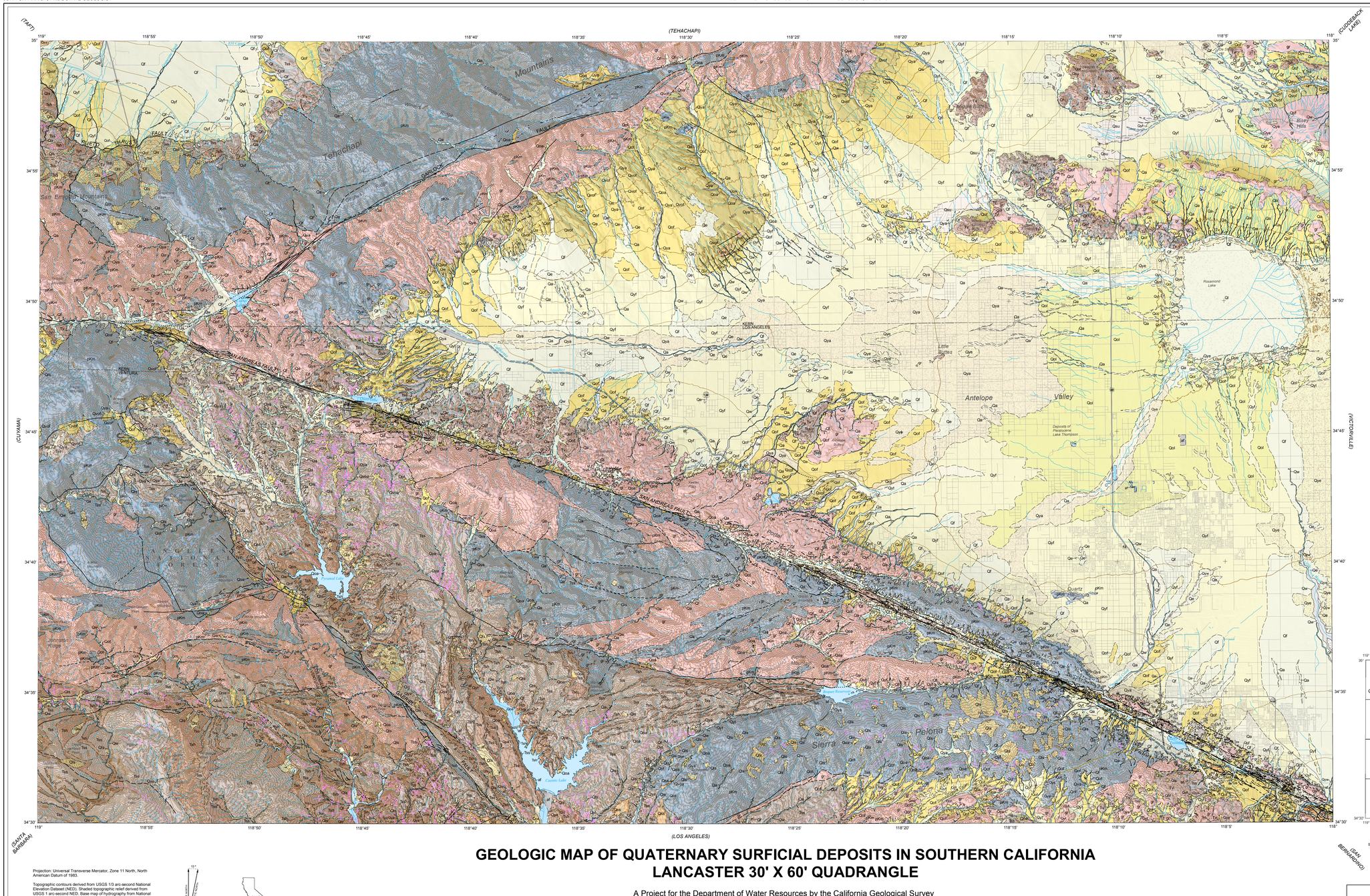

Projection: Universal Transverse Mercator, Zone 11 North, North American Datum of 1983.

Topographic contours derived from USGS 1/3 arc-second National Elevation Dataset (NED). Shaded topographic relief derived from USGS 1 arc-second NED. Base map of hydrography from National Hydrography Dataset Plus (NHDPlus) and California Department of Fish and Game. Base map of geographic names from USGS Geographic Names Information System (GNIS).

APPROXIMATE MEAN DECLINATION, 2012

MAP LOCATION

GEOLOGIC MAP OF QUATERNARY SURFICIAL DEPOSITS IN SOUTHERN CALIFORNIA
LANCASTER 30' X 60' QUADRANGLE

A Project for the Department of Water Resources by the California Geological Survey

by
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Digital preparation by
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MAP EXPLANATION

This map of Quaternary surficial deposits of the Lancaster 30' x 60' quadrangle was created by the California Geological Survey (CGS) for the Department of Water Resources (DWR) to assist in identifying where flooding and deposition of sediment occurred in the geologically recent past. The focus of this project is on Quaternary (Q) surficial deposits (less than 1.8 million years) on alluvial fans, floodplains, and in basins where such deposits are subject to a number of geologic hazards including flooding, amplification of seismic shaking, liquefaction, and collapsible soils. In general, areas of most recent deposition during Late Holocene time (within the last 500 years) have a greater potential to be areas of future flooding and deposition than those underlain by older surficial deposits.

Project Overview

The Lancaster 30' x 60' quadrangle represents one of several 100,000 scale quadrangles included in the detailed Geographic Information System (GIS) based geologic data set compiled by CGS from recent high resolution geologic mapping available for southern California. The GIS database merges more than 1400 geologic units from source maps published primarily by the U.S. Geological Survey (USGS) and by CGS (Source GIS Database) into a common format that depicts 40 derivative categories of surficial deposits and bedrock for the entire area (Derivative GIS Database). Because published source geologic mapping at the 100,000 scale was not available for the Lancaster quadrangle, CGS used the derivative map units as a basis for new Quaternary mapping within the quadrangle. Quaternary surficial deposits are divided into 28 categories modified from the methodology of Matti and Cossette (2007), the Southern California Areal Mapping Project (SCAMP, 2000), and the USGS and CGS (2000). While specific variations in age and physical properties exist within each unit, CGS retained the basic premise of Matti and Cossette (2007) that surficial deposits within each of the Quaternary map units formed during a particular range of geologic time, have a similar origin, and have generally similar physical properties. Within the 28 Quaternary surficial units, progressively older surficial deposits are typically better consolidated and more highly dissected by erosion, have more developed and/or eroded soil profiles with stronger degrees of weathering and surface armoring, and occupy a higher topographic position within alluvial fan and floodplain terrains. Geologic bedrock formations are divided into 12 categories, based on age and rock type. The bedrock categories can be used to provide a general understanding of the relative erodibility of the upland materials and the general character of the derived sediments. CGS also rectified inconsistencies along the boundaries of mapped areas to create a seamless Derivative GIS Database with other 30' x 60' quadrangles previously compiled under CGS Special Report 217. Correlation of equivalent deposits across the whole southern California project area is represented in the GIS table entitled Correlation of Derivative and Source Geologic Map Units.

Lancaster Quadrangle

The Lancaster quadrangle is situated at the convergence of four geomorphic provinces. The southern terminus of the Great Valley Geomorphic Province is located in the northwestern portion of the quadrangle; the southern terminus of the Sierra Nevada Geomorphic Province is located to the north and northeast; the western part of the Mojave Desert Geomorphic Province is located in the central and eastern portions of the quadrangle; and the Transverse Ranges Geomorphic Province occupies the southern portion of the quadrangle. Thick sequences of Quaternary-age alluvial deposits are widespread in the Great Valley to the northwest and in the Mojave Desert in the central and eastern portions of the mapped area. These deep alluvial basins are bordered by tectonically active mountains that are experiencing deformation such as uplift, folding, and faulting in response to the active west-northwest trending San Andreas Fault, which transects the quadrangle diagonally, and the active east-northeast trending Garlock Fault that intersects the San Andreas Fault near Frazier Park in the northwest portion of the quadrangle. In contrast to the deep alluvial basins of the Great Valley and Mojave Desert provinces, few broad alluvial valleys exist within the Transverse Ranges and southern Sierra Nevada provinces.

Quaternary-age alluvial deposits along the southern terminus of the Great Valley to the northwest result from numerous large drainages issuing from steep terrain of the San Emigdio and Tehachapi Mountains. Alluvial fans in this region are broad, gently sloping, and covered with dense grassland or agricultural land use that typically mask the presence of smaller distributary channel networks. Both historic debris laden floods and debris flows occur locally, as evident from the presence of boulder fields, narrow trapezoidal channels, and boulder lined levees located near the fan apices. Because the San Andreas Fault changes in trend to nearly due west in the vicinity of Frazier Park, a tectonic restraining bend has developed, causing compression in a north-south direction, and resulting in bedrock uplift and deformation in the San Emigdio Mountains (Smith, 1984). Consequently, bedrock and older Quaternary sediments are actively being deformed and thrust over basin deposits along the Holocene Pleito Thrust Fault located along the southern basin margin.

Within the southern Sierra Nevada in the north and northeastern portions of the mapped area, alluvial wash, terrace, and older alluvial deposits are confined within narrow canyons with very few broad alluvial valleys. Debris laden floods and debris flows form relatively small alluvial fans (or debris fans) at the mouths of tributary canyons to larger order drainages. Trending northeast through the Tehachapi Mountains, the Holocene Garlock Fault affects the topography, forming linear drainages where Quaternary age alluvial deposits are locally deformed and truncated.

The Quaternary-age alluvial deposits of the western Mojave Desert in the central and eastern portions of the quadrangle are dominated by the numerous drainages emanating from the Tehachapi and Transverse Ranges. These drainages form a coalescing sequence of alluvial fans and associated alluvial washes that converge at the basin floor in the western portion of the Antelope Valley. Toward the central Antelope Valley, the valley floor broadens and gently slopes toward the east, accommodating fine-grained valley alluvium with alluvial channels and associated floodplains terminating at Rosamond Lake. Because there is significantly more relief within the Tehachapi Mountains, alluvial geomorphic surfaces have steeper gradients along the north side of the valley when compared to their southern counterparts. Eolian processes are prevalent and are expressed as isolated sand sheets and sand ramps throughout the Antelope Valley, but become more laterally extensive, including historic dunes along the margins of Little Rock Wash and Rosamond Lake. A change in local base level from the Pleistocene Lake Thompson high-stand, approximately 36,000 years before present (Orme, 2008), to the modern predominantly dry Rosamond Lake has resulted in channel incision in near proximity to the mountains and the shifting of deposition of alluvial deposits toward the valley axis. However, where active faulting causes localized uplift, historic alluvial fan deposition occurs near the mountain fronts.

Within the western Transverse Ranges in the southern portion of the quadrangle, Quaternary-age alluvial deposits are present as alluvial wash, terrace, and older alluvial deposits in canyons of the steeper mountainous terrain. Similar to the mountainous region to the north, debris laden floods and debris flows form relatively small alluvial fans at the mouths of tributary canyons. Several broad alluvial valleys exist within the province, including areas along the San Andreas Rift Zone, Hungry Valley, and Sierra Pelona Valley. Within these broader valleys, alluvial fans, terraces, and valley alluvium are laterally extensive.

In preparing this map of the Lancaster 30' x 60' quadrangle, CGS primarily used Barrows and others (1985), CGS (2003a, 2003b, 2005), Hernandez (2009, 2010a, 2010b, 2011), Hernandez and Lancaster (2011), Lancaster (2011), Miller (2011), and Ponti and others (1980, 1981) to aid in mapping the Quaternary surficial deposits. In addition to existing geologic map data, new mapping of Quaternary surficial deposits was conducted using a combination of the soil survey data for the southern Great Valley (Cole and others, 1945; USDA, 1981, 2009) and the interpretation of units based on geomorphic expression, topographic position, relative dissection, and tonal contrasts. These interpretations were based primarily on observations from topographic contours, digital elevation models (Los Angeles County LAR-IAC, 2006), stereo-pair imagery (Department of County Engineers, 1968), and USDA NAIP digital imagery (2005a, 2005b, 2009a, 2009b). In addition, CGS remapped the contact between bedrock and Quaternary surficial deposits throughout much of the study area. Quaternary surficial deposits on this map are represented by 23 of the 28 generalized project derivative units. Quaternary faults were compiled using Barrows and others (1985), Bryant (2005), CDMG (1975a, 1975b, 1985), and the USGS and CGS (2011) Quaternary fault and fold data base. Bedrock geology was compiled from Bartow (1991), Barrows and others (1985), CGS (2003a, 2003b, 2005), Dibblee (1959, 1973), Dibblee and Ehrenspeck (1996a, 1996b, 1997a, 1997b, 1997c, 1997d, 2001), Dibblee and Minch (2002a, 2002b, 2002c, 2006a, 2006b, 2008), Hernandez (2009, 2010a, 2010b, 2011), Hernandez and Lancaster (2011), Jennings and Strand (1969), Miller (2011), Nilsen (1987), Ross (1989), Weber (1979), and Weise (1950). Bedrock faults and structure were compiled from the various bedrock sources listed above. Bedrock units identified in the study area are represented on this map by 7 of the 12 project derivative bedrock units (see Map Units and Correlation of Map Units).

This map, along with others in the Geologic Compilation of Quaternary Surficial Deposits in Southern California Derivative GIS Database, is regional in nature and should not be used as a substitute for detailed geologic studies in any specific area. It is intended only for rapid identification of areas subject to previous and potential future flooding and other geologic hazards on alluvial fans and floodplains.

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MAP UNITS

Late Holocene (Surficial Deposits)

af — **Artificial Fill** - deposits of fill resulting from human construction, mining, or quarrying activities; includes engineered fill for buildings, roads, dams, airport runways, harbor facilities, and waste landfills

Qsu — **Undifferentiated Surficial Deposits** - includes colluvium, slope wash, talus deposits, and other surface deposits of all ages; generally unconsolidated but locally may contain consolidated layers

Qls — **Landslide Deposits** - may include debris flows and older landslides of various earth material and movement types; unconsolidated to moderately well-consolidated

Qw — **Alluvial Wash Deposits** - unconsolidated sandy and gravelly sediment deposited in recently active channels of streams and rivers; may contain loose to moderately loose sand and silty sand

Qf — **Alluvial Fan Deposits** - unconsolidated boulders, cobbles, gravel, sand, and silt recently deposited where a river or stream issues from a confined valley or canyon; sediment typically deposited in a fan-shaped cone; gravelly sediment generally more dominant than sandy sediment

Qa — **Alluvial Valley Deposits** - unconsolidated clay, silt, sand, and gravel recently deposited parallel to localized stream valleys and/or spread more regionally onto alluvial flats of larger river valleys; sandy sediment generally more dominant than gravelly sediment

Qt — **Terrace Deposits** - includes marine and stream terrace deposits; marine deposits include slightly to moderately consolidated and bedded gravel and conglomerate, sand and sandstone, and silt and siltstone; river terrace deposits consist of unconsolidated thin- to thick-bedded gravel

Ql — **Lacustrine, Playa, and Estuarine (Paralic) Deposits** - mostly unconsolidated fine-grained sand, silt, mud, and clay from fresh water (lacustrine) lakes, saline (playa) dry lakes that are periodically flooded, and estuaries; deposits may contain salt and other evaporites

Qe — **Eolian and Dune Deposits** - unconsolidated, generally well-sorted wind-blown sand; may occur as dune forms or sheet sand

Holocene to Late Pleistocene (Surficial Deposits)

Qyw — **Young Alluvial Wash Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected sandy and gravelly stream bed sediments in marginal parts of active and recently active washes and river channels

Qyf — **Young Alluvial Fan Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qya — **Young Alluvial Valley Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers

Qyt — **Young Terrace Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected marine and stream terrace deposits

Qyl — **Young Lacustrine, Playa, and Estuarine (Paralic) Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected fine-grained sand, silt, mud and clay from lake, playa, and estuarine deposits of various types

Qye — **Young Eolian and Dune Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected wind-blown sands

Late to Middle Pleistocene (Surficial Deposits)

Qof — **Old Alluvial Fan Deposits** - slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qoa — **Old Alluvial Valley Deposits** - slightly to moderately consolidated, moderately dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers

Qot — **Old Terrace Deposits** - slightly to moderately consolidated, moderately dissected marine and stream terrace deposits

Qol — **Old Lacustrine, Playa, and Estuarine (Paralic) Deposits** - slightly to moderately consolidated, moderately dissected fine-grained sand, silt, mud, and clay from lake, playa, and estuarine deposits of various types

Qoe — **Old Eolian and Dune Deposits** - slightly to moderately consolidated, moderately dissected wind-blown sands

Middle to Early Pleistocene (Surficial Deposits)

Qvof — **Very Old Alluvial Fan Deposits** - moderately to well-consolidated, highly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qvoa — **Very Old Alluvial Valley Deposits** - moderately to well-consolidated, highly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers, generally uplifted and deformed

Qvot — **Very Old Terrace Deposits** - moderately to well-consolidated, highly dissected marine and stream terrace deposits

Quaternary (Bedrock)

Qss — **Coarse-grained formations of Pleistocene age and younger age** - primarily sandstone and conglomerate

Qsh — **Fine-grained formations of Pleistocene age and younger** - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments

Tertiary (Bedrock)

Tss — **Coarse-grained Tertiary age formations** - primarily sandstone and conglomerate

Tsh — **Fine-grained Tertiary age formations** - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments

Tv — **Tertiary age formations of volcanic origin**

Mesozoic and Older (Bedrock)

pKm — **Cretaceous and Pre-Cretaceous metamorphic formations of sedimentary and volcanic origin**

gr — **Granitic and other intrusive crystalline rocks of all ages**

SYMBOL EXPLANATION

[For geologic line symbols: lines are solid where location is accurate, long-dashed where location is approximate, short-dashed where location is inferred, dotted where location is concealed. Queries added where identity or existence may be questionable.]

Contacts

Contact

Fault -- Includes strike-slip, normal, reverse, oblique, and unspecified slip

Folds -- Showing direction of plunge where appropriate

Anticline

Syncline

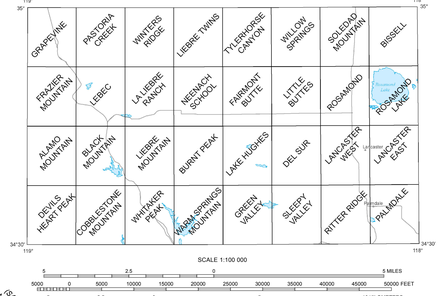
Stream

Spring

Road

County boundary

INDEX TO USGS 7.5' QUADRANGLES



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CONTOUR INTERVAL 50 METERS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

CORRELATION OF MAP UNITS*

		Alluvial Deposits							
		Artificial Fill	Undiff. Surficial Deposits	Landslide Deposits	Alluvial Wash Deposits	Alluvial Fan Deposits	Alluvial Valley Deposits	Terrace Deposits	Lacustrine, Playa, and Estuarine Deposits	Eolian and Dune Deposits
Quaternary Surficial Deposits	Late Holocene	af	Qsu	Qls	Qw	Qf	Qa	Qt	Ql	Qe
	Holocene to Late Pleistocene				Qyw	Qyf	Qya	Qyt	Qyl	Qye
	Late to Middle Pleistocene					Qof	Qoa	Qot	Qol	Qoe
	Middle to Early Pleistocene					Qvof	Qvoa	Qvot		

		Coarse-grained	Fine-grained	Volcanic	Cretaceous and Pre-Cretaceous Metamorphic (sedimentary and volcanic)	Granitic Rocks (all ages)
Quaternary (Bedrock)		Qss	Qsh			
Tertiary (Bedrock)		Tss	Tsh	Tv		
Mesozoic and Older (Bedrock)					pKm	gr

* Boundaries of Quaternary units are gradational and time transgressive in a regional sense.

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Information on this map is not sufficient to serve as a substitute for the geologic and geotechnical site investigations required under Chapters 7.5 and 7.8 of Division 2 of the California Public Resources Code.