

ENVIRONMENTAL CONDITIONS

SOILS

Folsom Lake State Recreation Area

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by

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SOILS

Introduction

Geotechnical Consultants, Inc. prepared this summary of the soil information for the region within and immediately around the Folsom Lake State Recreation Area (the Unit). The soil information presented here is derived from the U.S. Department of Agriculture's soil surveys of Placer and Eastern Sacramento Counties and the El Dorado Area. Geotechnical Consultants, Inc. did not conduct field exploration to examine soils.

The Unit is located along the western margin of the Sierra Foothills, 15 to 20 miles east of the City of Sacramento. The foothills are subdued in the western portion of the Unit but are steeper and more deeply incised in the eastern part, especially in the upper reaches where the North and South Forks of the American River meet Folsom Lake. The soil region occupied by the Unit (CDC, 1979) occurs at the boundary between Regions III (Sierra Nevada) and IV (Sacramento Valley).

Soil Descriptions and Interpretations

General Description

Soil surveys are generally prepared for a single county. As the study area straddles three counties, we compiled the data from three county soil surveys. Each county has a unique nomenclature with no common designations with the adjacent counties; thus, the list of soil units for the study area is long and soils that are basically identical may have different names and designations when they occur in different counties. The soils are summarized in Table S-1. Soils in the higher elevations of the Unit are mostly thin, with numerous outcroppings of igneous and metamorphic rock. The bedrock strongly controls the type of soil. For example, loose soils of decomposed granite are common on the north and west side of Folsom Lake, while clayey, denser soils are common on the south side of the Lake. Much of the area around Lake Natoma has been modified by large-scale dredging for gold, resulting in extensive deposits of dredge tailings.

A map of soils in the study area is shown in Figures S-1A and S-1B: Soils of Folsom Lake State Recreation Area.

Table S-1: Comparison Table of Soils for Three Counties in the Project Area:

El Dorado Co.	Placer Co.	Sacramento Co.	Parent rock / underlying geology
Ahwahnee	Andregg Caperton Sierra	Andregg	Crystalline granite or granodiorite bedrock
Auburn Boomer Sobrante	Auburn	No equivalent	Metavolcanic and metasedimentary bedrock
Rescue	No equivalent	No equivalent	Crystalline mafic rock (gabbro)
Serpentine rock land No equivalent	No equivalent Redding	No equivalent Natomas – often with Urban Land on top	Serpentine Tertiary sedimentary rocks
No equivalent No equivalent	Inks No equivalent	No equivalent Xerolls (terraces of alluvium)	Tertiary volcanic rocks Quaternary terrace deposits near river
Tailings	Xerorthents	Xerorthents	Tailings from dredging

Figure S-1A: Soils of the Folsom Lake State Recreation Area (Folsom Lake)

Figure S-1B: Soils of the Folsom Lake State Recreation Area (Lake Natoma)

El Dorado County Soils

Soils of El Dorado County are described in the U.S. Department of Agriculture Soil Conservation Survey of 1974. Descriptions are presented in Appendix A – Soil Descriptions. A brief list follows, along with Table S-2: Engineering Index Properties - El Dorado County Soils, and Table S-3: Physical and Chemical Properties of Soils - El Dorado County, that show soil characteristics. Some of the soil characteristics requested in the scope can not be presented because they represent *in situ* conditions that are time- and location-specific; these include wetness, porosity, and density. Wetness is highly variable, depending on location and time of year. Porosity is also highly variable and is better characterized through Capacity. Limited data were available for some of the other requested characteristics. The tables are as complete as the available literature allows.

The term “loam” is frequently used in the Soil Conservation surveys. Loam is defined as a combination of clay, silt, and sand with some organic material. This broad definition is not compatible with usage of the Unified Soil Classification System, and in recent years, use of this term has been avoided by geotechnical workers because of its inexactness. Nevertheless, the soil surveys have used the term extensively, and rather than reinterpret all the soil descriptions, the wording has been left as it is used in the published soil surveys.

Auburn-Argonaut association

AxD Auburn very rocky silt loam, 2-30% slopes

AwD Auburn silt loam, 2-30% slopes

AxE Auburn very rocky silt loam, 30-50% slopes

Auberry-Ahwahnee-Sierra association

AcC Ahwahnee coarse sandy loam, 9-15% slopes

AdD Ahwahnee very rocky coarse sandy loam, 9-30% slopes

AdE Ahwahnee very rocky coarse sandy loam, 30-50% slopes

AyF Auburn extremely rocky silt loam, 3-70% slopes

Boomer-Argonaut association

BkE Boomer very rocky loam, 3-51% slopes

BhD Boomer very rocky loam, 0-3% slopes

Serpentine rock land-Delpiedra association

SaF Serpentine rock land

Soils not in an association

SuC Sobrante silt loam, 3-15% slopes

TaD Tailings

Table S-2: Engineering Index Properties – El Dorado County Soil Types

Soil Name	Depth from Surface (in)	Texture Parent Rock	Unified Soil Classification System	Percent Passing			
				Sieve Number 4	Sieve Number 10	Sieve Number 40	Sieve Number 200
Ahwahnee soils: AcC, AdD, AdE	0-8	Coarse sandy loam	SM	100	85-100	40-50	20-30
	8-26	Heavy coarse sandy loam	SM	100	85-100	50-60	25-35
	26	Weathered granodiorite bedrock	--*	--	--	--	--
Auburn soils: AxD, AwD, AxE, AyF	0-14	Silt loam	ML or CL	90-100	85-95	75-80	70-80
	14	Metavolcanic and schist bedrock	--	--	--	--	--
Boomer soils: BhD, BkE, BkF	0-13	Gravelly loam	SM	80-90	70-80	50-70	40-50
	13-52	Gravelly clay loam, gravelly sandy clay loam	SC	65-90	50-85	25-35	35-50
	52	Mafic schist bedrock	--	--	--	--	--
Rescue soil: RgE2	0-10	Sandy loam from gabbrodiorite	SM or SC	100	90-100	65-75	40-50
Serpentine rock land: SaF		Serpentine bedrock	--	--	--	--	--
Sobrante soils: SuC	0-11	Silt loam	M or CL	100	95-100	80-90	70-80
	11-24	Clay loam	CL	95-100	90-95	80-90	70-80
	24	Mafic schist bedrock	--	--	--	--	--
Tailings: TaD	0	River cobbles	--	--	--	--	--

U.S.D.A. Soil Conservation Service, 1974, Soil Survey of El Dorado Area, California.

* The symbol "--" indicates no data were reported for this soil type.

Table S-3: Physical and Chemical Properties of Soil Types – El Dorado County

Soil Name	Depth to bedrock (ft)	Depth from surface (inches)	Permeability (In/hr)	Available water capacity (IN/in)	Salinity (Mmhos/cm)	Mineral Content	pH	Shrink-Swell Potential	Erodibility (K)	Fertility (T)	Clay Content (%)
Ahwahnee soils: AcC, AdD, AdE	2.0-3.5	0-8	2.0-6.3	0.11-0.13	--	--	6.1-7.3	Low	--	--	<50
		8-26	2.0-6.3	0.13-0.15	--	--	6.1-6.5	Low	--	--	>50
Auburn soils: AxD, AwD, AxE, AyF	1.0-2.0	0-14	0.63 – 2.00	0.16-0.20	--	--	6.1-7.3	Low	--	--	--
Boomer soils: BhD, BkE, BkF	2.0-4.5	0-13	0.63-2.00	0.15-0.17	--	--	5.6-6.5	Low	--	--	>50
		13-52	0.20-0.62	0.15-0.17	--	--	5.6-6.5	Moderate	--	--	>50
Rescue soil: RgE2	0-10	0-10	0.62-2.00	0.12-0.14	--	--	5.6-6.5	Low	--	--	>50
Serpentine rock land: SaF	--		properties too variable to be estimated	--	--	High in nickel and chromium	--	--	--	--	--
Sobrante soils: SuC	2.0-3.0	0-11	0.63-2.00	0.18-0.20	--	--	5.6-6.5	Low			
		11-24	0.63-2.00	0.18-0.20	--	--	6.1-6.5	Moderate		Low	--
Tailings: TaD	--	--	properties too variable to be estimated	--	--	--	--	Low	--		

USDA Soil Conservation Service, 1974, Soil Survey of El Dorado Area, California.

* The symbol "--" indicates no data were reported for this soil type

Placer County Soils

Soils of western Placer County are described in the U.S. Department of Agriculture Soil Conservation Survey of 1980. These descriptions are presented in Appendix A – Soil descriptions. A brief listing follows, along with Table S-4: Engineering Index Properties – Placer County Soils and Table S-5: Physical and Chemical Properties of Soil Types – Placer County, showing soil characteristics. Some of the soil characteristics requested in the scope can not be presented because they represent *in situ* conditions that are time- and location-specific; these include wetness, porosity, and density. Wetness is highly variable, depending on location and time of year. Porosity is also highly variable and is better characterized through Capacity. Limited data were available for some of the other requested characteristics. The tables are as complete as the available literature allows.

- 106 Andregg coarse sandy loam, 2-9% slopes
- 107 Andregg coarse sandy loam, 9-15% slopes
- 108 Andregg coarse sandy loam, 15-30% slopes
- 109 Andregg coarse sandy loam, rocky, 2-15% slopes
- 110 Andregg coarse sandy loam, rocky, 15-30% slopes
- 111 Andregg coarse sandy loam, rocky, 30-50% slopes
- 112 Andregg-Rock outcrop complex, 5-30% slopes
- 113 Andregg-Shenandoah complex, 2-15% slopes
- 120 Auburn-Sobrante-rock outcrop complex, 30-15% slopes
- 133 Caperton-Rock outcrop complex, 30-50 slopes
- 152 Inks cobbly loam, 2-30% slopes
- 176 Redding and Corning gravelly loam, 2-9% slopes
- 177 Redding and Corning gravelly loams, 9-18% slopes
- 185 Sierra Sandy loam, 15-30% slopes
- 196 Xerorthents, cut and fill areas
- 197 Xerorthents, placer areas

The term Xerorthents refers to man-modified material, either soils rearranged in a cut and fill or as tailings heaps.

Table S-4: Engineering Index Properties - Placer County Soils

Soil Name	Depth (inches)	Texture / bedrock type	Classification Unified System	Percent Passing			
				Sieve Number 4	Sieve Number 10	Sieve Number 40	Sieve Number 200
Andregg soils: 106, 107, 108, 109, 110, 111, 112, 113*	0-29	Coarse sandy loam	SM	95-100	85-95	50-60	25-45
	29	Weathered granodiorite					
Auburn soil: 120	0-20	Silt loam	ML	95-100	75-95	70-85	20-40
	20	Unweathered bedrock	---	---	---	---	---
Caperton soil: 133	0-18	Gravelly coarse sandy loam	SM	95-100	65-75	45-65	20-30
	18	Weathered granite	---	---	---	---	---
Inks soil: (rubble land) 152	0-5	Cobbly loam	GM, SM, GM-GC, SM-SC	60-80	55-75	40-65	25-50
	5-18	Very cobbly clay loam.	GC to SC	55-75	50-75	45-70	35-50
	18	Unweathered andesitic conglomerate	---	---	---	---	---
Redding soils: 176, 177	0-14	Gravelly loam	SC, SM-SC, GC, GM-GC,	65-90	60-75	55-70	35-50
	14-28	Clay, clay loam	CH, CL	80-95	75-90	70-90	60-75
	28	Indurated sediment or hardpan	---	---	---	---	---
Sierra soil: 185	0-23	Sandy Loam	SM	95-100	90-100	60-75	35-50
	23-41	Loam, clay loam, sandy clay loam	CL, SC	95-100	95-100	65-80	35-70
	41	Weathered granite	---	---	---	---	---
Xerorthents: 196, 197	0-60	Variable – cut and fill material	---	---	---	---	---

* indicates rock outcrop within soil unit.

The symbol “---” indicates no data were reported for this soil type.

Source: USDA Soil Conservation Service, 1980, Soil Survey of Placer County, Western Part, California.

Table S-5: Physical and Chemical Properties of Soils - Placer County

Soil Name	Depth (inches)	Permeability (inches/hr)	Available water capacity (inches/inch)	Salinity (Mmhos/cm)	Mineral Content	pH	Shrink-Swell potential	Erodibility (K)	Fertility (T)	Clay Content (%)
Andregg soils: 106, 107, 108, 109, 110, 112, 113*	0-29	20-6.0	0.10-01.3	--	--	5.6-7.3	Low	0.24	2	<40
Auburn soil: 120	0-20	0.6-2.0	0.14-0.17	--	--	5.6-6.5	Low	0.32	1	approx 50
Caperton soil: 133	0-18	2.0-6.0	0.08-0.11	--	--	5.6-6.5	Low	0.20	1	<40
Inks soil: (rubble land) 152	0-5	0.6-2.0	0.07-0.12	--	--	5.6-6.5	Low	0.20	1	approx 50
	5-18	0.6-2.0	0.08-0.12	--	--	5.6-6.5	Low	0.24	--	>50
Redding soils: 176, 177	0-14	0.6-2.0	0.10-0.14	--	--	5.1-6.0	Low	0.20	2	>50
	14-28	<0.06	0.04-0.04	--	--	4.5-6.0	Moderate	0.28	--	>50
Sierra soil: 185	0-23	0.6-2.0	0.10-0.12	--	--	5.6-7.3	Low	0.28	3	<50
	23-41	0.2-0.6	0.15-0.18	--	--	5.6-6.5	Moderate	0.32	--	approx 50
Xerorthents: 196, 197	0-60	--	--	--	--	--	--	--	--	

* indicates rock outcrop within soil unit.

The symbol "--" indicates no data were reported for this soil type.

Source: USDA Soil Conservation Service, 1980, Soil Survey of Placer County, Western Part, California.

Sacramento County Soils

Soils of Sacramento County are described in the U.S. Department of Agriculture Soil Conservation Survey of 1993. These descriptions are presented in Appendix A – Soil Descriptions. A brief listing follows, along with Table S-6: Engineering Index Properties - Sacramento County Soils and Table S-7: Physical and Chemical Properties of Soils - Sacramento County showing soil characteristics. Some of the soil characteristics requested in the scope can not be presented because they represent *in situ* conditions that are time- and location-specific; these include wetness, porosity, and density. Wetness is highly variable, depending on location and time of year. Porosity is also highly variable and is better characterized through Capacity. Limited data were available for some of the other requested characteristics. The tables are as complete as the available literature allows.

- 103 Andregg coarse sandy loam, 2 to 8 % slopes
- 104 Andregg coarse sand loam, 8 to 15 % slopes
- 105 Andregg-Urban land complex, 8 to 15 % slopes
- 136 Dumps
- 181 Natoma loam, 0 to 2 % slopes
- 182 Natoma –Xerorthents, dredge tailings complex 0 to 50% slopes
- 227 Urban land
- 228 Urban land- Natoma complex, 0-2% slopes
- 243 Xerolls, 30-70% slopes
- 245 Xerorthents, dredge tailings, 2-50% slopes
- 246 Xerorthents, dredge tailings-Urban land complex, 0-2% slopes

Table S-6: Engineering Index Properties - Sacramento County Soils

Soil Name	Depth (in)	Texture Parent Rock	Unified Soil Classification System	Percent Passing			
				Sieve Number 4	Sieve Number 10	Sieve Number 40	Sieve Number 200
Andregg soils: 103, 104, 105	0-11	Coarse sandy loam	SM	95-100	85-100	50-60	25-45
	11-32	Coarse sandy loam, sandy loam	SM	95-100	85-100	50-60	25-40
	32	Weathered bedrock	–	–	–	–	–
Dumps soil: 136	–	–	–	–	–	–	–
Natomas soils: 181, 182	0-17	Loam	CI, CI-MI	100	95-100	80-90	50-65
	17-33	Loam , clay loam	CL	100	95-100	80-90	50-65
	33-78	Clay loam	CL	100	95-100	80-90	50-65
	78-84	Stratified gravelly coarse sandy loam to sandy loam	SM-SC	65-100	60-100	45-70	25-50
Urban land: 227-228	–	–	–	–	–	–	–
Xerolls: 243, 246	–	–	–	–	–	–	–
Xerorthents: 245	–	–	–	–	–	–	–

The symbol “–” indicates no data were reported for this soil type.

Source: U.S.D.A. Soil Conservation Service, 1993, *Soil Survey of Sacramento County, California*.

Table S-7: Physical and Chemical Properties of Soils - Sacramento County

Soil Name	Depth (in)	Permeability (In/hr)	Available water capacity (IN/in)	Salinity (Mmhos/cm)	Mineral Content	pH	Shrink-Swell potential	Erodibility (K)	Fertility (T)	Clay Content (%)
Andreg soils: 103, 104, 105	0-11	2.0-6.0	0.10-0.13	--	--	5.6-7.3	Low	2	8	7-18
	11-32	2.0-6.0	0.10-0.13	--	--	5.6-7.3	Low	--	--	10-18
Dumps: 136	--	--	--	--	--	--	--	--	--	--
Natomas soils: 181, 182	0-17	0.6-2.0	0.14-0.17	--	--	6.7-7.3	Low	5	8	15-25
	17-33	0.6-2.0	0.15-0.18	--	--	5.6-7.3	Low	--	--	20-30
	33-78	0.2-0.6	0.17-0.19	--	--	5.1-6.5	Moderate	--	--	27-35
	78-84	0.6-2.0	0.10-0.12	--	--	6.1-7.3	Low	--	--	15-20
Urban land: 227-228	--	--	--	--	--	--	--	--	--	--
Xerolls: 243, 246	--	--	--	--	--	--	--	--	--	--
Xerorthents: 245	--	--	--	--	--	--	--	--	--	--

The symbol "--" indicates no data were reported for this soil type.

Source: U.S.D.A. Soil Conservation Service, 1993, *Soil Survey of Sacramento County, California*.

Recommendations

In this subsection, specific areas of concern have been described and brief recommendations have been provided. As with any specific project, a site-specific geotechnical and soil survey should be conducted prior to foundation design and design of other surface and subsurface facilities.

Shrink-swell soils: In general, all soils in the Unit have low shrink-swell potential of the surface layer. Moderate shrink-swell potential was identified in Redding soil in the 1-2 foot depth, in Sierra soil in the 2-3 foot depth, in Natomas soil in the 3 to 6 foot depth, and in the Boomer and Sobrante soils at 1 to 4 foot depth. If developments are planned in those areas where moderate shrink-swell potential has been identified approximately 1 to 3 feet below the surface, the geotechnical characteristics of the soil should be described through field and laboratory tests prior to foundation design.

Coarse soils over granite: Most of the northern and northwestern margin of Folsom Lake is underlain by granite. The soils developed over granite bedrock (Ahwahnee, Andregg, Caperton and Sierra) are extremely coarse and sandy and drain rapidly; consequently, granitic soils are highly erodible. Evidence of excessive erosion was observed at numerous places along the north shore; most of it appears to have been worsened by off-road vehicle users as well as by use of unpaved trails. Another problem associated with granitic soils is excessive drainage. Leach fields should not be constructed in this soil type, because leachate will travel rapidly through the soil and emerge at the surface downslope.

Serpentine rock and soil: Serpentine soil forms over serpentine bedrock, the bulk of which lies in a north-south swath through the Peninsula (between the North and South Forks at Flagstaff Hill) and south of the South Fork of the American River at Iron Mountain. Serpentine soils (Serpentine rock land in El Dorado Co.) are high in nickel, chromium, and manganese that limit the varieties of plants that can grow in it. Serpentine soil is generally unsuitable for construction of leach fields due to the corrosive qualities of the soil.

Dredge tailings: Adjacent to Lake Natoma, dredge tailings ('Tailings' in El Dorado Co., Xerorthents in Placer and Sacramento Counties) are generally composed of small to large cobbles to small boulders of smooth rock occurring in a hummocky or lumpy pattern. Water washes through these cobbles so quickly, that any fine-grained material is soon washed away, leaving the tailings piles largely unvegetated. Some of these tailings piles could be removed through quarrying operations that mine the cobbles for landscaping rock. This process would flatten out the topography, reduce the thickness of cobble accumulation, and eventually allow revegetation of the native soil when they have been uncovered.

Groundwater: Areas of thin soil over bedrock will have limited permeability. This characteristic must be factored in when designing facilities on bedrock. Thin soils are likely to occur in the uplands or steeply sloping portions of the Unit along the margins of Folsom Lake. The soil types would include Ahwahnee, Andregg, Caperton and Sierra soils; Auburn Boomer and Sobrante soils; and Rescue and Serpentine rock land soils.

References

California Department of Conservation (C.D.C.), 1979, California Soils: An Assessment, Draft Report by the Soil Resources Protection Unit.

U.S.D.A. Soil Conservation Service, 1974, Soil Survey of El Dorado Area, California.

U.S.D.A. Soil Conservation Service, 1980, Soil Survey of Placer County, Western Part, California.

U.S.D.A. Soil Conservation Service, 1993, Soil Survey of Sacramento County, California.

Appendix

Soil Descriptions and Interpretations

The Folsom Lake–Lake Natoma Region lies within the Lower and Middle Foothills. Soils developed in this setting are generally well-drained silty, sandy and gravelly mixtures developed over either granitic or metamorphic bedrock. An exception is in the area of exposures of serpentine rock where a specialized soil type forms.

The following soil series descriptions and interpretations are taken directly from the published Soil Conservation Service reports for El Dorado, Placer, and Sacramento Counties.

El Dorado County

Ahwahnee Series.

The Ahwahnee series consists of well-drained soils that are underlain by weathered granitic rocks at a depth of 24 to 40 inches. These are rolling to steep soils on foothills. Slopes are 9 to 50 percent. Elevations range from 500 feet to 2,500 feet. The average annual rainfall is 25 to 35 inches, average annual temperature is 60 ° F and the frost-free season is 170 to 270 days. Vegetation is mainly annual grasses, forbs, and oaks; and there are scattered Digger (Gray) and Ponderosa Pines. Ahwahnee soils are associated principally with Auberry, Sierra, and Auburn soils.

In a representative profile, the surface layer is very dark gray and grayish-brown, neutral and slightly acid, sandy loam and coarse sandy loam about 8 inches thick. The subsoil is pale brown and light yellowish brown, slightly acid, heavy coarse sandy loam. Weathered granodiorite occurs at a depth of about 26 inches. Ahwahnee soils are used for annual range.

Ahwahnee coarse sandy loam, 9 to 15 percent slopes (AcC). This soil is strongly sloping. Exposed bedrock occupies less than 5 percent of the surface. A representative profile is located 7 miles southwest of Pilot Hill, 0.1-mile east of the high-water mark on Folsom Reservoir, 0.1-mile southwest of the northeast corner of Section 8, Township 10 North, Range 8 East:

- A11 0 to 2 ½ inches from surface, very dark gray (N3/0)¹, sandy loam, black (N 2/0) when moist; massive; soft, friable, nonsticky and nonplastic; many very fine roots; many very fine tubular and interstitial pores; neutral; clear, smooth boundary.
- A12 2 ½ to 8 inches from surface, grayish-brown (10YR 5/2), coarse sandy loam, dark brown (10YR 3/3) when moist; massive; soft, friable, nonsticky and nonplastic; common very fine and fine roots; common very fine tubular pores; slightly acid; clear, smooth boundary.

¹ Letters and numbers within parentheses refer to colors as defined in the Munsell Color System for Soil.

- B1 8 to 18 inches from surface, pale-brown (10YR 6/3), heavy coarse sandy loam, dark yellowish brown (10YR 4/4) when moist; massive; hard, friable, slightly sticky and nonplastic; common fine and medium roots; common very fine tubular and interstitial pores and few fine tubular pores; slightly acid; clear, smooth boundary.
- B2t 18 to 26 inches from surface, light yellowish-brown (10YR 6/4), heavy coarse sandy loam, brown (7.5YR 4/4), when moist; massive; very hard, friable, slightly sticky and nonplastic; few fine and medium roots; common very fine tubular and interstitial pores; few thin clay films in pores and as bridges; slightly acid; abrupt, irregular boundary
- C 26 inches from surface, weathered granodiorite that has many thin clay films in pores and as bridges.

Total thickness of the A horizon is about 6 to 10 inches. Depth to rock is 24 to 40 inches. Included in mapping are small areas of Auberry coarse sandy loam, Sierra sandy loam, Auburn very rocky silt loam, and a soil that is similar to this Ahwahnee soil but has a paler surface layer. Permeability of this Ahwahnee soil is moderately rapid. Surface runoff is medium, and the erosion hazard is moderate to high. The available water-holding capacity is 3.5 to 5 inches. The effective rooting depth is 24 to 40 inches. This soil is used for range. Capability Unit IV3-1(18); Range Site 3; Woodland Suitability Group not assigned.

Ahwahnee very rocky, coarse sandy loam, 9 to 30 percent slopes (AdD). In areas of this soil, rock outcrops occupy 5 to 25 percent of the surface. Included in mapping are small areas of Auberry very rocky coarse sandy loam, Auburn very rocky silt loam, Chawanakee very rocky coarse sandy loam, Chaix very rocky coarse sandy loam, and Sierra very rocky sandy loam. Surface runoff is medium to rapid, and the erosion hazard is high. This soil is used for range. Capability Unit VIs-1(18); Range Site 3; Woodland Suitability Group not assigned.

Ahwahnee very rocky, coarse sandy loam, 30 to 50 percent slopes (AdE). In areas of this soil, rock outcrops make up 5 to 25 percent of the surface. Included in mapping are small areas of Auberry very rocky coarse sandy loam, Auburn very rocky silt loam, Chawanakee very rocky coarse sandy loam, Chaix very rocky coarse sandy loam, and Sierra very rocky sandy loam. Surface runoff is rapid, and the erosion hazard is very high. This soil is used for range and watershed. Capability Unit VIIs-1(18); Range Site 3; Woodland Suitability Group not assigned.

Auburn Series.

The Auburn series consists of well-drained soils that are underlain by hard metamorphic rocks at a depth of 12 to 26 inches. These soils are present on undulating to very steep foothills. Slopes are 2 to 70 percent. Elevations range from 500 feet to 1,800 feet. The average annual rainfall is 25 to 35 inches, average annual temperature is 60 ° F and the frost-free season is 170 to 270 days. Vegetation is mainly annual grasses, forbs, and oaks, and there are scattered areas of Digger (Gray) pine and brush. Auburn soils are associated principally with Argonaut, Boomer, Sobrante, and Whiterock soils. In a representative profile, the surface layer is brown, slightly acid silt loam. Weathered metabasic rock is at a depth of about 14 inches. Auburn soils are used mainly for range. A few small areas are used for irrigated pasture.

Auburn very rocky silt loam, 2 to 30 percent slopes (AxD). This soil is gently sloping to moderately steep. Outcrops of bedrock cover 5 to 25 percent of the surface. A representative profile is located 5 miles west of Shingle Springs, 2,000 feet west and 1,200 feet south of the northeast corner of Section 7, Township 9 North, Range 9 East:

- A1 0 to 3 inches from surface, brown (7.5YR 5/4) silt loam, dark reddish brown (5YR 3/3) when moist; massive; slightly hard, friable, nonsticky and nonplastic; many very fine roots; many very fine and fine pores; slightly acid; clear, wavy boundary.
- B2 3 to 14 inches from surface, reddish-yellow (5YR 6/8) silt loam, dark reddish brown (5YR 6/8) when moist; massive; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; slightly acid; abrupt, wavy boundary.
- R 14 inches from surface, weathered metabasic rock.

Depth to bedrock ranges from 12 to 26 inches. As much as 25 percent of the soil mass consists of gravel- and cobblestone-sized rock fragments. The color of the A horizon ranges from reddish brown or brown to yellowish red. The texture is loam or silt loam. The total thickness of the A horizon is 3 to 10 inches. There is a slight increase in clay content in the B horizon. Reaction is slightly acid or neutral. Included in mapping are small areas of Argonaut very rocky loam, Boomer very rocky loam, and Sobrante very rocky silt loam. In the Folsom Reservoir area, there is a soil similar to this Auburn soil that has a darker colored surface layer and formed on mica schist. Permeability of this Auburn soil is moderate. Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The available water-holding capacity is 2 to 4 inches. The effective rooting depth is 12 to 26 inches. This soil is used for range. A few small areas are used as irrigated pasture. Capability Unit VI_s-1(18); Range Site 1; Woodland Suitability Group not assigned.

Auburn silt loam, 2 to 30 percent slopes (AwD). This soil has slopes that are dominantly between 5 and 15 percent. It is similar to Auburn very rocky silt loam, 2 to 30 percent slopes except that less than 5 percent of the surface is exposed bedrock. Included in mapping are small areas of Argonaut gravelly loam; Perkins gravelly loam, moderately deep variant; and Sobrante silt loam. This soil is used for range, irrigated pasture, and some dryland hay and grain. Capability Unit IV_e-8(18); Range Site 1; Woodland Suitability Group not assigned.

Auburn very rocky silt loam, 30 to 50 percent slopes (AxE). This soil is steep in the more prominent foothills and slopes that drop into creek channels and drainageways. Included in mapping are small areas of Boomer very rocky loam. In the Folsom Reservoir area, there is a soil similar to this Auburn soil that has a darker surface layer and formed from mica schist. Surface runoff is medium to rapid, and the erosion hazard is moderate to high. This soil is used for range. Capability Unit VII_s-1(18); Range Site 1; Woodland Suitability Group not assigned.

Auburn extremely rocky silt loam, 3 to 70 percent slopes (AyF). This soil has slopes that dominantly range from 15 to 50 percent. It is similar to Auburn very rocky silt loam, 2 to 30 percent slopes, except that 20 to 50 percent of the surface has rock outcrops and the depth to bedrock ranges from 12 to 20 inches. Included in mapping are small areas of Metamorphic rock land.

The available water-holding capacity of this Auburn soil is 2 to 4 inches. Surface runoff is slow to very rapid, and the erosion hazard is slight to very high. The effective rooting depth is 12 to 20 inches. This soil is used for range. Capability Unit VIIIs-1(18); Range Site 1; Woodland Suitability Group not assigned.

Boomer Series.

The Boomer series consists of well-drained soils that are underlain by basic² schists at a depth of 24 to 52 inches. These soils are undulating to very steep on uplands. Slopes are 3 to 70 percent. Elevations are 1,000 to 3,500 feet. The average annual precipitation is 35 to 50 inches, average annual temperature is 57° F and the frost-free season is 170 to 270 days. Vegetation is mainly coniferous forest and annual grasses. Boomer soils are associated principally with Auburn and Sites soils. In a representative profile, the surface layer is yellowish red, medium acid gravelly loam about 13 inches thick. The subsoil is red, medium acid, gravelly clay loam to very gravelly sandy clay loam about 39 inches thick. This is underlain by basic schist at a depth of about 52 inches. Boomer soils are used for woodland and range.

Boomer very rocky loam, 30 to 50 percent slopes (BkE). This soil is the transition zone between areas of grass and oak trees and coniferous forest. Rock outcrops cover 5 to 25 percent of the surface. A representative profile is located, 6 miles northwest of Coloma and 0.25 miles east of the west quarter corner of section 33, Township 12 North, R. 9 East:

- O1&O2 1 inch to 0 from surface, pine needles and decomposing litter.
- A1 0 to 5 inches from surface, yellowish red (5YR 5/6) gravelly loam, dark reddish brown (5YR 3/4) when moist; moderate, medium and fine, granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots and common fine roots; many very fine tubular pores; medium acid; clear, smooth boundary.
- A3 5 to 13 inches from surface, yellowish red (5YR 5/6) gravelly loam, dark reddish brown (5YR 3/4) when moist; moderate, medium subangular blocky structure and weak, medium and fine, granular structure; slightly hard, friable, sticky and plastic; many very fine and fine roots and common medium roots; many very fine and fine tubular and interstitial pores and few medium tubular pores; few thin clay films in pores; medium acid; clear, smooth boundary.
- B21t 13 to 24 inches from surface, red (2.5YR 4/6) gravelly clay loam, dark red (2.5YR 3/6) when moist; moderate, medium and fine, subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine, fine, medium, and coarse roots; many very fine tubular and interstitial pores and a few fine tubular pores; many thin clay films in pores; medium acid; clear, smooth boundary.
- B22t 24 to 37 inches from surface, red (2.5YR 4/8) gravelly sandy clay loam, dark red (2.5YR 3/6) and yellowish red (5YR 4/6) when moist; moderate, medium and fine, subangular blocky structure; hard, firm, sticky and plastic; few fine, medium, and

² Basic refers to the relatively low silica content of a rock. A basic schist would have between 44 and 52% quartz, while normal (or felsic) schists have over 52% quartz.

coarse roots; many very fine tubular and interstitial pores and few fine tubular pores; many thin clay films in pores; medium acid; gradual, smooth boundary.

- B31t 37 to 52 inches from surface, red (2.5YR 4/6) very gravelly sandy clay loam, red (2.5YR 4/6 and yellowish red (5YR 4/6) when moist; massive; hard, firm, sticky and plastic; very few fine, medium, and coarse roots; few fine pores; many thin clay films as bridges and coating gravel; medium acid; clear, slightly wavy boundary.
- R 52 inches from surface, well-fractured schist that has dark-red (2.5YR 3/6) sandy clay loam in cracks, variable dark red (2.5YR 3/6, yellowish red (5YR 4/6), and strong brown (7.5YR 5/6) when moist; firm, sticky and slightly plastic; many thin clay films as bridges and coats on gravel; medium acid.

As much as 35 percent of the soil mass consists of gravel- and cobblestone-sized rock fragments. The A horizon is 10 to 15 inches thick and is brown to yellowish red in color. The B horizon is reddish brown to red and is medium acid or slightly acid. Depth to rock is 24 to 52 inches. Included in mapping are small areas of Auburn silt loam and Sites loam. Permeability of this Boomer soil is moderately slow. Surface runoff is rapid, and the erosion hazard is high. The available water-holding capacity is 4 to 7 inches. The effective rooting depth is 24 to 52 inches. This soil is used for range and woodland. Capability Unit VIs-1(22); Range Site 2; Woodland Suitability Group 4.

Boomer very rocky loam, 3 to 30 percent slopes (BkD). This soil is similar to Boomer very rocky loam, 30 to 50 percent slopes (BkE), except that it is less sloping. Included in mapping are small areas of Auburn very rocky silt loam, Argonaut very rocky loam, Sites very rocky loam, and Sobrante very rocky silt loam. Surface runoff is medium, and the erosion hazard is slight to moderate. This soil is used for range, irrigated or dryland pasture, and woodland. Capability Unit VIs-1(22); Range Site 2; Woodland Suitability Group 4.

Boomer very rocky loam, 50 to 70 percent slopes (BkF). This soil is adjacent to the major drainageways, and depth to the parent rock ranges from 24 to 40 inches. Included in mapping are small areas of Auburn very rocky silt loam, Sites very rocky loam, and metamorphic rock land. Surface runoff is rapid, and the erosion hazard is high. The available water-holding capacity is 4 to 6 inches for the 24- to 40-inch rooting depth. This soil is used for woodland, range, and watershed. Capability Unit VIIs-1(22); Range Site 2; Woodland Suitability Group 6.

Sobrante Series.

The Sobrante series consists of well-drained soils that are underlain by fine-grained metamorphic rocks at a depth of 22 to 36 inches. These soils are undulating to hilly and are in the foothills. Slopes are 3 to 30 percent. Elevations range from 800 to 1,800 feet. The average annual temperature is 60° F average annual rainfall is 25 to 35 inches, and the frost-free season is 170 to 270 days. Vegetation is chiefly annual grasses and forbs, and there are scattered oaks. Sobrante soils are associated principally with Auburn, Argonaut, and Boomer soils. In a representative profile, the surface layer is reddish brown, medium acid silt loam about 5 inches thick. The subsoil is yellowish red, slightly acid silt loam and light clay loam about 19 inches thick. The substratum is well-weathered basic schist about 6 inches thick. Bedrock is at a depth of 30 inches. The Sobrante soils are used mainly for range. A few small areas are used for irrigated pasture and deciduous orchards.

Sobrante silt loam, 3 to 15 percent slopes (SuC) This soil is gently sloping to strongly sloping. Representative profile, 2 ½ miles south of Shingle Springs, 200 feet west of French Creek Road, and 200 feet south of the north quarter corner of sec. 19, T. 9 N., R. 10 E.:

- A1 0 to 5 inches from the surface, reddish brown (5YR 5/4) silt loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard and hard, friable, slightly sticky and slightly plastic; many micro and very fine roots; common very fine, fine, and medium tubular and interstitial pores; medium acid; clear, smooth boundary.
- B1 5 to 11 inches from the surface, yellowish red (5YR 4/6) silt loam, yellowish red (5YR 3/6) when moist; weak, medium, subangular blocky structure; hard, friable, sticky and slightly plastic; common very fine roots; many very fine and fine tubular pores; few thin clay films in pores; slightly acid; clear, smooth boundary.
- B2t 11 to 24 inches from the surface, yellowish red (5YR 5/6) light clay loam near silty clay loam, dark red (2.5YR 3/6) when moist; moderate, medium, subangular blocky structure; hard, friable, sticky and slightly plastic; common very fine roots; common very fine tubular pores and many fine and medium tubular pores; many thin clay films in pores and on ped faces; slightly acid; clear, wavy boundary.
- C 24 to 30 inches from the surface, soft, well-weathered basic schist; slightly acid.
- R 30 inches from the surface, hard basic schist; pockets of slightly weathered material.

The A horizon is reddish brown to strong brown, is slightly acid to medium acid, and ranges from 3 to 9 inches in thickness. The B horizon ranges from reddish brown to yellowish red and from silt loam and light clay loam to light silty clay loam. Included in mapping are small areas of Auburn silt loam, Argonaut gravelly loam, and Boomer gravelly loam. Permeability of this *Sobrante* soil is moderate. Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The available water-holding capacity is 4 to 7 inches. Effective rooting depth is 22 to 36 inches. This soil is used mainly for range. Small areas are used for pasture and deciduous orchards. Capability Unit IIIe-8(18); Range Site 2; Woodland Suitability Group not assigned.

Tailings

Tailings consist of cobbly and stony tailings from dredge mining and hydraulic mining and in hard-rock mine dumps. All the soil material either has been washed away, as in hydraulic mining, or has been buried, as in dredge mining or mine dumps. Surface runoff is slight, and the erosion hazard is none to slight. This land type is used for water shed and wildlife habitat. It has no farming value. Capability Unit VIIS-1(18, 22); Range Site and Woodland Suitability Group not assigned.

Serpentine Rock Land (SaF)

Serpentine rock land is in areas of highly resistant serpentine and other ultrabasic rock formations. Rock outcrops and stones make up from 50 to 90 percent of the surface, and there is a thin mantle of soil. This land type is undulating to very steep. At lower elevations it is associated with *Delpiedra* soils. Included with this miscellaneous land type, above an elevation of 1,000 feet, are small, scattered areas of a soil that has a surface layer of reddish brown, slightly acid loam and a subsoil of reddish brown and yellowish red neutral very

gravelly heavy clay loam and clay. Depth to hard bedrock ranges from 10 to 24 inches. This land type is excessively drained. Surface runoff is very rapid, and the erosion hazard is slight to moderate. Serpentine rock land is used for watershed and wildlife habitat. It has no farming value. Capability Unit VIIIs-1(18, 22); Range Site and Woodland Suitability Group not assigned.

Placer County

Andregg Series.

The Andregg series is part of the Andregg-Caperton-Sierra association. As such, it is described in the Soil Survey as: undulating to steep, well-drained and somewhat excessively drained soils that are deep to shallow over granitic rock. Most of this map unit is in the Loomis Basin. The soils are produced from weathered granitic rock. Slopes are 2 to 50 percent. The plant cover is annual grasses and blue and live oak. Elevations range from 200 to 1,000 feet. This unit makes up about 15 percent of the survey area. It is about 50 percent Andregg soils, 20 percent Caperton soils, 10 percent Sierra soils, and 20 percent Shenandoah soils and Rock outcrop. Andregg soils are moderately deep and well-drained. The surface layer is grayish brown coarse sandy loam. The subsoil is pale brown coarse sandy loam that is underlain at a depth of 24 to 40 inches by weathered granitic rock. This unit is used mostly for deciduous orchards and irrigated pasture. Many of the orchards are being subdivided into rural “ranchettes”.

Andregg coarse sandy loam, 2 to 9 percent slopes (106) This is a moderately deep, gently rolling, well-drained soil underlain by weathered granitic bedrock. It formed in residuum on low hills in the Loomis Basin. Elevations are 200 to 1,000 feet. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 5 percent of the acreage is included areas of a soil that is similar to this Andregg soil but is 35 to 60 inches deep to weathered bedrock and has a light yellowish brown and brown sandy clay loam subsoil; 5 percent is Caperton coarse sandy loam; 5 percent is Sierra sandy loam; 5 percent is a soil that is similar to the Sierra soil but is 20 to 40 inches deep to weathered rock; and 5 percent is a soil that is very similar to this Andregg soil but is 40 to 60 inches deep over weathered bedrock. In some swales and along drainageways, there is a somewhat poorly drained or moderately well-drained soil that is otherwise similar to this Andregg soil.

Typically, the surface layer of this Andregg soil is grayish brown coarse sandy loam about 15 inches thick. The subsoil is pale brown and very pale brown coarse sandy loam. At a depth of 29 inches is highly weathered granodiorite. Permeability is moderately rapid. The available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches. Surface runoff is medium. The hazard of erosion is moderate. This soil is used for irrigated pasture, deciduous orchards, and rangeland. Many orchards are being converted to rural or ranchette housing developments. (Some of the SCS description has been skipped) The major limitation to urban use is the depth to rock. Community sewage systems must be constructed in medium and high density subdivisions. Septic tank absorption fields are not practical because the depth to rock is generally less than 40 inches. Capability Unit IIIe-1(18) irrigated and nonirrigated; Storie Index 54.

Andregg coarse sandy loam, 9 to 15 percent slopes (107) This is a moderately deep, rolling, well-drained soil underlain by weathered granitic bedrock. It formed in residuum on low hills in the Loomis Basin. Elevations are 200 to 1,000 feet. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 5 percent of the acreage is included areas of a soil that is similar to this Andregg soil but is 35 to 60 inches deep to weathered bedrock and has a light yellowish brown and brown sandy clay loam subsoil; 5 percent is Caperton coarse sandy loam; 5 percent is Sierra sandy loam; 3 percent is a soil that is similar to the Sierra soil but is 20 to 40 inches deep to weathered rock; and 3 percent is a soil that is very similar to this Andregg soil but is 40 to 60 inches deep to weathered bedrock. Along the contact areas between the granite and volcanic ridges, the soil surface is modified by cobbly dark brown loamy colluvium that has moved downslope. Spot symbols denote scattered rock outcrop.

Typically, the surface layer of this Andregg soil is grayish brown coarse sandy loam about 15 inches thick. The subsoil is pale brown and very pale brown coarse sandy loam. At a depth of 29 inches is highly weathered granodiorite. Permeability is moderately rapid. The available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches. Surface runoff is medium. The hazard of erosion is moderate.

This soil is used mainly for irrigated pasture, deciduous orchards, and rangeland. Many orchards are being converted to rural or ranchette housing developments. (Some of the SCS description has been skipped) The major limitation to urban use is the depth to rock. and the slope. Community sewage systems must be constructed in medium and high density subdivisions. Septic tank absorption fields are not practical because the depth to rock is generally less than 40 inches. Capability Unit IVE-1(18) irrigated and nonirrigated; Storie Index 48

Andregg coarse sandy loam, 15 to 30 percent slopes (108) This is a moderately deep, hilly, well-drained soil underlain by weathered granitic bedrock. It formed in residuum on low hills in the Loomis Basin. Elevations are 300 to 1,000 feet. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 5 percent of the acreage is included areas of a soil that is similar to this Andregg soil but is 35 to 60 inches deep to weathered bedrock and has a light yellowish brown and brown sandy clay loam subsoil; 10 percent is Caperton coarse sandy loam; 5 percent is Sierra sandy loam; 5 percent is a soil that is similar to the Sierra soil but is 20 to 40 inches deep to weathered rock; and 3 percent is a soil that is very similar to this Andregg soil but is 40 to 60 inches deep to weathered bedrock. Ad hoc symbols denote scattered rock outcrop.

Typically, the surface layer of this Andregg soil is grayish brown coarse sandy loam about 15 inches thick. The subsoil is pale brown and very pale brown coarse sandy loam. At a depth of 29 inches is highly weathered granodiorite. Permeability is moderately rapid. The available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches. Surface runoff is medium to rapid. The hazard of erosion is high.

This soil is used mainly for irrigated pasture and rangeland. It also supports deciduous orchards. Many areas are being converted to rural or ranchette housing developments. (Some of the SCS description has been skipped) The major limitations to urban use are the depth to rock. In locating roads, special care is needed to minimize the heights of cuts and fills. Cuts and fills greater than 6 feet make access to building sites a problem. Because of the erodibility of this soil and its parent material, cuts and fills should be on at least a 2 to 1 slope. Community sewage systems must be constructed in medium and high density subdivisions. Septic tank absorption fields are not practical because of the slope and depth to rock. Capability subclass VIe (18) irrigated and nonirrigated; Storie Index 42.

Andregg coarse sandy loam, rocky, 2 to 15 percent slopes (109) This is a moderately deep, gently rolling and rolling, well-drained soil underlain by weathered granitic bedrock. It formed in residuum on low hills in the Loomis Basin. Five percent of the area is scattered granitic rock outcrop that ranges from 2 to 10 feet in diameter to large areas covering one-half acre. Elevations are 200 to 1,000 feet. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 5 percent of the acreage is included areas of a soil that is similar to this Andregg soil but is 35 to 60 inches deep to weathered bedrock and has a light yellowish brown and brown sandy clay loam subsoil; 5 percent is Caperton coarse sandy loam; 2 percent is Sierra sandy loam; and 3 percent is a soil that is similar to the Sierra soil but is 20 to 40 inches deep to weathered rock. In some swales and along drainageways, there is a somewhat poorly drained or moderately well-drained soil that is otherwise similar to this Andregg soil.

Typically, the surface layer of this Andregg soil is grayish brown coarse sandy loam about 15 inches thick. The subsoil is pale brown and very pale brown coarse sandy loam. At a depth of 29 inches is highly weathered granodiorite. Permeability is moderately rapid. The available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches. Surface runoff is medium. The hazard of erosion is moderate.

This soil is used mainly for irrigated pasture, deciduous orchards, and rangeland. Many areas are being converted to rural or ranchette housing developments. (Some of the SCS description has been skipped) The major limitations to urban use are the depth to rock and the occurrence of rock outcrop. Community sewage systems must be constructed in medium and high density subdivisions. Septic tank absorption fields are not practical because the depth to rock is generally less than 40 inches. The rocky areas may dictate the location of building sites. Capability Unit IVe-7(18) irrigated and non-irrigated; Storie Index 34.

Andregg coarse sandy loam, rocky, 15 to 30 percent slopes (110) This is a moderately deep, hilly, well-drained soil underlain by weathered granitic bedrock. It formed in residuum in the Loomis Basin. Five percent of the area is scattered granitic rock outcrop that ranges from 2 to 10 feet in diameter to large areas covering about one-half acre. Elevations are 300 to 1,000 feet. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 5 percent of the acreage is included areas of a soil that is similar to this Andregg soil but is 35 to 60 inches deep to weathered bedrock and has a light yellowish brown and brown

sandy clay loam subsoil; 10 percent is Caperton coarse sandy loam; 2 percent is Sierra sandy loam; 3 percent is a soil that is similar to the Sierra soil but is 20 to 40 inches deep to weathered rock; and 5 percent is a soil that is very similar to this Andregg soil but is 40 to 60 inches deep to weathered bedrock.

Typically, the surface layer of this Andregg soil is grayish brown coarse sandy loam about 15 inches thick. The subsoil is pale brown and very pale brown coarse sandy loam. At a depth of 29 inches is highly weathered granodiorite. Permeability is moderately rapid. The available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches. Surface runoff is medium to rapid. The hazard of erosion is high.

This soil is used mainly for rangeland because of the slope and the rock areas. Some areas are used for deciduous orchards and irrigated pasture. Many areas are being converted to rural or ranchette housing developments. The major limitations to urban use are the depth to rock and the slope. In locating roads, special care is needed to minimize the heights of cuts and fills. Cuts and fills greater than 6 feet make access to building sites a problem. Because of the erodibility of the soil and its parent material, all cuts and fills should be on at least a 2 to 1 slope. Community sewage systems must be constructed in medium and high density subdivisions. Septic tank absorption fields are not practical because of the slope and the depth to rock. The rocky areas may dictate the location of building sites. Capability Unit VIs(18) irrigated and non-irrigated; Storie Index 28.

Andregg coarse sandy loam, rocky, 30 to 50 percent slopes (111) This is a moderately deep, steep, well-drained soil underlain by weathered granitic bedrock. It formed in residuum on foothills in the Loomis Basin. Ten percent of the area is granitic rock outcrop that ranges from 2 to 10 feet in diameter to large areas covering about one-half acre. Elevations are 500 to 1,000 feet. The average annual precipitation ranges from 24 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 15 percent of the acreage is included areas of Caperton coarse sandy loam, generally on the steeper slopes; 2 percent is Sierra sandy loam; and 3 percent is a soil that is similar to the Sierra soil but is 20 to 40 inches deep to weathered rock.

Typically, the surface layer of this Andregg soil is grayish brown coarse sandy loam about 15 inches thick. The subsoil is pale brown and very pale brown coarse sandy loam. At a depth of 29 inches is highly weathered granodiorite. Permeability is moderately rapid. The available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches. Surface runoff is rapid. The hazard of erosion is high.

This soil is used mainly for annual range.(Some of the SCS description has been skipped) The major limitations to urban use are the depth to rock and the slope. In locating roads, special care is needed to minimize the heights of cuts and fills. Cuts and fills greater than 6 feet make access to building sites a problem. Because of the erodibility of the soil and its parent material, all cuts and fills should be on at least a 2 to 1 slope. Community sewage systems must be constructed in medium and high-density subdivisions. Septic tank absorption fields are not practical because of the slope and the depth to rock. The rocky areas may dictate the location of building sites. Capability subclass VIIs(18) non-irrigated; Storie Index 16.

Andregg-Rock outcrop complex, 15 to 30 percent slopes (112) This rolling to hilly soil and Rock outcrop are on granitic upland in the Loomis Basin near Folsom Lake. This unit is about 65 percent Andregg soil and 15 percent granitic Rock outcrop. Elevations are 200 to 1,000 feet. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 5 percent of this soil type occurs in areas containing an Andregg-type soil that is 35 to 60 inches deep to weathered bedrock and has a light yellowish brown and brown sandy clay loam subsoil; 10 percent is Caperton coarse sandy loam; 2 percent is Sierra sandy loam; and 3 percent is a soil that is similar to the Sierra soil but is 20 to 40 inches deep to weathered rock. The Andregg soil is moderately deep and well-drained. It formed in residuum of granitic rock.

Typically, the surface layer of this Andregg soil is grayish brown coarse sandy loam about 15 inches thick. The subsoil is pale brown and very pale brown coarse sandy loam. At a depth of 29 inches is highly weathered granodiorite. Permeability is moderately rapid. The available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches. Surface runoff is medium to rapid. The hazard of erosion is moderate to high. Rock outcrop consists of areas of scattered hard granitic rock ranging in size from 2 to 10 feet in diameter to large areas covering ½ to 2 acres. Surface runoff is very rapid. There is no erosion hazard.

This unit is used mainly for range and rural development. The major limitations to urban use are the depth to rock, Rock outcrop, and the slope. In locating roads, special care is needed to minimize the heights of cuts and fills. Cuts and fills greater than 6 feet make access to building sites a problem. Because of the erodibility of this Andregg soil and parent material, all cuts and fills should be on at least a 2 to 1 slope. Community sewage systems must be constructed in medium and high-density subdivisions. Septic tank absorption fields are not practical because of the slope and the depth to rock and should be located away from rocky areas. The rock outcrop limits the location of building sites. Capability subclass VIs(18) irrigated and non-irrigated; Storie Index 38.

Caperton-Rock outcrop complex, 30 to 50 percent slopes (133) This steep soil and Rock outcrop are on granitic side slopes of volcanic ridges in the Loomis Basin. Elevations are 300 to 1,000 feet. The unit is about 70 percent Caperton soil and 15 percent granitic Rock outcrop. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered brush.

About 15 percent of this unit is included areas of Andregg coarse sandy loam. On the upper slopes, below the volcanic ridges, the surface layer of this Caperton soil is 5 to 20 percent andesitic cobbles. Typically, the surface layer is grayish brown and brown gravelly coarse sandy loam about 12 inches thick. The next 6 inches is pale brown coarse sandy loam. At a depth of 18 inches is weathered granodiorite. Permeability is moderately rapid. The available water capacity is 0.5 to 2.0 inches. Surface runoff is rapid. The hazard of erosion is high. Rock outcrop consists of areas of scattered hard granitic rock ranging from 2 to 5 feet in diameter to areas that cover up to one-half acre. Surface runoff is very rapid. There is no hazard of erosion.

Most areas are used for rangeland and watershed. The steepness of slope, the erosion hazard, and the rock outcrop are the major limitations to be considered in planning home and road construction. Capability Unit VII(18) non-irrigated; Storie Index 10.

Inks cobbly loam, 2 to 30 percent slopes (110) This is a shallow, well-drained cobbly soil underlain by andesitic conglomerate. It formed in residuum on long broad volcanic ridges and side slopes at elevations of 200 to 1,200 feet. The average annual precipitation ranges from 20 to 35 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, and blue and live oak.

About 10 percent of the acreage is included areas of Inks Variant cobbly loam, and 10 percent Exchequer very stony loam. In a few places, the surface layer of the Inks soil is reddish brown.

Typically, the surface layer is yellowish brown cobbly loam about 5 inches thick. The subsoil is brown very cobbly clay loam. At a depth of 18 inches is andesitic conglomerate. Permeability is moderate. The available water capacity is 1.0 to 2.5 inches. The effective rooting depth is 12 to 20 inches. Surface runoff is medium or rapid. The hazard of erosion is slight to high.

Most areas are used for annual rangeland. A few are irrigated pasture. (Some of the SCS description has been skipped) Some rural housing has been developed on this soil. The major limitations to rural development are the slope and the depth to rock. Septic tank absorption fields are not practical because of the slope and the depth to rock which is generally less than 20 inches. Capability Unit IVe-8(18) irrigated and nonirrigated; Storie Index 21.

Redding and Corning gravelly loams, 2 to 9 percent slopes (176) These undulating to rolling soils are on high terraces at elevations of 100 to 240 feet. Both soils have a claypan. The Redding soil has a hardpan under the claypan, and the Corning soil has softly consolidated gravelly alluvium under the claypan. A mapped area can consist of only one of these soils or both. The average annual precipitation is about 22 inches. The average annual air temperature is about 62 ° F. The average frost-free season is about 270 days. Natural vegetation is annual grasses, forbs, and few scattered oak.

About 5 percent of this unit is included areas of a deep soil that does not have a clay pan and supports fair stands of oak trees. Another 5 percent is a soil that is similar to this Redding soil but has a yellowish brown subsoil. Along the contact with the low terraces, there are small areas of Cometa, Fiddyment, and San Joaquin soils.

The Redding is a well-drained claypan soil that is moderately deep over a hardpan. It formed in gravelly old valley fill from mixed sources. Typically, the surface layer is strong brown and yellowish red gravelly loam and reddish brown loam about 14 inches thick. The subsoil is dark reddish brown and reddish brown clay. At a depth of about 28 inches is the hardpan. Permeability is very slow. The available water capacity is 1.5 to 3.0 inches. The effective rooting depth is 20 to 34 inches. Most roots in the clay subsoil are along the faces of pads, which reduces the water available to plants. Surface runoff is slow or medium. The hazard of erosion is slight or moderate. After intense rainstorms, the soil is saturated for a short time.

The Corning is a well-drained, very deep claypan soil that is underlain by gravelly alluvium. It formed in old valley fill from mixed sources. Typically, the surface layer is reddish brown, yellowish red, and red gravelly loam about 22 inches thick. The subsoil is red and dark red clay about 18 inches thick. The substratum to a depth of 60 inches is strong brown clay loam. Permeability is very slow. The available water capacity is 4.0 to 6.5 inches. The effective rooting depth is 60 inches or more, but most roots in the clay subsoil are along the faces of peds, which reduces the water available to plants. Surface runoff is slow or medium. The hazard of erosion is slight or moderate. After intense rainstorms, the soil is saturated for a short time.

Most areas are used as annual rangeland. A few areas are used for irrigated pasture and winter grains. (Some of the SCS description has been skipped) The major limitations to urban use of the Redding soil are the very slow permeability of the subsoil and substratum, the moderate depth to a hardpan, and the limited ability of the soil to support a load. The major limitations of the Corning soil are the very slow permeability of the subsoil, the shrink-swell potential of the subsoil, and the limited ability of the soil to support a load. Dwellings and roads can be designed to offset the low bearing strength and the shrink-swell potential. Septic tank absorption fields probably will not function properly on the Redding soil because of the very slow permeability of the subsoil and the underlying hardpan. They will not function properly on the Corning soil because of the very slow permeability of the subsoil and substratum. Capability Unit IVE-3(17) irrigated and non-irrigated; Storie Index Redding 22, Corning 34.

Redding and Corning gravelly loams, 9 to 15 percent slopes (177) These soils occupy prominent mounds and side slopes of high terraces in the Sheridan area. Both soils have a claypan. The Redding soil has a hardpan under the claypan. The Corning soil has gravelly alluvium under the claypan. A mapped area can consist of only one of these soils or both. Elevations are 100 to 240 feet. The average annual precipitation is about 22 inches. The average annual air temperature is about 62 ° F. The average frost-free season is about 270 days. Natural vegetation is annual grasses, forbs, and few scattered oak.

About 5 percent of this unit is included areas of a deep soil that does not have a clay pan and supports fair stands of oak trees. About 5 percent is a soil that is similar to this Redding soil but has a yellowish brown subsoil. Also included are a few small areas where slopes are up to 20 percent.

The Redding is a well-drained claypan soil that is moderately deep over a hardpan. It formed in gravelly old valley fill from mixed sources. Typically, the surface layer is strong brown and yellowish red gravelly loam and reddish brown loam about 14 inches thick. The subsoil is dark reddish brown and reddish brown clay. At a depth of about 28 inches is the hardpan. Permeability is very slow. The available water capacity is 1.5 to 3.0 inches. The effective rooting depth is 20 to 34 inches. Most roots in the clay subsoil are along the faces of pads, which reduces the water available to plants. Surface runoff is medium. The hazard of erosion is moderate.

The Corning is a very deep, well-drained claypan soil that is underlain by gravelly alluvium. It formed in old valley fill from mixed sources. Typically, the surface layer is reddish brown, yellowish red, and red, gravelly loam about 22 inches thick. The substratum to a depth of 58 inches is strong brown clay loam. Permeability is very slow. The available water capacity is 4.0 to 6.5 inches. The effective rooting depth is 60 inches or more, but most roots in the clay

subsoil are along the faces of peds, which reduces the water available to plants. Surface runoff is medium. The hazard of erosion is moderate.

These soils are used mainly as annual rangeland. (Some of the SCS description has been skipped) The major limitations to urban use are the very slow permeability in the subsoil of both soils and the hardpan under the Redding soil. These limitations restrict the proper functioning of septic tank absorption fields. Capability Unit IVE-3(17) non-irrigated; Storie Index Redding 19, Corning 30.

Andregg coarse sandy loam, 15 to 30 percent slopes (108) This is a moderately deep, hilly, well-drained soil underlain by weathered granitic bedrock. It formed in residuum on low hills in the Loomis Basin. Elevations are 300 to 1,000 feet. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 5 percent of the acreage is included areas of a soil that is similar to this Andregg soil but is 35 to 60 inches deep to weathered bedrock and has a light yellowish brown and brown sandy clay loam subsoil; 10 percent is Caperton coarse sandy loam; 5 percent is Sierra sandy loam; 5 percent is a soil that is similar to the Sierra soil but is 20 to 40 inches deep to weathered rock; and 3 percent is a soil that is very similar to this Andregg soil but is 40 to 60 inches deep to weathered bedrock. Ad hoc symbols denote scattered rock outcrop.

Typically, the surface layer of this Andregg soil is grayish brown coarse sandy loam about 15 inches thick. The subsoil is pale brown and very pale brown coarse sandy loam. At a depth of 29 inches is highly weathered granodiorite. Permeability is moderately rapid. The available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches. Surface runoff is medium to rapid. The hazard of erosion is high.

This soil is used mainly for irrigated pasture and rangeland. It also supports deciduous orchards. Many areas are being converted to rural or ranchette housing developments. (Some of the SCS description has been skipped) The major limitations to urban use are the depth to rock and the slope. In locating roads, special care is needed to minimize the heights of cuts and fills. Cut and fills greater than 6 feet make access to building sites a problem. Because of the erodibility of this soil and its parent material, cuts and fills should be on at least a 2 to 1 slope. Community sewage systems must be constructed in medium and high density subdivisions. Septic tank absorption fields are not practical because of the slope and depth to rock. Capability subclass VIe(18) irrigated and non-irrigated; Storie Index 42.

Sierra sandy loam, 2 to 9 percent slopes (183) This is a deep, gently rolling, well-drained soil underlain by weathered granitic bedrock. It formed in residuum on low hills at elevations of 200 to 1,000 feet. It occurs as scattered areas throughout the Loomis Basin. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 15 percent of the acreage is included areas of Andregg coarse sandy loam, 5 percent is a soil that is similar to this Sierra soil but is 20 to 40 inches deep to weathered rock, and 5 percent is another soil that is similar to this Sierra soil but has a light yellowish brown and brown sandy clay loam subsoil. In some swales there is dark colored, poorly drained soil.

Near Folsom Lake, there are small areas where this Sierra soil has a thin gravel mantle from old valley fill. About 2 percent of the acreage is scattered rock outcrop. Typically, the surface layer of this Sierra soil is dark grayish brown, brown, and yellowish red sandy loam about 23 inches thick. The subsoil is yellowish red sandy clay loam and red clay loam. At a depth of 41 inches is highly weathered granodiorite. Permeability is moderately slow. The available water capacity is 5.0 to 9.5 inches. The effective rooting depth is 40 to 60 inches or more. Surface runoff is medium. The hazard of erosion is moderate.

This soil is used mainly for irrigated pasture and deciduous orchards. Small, scattered areas are used as rangeland. Many areas in orchards are now being subdivided and used for rural or ranchette housing. (Some of the SCS description has been skipped) There is increasing use of this soil for rural subdivisions. The major limitations to urban use are the moderately slow permeability of the subsoil, the shrink-swell potential of the subsoil, and the limited ability of the soil to support a load. Dwelling and road construction can be designed to offset most of these limitations. Community sewage systems must be constructed in medium and high-density subdivisions. Septic tank absorption fields are not practical because of the moderately slow permeability in the subsoil. Capability Unit IIIe-1(18) irrigated and non-irrigated; Storie Index 62.

Sierra sandy loam, 9 to 15 percent slopes (184) This is a deep, rolling, well-drained soil underlain by weathered granitic bedrock. It formed in residuum on low hills at elevations of 200 to 1,000 feet. It occurs as scattered areas throughout the Loomis Basin. The average annual precipitation ranges from 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 15 percent of the acreage is included areas of Andregg coarse sandy loam, 5 percent is a soil that is similar to this Sierra soil but is 20 to 40 inches deep to weathered rock, and 5 percent is another soil that is similar to this Sierra soil but has a light yellowish brown and brown sandy clay loam subsoil, and 2 percent of the acreage is scattered rock outcrop.

Typically, the surface layer of this Sierra soil is dark grayish brown, brown, and yellowish red sandy loam about 23 inches thick. The subsoil is yellowish red sandy clay loam and red clay loam. At a depth of 41 inches is highly weathered granodiorite. Permeability is moderately slow. The available water capacity is 5.0 to 9.5 inches. The effective rooting depth is 40 to 60 inches or more. Surface runoff is medium. The hazard of erosion is high.

This soil is used mainly for irrigated pasture and deciduous orchards. Small, scattered areas are used as rangeland. Many areas in orchards are now being subdivided and used for rural or ranchette housing. (Some of the SCS description has been skipped) There is increasing use of this soil for rural subdivisions. The major limitations to urban use are the moderately slow permeability of the subsoil, the shrink-swell potential of the subsoil, the slope, and the limited ability of the soil to support a load. Dwelling and road construction can be designed to offset most of these limitations. Community sewage systems must be constructed in medium and high density subdivisions. Septic tank absorption fields are not practical because of the moderately slow permeability in the subsoil. Capability Unit IVe-1(18) irrigated and nonirrigated; Storie Index 55.

Sierra sandy loam, rocky, 15 to 30 percent slopes (185) This is a deep, hilly, well-drained soil underlain by weathered granitic rock. It formed in residuum at elevations of 200 to 1,000

feet. The average annual precipitation ranges from about 22 to 33 inches. The average annual air temperature is about 61 ° F. The average frost-free season is between 250 and 270 days. Natural vegetation is annual grasses, forbs, blue and live oak, and scattered pine.

About 15 percent of the acreage is included areas of Andregg coarse sandy loam, 5 percent is a soil that is similar to this Sierra soil but is 20 to 40 inches deep to weathered rock, 5 percent is another soil that is similar to this Sierra soil but has a light yellowish brown and brown sandy clay loam subsoil, 5 percent is Caperton coarse sandy loam, and 3 percent is scattered rock outcrop.

Typically, the surface layer of this Sierra soil is dark grayish brown, brown, and yellowish red sandy loam about 23 inches thick. The subsoil is yellowish red sandy clay loam and red clay loam. At a depth of 41 inches is weathered granodiorite. Permeability is moderately slow. The available water capacity is 5.0 to 9.5 inches. The effective rooting depth is 40 to 60 inches or more. Surface runoff is medium to rapid. The hazard of erosion is high.

This soil is used mainly for irrigated pasture. It supports some deciduous orchards. Small scattered areas are used as rangeland. Many areas are being subdivided for rural or ranchette housing. (Some of the SCS description has been skipped) There is increasing use of this soil for rural subdivisions. The major limitation to urban use is the slope. In locating roads, special care is needed to minimize the heights of cuts and fills. Cuts and fills greater than 6 feet make access to building sites a problem. Because of the erodibility of this soil and its parent material, all cuts and fills should be on at least a 2 to 1 slope. Community sewage systems must be constructed in medium and high-density subdivisions. Septic tank absorption fields are not practical because of the slope and the moderately slow permeability. Capability Unit =V1e(18) irrigated and non-irrigated; Storie Index 48.

Sacramento County (East Part)

Andregg Series.

Andregg coarse sandy loam, rocky, 2 to 8 percent slopes (103) This moderately deep, well-drained soil is on foothills. It formed in material weathered from granitic rocks. Slopes are complex. The native vegetation is mainly oaks, annual grasses, and forbs. Elevation is 250 to 450 feet. The average annual precipitation is 23 to 24 inches.

Typically, the surface layer is grayish brown coarse sandy loam about 15 inches thick. The subsoil is pale brown and very pale brown coarse sandy loam. At a depth of 29 inches is highly weathered granodiorite. Permeability is moderately rapid. The available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches. Surface runoff is medium. The hazard of erosion is moderate.

This soil is used mainly for irrigated pasture, deciduous orchards, and rangeland. Many areas are being converted to rural or ranchette housing developments. (Some of the SCS description has been skipped) The major limitations to urban use are the depth to rock. Community sewage systems must be constructed in medium and high density subdivisions. Septic tank absorption fields are not practical because the depth to rock is generally less than 40 inches. The rocky areas may dictate the location of building sites. Capability Unit IVE-7(18) irrigated and nonirrigated; Storie Index 34.

Andregg coarse sandy loam, rocky, 8 to 15 percent slopes (104) This moderately deep, well-drained soil is on foothills. It formed in material weathered from granitic rocks. Slopes are complex. The native vegetation is mainly oaks, annual grasses, and forbs. Elevation is 200 to 600 feet. The average annual precipitation is 23 to 24 inches.

Typically, the surface layer is brown coarse sandy loam about 11 inches thick. The subsoil is light yellowish brown coarse sandy loam about 21 inches thick. Weathered granodiorite is at a depth of about 32 inches. In some area the surface layer is loamy sand, loam, or sandy loam. In other areas the subsoil is sandy clay loam. Included in this unit are small areas of Auburn and Argonaut soils, Rock outcrops, and Urban land. Also included are soils that are less than 20 inches or 40 to 60 inches deep over bedrock and soils that have slopes of 15 to 25 percent. Included areas make up about 15 percent of the total acreage. Permeability is moderately rapid in the Andregg soil. Available water capacity is low. The effective rooting depth and the depth to weathered bedrock are 20 to 40 inches. Surface runoff is medium. The hazard of water erosion is moderate.

Nearly all areas of this unit are used for urban or recreational development. A few small areas are used for irrigated orchards. Where this soil is used for urban development, the main limitations are the depth to bedrock, the slope, and the hazard of erosion. If shallow excavations, such as trenches and holes, or deep cuts are made during construction, the bedrock can be exposed. Heavy equipment may be required to remove the rock. (Some of the SCS description has been skipped) This unit is well suited to recreational development. It is limited mainly by the slope and the moderate hazard of erosion. Areas that have been cut and filled should be seeded or mulched. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. This unit is in Capability Unit IVE-1, irrigated and non-irrigated; The MLRA is 18.

Andregg-Urban land complex, 2 to 8 percent slopes (105) This map unit is on foothills. Slopes are complex and have been shaped for urban uses. The vegetation on the Andregg soil is mainly ornamental plants or oaks, annual grasses, and forbs. Elevation is 300 to 420 feet. The average annual precipitation is 23 to 24 inches. The unit is about 55 percent Andregg soil and 30 percent Urban land. Included in this unit are small areas of altered soils that have been cut or filled during construction, Rock outcrop, and soils that are less than 20 inches or more than 40 inches deep over bedrock. Included areas make up about 15 percent of the total acreage.

The Andregg soil is moderately deep and well-drained. It formed in material weathered from granitic rocks. Typically, the surface layer is brown coarse sandy loam about 11 inches thick. The subsoil is light yellowish brown coarse sandy loam about 21 inches thick. Weathered granodiorite is at a depth of about 32 inches. In some areas the surface layer is loamy sand. Permeability is moderately rapid in the Andregg soil. The available water capacity is low. The effective rooting depth and the depth to weathered bedrock are 20 to 40 inches. Runoff is slow or medium. The hazard of water erosion is slight or moderate.

Urban land consists of areas covered by impervious surfaces or structures, such as roads, driveways, sidewalks, buildings, and parking lots. The soil material under the impervious surfaces is similar to that of the Andregg soil, although it may have been truncated or otherwise altered.

This unit is used for urban development. The main limitation affecting urban uses is the depth to rock. Erosion is a hazard in the steeper area. It can be controlled by revegetating disturbed areas around construction sites. Steep slopes that have been cut and filled are susceptible to erosion and should be permanently protected. No land capability classification is assigned. The MLRA is 18.

Urban land (227) This map unit consists of large areas covered by impervious surfaces or structures, such as roads, driveways, sidewalks, buildings, and parking lots. In most places 90 percent or more of the area is covered by impervious surfaces. The soil material under the impervious surfaces may have been altered during construction. It is similar to that of the nearby soil, although it may have been truncated or otherwise altered. No land capability classification is assigned. The MLRA is 17.

Urban Land-Natoma complex, 0 to 2 percent slopes (228) This map unit is in high areas on low terraces. Slopes have been shaped for urban uses. The vegetation is mainly ornamental plants or oaks, annual grasses, and forbs. Elevation is 45 to 140 feet. The average annual precipitation is 17 to 23 inches. The unit is about 45 percent Urban land and 40 percent Natoma soil.

Included in this unit are small areas of Americanos, Kimball, and San Joaquin soils and Xerarents. Americanos soils are on low stream terraces. Kimball and San Joaquin soils are in the slightly lower areas on the low terraces. Xerarents are in filled areas. Also included, in low areas, are soils that have a subsoil of brown sandy clay loam and a base saturation of more than 75 percent. Included areas make up about 15 percent of the total acreage.

Urban land consists of areas covered by impervious surfaces or structures, such as roads, driveways, sidewalks, buildings, and parking lots. The soil material under the impervious surfaces is similar to that of the Natoma soil, although it may have been truncated or otherwise altered.

The Natoma soil is very deep and well-drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is brown loam about 17 inches thick. The upper part of the subsoil is yellowish red and reddish brown loam about 16 inches thick. The lower part is red clay loam about 45 inches thick. The substratum to a depth of 84 inches is yellowish red sandy loam. In some areas the surface layer is sandy loam. Permeability is moderately slow in the Natoma soil. Available water capacity is very high. The effective rooting depth is 60 inches or more. Runoff is slow. The hazard of water erosion is slight.

This unit is used for urban development. The main limitation affecting urban uses is low strength in the subsoil. Properly designing roads and streets helps to compensate for this limitation. Revegetating disturbed areas around construction sites helps to control erosion. (Some of the SCS description has been skipped) No land capability classification is assigned. The MLRA is 17.

Xerolls, 30 to 70 percent slopes (243) These shallow to very deep, somewhat excessively drained and well-drained soils are on terrace escarpments and steep hillslopes along drainageways near the American River. They formed in colluvium derived from mixed and granite or metabasic rocks. Slopes are convex to concave. The native vegetation is mainly oaks, annual grasses, and forbs. Elevation is 60 to 350 feet. The average annual precipitation is 19 to 24 inches.

The texture, color, and thickness of the layers of these soils vary from one area to another. In a reference pedon, the surface layer is about 10 inches of brown loam and very gravelly loam. The upper part of the subsoil is dark yellowish brown gravelly clay loam about 9 inches thick. The lower part is brown and strong brown very gravelly clay loam and very gravelly sandy clay loam. It is about 25 inches thick. The underlying material to a depth of 60 inches is strong brown very gravelly sandy clay loam. The depth to sandstone, siltstone, or granitic or metabasic rocks ranges from 10 to more than 80 inches.

Included in this unit are small areas of Andregg, Auburn, Fiddymont, Kaseberg, and Red Bluff soils on the upper end of escarpments or hillslopes. Also included are areas that have slopes of 15 to 30 percent. Included areas make up about 10 percent of the total acreage. Permeability is moderately rapid to moderately slow in the Xerolls. Available water capacity is very low to high. The effective rooting depth ranges from 10 to more than 80 inches. Runoff is rapid or very rapid. The hazard of water erosion is severe.

This unit is used for recreational development or for wildlife habitat. The main limitations affecting recreational development are the slope and the hazard of water erosion. The slope limits the use of these soils mainly to a few paths and trails, which should extend across the slope. (Some of the SCS description has been skipped) This unit is suited to wildlife habitat. It is limited mainly by the very low or low available water capacity, which limits the growth and diversity of trees and shrubs. Areas of this unit are significant as wildlife habitat because they are adjacent to the riparian habitat along the American River. The best management measures are those that maintain the existing habitat. This unit is in capability subclass VIIe, non-irrigated. The MLRA is 17.

Xerorthents, dredge tailings, 2 to 50 percent slopes (245) These very deep, somewhat excessively drained and well excessively drained soils are in areas of dredge tailings. They formed in material that has a high content of gravel and cobbles derived from mixed rock sources. The material was deposited as tailings after most of the fine-earth material was washed from it and removed during gold dredging activities. Slopes are short, complex, and disturbed. The vegetation is mainly sparse stands of annual grasses and forbs and scattered hardwoods. Many of the youngest deposits are bare. Elevation is 80 to 400 feet. The average annual precipitation is 18 to 24 inches.

The texture, color, and thickness of the layers of these soils vary from one area to another. In a reference pedon, the surface layer is light yellowish brown extremely cobbly fine sandy loam about 12 inches thick. The next 9 inches is a poorly sorted zone of well rounded stones, cobbles, and gravel. The underlying material to a depth of 63 inches is pale brown extremely cobbly and very cobbly fine sandy loam.

Included in this unit are small areas of Natoma, Red Bluff, Redding, and Rossmoor soils and Riverwash. Slickens, and Xerofluvents. Included areas make up about 10 percent of the total acreage. Permeability is moderately rapid to very rapid in the Xerorthents. Available water capacity is very low or low. The effective rooting depth is 60 inches or more. Runoff is very slow or slow. Water erosion is a slight hazard or is not a hazard at all.

This unit is used mainly for wildlife habitat. Some areas are used for recreational purposes. If leveled, the unit can be used for urban development. It may provide wetland functions and values. These should be considered when plans are made for enhancement of wildlife habitat or for land use conversion. This unit is poorly suited to wildlife habitat. It is limited by the

very low or low available water capacity and the high content of gravel and cobbles, which limit the growth of trees and shrubs. The best management measures are those that maintain the existing habitat. This unit is in capability subclass VIIIc, non-irrigated. The MLRA is 17.

Xerorthents, dredge tailings-Urban land complex, 0 to 2 percent slopes (246) This map unit is in areas of leveled dredge tailings. Slopes have been shaped for urban uses. The vegetation is mainly ornamental plants or annual grasses and forbs. Elevation is 90 to 200 feet. The average annual precipitation is 18 to 24 inches. The unit is about 45 percent Xerorthents land and 40 percent Urban land.

Included in this unit are small areas of Americanos and Natoma soils and Slickens. Americanos soils are on low stream terraces. Natoma soils are on low terraces. Included areas make up about 15 percent of the total acreage.

The Xerorthents are very deep and are somewhat excessively drained and excessively drained. They formed in material that has a high content of gravel and cobbles derived from mixed rock sources. The material was deposited as tailings after most of the fine-earth material was washed from it and removed during gold dredging activities. The texture, color, and thickness of the layers of these soils vary from one area to another. In a reference pedon, the surface layer is light yellowish brown extremely cobbly fine sandy loam about 12 inches thick. The next 9 inches is a poorly sorted zone of well-rounded stones, cobbles, and gravel. The underlying material to a depth of 63 inches is pale brown extremely cobbly and very cobbly fine sandy loam. Permeability is moderately rapid to very rapid in the Xerorthents. Available water capacity is very low or low. The effective rooting depth is 60 inches or more. Runoff is very slow. The hazard of water erosion is slight. (Some of the SCS description has been skipped) This unit is used for urban development. The main limitation affecting urban uses is low strength in the subsoil. Properly designing roads and streets helps to compensate for this limitation. No land capability classification is assigned.