sequoia sempervirens*	16	Not Protected		0 Dead	
2048	Coast Redwood	*Sequoia sempervirens*	24	Protected		0 Dead	
2049	Purple Leaf Plum	*Prunus cerasifera*	11 at 2	Not Protected		1 Very Poor	
2050	Purple Leaf Plum	*Prunus cerasifera*	11 at 2	Not Protected		1 Very Poor	
2051	Purple Leaf Plum	*Prunus cerasifera*	10 At 2	Not Protected		2 Poor	
2052	Purple Leaf Plum	*Prunus cerasifera*	6	Not Protected		2 Poor	
2053	Purple Leaf Plum	*Prunus cerasifera*	12 at 2	Not Protected		2 Poor	
2054	Purple Leaf Plum	*Prunus cerasifera*	13 at 2	Not Protected		2 Poor	
2055	Purple Leaf Plum	*Prunus cerasifera*	12 at 2	Not Protected		2 Poor	
2056	Purple Leaf Plum	*Prunus cerasifera*	11 at 2	Not Protected		2 Poor	
2057	Purple Leaf Plum	*Prunus cerasifera*	11 at 2	Not Protected		2 Poor	
2058	Purple Leaf Plum	*Prunus cerasifera*	9 at 2	Not Protected		1 Very Poor	
2059	Purple Leaf Plum	*Prunus cerasifera*	10 at 2	Not Protected		2 Poor	
2060	Purple Leaf Plum	*Prunus cerasifera*	8 at 2	Not Protected		1 Very Poor	
2061	Purple Leaf Plum	*Prunus cerasifera*	12 at 2	Not Protected		2 Poor	
2062	Valley Oak	*Quercus lobata*	14	Protected	Mechanical damage at 1ft with callus, many old pruning cuts with complete callus, dead wood 1-3in, Poor leaf surface	2 Poor	
2063	Valley Oak	*Quercus lobata*	12	Protected	epicormic sprouts live and dead, all canopy sprouts only	1 Very Poor	
2064	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		1 Very Poor	

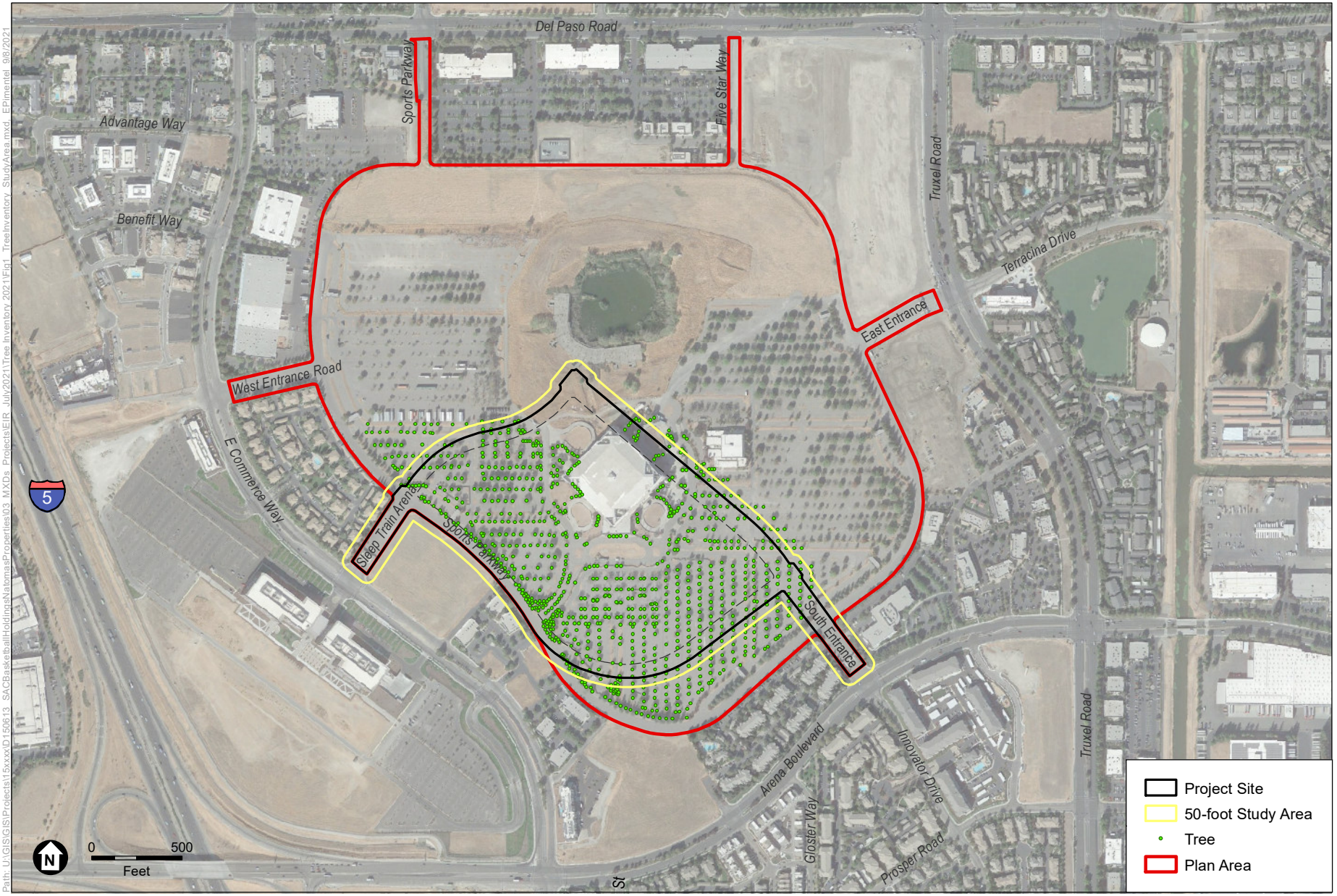
TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
2065	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		3 Moderate	
2066	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		2 Poor	
2067	Coast Redwood	*Sequoia sempervirens*	13	Not Protected		1 Very Poor	
2068	Coast Redwood	*Sequoia sempervirens*	15	Not Protected		2 Poor	
2069	Valley Oak	*Quercus lobata*	12	Protected	epicormic sprouts, Mechanical damage at 4 ft with callus with heart root decay, bulge at 8ft, decay, dead wood	1 Very Poor	
2070	Southern Magnolia	*Magnolia grandiflora*	9	Not Protected		2 Poor	
2071	Southern Magnolia	*Magnolia grandiflora*	10	Not Protected		2 Poor	
2072	Southern Magnolia	*Magnolia grandiflora*	13	Not Protected		3 Moderate	
2073	Southern Magnolia	*Magnolia grandiflora*	8	Not Protected		3 Moderate	
2074	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		2 Poor	
2075	Southern Magnolia	*Magnolia grandiflora*	9	Not Protected		3 Moderate	
2076	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		1 Very Poor	
2077	Southern Magnolia	*Magnolia grandiflora*	9	Not Protected		2 Poor	
2078	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		2 Poor	
2079	Southern Magnolia	*Magnolia grandiflora*	10	Not Protected		3 Moderate	
2080	Southern Magnolia	*Magnolia grandiflora*	7	Not Protected		2 Poor	
2081	Valley Oak	*Quercus lobata*	10	Not Protected		2 Poor	
2082	Valley Oak	*Quercus lobata*	8	Not Protected		1 Very Poor	
2083	Valley Oak	*Quercus lobata*	11	Not Protected		2 Poor	
2084	Valley Oak	*Quercus lobata*	13	Protected	old pruning cuts with callus, epicormic sprouts, Codominant Leader 7ft, included bark, Narrow angle attachments, limb tip die back, dead wood 1-3in, Fair leaf surface	2 Poor	
2085	Valley Oak	*Quercus lobata*	10	Not Protected		2 Poor	
2086	Valley Oak	*Quercus lobata*	14	Protected	old pruning cuts with callus, epicormic sprouts, Narrow angle attachments, limb tip die back, dead wood 1-3in, Poor leaf surface	2 Poor	
2087	Camphor Tree	*Cinnamomum camphora*	8	Not Protected		1 Very Poor	
2088	Camphor Tree	*Cinnamomum camphora*	10	Not Protected		1 Very Poor	
2089	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		2 Poor	
2090	Chinese Hackberry	*Celtis sinensis*	11	Not Protected		2 Poor	
2091	Chinese Hackberry	*Celtis sinensis*	9	Not Protected		1 Very Poor	
2092	Chinese Pistache	*Pistacia chinensis*	14	Not Protected		3 Moderate	
2093	Chinese Pistache	*Pistacia chinensis*	11	Not Protected		2 Poor	

TREE INVENTORY TABLE

Tag Number	Species Common Name	Scientific Name	DBH	Protection Status	Health Notes	Health & Vitality Rating	Other
2094	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		2 Poor	
2095	Chinese Pistache	*Pistacia chinensis*	9	Not Protected		2 Poor	
2096	Chinese Hackberry	*Celtis sinensis*	8	Not Protected		1 Very Poor	
2097	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		2 Poor	
2098	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		2 Poor	
2099	Camphor Tree	*Cinnamomum camphora*	11	Not Protected		1 Very Poor	

Attachment 2
Tree Location Maps

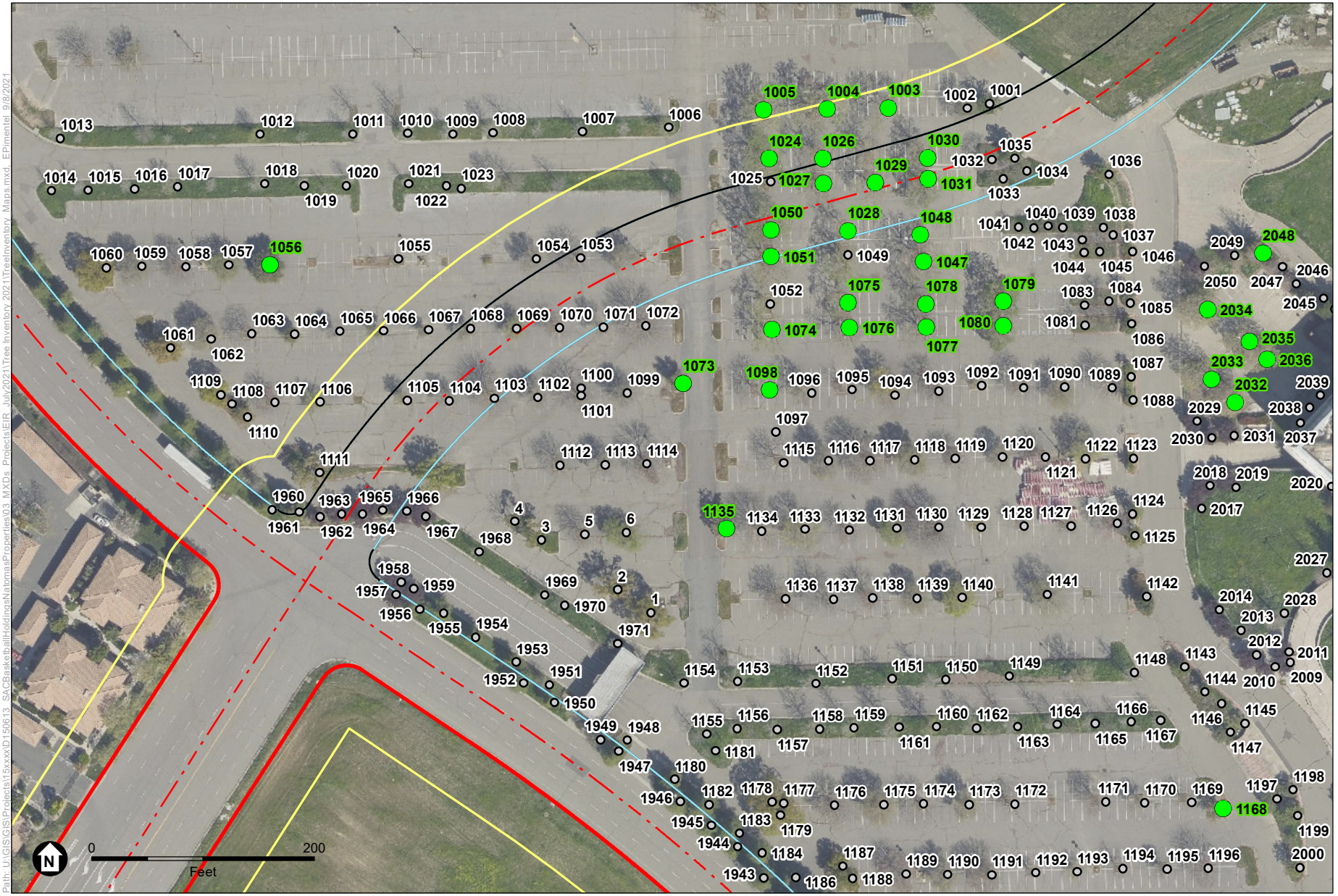


SOURCE: Google, 2020; ESA, 2021

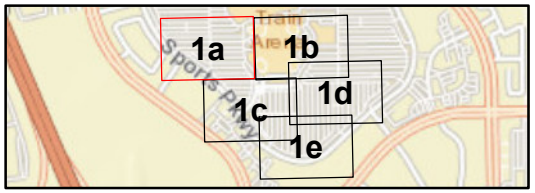
Innovation Park Planned Unit Development

Figure 1
Tree Inventory Study Area

ESA



SOURCE: Sacramento County, 2018; ESA, 2021



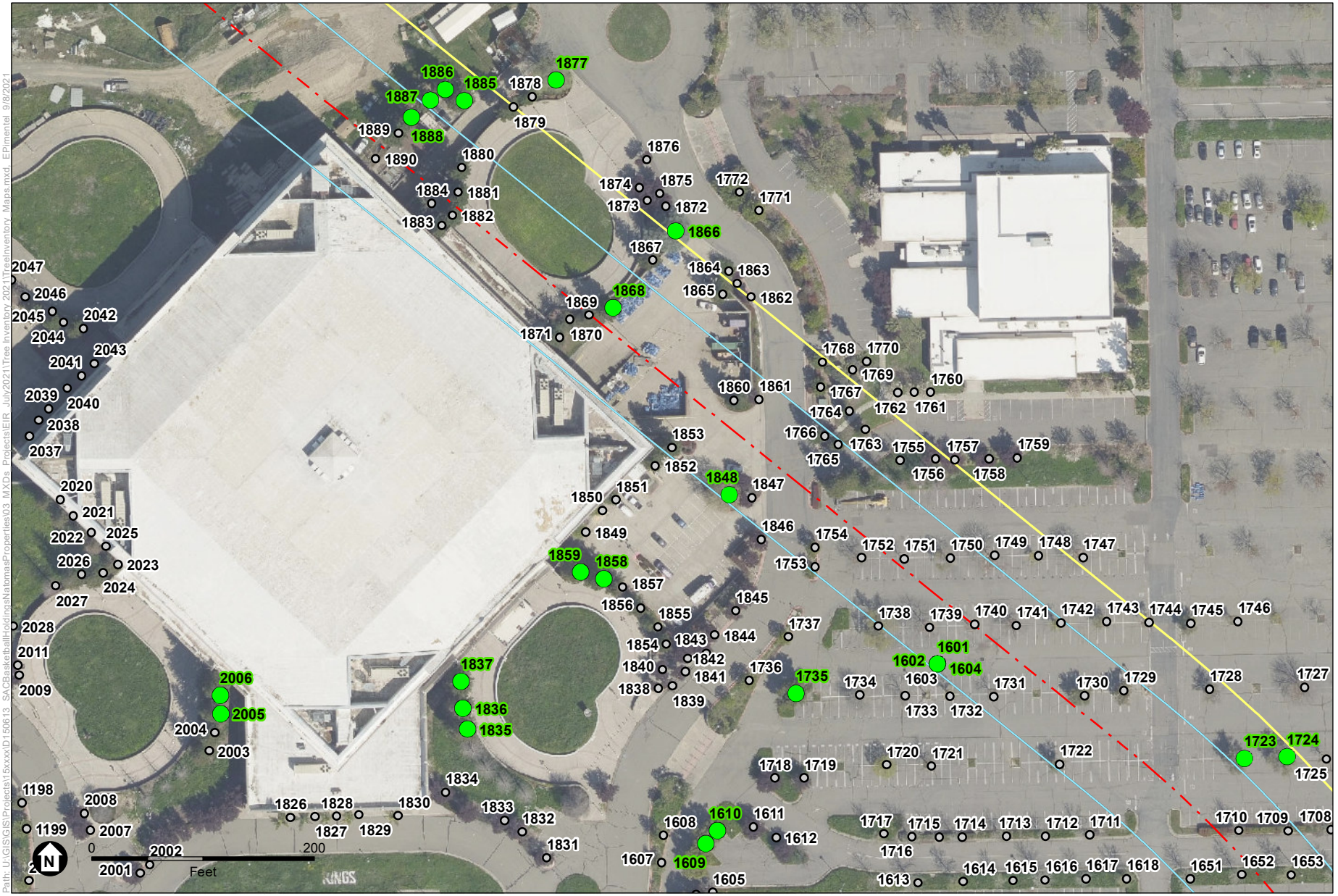
Protection Status
- Not Protected
- Protected

Plans
- Overall Boundary
- Parcel Areas
- Road Centerline
- Road Right-of-Way
- 50-foot Study Area

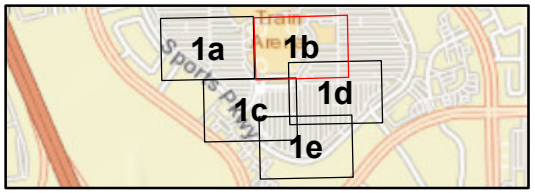
Innovation Park Planned Unit Development

Figure 1a
Tree Inventory

ESA



SOURCE: Sacramento County, 2018; ESA, 2021



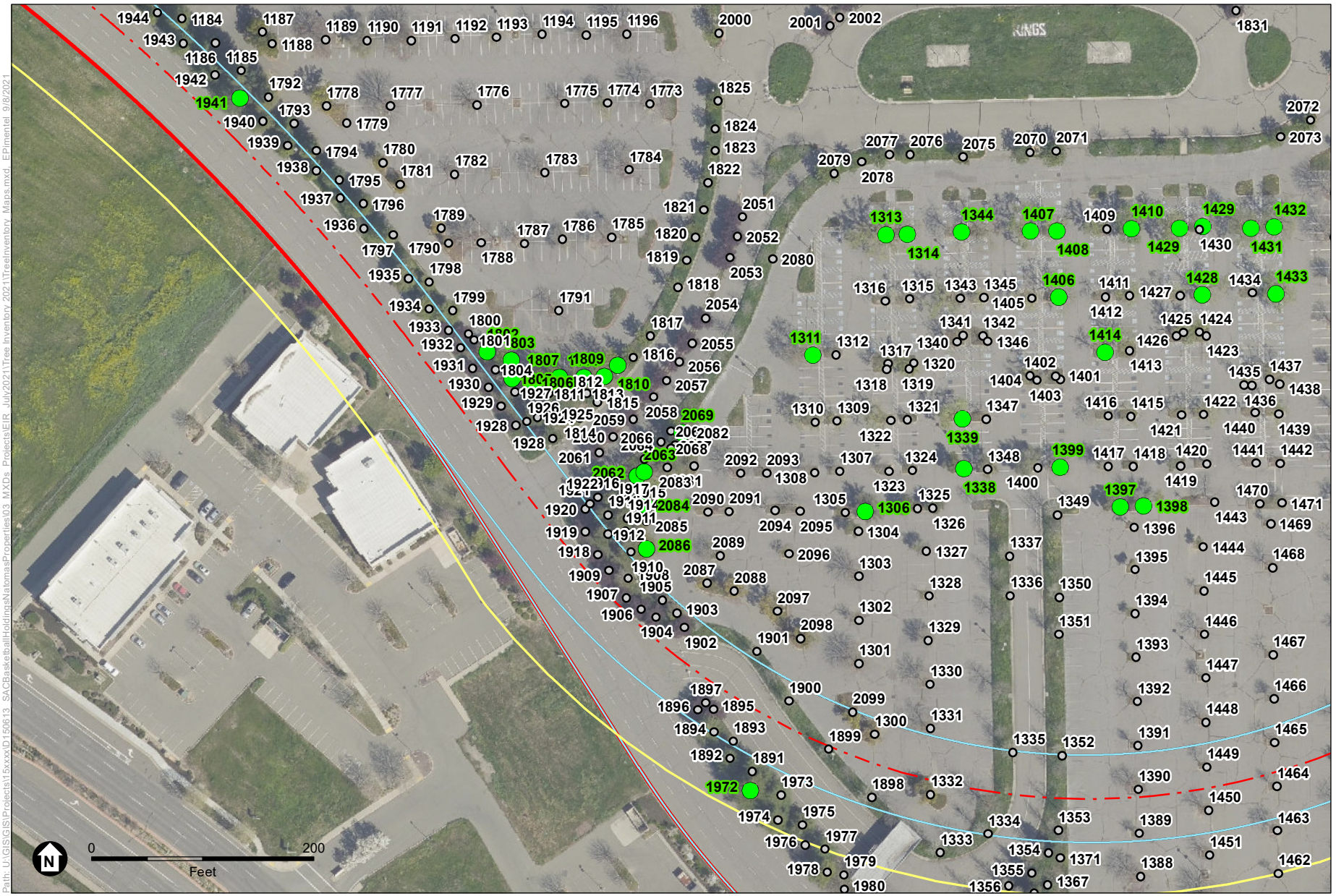
Protection Status
- Not Protected
- Protected

Plans
- Overall Boundary
- Parcel Areas
- Road Centerline
- Road Right-of-Way
- 50-foot Study Area

Innovation Park Planned Unit Development

Figure 1b
Tree Inventory

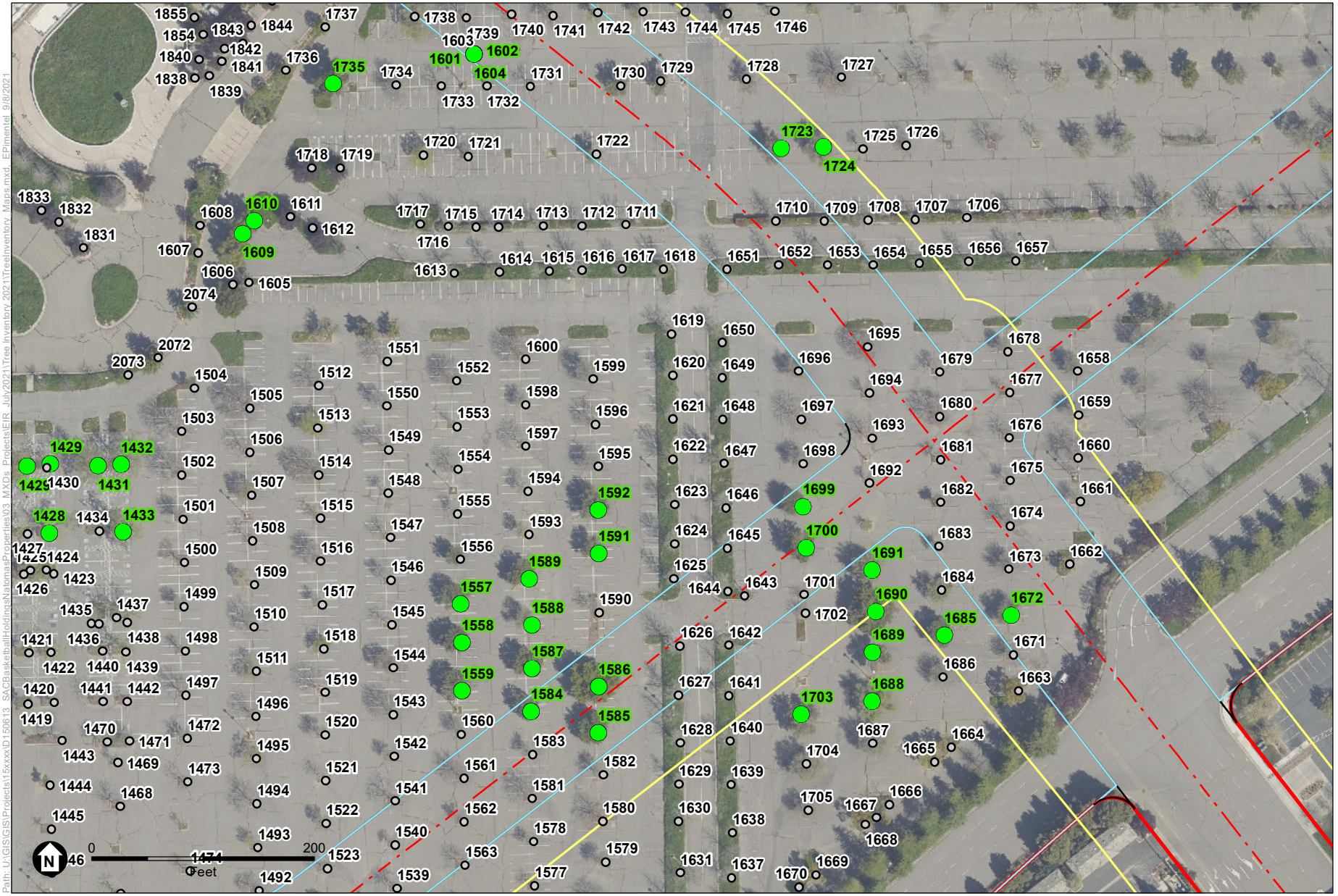
ESA



SOURCE: Sacramento County, 2018; ESA, 2021

Innovation Park Planned Unit Development

Figure 1c
Tree Inventory

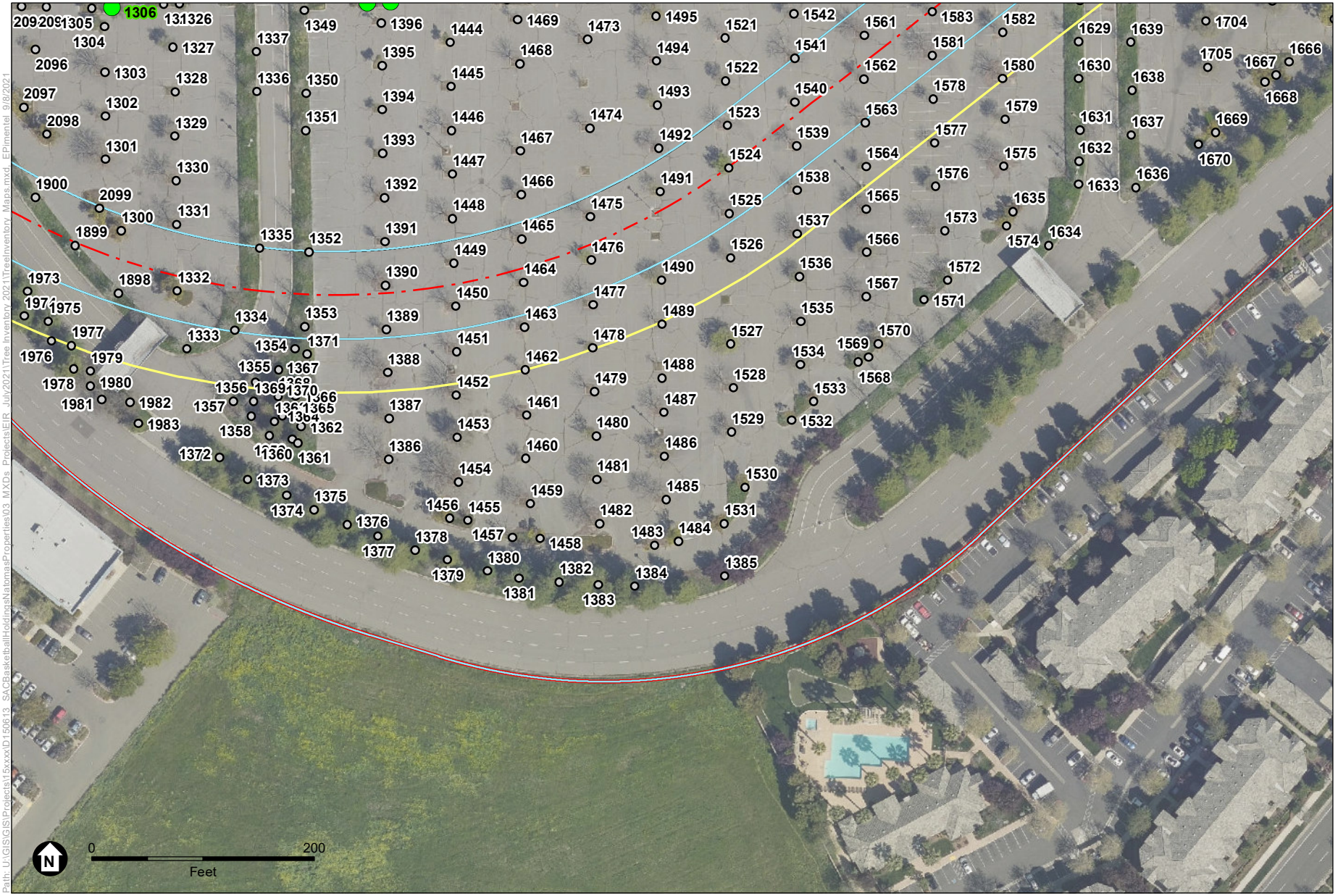


SOURCE: Sacramento County, 2018; ESA, 2021

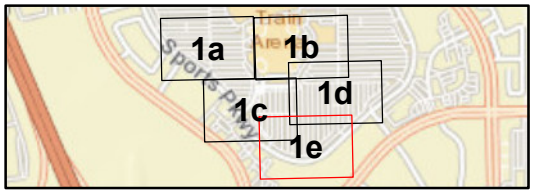
Innovation Park Planned Unit Development

Figure 1d
Tree Inventory

ESA



SOURCE: Sacramento County, 2018; ESA, 2021



Protection Status
- Not Protected
- Protected

Plans
- Overall Boundary
- Parcel Areas
- Road Centerline
- Road Right-of-Way
- 50-foot Study Area

Innovation Park Planned Unit Development

Figure 1e
Tree Inventory

Appendix D3
Study Area Photographs

Photograph 1
View of valley-foothill riparian woodland/freshwater emergent wetland/lacustrine complex.
Photograph taken on April 2, 2019.

Photograph 2
View of valley-foothill riparian woodland/freshwater emergent wetland/lacustrine complex.
Photograph taken on April 2, 2019.

Photograph 3
View of valley-foothill riparian woodland/freshwater emergent wetland/lacustrine complex. Foundation of abandoned baseball stadium in foreground. Photograph taken on April 2, 2019.

Photograph 4
View of valley-foothill riparian woodland/freshwater emergent wetland/lacustrine complex. Foundation of abandoned baseball stadium in foreground. Photograph taken on April 2, 2019.

Photograph 5
View of valley-foothill riparian woodland/freshwater emergent wetland/lacustrine complex. Foundation of abandoned baseball stadium in foreground and Sleep Train Arena in background.
Photograph taken on April 2, 2019.

Photograph 6
View of heron rookery.
Photograph taken on April 2, 2019.

Photograph 7
View of heron rookery.
Photograph taken on April 2, 2019.

Photograph 8
View of heron rookery.
Photograph taken on April 2, 2019.

Photograph 9
Roosting black-crowned night herons. Photograph taken on April 2, 2019.

Photograph 10
View of valley-foothill riparian woodland/freshwater emergent wetland/lacustrine complex.
Photograph taken on April 2, 2019.

Photograph 11
View of annual grassland habitat. Sleep Train Arena in background.
Photograph taken on April 24, 2019.

Photograph 12
View of urban habitat.
Photograph taken on April 24, 2019.

Appendix D4
CNDDB Query

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE **RareFind**

Query Summary:
Quad IS (Woodward Island (3712185) OR Brentwood (3712186) OR Antioch South (3712187) OR Bouldin Island (3812115) OR Jersey Island (3812116) OR Antioch North (3812117) OR Isleton (3812125) OR Rio Vista (3812126) OR Birds Landing (3812127) OR Courtland (3812135) OR Liberty Island (3812136) OR Dozier (3812137))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	6	None	Threatened	G1G2	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Alkali Meadow	Alkali Meadow	Herbaceous	CTT45310CA	8	1	None	None	G3	S2.1	null	null	Meadow & seep, Wetland
Alkali Seep	Alkali Seep	Herbaceous	CTT45320CA	10	1	None	None	G3	S2.1	null	null	Meadow & seep, Wetland
Ambystoma californiense pop. 1	California tiger salamander - central California DPS	Amphibians	AAAAA01181	1261	69	Threatened	Threatened	G2G3	S2S3	null	CDFW_WL-Watch List, IUCN_VU-Vulnerable	Cismontane woodland, Meadow & seep, Riparian woodland, Valley & foothill grassland, Vernal pool, Wetland
Ammodramus savannarum	grasshopper sparrow	Birds	ABPBXA0020	27	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Valley & foothill grassland
Amsinckia grandiflora	large-flowered fiddleneck	Dicots	PDBOR01050	9	3	Endangered	Endangered	G1	S1	1B.1	SB_UCBG-UC Botanical Garden at Berkeley	Cismontane woodland, Valley & foothill grassland
Andrena blennospermatis	Blennosperma vernal pool andrenid bee	Insects	IIHYM35030	15	3	None	None	G2	S2	null	null	Vernal pool
Anniella pulchra	Northern California legless lizard	Reptiles	ARACC01020	375	7	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Chaparral, Coastal dunes, Coastal scrub
Anomobryum julaceum	slender silver moss	Bryophytes	NBMUS80010	13	1	None	None	G5?	S2	4.2	null	Broadleaved upland forest, Lower montane coniferous forest, North coast coniferous forest
Anthicus antiochensis	Antioch Dunes anthicid beetle	Insects	IICOL49020	6	2	None	None	G1	S1	null	null	Interior dunes
Anthicus sacramento	Sacramento anthicid beetle	Insects	IICOL49010	13	3	None	None	G1	S1	null	IUCN_EN-Endangered	Interior dunes
Antrozous pallidus	pallid bat	Mammals	AMACC10010	420	1	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley & foothill grassland
Apodemia mormo langei	Lange's metalmark	Insects	IILEPH7012	1	1	Endangered	None	G5T1	S1	null	null	Interior dunes

	butterfly											
Archoplites interruptus	Sacramento perch	Fish	AFCQB07010	5	1	None	None	G2G3	S1	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern	Aquatic, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters
Arctostaphylos auriculata	Mt. Diablo manzanita	Dicots	PDERI04040	17	6	None	None	G2	S2	1B.3	null	Chaparral, Cismontane woodland
Ardea alba	great egret	Birds	ABNGA04040	43	1	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Ardea herodias	great blue heron	Birds	ABNGA04010	156	3	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Arizona elegans occidentalis	California glossy snake	Reptiles	ARADB01017	260	1	None	None	G5T2	S2	null	CDFW_SSC-Species of Special Concern	null
Astragalus tener var. ferrisiae	Ferris' milk-vetch	Dicots	PDFAB0F8R3	18	1	None	None	G2T1	S1	1B.1	null	Meadow & seep, Valley & foothill grassland, Wetland
Astragalus tener var. tener	alkali milk-vetch	Dicots	PDFAB0F8R1	65	15	None	None	G2T1	S1	1B.2	null	Alkali playa, Valley & foothill grassland, Vernal pool, Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	2011	92	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Atriplex cordulata var. cordulata	heartscale	Dicots	PDCHE040B0	66	8	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chenopod scrub, Meadow & seep, Valley & foothill grassland
Atriplex depressa	brittlescale	Dicots	PDCHE042L0	60	5	None	None	G2	S2	1B.2	null	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Atriplex persistens	vernal pool smallscale	Dicots	PDCHE042P0	41	3	None	None	G2	S2	1B.2	null	Vernal pool, Wetland
Blepharizonia plumosa	big tarplant	Dicots	PDAST1C011	53	23	None	None	G1G2	S1S2	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	437	1	None	Candidate Endangered	G3G4	S1S2	null	null	null
Bombus occidentalis	western bumble bee	Insects	IIHYM24250	306	5	None	Candidate Endangered	G2G3	S1	null	USFS_S-Sensitive	null
Branchinecta conservatio	Conservancy fairy shrimp	Crustaceans	ICBRA03010	47	8	Endangered	None	G2	S2	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Branchinecta lynchi	vernal pool fairy shrimp	Crustaceans	ICBRA03030	791	23	Threatened	None	G3	S3	null	IUCN_VU-Vulnerable	Valley & foothill grassland, Vernal pool, Wetland
Branchinecta mesovallensis	midvalley fairy shrimp	Crustaceans	ICBRA03150	144	12	None	None	G2	S2S3	null	null	Vernal pool, Wetland
Brasenia schreberi	watershield	Dicots	PDCAB01010	43	2	None	None	G5	S3	2B.3	IUCN_LC-Least Concern	Marsh & swamp, Wetland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2541	126	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley

												& foothill grassland
Calochortus pulchellus	Mt. Diablo fairy-lantern	Monocots	PMLIL0D160	52	6	None	None	G2	S2	1B.2	null	Chaparral, Cismontane woodland, Riparian woodland, Valley & foothill grassland
Carex comosa	bristly sedge	Monocots	PMCYP032Y0	32	8	None	None	G5	S2	2B.1	IUCN_LC-Least Concern	Coastal prairie, Freshwater marsh, Marsh & swamp, Valley & foothill grassland, Wetland
Centromadia parryi ssp. congdonii	Congdon's tarplant	Dicots	PDAST4R0P1	98	1	None	None	G3T1T2	S1S2	1B.1	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Centromadia parryi ssp. parryi	pappose tarplant	Dicots	PDAST4R0P2	39	4	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chaparral, Coastal prairie, Marsh & swamp, Meadow & seep, Valley & foothill grassland
Charadrius montanus	mountain plover	Birds	ABNNB03100	90	4	None	None	G3	S2S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Chenopod scrub, Valley & foothill grassland
Chloropyron molle ssp. molle	soft salty bird's-beak	Dicots	PDSCR0J0D2	27	1	Endangered	Rare	G2T1	S1	1B.2	null	Marsh & swamp, Salt marsh, Wetland
Cicuta maculata var. bolanderi	Bolander's water-hemlock	Dicots	PDAPI0M051	17	5	None	None	G5T4T5	S2?	2B.1	null	Marsh & swamp, Salt marsh, Wetland
Cismontane Alkali Marsh	Cismontane Alkali Marsh	Marsh	CTT52310CA	4	1	None	None	G1	S1.1	null	null	Marsh & swamp, Wetland
Coastal Brackish Marsh	Coastal Brackish Marsh	Marsh	CTT52200CA	30	2	None	None	G2	S2.1	null	null	Marsh & swamp, Wetland
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	7	None	None	G3	S2.1	null	null	Marsh & swamp, Wetland
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Birds	ABNRB02022	165	1	Threatened	Endangered	G5T2T3	S1	null	BLM_S-Sensitive, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Riparian forest
Coelus gracilis	San Joaquin dune beetle	Insects	IICOL4A020	11	1	None	None	G1	S1	null	BLM_S-Sensitive, IUCN_VU-Vulnerable	Interior dunes
Cryptantha hooveri	Hoover's cryptantha	Dicots	PDBOR0A190	4	1	None	None	GH	SH	1A	null	Interior dunes, Valley & foothill grassland
Downingia pusilla	dwarf downingia	Dicots	PDCAM060C0	132	19	None	None	GU	S2	2B.2	null	Valley & foothill grassland, Vernal pool, Wetland
Efferia antiochi	Antioch efferian robberfly	Insects	IIDIP07010	4	1	None	None	G1G2	S1S2	null	null	Interior dunes
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	180	6	None	None	G5	S3S4	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Elaphrus viridis	Delta green ground beetle	Insects	IICOL36010	7	3	Threatened	None	G1	S1	null	IUCN_CR-Critically Endangered	Vernal pool, Wetland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1398	42	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern,	Aquatic, Artificial flowing waters, Klamath/North coast flowing

											IUCN_VU-Vulnerable, USFS_S-Sensitive	waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eriogonum nudum var. psychicola	Antioch Dunes buckwheat	Dicots	PDPGN0849Q	1	1	None	None	G5T1	S1	1B.1	null	Interior dunes
Eriogonum truncatum	Mt. Diablo buckwheat	Dicots	PDPGN085Z0	7	3	None	None	G1	S1	1B.1	SB_UCBG-UC Botanical Garden at Berkeley	Chaparral, Coastal scrub, Valley & foothill grassland
Eryngium jepsonii	Jepson's coyote-thistle	Dicots	PDAPI0Z130	19	1	None	None	G2	S2	1B.2	null	Valley & foothill grassland, Vernal pool
Eryngium racemosum	Delta button-celery	Dicots	PDAPI0Z0S0	26	1	None	Endangered	G1	S1	1B.1	null	Riparian scrub, Wetland
Erysimum capitatum var. angustatum	Contra Costa wallflower	Dicots	PDBRA16052	4	4	Endangered	Endangered	G5T1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Interior dunes
Eschscholzia rhombipetala	diamond-petaled California poppy	Dicots	PDPAP0A0D0	12	1	None	None	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Valley & foothill grassland
Eucerceris ruficeps	redheaded sphecid wasp	Insects	IIHYM18010	4	2	None	None	G1G3	S1S2	null	null	Interior dunes
Extriplex joaquinana	San Joaquin spearscale	Dicots	PDCHE041F3	127	17	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland
Falco peregrinus anatum	American peregrine falcon	Birds	ABNKD06071	58	1	Delisted	Delisted	G4T4	S3S4	null	CDF_S-Sensitive, CDFW_FP-Fully Protected, USFWS_BCC-Birds of Conservation Concern	null
Fritillaria agrestis	stinkbells	Monocots	PMLIL0V010	32	3	None	None	G3	S3	4.2	null	Chaparral, Cismontane woodland, Pinon & juniper woodlands, Ultramafic, Valley & foothill grassland
Fritillaria liliacea	fragrant fritillary	Monocots	PMLIL0V0C0	82	6	None	None	G2	S2	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Cismontane woodland, Coastal prairie, Coastal scrub, Ultramafic, Valley & foothill grassland
Geothlypis trichas sinuosa	saltmarsh common yellowthroat	Birds	ABPBX1201A	112	4	None	None	G5T3	S3	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Marsh & swamp
Gonidea angulata	western ridged mussel	Mollusks	IMBIV19010	157	2	None	None	G3	S1S2	null	null	Aquatic
Gratiola heterosepala	Boggs Lake hedge-hyssop	Dicots	PDSCR0R060	99	6	None	Endangered	G2	S2	1B.2	BLM_S-Sensitive	Freshwater marsh, Marsh & swamp, Vernal pool, Wetland
Helianthella castanea	Diablo helianthella	Dicots	PDAST4M020	107	8	None	None	G2	S2	1B.2	null	Broadleaved upland forest, Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland

Helminthoglypta nickliniana bridgesi	Bridges' coast range shoulderband	Mollusks	IMGASC2362	6	1	None	None	G3T1	S1S2	null	IUCN_DD-Data Deficient	Valley & foothill grassland
Hesperolinon breweri	Brewer's western flax	Dicots	PDLIN01030	29	3	None	None	G2	S2	1B.2	null	Chaparral, Cismontane woodland, Ultramafic, Valley & foothill grassland
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Dicots	PDMAL0H0R3	173	63	None	None	G5T3	S3	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Freshwater marsh, Marsh & swamp, Wetland
Hydrochara ricksecker	Ricksecker's water scavenger beetle	Insects	IICOL5V010	13	3	None	None	G2?	S2?	null	null	Aquatic, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters
Hygrotus curvipes	curved-foot hygrotus diving beetle	Insects	IICOL38030	21	1	None	None	G1	S1	null	null	Aquatic
Hypomesus transpacificus	Delta smelt	Fish	AFCHB01040	29	16	Threatened	Endangered	G1	S1	null	AFS_TH-Threatened, IUCN_EN-Endangered	Aquatic, Estuary
Idiostatus middlekauffi	Middlekauff's shieldback katydid	Insects	IIORT31010	1	1	None	None	G1G2	S1	null	IUCN_CR-Critically Endangered	Interior dunes
Isocoma arguta	Carquinez goldenbush	Dicots	PDAST57050	14	6	None	None	G1	S1	1B.1	null	Valley & foothill grassland
Lanius ludovicianus	loggerhead shrike	Birds	ABPBR01030	110	1	None	None	G4	S4	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Desert wash, Joshua tree woodland, Mojavean desert scrub, Pinon & juniper woodlands, Riparian woodland, Sonoran desert scrub
Lasiurus blossevillii	western red bat	Mammals	AMACC05060	128	5	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority	Cismontane woodland, Lower montane coniferous forest, Riparian forest, Riparian woodland
Lasiurus cinereus	hoary bat	Mammals	AMACC05030	238	2	None	None	G3G4	S4	null	IUCN_LC-Least Concern, WBWG_M-Medium Priority	Broadleaved upland forest, Cismontane woodland, Lower montane coniferous forest, North coast coniferous forest
Lasthenia chrysantha	alkali-sink goldfields	Dicots	PDAST5L030	55	3	None	None	G2	S2	1B.1	null	Vernal pool
Lasthenia conjugens	Contra Costa goldfields	Dicots	PDAST5L040	36	1	Endangered	None	G1	S1	1B.1	SB_UCBG-UC Botanical Garden at Berkeley	Alkali playa, Cismontane woodland, Valley & foothill grassland, Vernal pool, Wetland
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Dicots	PDAST5L0A1	111	1	None	None	G4T2	S2	1B.1	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Alkali playa, Marsh & swamp, Salt marsh, Vernal pool, Wetland
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	303	25	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland

											of Conservation Concern	
Lathyrus jepsonii var. jepsonii	Delta tule pea	Dicots	PDFAB250D2	133	50	None	None	G5T2	S2	1B.2	SB_BerrySB-Berry Seed Bank, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Freshwater marsh, Marsh & swamp, Wetland
Legenere limosa	legenere	Dicots	PDCAM0C010	83	9	None	None	G2	S2	1B.1	BLM_S-Sensitive, SB_UCBG-UC Botanical Garden at Berkeley	Vernal pool, Wetland
Lepidium latipes var. heckardii	Heckard's pepper-grass	Dicots	PDBRA1M0K1	14	2	None	None	G4T1	S1	1B.2	null	Valley & foothill grassland, Vernal pool
Lepidurus packardi	vernal pool tadpole shrimp	Crustaceans	ICBRA10010	324	16	Endangered	None	G4	S3S4	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Lilaeopsis masonii	Mason's lilaeopsis	Dicots	PDAPI19030	198	125	None	Rare	G2	S2	1B.1	null	Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Limosella australis	Delta mudwort	Dicots	PDSCR10030	59	48	None	None	G4G5	S2	2B.1	null	Brackish marsh, Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Linderiella occidentalis	California linderiella	Crustaceans	ICBRA06010	508	20	None	None	G2G3	S2S3	null	IUCN_NT-Near Threatened	Vernal pool
Lytta molesta	molestan blister beetle	Insects	IICOL4C030	17	2	None	None	G2	S2	null	null	Vernal pool, Wetland
Madia radiata	showy golden madia	Dicots	PDAST650E0	100	2	None	None	G3	S3	1B.1	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Cismontane woodland, Valley & foothill grassland
Malacothamnus hallii	Hall's bush-mallow	Dicots	PDMAL0Q0F0	43	1	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Chaparral, Coastal scrub, Ultramafic
Masticophis lateralis euryxanthus	Alameda whipsnake	Reptiles	ARADB21031	167	7	Threatened	Threatened	G4T2	S2	null	null	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Melospiza melodia	song sparrow ("Modesto" population)	Birds	ABPBXA3010	92	37	None	None	G5	S3?	null	CDFW_SSC-Species of Special Concern	null
Melospiza melodia maxillaris	Suisun song sparrow	Birds	ABPBXA301K	36	6	None	None	G5T3	S3	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Marsh & swamp, Wetland
Metapogon hurdi	Hurd's metapogon robberfly	Insects	IIDIP08010	3	1	None	None	G1G2	S1S2	null	null	Interior dunes
Myrmosula pacifica	Antioch multilid wasp	Insects	IIHYM15010	3	1	None	None	GH	SH	null	null	Interior dunes
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Dicots	PDPLM0C0E1	64	7	None	None	G4T2	S2	1B.1	null	Cismontane woodland, Lower montane coniferous forest, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Navarretia nigelliformis ssp. radians	shining navarretia	Dicots	PDPLM0C0J2	102	3	None	None	G4T2	S2	1B.2	BLM_S-Sensitive	Cismontane woodland, Valley & foothill grassland, Vernal pool, Wetland
Neostapfia colusana	Colusa grass	Monocots	PMPOA4C010	66	4	Threatened	Endangered	G1	S1	1B.1	null	Vernal pool, Wetland
Northern Claypan Vernal Pool	Northern Claypan Vernal Pool	Herbaceous	CTT44120CA	21	3	None	None	G1	S1.1	null	null	Vernal pool, Wetland

Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	Dicots	PDONA0C0B4	10	9	Endangered	Endangered	G5T1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Interior dunes
Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	Fish	AFCHA0209K	31	2	Threatened	None	G5T2Q	S2	null	AFS_TH-Threatened	Aquatic, Sacramento/San Joaquin flowing waters
Perdita scitula antiochensis	Antioch andrenid bee	Insects	IIHYM01031	2	2	None	None	G1T1	S1	null	null	Interior dunes
Perognathus inornatus	San Joaquin pocket mouse	Mammals	AMAFD01060	140	4	None	None	G2G3	S2S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern	Cismontane woodland, Mojavean desert scrub, Valley & foothill grassland
Phalacrocorax auritus	double-crested cormorant	Birds	ABNFD01020	39	1	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Philanthus nasalis	Antioch specid wasp	Insects	IIHYM20010	4	1	None	None	G1	S1	null	null	Interior dunes
Plagiobothrys hystriculus	bearded popcornflower	Dicots	PDBOR0V0H0	15	10	None	None	G2	S2	1B.1	null	Valley & foothill grassland, Vernal pool, Wetland
Pogonichthys macrolepidotus	Sacramento splittail	Fish	AFCJB34020	15	1	None	None	GNR	S3	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered	Aquatic, Estuary, Freshwater marsh, Sacramento/San Joaquin flowing waters
Potamogeton zosteriformis	eel-grass pondweed	Monocots	PMPOT03160	20	1	None	None	G5	S3	2B.2	null	Marsh & swamp, Wetland
Puccinellia simplex	California alkali grass	Monocots	PMPOA53110	80	1	None	None	G3	S2	1B.2	BLM_S-Sensitive	Chenopod scrub, Meadow & seep, Valley & foothill grassland, Vernal pool
Rana boylii	foothill yellow-legged frog	Amphibians	AAABH01050	2468	1	None	Endangered	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened, USFS_S-Sensitive	Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/North coast flowing waters, Lower montane coniferous forest, Meadow & seep, Riparian forest, Riparian woodland, Sacramento/San Joaquin flowing waters
Rana draytonii	California red-legged frog	Amphibians	AAABH01022	1664	19	Threatened	None	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable	Aquatic, Artificial flowing waters, Artificial standing waters, Freshwater marsh, Marsh & swamp, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Reithrodontomys raviventris	salt-marsh harvest mouse	Mammals	AMAFF02040	144	7	Endangered	Endangered	G1G2	S1S2	null	CDFW_FP-Fully Protected, IUCN_EN-Endangered	Marsh & swamp, Wetland
Riparia riparia	bank swallow	Birds	ABPAU08010	298	1	None	Threatened	G5	S2	null	BLM_S-Sensitive, IUCN_LC-Least	Riparian scrub, Riparian

											Concern	woodland
Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	126	10	None	None	G3	S3	1B.2	BLM_S-Sensitive	Marsh & swamp, Wetland
Scutellaria galericulata	marsh skullcap	Dicots	PDLAM1U0J0	39	3	None	None	G5	S2	2B.2	null	Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Wetland
Scutellaria lateriflora	side-flowering skullcap	Dicots	PDLAM1U0Q0	13	3	None	None	G5	S2	2B.2	IUCN_LC-Least Concern	Marsh & swamp, Meadow & seep, Wetland
Senecio aphanactis	chaparral ragwort	Dicots	PDAST8H060	98	1	None	None	G3	S2	2B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_CRES-San Diego Zoo CRES Native Gene Seed Bank	Chaparral, Cismontane woodland, Coastal scrub
Sidalcea keckii	Keck's checkerbloom	Dicots	PDMAL110D0	50	2	Endangered	None	G2	S2	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Cismontane woodland, Ultramafic, Valley & foothill grassland
Sphecodogastra antiochensis	Antioch Dunes halcitid bee	Insects	IIHYM78010	1	1	None	None	G1	S1	null	null	Interior dunes
Spirinchus thaleichthys	longfin smelt	Fish	AFCHB03010	46	14	Candidate	Threatened	G5	S1	null	null	Aquatic, Estuary
Stabilized Interior Dunes	Stabilized Interior Dunes	Dune	CTT23100CA	2	1	None	None	G1	S1.1	null	null	Interior dunes
Symphyotrichum lentum	Suisun Marsh aster	Dicots	PDASTE8470	175	103	None	None	G2	S2	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_USDA-US Dept of Agriculture	Brackish marsh, Freshwater marsh, Marsh & swamp, Wetland
Taxidea taxus	American badger	Mammals	AMAJF04010	594	4	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog & fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, Ione formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn

												woodland, Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley & foothill grassland
Thamnophis gigas	giant gartersnake	Reptiles	ARADB36150	366	16	Threatened	Threatened	G2	S2	null	IUCN_VU-Vulnerable	Marsh & swamp, Riparian scrub, Wetland
Trifolium hydrophilum	saline clover	Dicots	PDFAB400R5	56	3	None	None	G2	S2	1B.2	null	Marsh & swamp, Valley & foothill grassland, Vernal pool, Wetland
Tropidocarpum capparideum	caper-fruited tropidocarpum	Dicots	PDBRA2R010	20	2	None	None	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Valley & foothill grassland
Tuctoria mucronata	Crampton's tuctoria or Solano grass	Monocots	PMPOA6N020	4	2	Endangered	Endangered	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland, Vernal pool, Wetland
Valley Needlegrass Grassland	Valley Needlegrass Grassland	Herbaceous	CTT42110CA	45	2	None	None	G3	S3.1	null	null	Valley & foothill grassland
Viburnum ellipticum	oval-leaved viburnum	Dicots	PDCPR07080	39	1	None	None	G4G5	S3?	2B.3	null	Chaparral, Cismontane woodland, Lower montane coniferous forest
Vulpes macrotis mutica	San Joaquin kit fox	Mammals	AMAJA03041	1020	9	Endangered	Threatened	G4T2	S2	null	null	Chenopod scrub, Valley & foothill grassland

Appendix D5
CNPS Query

Search Results

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21 matches found. Click on scientific name for details

Search Criteria: Quad is one of [3812175,3812165,3812155,3812154,3812164,3812174,3812176,3812166,3812156]

Scientific Name | Common Name | Family | Lifeform | Blooming Period | Fed List | State List | Global Rank | State Rank | CA Rare Plant Rank | General Habitats | Micro Habitats | Lowest Elevation | Highest Elevation | CA Endemic | Date Added | Photo

Search:

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CA RARE PLANT RANK	PHOTO
Astragalus pauperculus	depauperate milk-vetch	Fabaceae	annual herb	Mar-Jun	None	None	G4	S4	4.3	No Photo Available
Astragalus tener var. *ferrisiae*	Ferris' milk-vetch	Fabaceae	annual herb	Apr-May	None	None	G2T1	S1	1B.1	No Photo Available
Astragalus tener var. *tener*	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	None	None	G2T1	S1	1B.2	No Photo Available
Atriplex cordulata var. *cordulata*	heartscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G3T2	S2	1B.2	No Photo Available
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	No Photo Available
Brodiaea rosea ssp. *vallicola*	valley brodiaea	Themidaceae	perennial bulbiferous herb	Apr-May(Jun)	None	None	G5T3	S3	4.2	No Photo Available
Centromadia parryi ssp. *parryi*	pappose tarplant	Asteraceae	annual herb	May-Nov	None	None	G3T2	S2	1B.2	No Photo Available
Centromadia parryi ssp. *rudis*	Parry's rough tarplant	Asteraceae	annual herb	May-Oct	None	None	G3T3	S3	4.2	No Photo Available
Chloropyron palmatum	palmate-bracted bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	May-Oct	FE	CE	G1	S1	1B.1	No Photo Available
Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	Mar-May	None	None	GU	S2	2B.2	No Photo Available

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CRPR PLANT RANK	PHOTO
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	No Photo Available
Fritillaria agrestis	stinkbells	Liliaceae	perennial bulbiferous herb	Mar-Jun	None	None	G3	S3	4.2	No Photo Available
Gratiola heterosepala	Boggs Lake hedge-hyssop	Plantaginaceae	annual herb	Apr-Aug	None	CE	G2	S2	1B.2	No Photo Available
Hibiscus lasiocarpos var. *occidentalis*	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	None	None	G5T3	S3	1B.2	No Photo Available
Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	None	None	G2	S2	1B.1	No Photo Available
Lepidium latipes var. *heckardii*	Heckard's pepper-grass	Brassicaceae	annual herb	Mar-May	None	None	G4T1	S1	1B.2	No Photo Available
Navarretia cotulifolia	cotula navarretia	Polemoniaceae	annual herb	May-Jun	None	None	G4	S4	4.2	No Photo Available
Puccinellia simplex	California alkali grass	Poaceae	annual herb	Mar-May	None	None	G3	S2	1B.2	No Photo Available
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	None	None	G3	S3	1B.2	No Photo Available
Symphyotrichum lentum	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	None	None	G2	S2	1B.2	No Photo Available
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	None	None	G2	S2	1B.2	No Photo Available

Showing 1 to 21 of 21 entries

Appendix D6
USFWS Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To:
Consultation Code: 08ESMF00-2021-SLI-2314
Event Code: 08ESMF00-2021-E-06644
Project Name: Innovation Park PUD

July 13, 2021

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to

utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2021-SLI-2314
Event Code: 08ESMF00-2021-E-06644
Project Name: Innovation Park PUD
Project Type: DEVELOPMENT
Project Description: Development
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.64947215,-121.51785014602791,14z

Counties: Sacramento County, California

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus*	Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
Species profile: https://ecos.fws.gov/ecp/species/7850

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi*	Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
Species profile: https://ecos.fws.gov/ecp/species/498

Vernal Pool Tadpole Shrimp *Lepidurus packardi*	Endangered

There is **final** critical habitat for this species. The location of the critical habitat is not available.
Species profile: https://ecos.fws.gov/ecp/species/2246

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Appendix D7
Staff Report on Burrowing Owl Mitigation

Staff Report on Burrowing Owl Mitigation

State of California

Natural Resources Agency

Department of Fish and Game

March 7, 2012[1]

[1] This document replaces the Department of Fish and Game 1995 Staff Report On Burrowing Owl Mitigation.

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INTRODUCTION AND PURPOSE

Maintaining California's rich biological diversity is dependent on the conservation of species and their habitats. The California Department of Fish and Game (Department) has designated certain species as "species of special concern" when their population viability and survival is adversely affected by risk factors such as precipitous declines or other vulnerability factors (Shuford and Gardali 2008). Preliminary analyses of regional patterns for breeding populations of burrowing owls (*Athene cunicularia*) have detected declines both locally in their central and southern coastal breeding areas, and statewide where the species has experienced modest breeding range retraction (Gervais et al. 2008). In California, threat factors affecting burrowing owl populations include habitat loss, degradation and modification, and eradication of ground squirrels resulting in a loss of suitable burrows required by burrowing owls for nesting, protection from predators, and shelter (See Appendix A).

The Department recognized the need for a comprehensive conservation and mitigation strategy for burrowing owls, and in 1995 directed staff to prepare a report describing mitigation and survey recommendations. This report, "1995 Staff Report on Burrowing Owl Mitigation," (Staff Report) (CDFG 1995), contained Department-recommended burrowing owl and burrow survey techniques and mitigation measures intended to offset the loss of habitat and slow or reverse further decline of this species. Notwithstanding these measures, over the past 15+ years, burrowing owls have continued to decline in portions of their range (DeSante et al. 2007, Wilkerson and Siegel, 2010). The Department has determined that reversing declining population and range trends for burrowing owls will require implementation of more effective conservation actions, and evaluating the efficacy of the Department's existing recommended avoidance, minimization and mitigation approaches for burrowing owls.

The Department has identified three main actions that together will facilitate a more viable, coordinated, and concerted approach to conservation and mitigation for burrowing owls in California. These include:

1. Incorporating burrowing owl comprehensive conservation strategies into landscape-based planning efforts such as Natural Community Conservation Plans (NCCPs) and multi-species Habitat Conservation Plans (HCPs) that specifically address burrowing owls.
2. Developing and implementing a statewide conservation strategy (Burkett and Johnson, 2007) and local or regional conservation strategies for burrowing owls, including the development and implementation of a statewide burrowing owl survey and monitoring plan.
3. Developing more rigorous burrowing owl survey methods, working to improve the adequacy of impacts assessments; developing clear and effective avoidance and minimization measures; and developing mitigation measures to ensure impacts to the species are effectively addressed at the project, local, and/or regional level (the focus of this document).

This Report sets forth the Department's recommendations for implementing the third approach identified above by revising the 1995 Staff Report, drawing from the most relevant and current knowledge and expertise, and incorporating the best scientific information

available pertaining to the species. It is designed to provide a compilation of the best available science for Department staff, biologists, planners, land managers, California Environmental Quality Act (CEQA) lead agencies, and the public to consider when assessing impacts of projects or other activities on burrowing owls.

This revised Staff Report takes into account the California Burrowing Owl Consortium's Survey Protocol and Mitigation Guidelines (CBOC 1993, 1997) and supersedes the survey, avoidance, minimization and mitigation recommendations in the 1995 Staff Report. Based on experiences gained from implementing the 1995 Staff Report, the Department believes revising that report is warranted. This document also includes general conservation goals and principles for developing mitigation measures for burrowing owls.

DEPARTMENT ROLE AND LEGAL AUTHORITIES

The mission of the Department is to manage California's diverse fish, wildlife and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. The Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitats necessary to maintain biologically sustainable populations of those species (Fish and Game Code (FGC) §1802). The Department, as trustee agency pursuant to CEQA (See CEQA Guidelines, §15386), has jurisdiction by law over natural resources, including fish and wildlife, affected by a project, as that term is defined in Section 21065 of the Public Resources Code. The Department exercises this authority by reviewing and commenting on environmental documents and making recommendations to avoid, minimize, and mitigate potential negative impacts to those resources held in trust for the people of California.

Field surveys designed to detect the presence of a particular species, habitat element, or natural community are one of the tools that can assist biologists in determining whether a species or habitat may be significantly impacted by land use changes or disturbance. The Department reviews field survey data as well as site-specific and regional information to evaluate whether a project's impacts may be significant. This document compiles the best available science for conducting habitat assessments and surveys, and includes considerations for developing measures to avoid impacts or mitigate unavoidable impacts.

CEQA

CEQA requires public agencies in California to analyze and disclose potential environmental impacts associated with a project that the agency will carry out, fund, or approve. Any potentially significant impact must be mitigated to the extent feasible. Project-specific CEQA mitigation is important for burrowing owls because most populations exist on privately owned parcels that, when proposed for development or other types of modification, may be subject to the environmental review requirements of CEQA.

Take

Take of individual burrowing owls and their nests is defined by FGC section 86, and prohibited by sections 3503, 3503.5 and 3513. Take is defined in FGC Section 86 as "hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture or kill."

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the United States and Canada, Japan, Mexico, and Russia for the protection of migratory birds, including the burrowing owl (50 C.F.R. § 10). The MBTA protects migratory bird nests from possession, sale, purchase, barter, transport, import and export, and collection. The other prohibitions of the MBTA - capture, pursue, hunt, and kill - are inapplicable to nests. The regulatory definition of take, as defined in Title 50 C.F.R. part 10.12, means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to hunt, shoot, wound, kill, trap, capture, or collect. Only the verb "collect" applies to nests. It is illegal to collect, possess, and by any means transfer possession of any migratory bird nest. The MBTA prohibits the destruction of a nest when it contains birds or eggs, and no possession shall occur during the destruction (see Fish and Wildlife Service, Migratory Bird Permit Memorandum, April 15, 2003). Certain exceptions to this prohibition are included in 50 C.F.R. section 21. Pursuant to Fish & Game Code section 3513, the Department enforces the Migratory Bird Treaty Act consistent with rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Treaty Act.

Regional Conservation Plans

Regional multiple species conservation plans offer long-term assurances for conservation of covered species at a landscape scale, in exchange for biologically appropriate levels of incidental take and/or habitat loss as defined in the approved plan. California's NCCP Act (FGC §2800 et seq.) governs such plans at the state level, and was designed to conserve species, natural communities, ecosystems, and ecological processes across a jurisdiction or a collection of jurisdictions. Complementary federal HCPs are governed by the Endangered Species Act (7 U.S.C. § 136, 16 U.S.C.§ 1531 et seq.) (ESA). Regional conservation plans (and certain other landscape-level conservation and management plans), may provide conservation for unlisted as well as listed species. Because the geographic scope of NCCPs and HCPs may span many hundreds of thousands of acres, these planning tools have the potential to play a significant role in conservation of burrowing owls, and grasslands and other habitats.

Fish and Game Commission Policies

There are a number of Fish and Game Commission policies (see FGC §2008) that can be applied to burrowing owl conservation. These include policies on: Raptors, Cooperation, Endangered and Threatened Species, Land Use Planning, Management and Utilization of Fish and Wildlife on Federal Lands, Management and Utilization of Fish and Wildlife on Private Lands, and Research.

GUIDING PRINCIPLES FOR CONSERVATION

Unless otherwise provided in a statewide, local, or regional conservation strategy, surveying and evaluating impacts to burrowing owls, as well as developing and implementing avoidance, minimization, and mitigation and conservation measures incorporate the following principles. These principles are a summary of Department staff expert opinion and were used to guide the preparation of this document.

1. Use the Precautionary Principle (Noss et al.1997), by which the alternative of increased conservation is deliberately chosen in order to buffer against incomplete knowledge of burrowing owl ecology and uncertainty about the consequences to burrowing owls of potential impacts, including those that are cumulative.
2. Employ basic conservation biology tenets and population-level approaches when determining what constitutes appropriate avoidance, minimization, and mitigation for impacts. Include mitigation effectiveness monitoring and reporting, and use an adaptive management loop to modify measures based on results.
3. Protect and conserve owls in wild, semi-natural, and agricultural habitats (conserve is defined at FGC §1802).
4. Protect and conserve natural nest burrows (or burrow surrogates) previously used by burrowing owls and sufficient foraging habitat and protect auxiliary "satellite" burrows that contribute to burrowing owl survivorship and natural behavior of owls.

CONSERVATION GOALS FOR THE BURROWING OWL IN CALIFORNIA

It is Department staff expert opinion that the following goals guide and contribute to the short and long-term conservation of burrowing owls in California:

1. Maintain size and distribution of extant burrowing owl populations (allowing for natural population fluctuations).
2. Increase geographic distribution of burrowing owls into formerly occupied historical range where burrowing owl habitat still exists, or where it can be created or enhanced, and where the reason for its local disappearance is no longer of concern.
3. Increase size of existing populations where possible and appropriate (for example, considering basic ecological principles such as carrying capacity, predator-prey relationships, and inter-specific relationships with other species at risk).
4. Protect and restore self-sustaining ecosystems or natural communities which can support burrowing owls at a landscape scale, and which will require minimal long-term management.
5. Minimize or prevent unnatural causes of burrowing owl population declines (e.g., nest burrow destruction, chemical control of rodent hosts and prey).
6. Augment/restore natural dynamics of burrowing owl populations including movement and genetic exchange among populations, such that the species does not require future listing and protection under the California Endangered Species Act (CESA) and/or the federal Endangered Species Act (ESA).
7. Engage stakeholders, including ranchers; farmers; military; tribes; local, state, and federal agencies; non-governmental organizations; and scientific research and education communities involved in burrowing owl protection and habitat management.

ACTIVITIES WITH THE POTENTIAL TO TAKE OR IMPACT BURROWING OWLS

The following activities are examples of activities that have the potential to take burrowing owls, their nests or eggs, or destroy or degrade burrowing owl habitat: grading, disking, cultivation, earthmoving, burrow blockage, heavy equipment compacting and crushing burrow tunnels, levee maintenance, flooding, burning and mowing (if burrows are impacted), and operating wind turbine collisions (collectively hereafter referred to as "projects" or "activities"

whether carried out pursuant to CEQA or not). In addition, the following activities may have impacts to burrowing owl populations: eradication of host burrowers; changes in vegetation management (i.e. grazing); use of pesticides and rodenticides; destruction, conversion or degradation of nesting, foraging, over-wintering or other habitats; destruction of natural burrows and burrow surrogates; and disturbance which may result in harassment of owls at occupied burrows.

PROJECT IMPACT EVALUATIONS

The following three progressive steps are effective in evaluating whether projects will result in impacts to burrowing owls. The information gained from these steps will inform any subsequent avoidance, minimization and mitigation measures. The steps for project impact evaluations are: 1) habitat assessment, 2) surveys, and 3) impact assessment. Habitat assessments are conducted to evaluate the likelihood that a site supports burrowing owl. Burrowing owl surveys provide information needed to determine the potential effects of proposed projects and activities on burrowing owls, and to avoid take in accordance with FGC sections 86, 3503, and 3503.5. Impact assessments evaluate the extent to which burrowing owls and their habitat may be impacted, directly or indirectly, on and within a reasonable distance of a proposed CEQA project activity or non-CEQA project. These three site evaluation steps are discussed in detail below.

Biologist Qualifications

The current scientific literature indicates that only individuals meeting the following minimum qualifications should perform burrowing owl habitat assessments, surveys, and impact assessments:

1. Familiarity with the species and its local ecology;
2. Experience conducting habitat assessments and non-breeding and breeding season surveys, or experience with these surveys conducted under the direction of an experienced surveyor;
3. Familiarity with the appropriate state and federal statutes related to burrowing owls, scientific research, and conservation;
4. Experience with analyzing impacts of development on burrowing owls and their habitat.

Habitat Assessment Data Collection and Reporting

A habitat assessment is the first step in the evaluation process and will assist investigators in determining whether or not occupancy surveys are needed. Refer to Appendix B for a definition of burrowing owl habitat. Compile the detailed information described in Appendix C when conducting project scoping, conducting a habitat assessment site visit and preparing a habitat assessment report.

Surveys

Burrowing owl surveys are the second step of the evaluation process and the best available scientific literature recommends that they be conducted whenever burrowing owl habitat or sign (see Appendix B) is encountered on or adjacent to (within 150 meters) a project site

(Thomsen 1971, Martin 1973). Occupancy of burrowing owl habitat is confirmed at a site when at least one burrowing owl, or its sign at or near a burrow entrance, is observed within the last three years (Rich 1984). Burrowing owls are more detectable during the breeding season with detection probabilities being highest during the nestling stage (Conway et al. 2008). In California, the burrowing owl breeding season extends from 1 February to 31 August (Haug et al. 1993, Thompsen 1971) with some variances by geographic location and climatic conditions. Several researchers suggest three or more survey visits during daylight hours (Haug and Diduik 1993, CBOC 1997, Conway and Simon 2003) and recommend each visit occur at least three weeks apart during the peak of the breeding season, commonly accepted in California as between 15 April and 15 July (CBOC 1997). Conway and Simon (2003) and Conway et al. (2008) recommended conducting surveys during the day when most burrowing owls in a local area are in the laying and incubation period (so as not to miss early breeding attempts), during the nesting period, and in the late nestling period when most owls are spending time above ground.

Non-breeding season (1 September to 31 January) surveys may provide information on burrowing owl occupancy, but do not substitute for breeding season surveys because results are typically inconclusive. Burrowing owls are more difficult to detect during the non-breeding season and their seasonal residency status is difficult to ascertain. Burrowing owls detected during non-breeding season surveys may be year-round residents, young from the previous breeding season, pre-breeding territorial adults, winter residents, dispersing juveniles, migrants, transients or new colonizers. In addition, the numbers of owls and their pattern of distribution may differ during winter and breeding seasons. However, on rare occasions, non-breeding season surveys may be warranted (i.e., if the site is believed to be a wintering site only based on negative breeding season results). Refer to Appendix D for information on breeding season and non-breeding season survey methodologies.

Survey Reports

Adequate information about burrowing owls present in and adjacent to an area that will be disturbed by a project or activity will enable the Department, reviewing agencies and the public to effectively assess potential impacts and will guide the development of avoidance, minimization, and mitigation measures. The survey report includes but is not limited to a description of the proposed project or proposed activity, including the proposed project start and end dates, as well as a description of disturbances or other activities occurring on-site or nearby. Refer to Appendix D for details included in a survey report.

Impact Assessment

The third step in the evaluation process is the impact assessment. When surveys confirm occupied burrowing owl habitat in or adjoining the project area, there are a number of ways to assess a project's potential significant impacts to burrowing owls and their habitat. Richardson and Miller (1997) recommended monitoring raptor behavior prior to developing management recommendations and buffers to determine the extent to which individuals have been sensitized to human disturbance. Monitoring results will also provide detail necessary for developing site-specific measures. Postovit and Postovit (1987) recommended an analytical approach to mitigation planning: define the problem (impact), set goals (to guide mitigation development), evaluate and select mitigation methods, and monitor the results.

Define the problem. The impact assessment evaluates all factors that could affect burrowing owls. Postovit and Postovit (1987) recommend evaluating the following in assessing impacts to raptors and planning mitigation: type and extent of disturbance, duration and timing of disturbance, visibility of disturbance, sensitivity and ability to habituate, and influence of environmental factors. They suggest identifying and addressing all potential direct and indirect impacts to burrowing owls, regardless of whether or not the impacts will occur during the breeding season. Several examples are given for each impact category below; however, examples are not intended to be used exclusively.

Type and extent of the disturbance. The impact assessment describes the nature (source) and extent (scale) of potential project impacts on occupied, satellite and unoccupied burrows including acreage to be lost (temporary or permanent), fragmentation/edge being created, increased distance to other nesting and foraging habitat, and habitat degradation. Discuss any project activities that impact either breeding and/or non-breeding habitat which could affect owl home range size and spatial configuration, negatively affect onsite and offsite burrowing owl presence, increase energetic costs, lower reproductive success, increase vulnerability to predation, and/or decrease the chance of procuring a mate.

Duration and timing of the impact. The impact assessment describes the amount of time the burrowing owl habitat will be unavailable to burrowing owls (temporary or permanent) on the site and the effect of that loss on essential behaviors or life history requirements of burrowing owls, the overlap of project activities with breeding and/or non-breeding seasons (timing of nesting and/or non-breeding activities may vary with latitude and climatic conditions, which should be considered with the timeline of the project or activity), and any variance of the project activities in intensity, scale and proximity relative to burrowing owl occurrences.

Visibility and sensitivity. Some individual burrowing owls or pairs are more sensitive than others to specific stimuli and may habituate to ongoing visual or audible disturbance. Site-specific monitoring may provide clues to the burrowing owl's sensitivities. This type of assessment addresses the sensitivity of burrowing owls within their nesting area to humans on foot, and vehicular traffic. Other variables are whether the site is primarily in a rural versus urban setting, and whether any prior disturbance (e.g., human development or recreation) is known at the site.

Environmental factors. The impact assessment discusses any environmental factors that could be influenced or changed by the proposed activities including nest site availability, predators, prey availability, burrowing mammal presence and abundance, and threats from other extrinsic factors such as human disturbance, urban interface, feral animals, invasive species, disease or pesticides.

Significance of impacts. The impact assessment evaluates the potential loss of nesting burrows, satellite burrows, foraging habitat, dispersal and migration habitat, wintering habitat, and habitat linkages, including habitat supporting prey and host burrowers and other essential habitat attributes. This assessment determines if impacts to the species will result in significant impacts to the species locally, regionally and range-wide per CEQA Guidelines §15382 and Appendix G. The significance of the impact to habitat depends on the extent of habitat disturbed and length of time the habitat is unavailable (for example: minor – several days, medium – several weeks to months, high - breeding season affecting juvenile survival,

or over winter affecting adult survival).

Cumulative effects. The cumulative effects assessment evaluates two consequences: 1) the project's proportional share of reasonably foreseeable impacts on burrowing owls and habitat caused by the project or in combination with other projects and local influences having impacts on burrowing owls and habitat, and 2) the effects on the regional owl population resulting from the project's impacts to burrowing owls and habitat.

Mitigation goals. Establishing goals will assist in planning mitigation and selecting measures that function at a desired level. Goals also provide a standard by which to measure mitigation success. Unless specifically provided for through other FGC Sections or through specific regulations, take, possession or destruction of individual burrowing owls, their nests and eggs is prohibited under FGC sections 3503, 3503.5 and 3513. Therefore, a required goal for all project activities is to avoid take of burrowing owls. Under CEQA, goals would consist of measures that would avoid, minimize and mitigate impacts to a less than significant level. For individual projects, mitigation must be roughly proportional to the level of impacts, including cumulative impacts, in accordance with the provisions of CEQA (CEQA Guidelines, §§ 15126.4(a)(4)(B), 15064, 15065, and 16355). In order for mitigation measures to be effective, they must be specific, enforceable, and feasible actions that will improve environmental conditions. As set forth in more detail in Appendix A, the current scientific literature supports the conclusion that mitigation for permanent habitat loss necessitates replacement with an equivalent or greater habitat area for breeding, foraging, wintering, dispersal, presence of burrows, burrow surrogates, presence of fossorial mammal dens, well drained soils, and abundant and available prey within close proximity to the burrow.

MITIGATION METHODS

The current scientific literature indicates that any site-specific avoidance or mitigation measures developed should incorporate the best practices presented below or other practices confirmed by experts and the Department. The Department is available to assist in the development of site-specific avoidance and mitigation measures.

Avoiding. A primary goal is to design and implement projects to seasonally and spatially avoid negative impacts and disturbances that could result in take of burrowing owls, nests, or eggs. Other avoidance measures may include but not be limited to:

- Avoid disturbing occupied burrows during the nesting period, from 1 February through 31 August.
- Avoid impacting burrows occupied during the non-breeding season by migratory or non-migratory resident burrowing owls.
- Avoid direct destruction of burrows through chaining (dragging a heavy chain over an area to remove shrubs), disking, cultivation, and urban, industrial, or agricultural development.
- Develop and implement a worker awareness program to increase the on-site worker's recognition of and commitment to burrowing owl protection.
- Place visible markers near burrows to ensure that farm equipment and other machinery does not collapse burrows.
- Do not fumigate, use treated bait or other means of poisoning nuisance animals in areas where burrowing owls are known or suspected to occur (e.g., sites observed with nesting

owls, designated use areas).
- Restrict the use of treated grain to poison mammals to the months of January and February.

Take avoidance (pre-construction) surveys. Take avoidance surveys are intended to detect the presence of burrowing owls on a project site at a fixed period in time and inform necessary take avoidance actions. Take avoidance surveys may detect changes in owl presence such as colonizing owls that have recently moved onto the site, migrating owls, resident burrowing owls changing burrow use, or young of the year that are still present and have not dispersed. Refer to Appendix D for take avoidance survey methodology.

Site surveillance. Burrowing owls may attempt to colonize or re-colonize an area that will be impacted; thus, the current scientific literature indicates a need for ongoing surveillance at the project site during project activities is recommended. The surveillance frequency/effort should be sufficient to detect burrowing owls if they return. Subsequent to their new occupancy or return to the site, take avoidance measures should assure with a high degree of certainty that take of owls will not occur.

Minimizing. If burrowing owls and their habitat can be protected in place on or adjacent to a project site, the use of buffer zones, visual screens or other measures while project activities are occurring can minimize disturbance impacts. Conduct site-specific monitoring to inform development of buffers (see Visibility and sensitivity above). The following general guidelines for implementing buffers should be adjusted to address site-specific conditions using the impact assessment approach described above. The CEQA lead agency and/or project proponent is encouraged to consult with the Department and other burrowing owl experts for assistance in developing site-specific buffer zones and visual screens.

Buffers. Holroyd et al. (2001) identified a need to standardize management and disturbance mitigation guidelines. For instance, guidelines for mitigating impacts by petroleum industries on burrowing owls and other prairie species (Scobie and Faminow, 2000) may be used as a template for future mitigation guidelines (Holroyd et al. 2001). Scobie and Faminow (2000) developed guidelines for activities around occupied burrowing owl nests recommending buffers around low, medium, and high disturbance activities, respectively (see below).

Recommended restricted activity dates and setback distances by level of disturbance for burrowing owls (Scobie and Faminow 2000).

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

* meters (m)

Based on existing vegetation, human development, and land uses in an area, resource managers may decide to allow human development or resource extraction closer to these area/sites than recommended above. However, if it is decided to allow activities closer than

the setback distances recommended, a broad-scale, long-term, scientifically-rigorous monitoring program ensures that burrowing owls are not detrimentally affected by alternative approaches.

Other minimization measures include eliminating actions that reduce burrowing owl forage and burrowing surrogates (e.g. ground squirrel), or introduce/facilitate burrowing owl predators. Actions that could influence these factors include reducing livestock grazing rates and/or changing the timing or duration of grazing or vegetation management that could result in less suitable habitat.

Burrow exclusion and closure. Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owls, or permanently exclude burrowing owls and close burrows after verifying burrows are empty by site monitoring and scoping. Exclusion in and of itself is not a take avoidance, minimization or mitigation method. Eviction of burrowing owls is a potentially significant impact under CEQA.

The long-term demographic consequences of these techniques have not been thoroughly evaluated, and the fate of evicted or excluded burrowing owls has not been systematically studied. Because burrowing owls are dependent on burrows at all times of the year for survival and/or reproduction, evicting them from nesting, roosting, and satellite burrows may lead to indirect impacts or take. Temporary or permanent closure of burrows may result in significant loss of burrows and habitat for reproduction and other life history requirements. Depending on the proximity and availability of alternate habitat, loss of access to burrows will likely result in varying levels of increased stress on burrowing owls and could depress reproduction, increase predation, increase energetic costs, and introduce risks posed by having to find and compete for available burrows. Therefore, exclusion and burrow closure are not recommended where they can be avoided. The current scientific literature indicates consideration of all possible avoidance and minimization measures before temporary or permanent exclusion and closure of burrows is implemented, in order to avoid take.

The results of a study by Trulio (1995) in California showed that burrowing owls passively displaced from their burrows were quickly attracted to adjacent artificial burrows at five of six passive relocation sites. The successful sites were all within 75 meters (m) of the destroyed burrow, a distance generally within a pair's territory. This researcher discouraged using passive relocation to artificial burrows as a mitigation measure for lost burrows without protection of adjacent foraging habitat. The study results indicated artificial burrows were used by evicted burrowing owls when they were approximately 50-100 m from the natural burrow (Thomsen 1971, Haug and Oliphant 1990). Locating artificial or natural burrows more than 100 m from the eviction burrow may greatly reduce the chances that new burrows will be used. Ideally, exclusion and burrow closure is employed only where there are adjacent natural burrows and non-impacted, sufficient habitat for burrowing owls to occupy with permanent protection mechanisms in place. Any new burrowing owl colonizing the project site after the CEQA document has been adopted may constitute changed circumstances that should be addressed in a re-circulated CEQA document.

The current scientific literature indicates that burrow exclusion should only be conducted by qualified biologists (meeting the Biologist's Qualifications above) during the non-breeding

season, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping. The literature also indicates that when temporary or permanent burrow exclusion and/or burrow closure is implemented, burrowing owls should not be excluded from burrows unless or until:

- A Burrowing Owl Exclusion Plan (see Appendix E) is developed and approved by the applicable local DFG office;
- Permanent loss of occupied burrow(s) and habitat is mitigated in accordance with the Mitigating Impacts sections below. Temporary exclusion is mitigated in accordance with the item #1 under Mitigating Impacts below.
- Site monitoring is conducted prior to, during, and after exclusion of burrowing owls from their burrows sufficient to ensure take is avoided. Conduct daily monitoring for one week to confirm young of the year have fledged if the exclusion will occur immediately after the end of the breeding season.
- Excluded burrowing owls are documented using artificial or natural burrows on an adjoining mitigation site (if able to confirm by band re-sight).

Translocation (Active relocation offsite >100 meters). At this time, there is little published information regarding the efficacy of translocating burrowing owls, and additional research is needed to determine subsequent survival and breeding success (Klute et al. 2003, Holroyd et al. 2001). Study results for translocation in Florida implied that hatching success may be decreased for populations of burrowing owls that undergo translocation (Nixon 2006). At this time, the Department is unable to authorize the capture and relocation of burrowing owls except within the context of scientific research (FGC §1002) or a NCCP conservation strategy.

Mitigating impacts. Habitat loss and degradation from rapid urbanization of farmland in the core areas of the Central and Imperial valleys is the greatest of many threats to burrowing owls in California (Shuford and Gardali, 2008). At a minimum, if burrowing owls have been documented to occupy burrows (see Definitions, Appendix B) at the project site in recent years, the current scientific literature supports the conclusion that the site should be considered occupied and mitigation should be required by the CEQA lead agency to address project-specific significant and cumulative impacts. Other site-specific and regionally significant and cumulative impacts may warrant mitigation. The current scientific literature indicates the following to be best practices. If these best practices cannot be implemented, the lead agency or lead investigator may consult with the Department to develop effective mitigation alternatives. The Department is also available to assist in the identification of suitable mitigation lands.

1. Where habitat will be temporarily disturbed, restore the disturbed area to pre-project condition including decompacting soil and revegetating. Permanent habitat protection may be warranted if there is the potential that the temporary impacts may render a nesting site (nesting burrow and satellite burrows) unsustainable or unavailable depending on the time frame, resulting in reduced survival or abandonment. For the latter potential impact, see the permanent impact measures below.
2. Mitigate for permanent impacts to nesting, occupied and satellite burrows and/or burrowing owl habitat such that the habitat acreage, number of burrows and burrowing owls impacted are replaced based on the information provided in Appendix A. Note: A

minimum habitat replacement recommendation is not provided here as it has been shown to serve as a default, replacing any site-specific analysis and discounting the wide variation in natal area, home range, foraging area, and other factors influencing burrowing owls and burrowing owl population persistence in a particular area.

3. Mitigate for permanent impacts to nesting, occupied and satellite burrows and burrowing owl habitat with (a) permanent conservation of similar vegetation communities (grassland, scrublands, desert, urban, and agriculture) to provide for burrowing owl nesting, foraging, wintering, and dispersal (i.e., during breeding and non-breeding seasons) comparable to or better than that of the impact area, and (b) sufficiently large acreage, and presence of fossorial mammals. The mitigation lands may require habitat enhancements including enhancement or expansion of burrows for breeding, shelter and dispersal opportunity, and removal or control of population stressors. If the mitigation lands are located adjacent to the impacted burrow site, ensure the nearest neighbor artificial or natural burrow clusters are at least within 210 meters (Fisher et al. 2007).
4. Permanently protect mitigation land through a conservation easement deeded to a non-profit conservation organization or public agency with a conservation mission, for the purpose of conserving burrowing owl habitat and prohibiting activities incompatible with burrowing owl use. If the project is located within the service area of a Department-approved burrowing owl conservation bank, the project proponent may purchase available burrowing owl conservation bank credits.
5. Develop and implement a mitigation land management plan to address long-term ecological sustainability and maintenance of the site for burrowing owls (see Management Plan and Artificial Burrow sections below, if applicable).
6. Fund the maintenance and management of mitigation land through the establishment of a long-term funding mechanism such as an endowment.
7. Habitat should not be altered or destroyed, and burrowing owls should not be excluded from burrows, until mitigation lands have been legally secured, are managed for the benefit of burrowing owls according to Department-approved management, monitoring and reporting plans, and the endowment or other long-term funding mechanism is in place or security is provided until these measures are completed.
8. Mitigation lands should be on, adjacent or proximate to the impact site where possible and where habitat is sufficient to support burrowing owls present.
9. Where there is insufficient habitat on, adjacent to, or near project sites where burrowing owls will be excluded, acquire mitigation lands with burrowing owl habitat away from the project site. The selection of mitigation lands should then focus on consolidating and enlarging conservation areas located outside of urban and planned growth areas, within foraging distance of other conserved lands. If mitigation lands are not available adjacent to other conserved lands, increase the mitigation land acreage requirement to ensure a selected site is of sufficient size. Offsite mitigation may not adequately offset the biological and habitat values impacted on a one to one basis. Consult with the Department when determining offsite mitigation acreages.
10. Evaluate and select suitable mitigation lands based on a comparison of the habitat attributes of the impacted and conserved lands, including but not limited to: type and structure of habitat being impacted or conserved; density of burrowing owls in impacted and conserved habitat; and significance of impacted or conserved habitat to the species range-wide. Mitigate for the highest quality burrowing owl habitat impacted first and foremost when identifying mitigation lands, even if a mitigation site is located outside of

a lead agency's jurisdictional boundary, particularly if the lead agency is a city or special district.

11. Select mitigation lands taking into account the potential human and wildlife conflicts or incompatibility, including but not limited to, human foot and vehicle traffic, and predation by cats, loose dogs and urban-adapted wildlife, and incompatible species management (i.e., snowy plover).
12. Where a burrowing owl population appears to be highly adapted to heavily altered habitats such as golf courses, airports, athletic fields, and business complexes, permanently protecting the land, augmenting the site with artificial burrows, and enhancing and maintaining those areas may enhance sustainability of the burrowing owl population onsite. Maintenance includes keeping lands grazed or mowed with weed-eaters or push mowers, free from trees and shrubs, and preventing excessive human and human-related disturbance (e.g., walking, jogging, off-road activity, dog-walking) and loose and feral pets (chasing and, presumably, preying upon owls) that make the environment uninhabitable for burrowing owls (Wesemann and Rowe 1985, Millsap and Bear 2000, Lincer and Bloom 2007). Items 4, 5 and 6 also still apply to this mitigation approach.
13. If there are no other feasible mitigation options available and a lead agency is willing to establish and oversee a Burrowing Owl Mitigation and Conservation Fund that funds on a competitive basis acquisition and permanent habitat conservation, the project proponent may participate in the lead agency's program.

Artificial burrows. Artificial burrows have been used to replace natural burrows either temporarily or long-term and their long-term success is unclear. Artificial burrows may be an effective addition to in-perpetuity habitat mitigation if they are augmenting natural burrows, the burrows are regularly maintained (i.e., no less than annual, with biennial maintenance recommended), and surrounding habitat patches are carefully maintained. There may be some circumstances, for example at airports, where squirrels will not be allowed to persist and create a dynamic burrow system, where artificial burrows may provide some support to an owl population.

Many variables may contribute to the successful use of artificial burrows by burrowing owls, including pre-existence of burrowing owls in the area, availability of food, predators, surrounding vegetation and proximity, number of natural burrows in proximity, type of materials used to build the burrow, size of the burrow and entrance, direction in which the burrow entrance is facing, slope of the entrance, number of burrow entrances per burrow, depth of the burrow, type and height of perches, and annual maintenance needs (Belthoff and King 2002, Smith et al. 2005, Barclay et al. 2011). Refer to Barclay (2008) and (2011) and to Johnson et al. 2010 (unpublished report) for guidance on installing artificial burrows including recommendations for placement, installation and maintenance.

Any long-term reliance on artificial burrows as natural burrow replacements must include semi-annual to annual cleaning and maintenance and/or replacement (Barclay et al. 2011, Smith and Conway 2005, Alexander et al. 2005) as an ongoing management practice. Alexander et al. (2005), in a study of the use of artificial burrows found that all of 20 artificial burrows needed some annual cleaning and maintenance. Burrows were either excavated by predators, blocked by soil or vegetation, or experienced substrate erosion forming a space beneath the tubing that prevented nestlings from re-entering the burrow.

Mitigation lands management plan. Develop a Mitigation Lands Management Plan for projects that require off-site or on-site mitigation habitat protection to ensure compliance with and effectiveness of identified management actions for the mitigation lands. A suggested outline and related vegetation management goals and monitoring success criteria can be found in Appendix E.

Mitigation Monitoring and Reporting

Verify the compliance with required mitigation measures, the accuracy of predictions, and ensure the effectiveness of all mitigation measures for burrowing owls by conducting follow-up monitoring, and implementing midcourse corrections, if necessary, to protect burrowing owls. Refer to CEQA Guidelines Section 15097 and the CEQA Guidelines for additional guidance on mitigation, monitoring and reporting. Monitoring is qualitatively different from site surveillance; monitoring normally has a specific purpose and its outputs and outcomes will usually allow a comparison with some baseline condition of the site before the mitigation (including avoidance and minimization) was undertaken. Ideally, monitoring should be based on the Before-After Control-Impact (BACI) principle (McDonald et al. 2000) that requires knowledge of the pre-mitigation state to provide a reference point for the state and change in state after the project and mitigation have been implemented.

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REFERENCES

Alexander, A. K., M. R. Sackschewsky, and C. A. Duberstein. 2005. Use of artificial burrows by burrowing owls (athene cunicularia) at the HAMMER Facility on the U.S. Department of Energy Hanford Site. Pacific Northwest National Lab-15414. U.S. Department of Energy, DE-AC05-76RL01830, Richland, Washington, USA.

BIOS. California Department of Fish and Game. The Biogeographic Information Observation System (http://bios.dfg.ca.gov/)

Barclay, J. H. 2008. A simple artificial burrow design for burrowing owls. Journal of Raptor Research. 42: 53-57.

Barclay, J. H. 2012. Albion Environmental, Inc, personal communication.

Barclay, J. H., K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts, editors. 2007. Proceedings of the California Burrowing Owl Symposium, 11-12 November 2003, Sacramento, California, USA. Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc., Point Reyes Station, CA.

Barclay, J. H., N. Korfanta, and M. Kauffman. 2011. Long-term population dynamics of a managed burrowing owl colony. Journal of Wildlife Management 75: 1295–1306.

Belthoff, J R., R. A. King. 2002. Nest-site characteristics of burrowing owls (athene cunicularia) in the Snake River Birds of Prey National Conservation Area, Idaho, and applications to artificial burrow installation. Western North American Naturalist 62: 112-119.

Botelho, E. S. 1996. Behavioral ecology and parental care of breeding western burrowing owls (Speotyto cunicularia hupugaea) in southern New Mexico, USA. Dissertation, New Mexico State University, Las Cruces, New Mexico, USA.

Burkett, E. E., and B. S. Johnson. 2007. Development of a conservation strategy for burrowing owls in California. Pages 165-168 *in* J. H. Barclay, K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts, editors. Proceedings of the California Burrowing Owl Symposium, 11-12 November 2003, Sacramento, California, USA. Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc., Point Reyes Station, CA.

CBOC (California Burrowing Owl Consortium). 1997. Burrowing owl survey protocol and mitigation guidelines. Pages 171-177 *in* Lincer, J. L. and K. Steenhof (editors). 1997. The burrowing owl, its biology and management. Raptor Research Report Number 9.

CDFG (California Department of Fish and Game). 1995. Staff report on burrowing owl mitigation. Unpublished report. Sacramento, California, USA.

CNDDB. California Department of Fish and Game. The California Natural Diversity Database (CNDDB) (http://www.dfg.ca.gov/biogeodata/cnddb/), Sacramento, California, USA.

Catlin, D. H. 2004. Factors affecting within-season and between-season breeding dispersal of Burrowing Owls in California. Thesis, Oregon State University, Corvallis, Oregon, USA

Catlin, D. H., and D. K. Rosenberg. 2006. Nest destruction increases mortality and dispersal of Burrowing Owls in the Imperial Valley, California. Southwest Naturalist 51: 406–409.

Catlin, D. H., D. K. Rosenberg, and K. L. Haley. 2005. The effects of nesting success and mate fidelity on breeding dispersal in burrowing owls. Canadian Journal of Zoology 83:1574–1580.

Conway, C. J., and J. Simon. 2003. Comparison of detection probability associated with burrowing owl survey methods. Journal of Wildlife Management 67: 501-511.

Conway, C. J., V. Garcia, M. D., and K. Hughes. 2008. Factors affecting detection of burrowing owl nests during standardized surveys. Journal of Wildlife Management 72: 688-696.

Coulombe, H. N. 1971. Behavior and population ecology of the burrowing owl, Speotyto cunicularia, in the Imperial Valley of California. Condor 73: 162–176.

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, P. A. Rabie, and B. R. Euliss. 2003. Effects of management practices on grassland birds: burrowing owl. Northern Prairie Wildlife Research Center, Jamestown, North Dakota. Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/literatr/grasbird/buow/buow.htm>.

DeSante, D. F., E. D Ruhlen, and R. Scalf. 2007. The distribution and relative abundance of burrowing owls in California during 1991–1993: Evidence for a declining population and thoughts on its conservation. Pages 1-41 *in* J. H. Barclay, K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts, editors. Proceedings of the California Burrowing Owl Symposium, 11-12 November 2003 Sacramento, California, USA. Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc., Point Reyes Station, CA.

Desmond, M. J., and J. A. Savidge. 1998. Burrowing Owl conservation in the Great Plains. Proceedings of the Second International Burrowing Owl Symposium, 29-30 September 1999, Ogden, Utah, USA.

Desmond, M. J., and J. A. Savidge. 1999. Satellite burrow use by burrowing owl chicks and its influence on nest fate. Pages 128-130 *in* P. D. Vickery and J. R. Herkert, editors. Ecology and conservation of grassland birds of the western hemisphere. Studies in Avian Biology 19.

Emlen, J. T. 1977. Estimating breeding season bird densities from transects counts. Auk 94: 455-468.

Fisher, J. B., L. A. Trulio, G. S. Biging, and D. Chromczack. 2007. An analysis of spatial clustering and implications for wildlife management: a burrowing owl example. Environmental Management 39: 403-11.

Gervais, J. A., D. K. Rosenberg, and L. A. Comrack. Burrowing Owl (Athene cunicularia) *in* Shuford, W.D. and T. Gardali, editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento, California, USA.

Gervais, J. A., D. K. Rosenberg, R. G. Anthony. 2003. Space use and pesticide exposure risk of male burrowing owls in an agricultural landscape. Journal of Wildlife Management 67: 155-164.

Green, G.A.; Anthony, R.G. 1989. Nesting success and habitat relationships of burrowing owls in the Columbia Basin, Oregon. The Condor 91: 347-354.

Haug, E. A. 1985. Observations on the breeding ecology of burrowing owls in Saskatchewan.

Thesis, University of Saskatchewan, Saskatoon, Saskatchewan, Canada.
Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. Burrowing owl (Speotyto cunicularia), *in* A. Poole and F. Gill, editors, The Birds of North America, The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, D.C., USA.
Haug, E. A., and L. W. Oliphant. 1990. Movements, activity patterns, and habitat use of burrowing owls in Saskatchewan. Journal of Wildlife Management 54: 27-35.
Holroyd, G. L., R. Rodriguez-Estrella, and S. R. Sheffield. 2001. Conservation of the burrowing owl in western North America: issues, challenges, and recommendations. Journal of Raptor Research 35: 399-407.
James, P. C., T. J. Ethier, and M. K. Toutloff. 1997. Parameters of a declining burrowing owl population in Saskatchewan. Pages 34-37. *in* J. L. Lincer, and K. Steenhof, editors. The burrowing owl, its biology and management: including the proceedings of the first international symposium. 13-14 November 1992, Bellevue, WA, USA. Raptor Research Report Number 9.
Johnson, D. H., D. C. Gillis, M. A. Gregg, J. L.Rebholz, J. L. Lincer, and J. R. Belthoff. 2010. Users guide to installation of artificial burrows for burrowing owls. Unpublished report. Tree Top Inc., Selah, Washington, USA.
Klute, D. S., A. W. Ayers, M. T. Green, W. H. Howe, S. L Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. Status assessment and conservation plan for the western burrowing owl in the United States. U.S. Department of the Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C, USA.
Koenig, W. D., D. D. Van Vuren, and P. N. Hooge. 1996. Detectability, philopatry, and the distribution of dispersal distances in vertebrates. Trends in Ecology and Evolution 11: 514–517.
LaFever, D. H., K. E. LaFever, D. H. Catlin, and D. K. Rosenberg. 2008. Diurnal time budget of burrowing owls in a resident population during the non-breeding season. Southwestern Naturalist 53: 29-33.
Lincer, J. L., and P. W. Bloom. 2007. The status of the burrowing owl (Athene cunicularia) in San Diego County, CA. Pages 90-102 *in* Proceedings of the California Burrowing Owl Symposium, 11-12 November 2003, Sacramento, California, USA. Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc., Point Reyes Station, CA.
Lutz, R. S. and D. L. Plumpton. 1999. Philopatry and nest site reuse by burrowing owls: implications for management. Journal of Raptor Research 33: 149-153.
MacCracken, J. G., D. W. Uresk, and R. M. Hansen. 1985a. Vegetation and soils of burrowing owl nest sites in Conata Basin, South Dakota. Condor 87: 152-154.
Manning, J. A., and R. S. A. Kaler. 2011. Effects of survey methods on burrowing owl behaviors. Journal of Wildlife Management 75: 525-30.
McDonald, T. L., W. P. Erickson, and L. L. McDonald. 2000. Analysis of count data from before-after control-impact studies. Journal of Agricultural, Biological and Environmental Statistics 5: 262-279.
Millsap, B. A., and C. Bear. 2000. Density and reproduction of burrowing owls along an urban development gradient. Journal of Wildlife Management 64:33-41.
Nixon, P A. 2006. Effects of translocation on the Florida burrowing owl (Athene cunicularia floridana). Thesis. University of South Florida, Tampa, Florida, USA.
Noss, R. F., M. A. O'Connell, and D. D. Murphy. 1997. The science of conservation planning:

habitat conservation under the Endangered Species Act. Island Press, Washington D.C., USA.
Postovit, H. R., and B. C. Postovit. 1987. Impacts and mitigation techniques. Pages 183-213 in Raptor management techniques manual scientific technical series number 10, National Wildlife Federation, Washington, D. C., USA
Remsen, J. V., Jr. 1978. Bird species of special concern in California: An annotated list of declining or vulnerable bird species. California Department of Fish and Game, Nongame Wildlife. Investigations, Wildlife Management Branch Administrative Report 78-1, Sacramento, California, USA.
Rich, T. 1984. Monitoring burrowing owl populations: implications of burrow re-use. Wildlife Society Bulletin 12: 178-189.
Richardson, C. T. and C. K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. Wildlife Society Bulletin 25: 634-38.
Ronan, N. A. 2002. Habitat selection, reproductive success, and site fidelity of burrowing owls in a grassland ecosystem. Thesis, Oregon State University, Corvallis, Oregon, USA.
Rosenberg, D., 2009 Oregon State University, Corvallis, personal communication.
Rosenberg, D. K., J. A. Gervais, D. F. DeSante, and H. Ober. 2009. An updated adaptive management plan for the burrowing owl population at NAS Lemoore. The Oregon Wildlife Institute, Corvallis, OR and The Institute for Bird Populations, Point Reyes Station, CA. OWI Contribution No. 201 and IBP Contribution No. 375.
Rosenberg, D. K., J. A. Gervais, H. Ober, and D. F. DeSante. 1998. An adaptive management plan for the burrowing owl population at Naval Air Station Lemoore, California, USA. Publication 95, Institute for Bird Populations, P.O. Box 1346, Pt. Reyes Station, CA 94956.
Rosenberg, D. K., and K. L. Haley. 2004. The ecology of burrowing owls in the agroecosystem of the Imperial Valley, California. Studies in Avian Biology 27:120-135.
Rosenberg, D. K., L. A. Trulio, D. H. Catlin, D. Chromczack, J. A. Gervais, N. Ronan, and K. A. Haley. 2007. The ecology of the burrowing owl in California, unpublished report to Bureau of Land Management.
Rosier, J. R., N. A., Ronan, and D. K. Rosenberg. 2006. Post-breeding dispersal of burrowing owls in an extensive California grassland. American Midland Naturalist 155: 162–167.
Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A manual of California vegetation, Second edition. California Native Plant Society, Sacramento, California, USA.
Scobie, D., and C. Faminow. 2000. Development of standardized guidelines for petroleum industry activities that affect COSEWIC Prairie and Northern Region vertebrate species at risk. Environment Canada, Prairie and Northern Region, Edmonton, Alberta, Canada.
Shuford, W. D. and T. Gardali, editors. 2008. California Bird Species of Special Concern: a ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento. Gervais, J. A., D. K. Rosenberg, and L. Comrack. 2008. Burrowing Owl (Athene cunicularia).
Smith, M. D., C. J. Conway, and L. A. Ellis. 2005. Burrowing owl nesting productivity: a comparison between artificial and natural burrows on and off golf courses. Wildlife Society Bulletin 33: 454-462.
Thelander, C. G., K. S. Smallwood, and L. Rugge. 2003. Bird risk behaviors and fatalities at the Altamont Pass Wind Resource Area, period of performance: March 1998–

December 2000. U.S. Department of Energy, National Renewable Energy Laboratory, Golden, Colorado, USA.
Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. Condor 73: 177-192.
Thompson, C. D. 1984. Selected aspects of burrowing owl ecology in central Wyoming. Thesis, University of Wyoming, Laramie, Wyoming, USA.
Trulio, L. 1995. Passive relocation: A method to preserve burrowing owls on disturbed sites. Journal of Field Ornithology 66: 99–106.
U.S. Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. U.S. Department of Interior, Division of Migratory Bird Management, Arlington, Virginia, USA.
U.S. Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. U.S. Department of Interior, Division of Migratory Bird Management, Arlington, Virginia, USA.
Wesemann, T. and M. Rowe. 1985. Factors influencing the distribution and abundance of burrowing owls in Cape Coral, Florida. Pages 129-137 *in* L. W. Adams and D. L. Leedy, editors. Integrating Man and Nature in the Metropolitan Environment. Proceedings National Symposium. on Urban Wildlife, 4-7 November 1986, Chevy Chase, Maryland, USA.
Wilkerson, R. L. and R. B. Siegel. 2010. Assessing changes in the distribution and abundance of burrowing owls in California, 1993-2007. Bird Populations 10: 1-36.
Zarn, M. 1974. Burrowing owl. U.S. Department of the Interior, Bureau of Land Management. Technical Note T-N-250, Denver, Colorado, USA.

Appendix A. Burrowing Owl Natural History and Threats

Diet

Burrowing owl diet includes arthropods, small rodents, birds, amphibians, reptiles, and carrion (Haug et al. 1993).

Breeding

In California, the breeding season for the burrowing owl typically occurs between 1 February and 31 August although breeding in December has been documented (Thompson 1971, Gervais et al. 2008); breeding behavior includes nest site selection by the male, pair formation, copulation, egg laying, hatching, fledging, and post-fledging care of young by the parents. The peak of the breeding season occurs between 15 April and 15 July and is the period when most burrowing owls have active nests (eggs or young). The incubation period lasts 29 days (Coulombe 1971) and young fledge after 44 days (Haug et al. 1993). Note that the timing of nesting activities may vary with latitude and climatic conditions. Burrowing owls may change burrows several times during the breeding season, starting when nestlings are about three weeks old (Haug et al. 1993).

Dispersal

The following discussion is an excerpt from Gervais et al (2008):

> "The burrowing owl is often considered a sedentary species (e.g., Thomsen 1971). A large proportion of adults show strong fidelity to their nest site from year to year, especially where resident, as in Florida (74% for females, 83% for males; Millsap and Bear 1997). In California, nest-site fidelity rates were 32%–50% in a large grassland and 57% in an agricultural environment (Ronan 2002, Catlin 2004, Catlin et al. 2005). Differences in these rates among sites may reflect differences in nest predation rates (Catlin 2004, Catlin et al. 2005). Despite the high nest fidelity rates, dispersal distances may be considerable for both juveniles (natal dispersal) and adults (postbreeding dispersal), but this also varied with location (Catlin 2004, Rosier et al. 2006). Distances of 53 km to roughly 150 km have been observed in California for adult and natal dispersal, respectively (D. K. Rosenberg and J. A. Gervais, unpublished data), despite the difficulty in detecting movements beyond the immediate study area (Koenig et al. 1996)."

Habitat

The burrowing owl is a small, long-legged, ground-dwelling bird species, well-adapted to open, relatively flat expanses. In California, preferred habitat is generally typified by short, sparse vegetation with few shrubs, level to gentle topography and well-drained soils (Haug et al. 1993). Grassland, shrub steppe, and desert are naturally occurring habitat types used by the species. In addition, burrowing owls may occur in some agricultural areas, ruderal grassy fields, vacant lots and pastures if the vegetation structure is suitable and there are useable burrows and foraging habitat in proximity (Gervais et al 2008). Unique amongst North

American raptors, the burrowing owl requires underground burrows or other cavities for nesting during the breeding season and for roosting and cover, year round. Burrows used by the owls are usually dug by other species termed host burrowers. In California, California ground squirrel (*Spermophilus beecheyi*) and round-tailed ground squirrel (*Citellus tereticaudus*) burrows are frequently used by burrowing owls but they may use dens or holes dug by other fossorial species including badger (*Taxidea taxus*), coyote (*Canis latrans*), and fox (e.g., San Joaquin kit fox, *Vulpes macrotis mutica*; Ronan 2002). In some instances, owls have been known to excavate their own burrows (Thompson 1971, Barclay 2007). Natural rock cavities, debris piles, culverts, and pipes also are used for nesting and roosting (Rosenberg et al. 1998). Burrowing owls have been documented using artificial burrows for nesting and cover (Smith and Belthoff, 2003).

Foraging habitat. Foraging habitat is essential to burrowing owls. The following discussion is an excerpt from Gervais et al. (2008):

> "Useful as a rough guide to evaluating project impacts and appropriate mitigation for burrowing owls, adult male burrowing owls home ranges have been documented (calculated by minimum convex polygon) to comprise anywhere from 280 acres in intensively irrigated agroecosystems in Imperial Valley (Rosenberg and Haley 2004) to 450 acres in mixed agricultural lands at Lemoore Naval Air Station, CA (Gervais et al. 2003), to 600 acres in pasture in Saskatchewan, Canada (Haug and Oliphant 1990). But owl home ranges may be much larger, perhaps by an order of magnitude, in non-irrigated grasslands such as at Carrizo Plain, California (Gervais et al. 2008), based on telemetry studies and distribution of nests. Foraging occurs primarily within 600 m of their nests (within approximately 300 acres, based on a circle with a 600 m radius) during the breeding season."

Importance of burrows and adjacent habitat. Burrows and the associated surrounding habitat are essential ecological requisites for burrowing owls throughout the year and especially during the breeding season. During the non-breeding season, burrowing owls remain closely associated with burrows, as they continue to use them as refuge from predators, shelter from weather and roost sites. Resident populations will remain near the previous season's nest burrow at least some of the time (Coulombe 1971, Thomsen 1971, Botelho 1996, LaFever et al. 2008).

In a study by Lutz and Plumpton (1999) adult males and females nested in formerly used sites at similar rates (75% and 63%, respectively) (Lutz and Plumpton 1999). Burrow fidelity has been reported in some areas; however, more frequently, burrowing owls reuse traditional nesting areas without necessarily using the same burrow (Haug et al. 1993, Dechant et al. 1999). Burrow and nest sites are re-used at a higher rate if the burrowing owl has reproduced successfully during the previous year (Haug et al. 1993) and if the number of burrows isn't limiting nesting opportunity.

Burrowing owls may use "satellite" or non-nesting burrows, moving young at 10-14 days, presumably to reduce risk of predation (Desmond and Savidge 1998) and possibly to avoid nest parasites (Dechant et al. 1999). Successful nests in Nebraska had more active satellite burrows within 75 m of the nest burrow than unsuccessful nests (Desmond and Savidge

1999). Several studies have documented the number of satellite burrows used by young and adult burrowing owls during the breeding season as between one and 11 burrows with an average use of approximately five burrows (Thompsen 1984, Haug 1985, Haug and Oliphant 1990). Supporting the notion of selecting for nest sites near potential satellite burrows, Ronan (2002) found burrowing owl families would move away from a nest site if their satellite burrows were experimentally removed through blocking their entrance.

Habitat adjacent to burrows has been documented to be important to burrowing owls. Gervais et al. (2003) found that home range sizes of male burrowing owls during the nesting season were highly variable within but not between years. Their results also suggested that owls concentrate foraging efforts within 600 meters of the nest burrow, as was observed in Canada (Haug and Oliphant 1990) and southern California (Rosenberg and Haley 2004). James et al. (1997), reported habitat modification factors causing local burrowing owl declines included habitat fragmentation and loss of connectivity.

In conclusion, the best available science indicates that essential habitat for the burrowing owl in California must include suitable year-round habitat, primarily for breeding, foraging, wintering and dispersal habitat consisting of short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey within close proximity to the burrow.

Threats to Burrowing Owls in California

Habitat loss. Habitat loss, degradation, and fragmentation are the greatest threats to burrowing owls in California. According to DeSante et al. (2007), “the vast majority of burrowing owls [now] occur in the wide, flat lowland valleys and basins of the Imperial Valley and Great Central Valley [where] for the most part,...the highest rates of residential and commercial development in California are occurring.” Habitat loss from the State’s long history of urbanization in coastal counties has already resulted in either extirpation or drastic reduction of burrowing owl populations there (Gervais et al. 2008). Further, loss of agricultural and other open lands (such as grazed landscapes) also negatively affect owl populations. Because of their need for open habitat with low vegetation, burrowing owls are unlikely to persist in agricultural lands dominated by vineyards and orchards (Gervais et al. 2008).

Control of burrowing rodents. According to Klute et al. (2003), the elimination of burrowing rodents through control programs is a primary factor in the recent and historical decline of burrowing owl populations nationwide. In California, ground squirrel burrows are most often used by burrowing owls for nesting and cover; thus, ground squirrel control programs may affect owl numbers in local areas by eliminating a necessary resource.

Direct mortality. Burrowing owls suffer direct losses from a number of sources. Vehicle collisions are a significant source of mortality especially in the urban interface and where owls nest alongside roads (Haug et al. 1993, Gervais et al. 2008). Road and ditch maintenance, modification of water conveyance structures (Imperial Valley) and discing to control weeds in fallow fields may destroy burrows (Rosenberg and Haley 2004, Catlin and Rosenberg 2006) which may trap or crush owls. Wind turbines at Altamont Pass Wind Resource Area are known to cause direct burrowing owl mortality (Thelander et al. 2003). Exposure to

pesticides may pose a threat to the species but is poorly understood (Klute et al. 2003, Gervais et al. 2008).

Appendix B. Definitions

Some key terms that appear in this document are defined below.

Adjacent habitat means burrowing owl habitat that abuts the area where habitat and burrows will be impacted and rendered non-suitable for occupancy.

Breeding (nesting) season begins as early as 1 February and continues through 31 August (Thomsen 1971, Zarn 1974). The timing of breeding activities may vary with latitude and climatic conditions. The breeding season includes pairing, egg-laying and incubation, and nestling and fledging stages.

Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owls or permanently exclude burrowing owls and excavate and close burrows after confirming burrows are empty.

Burrowing owl habitat generally includes, but is not limited to, short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey.

Burrow surrogates include culverts, piles of concrete rubble, piles of soil, burrows created along soft banks of ditches and canals, pipes, and similar structures.

Civil twilight - Morning civil twilight begins when the geometric center of the sun is 6 degrees below the horizon (civil dawn) and ends at sunrise. Evening civil twilight begins at sunset and ends when the geometric center of the sun reaches 6 degrees below the horizon (civil dusk). During this period there is enough light from the sun that artificial sources of light may not be needed to carry on outdoor activities. This concept is sometimes enshrined in laws, for example, when drivers of automobiles must turn on their headlights (called lighting-up time in the UK); when pilots may exercise the rights to fly aircraft. Civil twilight can also be described as the limit at which twilight illumination is sufficient, under clear weather conditions, for terrestrial objects to be clearly distinguished; at the beginning of morning civil twilight, or end of evening civil twilight, the horizon is clearly defined and the brightest stars are visible under clear atmospheric conditions.

Conservation for burrowing owls may include but may not be limited to protecting remaining breeding pairs or providing for population expansion, protecting and enhancing breeding and essential habitat, and amending or augmenting land use plans to stabilize populations and other specific actions to avoid the need to list the species pursuant to California or federal Endangered Species Acts.

Contiguous means connected together so as to form an uninterrupted expanse in space.

Essential habitat includes nesting, foraging, wintering, and dispersal habitat.

Foraging habitat is habitat within the estimated home range of an occupied burrow, supports suitable prey base, and allows for effective hunting.

Host burrowers include ground squirrels, badgers, foxes, coyotes, gophers etc.

Locally significant species is a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or occurring in a unique habitat type.

Non-breeding season is the period of time when nesting activity is not occurring, generally September 1 through January 31, but may vary with latitude and climatic conditions.

Occupied site or occupancy means a site that is assumed occupied if at least one burrowing owl has been observed occupying a burrow within the last three years (Rich 1984). Occupancy of suitable burrowing owl habitat may also be indicated by owl sign including its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance or perch site.

Other impacting activities may include but may not be limited to agricultural practices, vegetation management and fire control, pest management, conversion of habitat from rangeland or natural lands to more intensive agricultural uses that could result in “take”. These impacting activities may not meet the definition of a project under CEQA.

Passive relocation is a technique of installing one-way doors in burrow openings to temporarily or permanently evict burrowing owls and prevent burrow re-occupation.

Peak of the breeding season is between 15 April and 15 July.

Sign includes its tracks, molted feathers, cast pellets (defined as 1-2” long brown to black regurgitated pellets consisting of non-digestible portions of the owls’ diet, such as fur, bones, claws, beetle elytra, or feathers), prey remains, egg shell fragments, owl white wash, nest burrow decoration materials (e.g., paper, foil, plastic items, livestock or other animal manure, etc.), possible owl perches, or other items.

Appendix C. Habitat Assessment and Reporting Details

Habitat Assessment Data Collection and Reporting

Current scientific literature indicates that it would be most effective to gather the data in the manner described below when conducting project scoping, conducting a habitat assessment site visit and preparing a habitat assessment report:

1. Conduct at least one visit covering the entire potential project/activity area including areas that will be directly or indirectly impacted by the project. Survey adjoining areas within 150 m (Thomsen 1971, Martin 1973), or more where direct or indirect effects could potentially extend offsite. If lawful access cannot be achieved to adjacent areas, surveys can be performed with a spotting scope or other methods.
2. Prior to the site visit, compile relevant biological information for the site and surrounding area to provide a local and regional context.
3. Check all available sources for burrowing owl occurrence information regionally prior to a field inspection. The CNDDB and BIOS (see References cited) may be consulted for known occurrences of burrowing owls. Other sources of information include, but are not limited to, the Proceedings of the California Burrowing Owl Symposium (Barclay et al. 2007), county bird atlas projects, Breeding Bird Survey records, eBIRD (http://ebird.org), Gervais et al. (2008), local reports or experts, museum records, and other site-specific relevant information.
4. Identify vegetation and habitat types potentially supporting burrowing owls in the project area and vicinity.
5. Record and report on the following information:
    a. A full description of the proposed project, including but not limited to, expected work periods, daily work schedules, equipment used, activities performed (such as drilling, construction, excavation, etc.) and whether the expected activities will vary in location or intensity over the project's timeline;
    b. A regional setting map, showing the general project location relative to major roads and other recognizable features;
    c. A detailed map (preferably a USGS topo 7.5' quad base map) of the site and proposed project, including the footprint of proposed land and/or vegetation-altering activities, base map source, identifying topography, landscape features, a north arrow, bar scale, and legend;
    d. A written description of the biological setting, including location (Section, Township, Range, baseline and meridian), acreage, topography, soils, geographic and hydrologic characteristics, land use and management history on and adjoining the site (i.e., whether it is urban, semi-urban or rural; whether there is any evidence of past or current livestock grazing, mowing, disking, or other vegetation management activities);
    e. An analysis of any relevant, historical information concerning burrowing owl use or occupancy (breeding, foraging, over-wintering) on site or in the assessment area;
    f. Vegetation type and structure (using Sawyer et al. 2009), vegetation height, habitat types and features in the surrounding area plus a reasonably sized (as supported with logical justification) assessment area; (Note: use caution in discounting habitat based on grass height as it can be a temporary condition variable by season and conditions (such as current grazing regime) or may be distributed as a mosaic).

g. The presence of burrowing owl individuals or pairs or sign (see Appendix B);
h. The presence of suitable burrows and/or burrow surrogates (>11 cm in diameter (height and width) and >150 cm in depth) (Johnson et al. 2010), regardless of a lack of any burrowing owl sign and/or burrow surrogates; and burrowing owls and/or their sign that have recently or historically (within the last 3 years) been identified on or adjacent to the site.

Appendix D. Breeding and Non-breeding Season Surveys and Reports

Current scientific literature indicates that it is most effective to conduct breeding and non-breeding season surveys and report in the manner that follows:

Breeding Season Surveys

Number of visits and timing. Conduct 4 survey visits: 1) at least one site visit between 15 February and 15 April, and 2) a minimum of three survey visits, at least three weeks apart, between 15 April and 15 July, with at least one visit after 15 June. Note: many burrowing owl migrants are still present in southwestern California during mid-March, therefore, exercise caution in assuming breeding occupancy early in the breeding season.

Survey method. Rosenberg et al. (2007) confirmed walking line transects were most effective in smaller habitat patches. Conduct surveys in all portions of the project site that were identified in the Habitat Assessment and fit the description of habitat in Appendix A. Conduct surveys by walking straight-line transects spaced 7 m to 20 m apart, adjusting for vegetation height and density (Rosenberg et al. 2007). At the start of each transect and, at least, every 100 m, scan the entire visible project area for burrowing owls using binoculars. During walking surveys, record all potential burrows used by burrowing owls as determined by the presence of one or more burrowing owls, pellets, prey remains, whitewash, or decoration. Some burrowing owls may be detected by their calls, so observers should also listen for burrowing owls while conducting the survey.

Care should be taken to minimize disturbance near occupied burrows during all seasons and not to "flush" burrowing owls especially if predators are present to reduce any potential for needless energy expenditure or burrowing owl mortality. Burrowing owls may flush if approached by pedestrians within 50 m (Conway et al. 2003). If raptors or other predators are present that may suppress burrowing owl activity, return at another time or later date for a follow-up survey.

Check all burrowing owls detected for bands and/or color bands and report band combinations to the Bird Banding Laboratory (BBL). Some site-specific variations to survey methods discussed below may be developed in coordination with species experts and Department staff.

Weather conditions. Poor weather may affect the surveyor's ability to detect burrowing owls, therefore, avoid conducting surveys when wind speed is >20 km/hr, and there is precipitation or dense fog. Surveys have greater detection probability if conducted when ambient temperatures are >20º C, <12 km/hr winds, and cloud cover is <75% (Conway et al. 2008).

Time of day. Daily timing of surveys varies according to the literature, latitude, and survey method. However, surveys between morning civil twilight and 10:00 AM and two hours before sunset until evening civil twilight provide the highest detection probabilities (Barclay pers. comm. 2012, Conway et al. 2008).

Alternate methods. If the project site is large enough to warrant an alternate method, consult current literature for generally accepted survey methods and consult with the Department on the proposed survey approach.

Additional breeding season site visits. Additional breeding season site visits may be necessary, especially if non-breeding season exclusion methods are contemplated. Detailed information, such as approximate home ranges of each individual or of family units, as well as foraging areas as related to the proposed project, will be important to document for evaluating impacts, planning avoidance measure implementation and for mitigation measure performance monitoring.

Adverse conditions may prevent investigators from determining presence or occupancy. Disease, predation, drought, high rainfall or site disturbance may preclude presence of burrowing owls in any given year. Any such conditions should be identified and discussed in the survey report. Visits to the site in more than one year may increase the likelihood of detection. Also, visits to adjacent known occupied habitat may help determine appropriate survey timing.

Given the high site fidelity shown by burrowing owls (see Appendix A, Importance of burrows), conducting surveys over several years may be necessary when project activities are ongoing, occur annually, or start and stop seasonally. (See Negative surveys).

Non-breeding Season Surveys

If conducting non-breeding season surveys, follow the methods described above for breeding season surveys, but conduct at least four (4) visits, spread evenly, throughout the non-breeding season. Burrowing owl experts and local Department staff are available to assist with interpreting results.

Negative Surveys

Adverse conditions may prevent investigators from documenting presence or occupancy. Disease, predation, drought, high rainfall or site disturbance may preclude presence of burrowing owl in any given year. Discuss such conditions in the Survey Report. Visits to the site in more than one year increase the likelihood of detection and failure to locate burrowing owls during one field season does not constitute evidence that the site is no longer occupied, particularly if adverse conditions influenced the survey results. Visits to other nearby known occupied sites can affirm whether the survey timing is appropriate.

Take Avoidance Surveys

Field experience from 1995 to present supports the conclusion that it would be effective to complete an initial take avoidance survey no less than 14 days prior to initiating ground disturbance activities using the recommended methods described in the Detection Surveys section above. Implementation of avoidance and minimization measures would be triggered by positive owl presence on the site where project activities will occur. The development of avoidance and minimization approaches would be informed by monitoring the burrowing owls.

Burrowing owls may re-colonize a site after only a few days. Time lapses between project activities trigger subsequent take avoidance surveys including but not limited to a final survey conducted within 24 hours prior to ground disturbance.

Survey Reports

Report on the survey methods used and results including the information described in the Summary Report and include the reports within the CEQA documentation:

1. Date, start and end time of surveys including weather conditions (ambient temperature, wind speed, percent cloud cover, precipitation and visibility);
2. Name(s) of surveyor(s) and qualifications;
3. A discussion of how the timing of the survey affected the comprehensiveness and detection probability;
4. A description of survey methods used including transect spacing, point count dispersal and duration, and any calls used;
5. A description and justification of the area surveyed relative to the project area;
6. A description that includes: number of owls or nesting pairs at each location (by nestlings, juveniles, adults, and those of an unknown age), number of burrows being used by owls, and burrowing owl sign at burrows. Include a description of individual markers, such as bands (numbers and colors), transmitters, or unique natural identifying features. If any owls are banded, request documentation from the BBL and bander to report on the details regarding the known history of the banded burrowing owl(s) (age, sex, origins, whether it was previously relocated) and provide with the report if available;
7. A description of the behavior of burrowing owls during the surveys, including feeding, resting, courtship, alarm, territorial defense, and those indicative of parents or juveniles;
8. A list of possible burrowing owl predators present and documentation of any evidence of predation of owls;
9. A detailed map (1:24,000 or closer to show details) showing locations of all burrowing owls, potential burrows, occupied burrows, areas of concentrated burrows, and burrowing owl sign. Locations documented by use of global positioning system (GPS) coordinates must include the datum in which they were collected. The map should include a title, north arrow, bar scale and legend;
10. Signed field forms, photos, etc., as appendices to the field survey report;
11. Recent color photographs of the proposed project or activity site; and
12. Original CNDDB Field Survey Forms should be sent directly to the Department's CNDDB office, and copies should be included in the environmental document as an appendix. (http://www.dfg.ca.gov/bdb/html/cnddb.html).

Appendix E. Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans

Whereas the Department does not recommend exclusion and burrow closure, current scientific literature and experience from 1995 to present, indicate that the following example components for burrowing owl artificial burrow and exclusion plans, combined with consultation with the Department to further develop these plans, would be effective.

Artificial Burrow Location

If a burrow is confirmed occupied on-site, artificial burrow locations should be appropriately located and their use should be documented taking into consideration:

1. A brief description of the project and project site pre-construction;
2. The mitigation measures that will be implemented;
3. Potential conflicting site uses or encumbrances;
4. A comparison of the occupied burrow site(s) and the artificial burrow site(s) (e.g., vegetation, habitat types, fossorial species use in the area, and other features);
5. Artificial burrow(s) proximity to the project activities, roads and drainages;
6. Artificial burrow(s) proximity to other burrows and entrance exposure;
7. Photographs of the site of the occupied burrow(s) and the artificial burrows;
8. Map of the project area that identifies the burrow(s) to be excluded as well as the proposed sites for the artificial burrows;
9. A brief description of the artificial burrow design;
10. Description of the monitoring that will take place during and after project implementation including information that will be provided in a monitoring report.
11. A description of the frequency and type of burrow maintenance.

Exclusion Plan

An Exclusion Plan addresses the following including but not limited to:

1. Confirm by site surveillance that the burrow(s) is empty of burrowing owls and other species preceding burrow scoping;
2. Type of scope and appropriate timing of scoping to avoid impacts;
3. Occupancy factors to look for and what will guide determination of vacancy and excavation timing (one-way doors should be left in place 48 hours to ensure burrowing owls have left the burrow before excavation, visited twice daily and monitored for evidence that owls are inside and can't escape i.e., look for sign immediately inside the door).
4. How the burrow(s) will be excavated. Excavation using hand tools with refilling to prevent reoccupation is preferable whenever possible (may include using piping to stabilize the burrow to prevent collapsing until the entire burrow has been excavated and it can be determined that no owls reside inside the burrow);
5. Removal of other potential owl burrow surrogates or refugia on site;
6. Photographing the excavation and closure of the burrow to demonstrate success and sufficiency;

7. Monitoring of the site to evaluate success and, if needed, to implement remedial measures to prevent subsequent owl use to avoid take;
8. How the impacted site will continually be made inhospitable to burrowing owls and fossorial mammals (e.g., by allowing vegetation to grow tall, heavy disking, or immediate and continuous grading) until development is complete.

Appendix F. Mitigation Management Plan and Vegetation Management Goals

Mitigation Management Plan

A mitigation site management plan will help ensure the appropriate implementation and maintenance for the mitigation site and persistence of the burrowing owls on the site. For an example to review, refer to Rosenberg et al. (2009). The current scientific literature and field experience from 1995 to present indicate that an effective management plan includes the following:

1. Mitigation objectives;
2. Site selection factors (including a comparison of the attributes of the impacted and conserved lands) and baseline assessment;
3. Enhancement of the conserved lands (enhancement of reproductive capacity, enhancement of breeding areas and dispersal opportunities, and removal or control of population stressors);
4. Site protection method and prohibited uses;
5. Site manager roles and responsibilities;
6. Habitat management goals and objectives:
    a. Vegetation management goals,
        i. Vegetation management tools:
            1. Grazing
            2. Mowing
            3. Burning
            4. Other
    b. Management of ground squirrels and other fossorial mammals,
    c. Semi-annual and annual artificial burrow cleaning and maintenance,
    d. Non-natives control – weeds and wildlife,
    e. Trash removal;
7. Financial assurances:
    a. Property analysis record or other financial analysis to determine long-term management funding,
    b. Funding schedule;
8. Performance standards and success criteria;
9. Monitoring, surveys and adaptive management;
10. Maps;
11. Annual reports.

Vegetation Management Goals

- Manage vegetation height and density (especially in immediate proximity to burrows). Suitable vegetation structure varies across sites and vegetation types, but should generally be at the average effective vegetation height of 4.7 cm (Green and Anthony 1989) and <13 cm average effective vegetation height (MacCracken et al. 1985*a)*.
- Employ experimental prescribed fires (controlled, at a small scale) to manage vegetation structure;

- Vegetation reduction or ground disturbance timing, extent, and configuration should avoid take. While local ordinances may require fire prevention through vegetation management, activities like disking, mowing, and grading during the breeding season can result in take of burrowing owls and collapse of burrows, causing nest destruction. Consult the take avoidance surveys section above for pre-management avoidance survey recommendations;
- Promote natural prey distribution and abundance, especially in proximity to occupied burrows; and
- Promote self-sustaining populations of host burrowers by limiting or prohibiting lethal rodent control measures and by ensuring food availability for host burrowers through vegetation management.

Refer to Rosenberg et al. (2009) for a good discussion of managing grasslands for burrowing owls.

Mitigation Site Success Criteria

In order to evaluate the success of mitigation and management strategies for burrowing owls, monitoring is required that is specific to the burrowing owl management plan. Given limited resources, Barclay et al. (2011) suggests managers focus on accurately estimating annual adult owl populations rather than devoting time to estimating reproduction, which shows high annual variation and is difficult to accurately estimate. Therefore, the key objective will be to determine accurately the number of adult burrowing owls and pairs, and if the numbers are maintained. A frequency of 5-10 years for surveys to estimate population size may suffice if there are no changes in the management of the nesting and foraging habitat of the owls.

Effective monitoring and evaluation of off-site and on-site mitigation management success for burrowing owls includes (Barclay, pers. comm.):

- Site tenacity;
- Number of adult owls present and reproducing;
- Colonization by burrowing owls from elsewhere (by band re-sight);
- Evidence and causes of mortality;
- Changes in distribution; and
- Trends in stressors.

Appendix D8
Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley

RECOMMENDED TIMING AND METHODOLOGY FOR SWAINSON'S HAWK NESTING SURVEYS IN CALIFORNIA'S CENTRAL VALLEY

Swainson's Hawk Technical Advisory Committee

May 31, 2000

This set of survey recommendations was developed by the Swainson's Hawk Technical Advisory Committee (TAC) to maximize the potential for locating nesting Swainson's hawks, and thus reducing the potential for nest failures as a result of project activities/disturbances. The combination of appropriate surveys, risk analysis, and monitoring has been determined to be very effective in reducing the potential for project-induced nest failures. As with most species, when the surveyor is in the right place at the right time, Swainson's hawks may be easy to observe; but some nest sites may be very difficult to locate, and even the most experienced surveyors have missed nests, nesting pairs, mis-identified a hawk in a nest, or believed incorrectly that a nest had failed. There is no substitute for specific Swainson's hawk survey experience and acquiring the correct search image.

METHODOLOGY

Surveys should be conducted in a manner that maximizes the potential to observe the adult Swainson's hawks, as well as the nest/chicks second. To meet the California Department of Fish and Game's (CDFG) recommendations for mitigation and protection of Swainson's hawks, surveys should be conducted for a ½ mile radius around all project activities, and if active nesting is identified within the ½ mile radius, consultation is required. In general, the TAC recommends this approach as well.

Minimum Equipment

Minimum survey equipment includes a high-quality pair of binoculars and a high quality spotting scope. Surveying even the smallest project area will take hours, and poor optics often result in eye-strain and difficulty distinguishing details in vegetation and subject birds. Other equipment includes good maps, GPS units, flagging, and notebooks.

Walking vs Driving

Driving (car or boat) or "windshield surveys" are usually preferred to walking if an adequate roadway is available through or around the project site. While driving, the observer can typically approach much closer to a hawk without causing it to fly. Although it might appear that a flying bird is more visible, they often fly away from the observer using trees as screens; and it is difficult to determine from where a flying bird came. Walking surveys are useful in locating a nest after a nest territory is identified, or when driving is not an option.

Angle and Distance to the Tree

Surveying subject trees from multiple angles will greatly increase the observer's chance of detecting a nest or hawk, especially after trees are fully leafed and when surveying multiple trees

in close proximity. When surveying from an access road, survey in both directions. Maintaining a distance of 50 meters to 200 meters from subject trees is optimal for observing perched and flying hawks without greatly reducing the chance of detecting a nest/young: Once a nesting territory is identified, a closer inspection may be required to locate the nest.

Speed
Travel at a speed that allows for a thorough inspection of a potential nest site. Survey speeds should not exceed 5 miles per hour to the greatest extent possible. If the surveyor must travel faster than 5 miles per hour, stop frequently to scan subject trees.

Visual and Aural Ques
Surveys will be focused on both observations and vocalizations. Observations of nests, perched adults, displaying adults, and chicks during the nesting season are all indicators of nesting Swainson's hawks. In addition, vocalizations are extremely helpful in locating nesting territories. Vocal communication between. hawks is frequent during territorial displays; during courtship and mating; through the nesting period as mates notify each other that food is available or that a threat exists; and as older chicks and fledglings beg for food.

Distractions
Minimize distractions while surveying. Although two pairs of eyes may be better than one pair at times, conversation may limit focus. Radios should be off, not only are they distracting, they may cover a hawk's call.

Notes and Species Observed
Take thorough field notes. Detailed notes and maps of the location of observed Swainson's hawk nests are essential for filling gaps in the Natural Diversity Data Base; please report all observed nest sites. Also document the occurrence of nesting great homed owls, red-tailed hawks, red-shouldered hawks and other potentially competitive species. These species will infrequently nest within 100 yards of each other, so the presence of one species will not necessarily exclude another.

TIMING

To meet **the minimum level** of protection for the species, surveys should be completed for **at least** the two survey periods immediately prior to a project's initiation. For example, if a project is scheduled to begin on June 20, you should complete 3 surveys in Period III and 3 surveys in Period V. However, it is always recommended that surveys be completed in Periods II, III and V. **Surveys should not be conducted in Period IV.**

The survey periods are defined by the timing of migration, courtship, and nesting in a "typical" year for the majority of Swainson's hawks from San Joaquin County to Northern Yolo County. Dates should be adjusted in consideration of early and late nesting seasons, and geographic differences (northern nesters tend to nest slightly later, etc). If you are not sure, contact a TAC member or CDFG biologist.

Survey dates **Justification and search image**	**Survey time**	**Number of Surveys**
I. *January-March 20 (recommended optional)*	*All day*	*1*

Prior to Swainson's hawks returning, it may be helpful to survey the project site to determine potential nest locations. Most nests are easily observed from relatively long distances, giving the surveyor the opportunity to identify potential nest sites, as well as becoming familiar with the project area. It also gives the surveyor the opportunity to locate and map competing species nest sites such as great homed owls from February on, and red-tailed hawks from March on. After March 1, surveyors are likely to observe Swainson's hawks staging in traditional nest territories.

II. *March 20 to April 5*	*Sunrise to 1000* *1600 to sunset*	*3*

Most Central Valley Swainson's hawks return by April 1, and immediately begin occupying their traditional nest territories. For those few that do not return by April 1, there are often hawks ("floaters") that act as place-holders in traditional nest sites; they are birds that do not have mates, but temporarily attach themselves to traditional territories and/or one of the site's "owners." Floaters are usually displaced by the territories' owner(s) if the owner returns.

Most trees are leafless and are relatively transparent; it is easy to observe old nests, staging birds, and competing species. The hawks are usually in their territories during the survey hours, but typically soaring and foraging in the mid-day hours. Swainson's hawks may often be observed involved in territorial and courtship displays, and circling the nest territory. Potential nest sites identified by the observation of staging Swainson's hawks will usually be active territories during that season, although the pair may not successfully nest/reproduce that year.

III. *April 5 to April 20*	*Sunrise to 1200* *1630 to Sunset*	*3*

Although trees are much less transparent at this time, 'activity at the nest site increases significantly. Both males and females are actively nest building, visiting their selected site frequently. Territorial and courtship displays are increased, as is copulation. The birds tend to vocalize often, and nest locations are most easily identified. This period may require a great deal of "sit and watch" surveying.

IV. *April 21 to June 10*	*Monitoring known nest sites only* ***Initiating Surveys is not recommended***	

Nests are extremely difficult to locate this time of year, and even the most experienced surveyor will miss them, especially if the previous surveys have not been done. During this phase of nesting, the female Swainson's hawk is in brood position, very low in the nest, laying eggs, incubating, or protecting the newly hatched and vulnerable chicks; her head may or may not be visible. Nests are often well-hidden, built into heavily vegetated sections of trees or in clumps of mistletoe, making them all but invisible. Trees are usually not viewable from all angles, which may make nest observation impossible.

Following the male to the nest may be the only method to locate it, and the male will spend hours away from the nest foraging, soaring, and will generally avoid drawing attention to the nest site. Even if the observer is fortunate enough to see a male returning with food for the female, if the female determines it is not safe she will not call the male in, and he will not approach the nest; this may happen if the observer, or others, are too close to the nest or if other threats, such as rival hawks, are apparent to the female or male.

V. ***June 10 to JuIy 30 (post-fledging)*** ***Sunrise to 1200*** ***3***
1600 to sunset

Young are active and visible, and relatively safe without parental protection. Both adults make numerous trips to the nest and are often soaring above, or perched near or on the nest tree. The location and construction of the nest may still limit visibility of the nest, young, ‘and adults.

DETERMINING A PROJECT'S POTENTIAL
FOR IMPACTING SWAINSON'S HAWKS

LEVEL OF RISK	REPRODUCTIVE SUCCESS (Individuals)	LONGTERM SURVIVABILITY (Population)	NORMAL SITE CHARACTERISTICS (Daily Average)	NEST MONI-TORING
HIGH	Direct physical contact with the nest tree while the birds are on eggs or protecting young. (Helicopters in close proximity)	Loss of available foraging area.	Little human-created noise, little human use: nest is well away from dwellings, equipment yards, human access areas, etc. *Do not include general cultivation practices in evaluation.*	**MORE**
		Loss of nest trees.		
	Loss of nest tree after nest building is begun prior to laying eggs.	Loss of potential nest trees.		
	Personnel within 50 yards of nest tree (out of vehicles) for extended periods while birds are on eggs or protecting young that are < 10 days old.	Cumulative: Multi-year, multi-site projects with substantial noise/personnel disturbance.		
	Initiating construction activities (machinery and personnel) within 200 yards of the nest after eggs are laid and before young are > 10 days old.	Cumulative: Single-season projects with substantial noise/personnel disturbance that is greater than or significantly different from the daily norm.		
	Heavy machinery only working within 50 yards of nest.		Substantial human-created noise and occurrence: nest is near roadways, well-used waterways, active airstrips, areas that have high human use. *Do not include general cultivation practices in evaluation.*	
	Initiating construction activities within 200 yards of nest before nest building begins or after young > 10 days old.	Cumulative: Single-season projects with activities that "blend" well with site's "normal' activities.		
LOW	All project activities (personnel and machinery) greater than 200 yards from nest.			**LESS**