U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

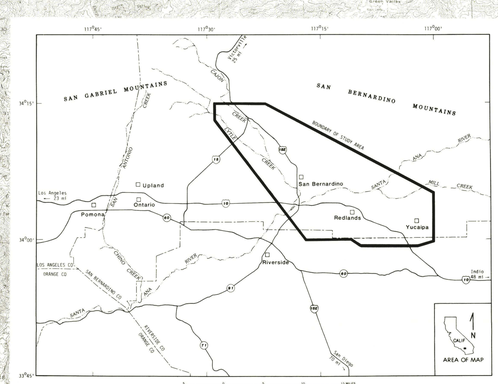
BULLETIN 1898
PLATE 3

117°30' 117°22'30" 117°15' 117°07'30" 117°00'

34°15'

34°07'30"

34°00'



Index map showing location of study area, San Bernardino valley and vicinity, southern California

CORRELATION OF MAP UNITS

Qls	Qh_2	Holocene	QUATERNARY
	Qh_1		
	Qp	Pleistocene	
	b		QUATERNARY AND OLDER

DESCRIPTION OF MAP UNITS

Qh_2 — YOUNGER HOLOCENE ALLUVIAL DEPOSITS—Undissected to slightly dissected surfaces. Pedogenic soil development ranges from none to weak; the most well-developed soils have A horizons and thin C_{ca} horizons. Geomorphologic and soil evidence suggests that these materials were deposited within approximately the last 500 to 1,000 years

Qh_1 — OLDER HOLOCENE ALLUVIAL DEPOSITS—Moderately dissected surfaces. Pedogenic soil development ranges from soils with A horizons and thin C_{ca} horizons to soils with A, weak argillic, and C_{ca} horizons. Geomorphologic and soil evidence suggests that these materials were deposited between approximately 500 to 1,000 years ago and 10,000 years ago, although deposits as old as 15,000 years may be included

Qp — LATE TO MIDDLE PLEISTOCENE ALLUVIAL DEPOSITS—Well-dissected surfaces having original depositional morphology progressively destroyed with increasing age. Pedogenic soils may or may not have an A horizon, but typically have a moderately to well-developed argillic horizon and an underlying C_{ca} horizon. Geomorphologic and soil evidence suggests that these materials were deposited during the last half of the Pleistocene (between approximately 10,000 to 15,000 years ago and 750,000 years ago)

Qls — LANDSLIDE DEPOSITS—Include displaced landslide deposits as well as head-scarp and flank-scarp areas. Arrows show direction of movement

b — BEDROCK AND UNDIFFERENTIATED SURFICIAL DEPOSITS—Consolidated sedimentary materials of Quaternary age and older, and metamorphic and granitic basement rocks. Locally include weakly consolidated sedimentary materials and landslide deposits

EXPLANATION OF MAP SYMBOLS

GEOLOGIC CONTACT

FAULT—Dashed where approximately located, dotted where concealed. Arrows indicate direction of relative movement; bar and ball on downdropped block. Hachures indicate fault scarp, with hachures on downdropped block. Queried where uncertain

THRUST FAULT—Sawteeth on upper plate

50 — CONTOUR LINE SHOWING MINIMUM DEPTH TO GROUND WATER DURING 1973–1983 PERIOD—Dashed where location uncertain; depth in feet below land surface. Contour interval 20 ft at depths less than 50 ft, 25 ft between 50 and 100 ft, and 50 ft at depths greater than 100 ft

APPROXIMATE LOCATION OF BORE-HOLE SITES HAVING STANDARD PENETRATION TESTS (SPTs) USED IN THIS INVESTIGATION—Each dot represents the approximate center of a site having one or more borings. The size and shape of sites vary from location to location, and individual SPTs at a site may have been completed anywhere up to 0.75 mi from the location indicated

4 miles — LINE OF EQUAL DISTANCE FROM THE SAN ANDREAS FAULT

REGIONAL SUSCEPTIBILITY RATINGS

Regional liquefaction-susceptibility ratings are assigned to populations of susceptibility determinations that are grouped according to ground-water depth, distance to causative fault, and geologic unit (tables 1 through 7; see text for discussion). The ratings are based on the percentage of SPT determinations that indicate susceptible conditions: HIGH, >80 percent; MODERATELY HIGH, 60 to 80 percent; MODERATE, 30 to 60 percent; LOW, <30 percent. Both single ratings (for example, HIGH) and compound ratings (for example, MODERATELY HIGH TO MODERATE) are used. Compound ratings typically are applied to the 20-foot ground-water intervals at 10 to 50 foot depths. For these 20-foot intervals, the first part of the compound rating applies to the shallower 10-foot interval while the second rating applies to the deeper 10-foot interval.

HIGH SUSCEPTIBILITY

MODERATELY HIGH TO MODERATE SUSCEPTIBILITY

MODERATE SUSCEPTIBILITY

Base from U.S. Geological Survey, 1:24,000 Devore, 1966; El Casco, Redlands, Sunnymead, Keller Peak, 1967; Fontana, Harrison Mtn., Riverside East, Riverside West, San Bernardino North, San Bernardino South, Yucaipa, 1967 (photorevised 1973)

LIMITATIONS

This map is subject to the limitations described in the accompanying text. The map identifies generalized regional patterns of liquefaction susceptibility rather than local conditions and therefore cannot be used to determine the degree of liquefaction susceptibility at specific sites. Moreover, the map only addresses liquefaction susceptibility; the level of hazard created by liquefaction-induced ground failures is not addressed. The boundaries between susceptibility zones will shift as ground-water conditions change.

SCALE 1:48 000

1 ½ 0 1 2 3 4 5 MILES

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVALS 20 and 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology compiled from published and unpublished 1:24,000-scale geologic quadrangle maps as follows: the Devore quadrangle (D.M. Morton and J.C. Matti, unpublished mapping, 1975–1986); the San Bernardino North quadrangle (Miller, 1979; S.E. Carson and J.C. Matti, unpublished mapping, 1980–1986); the Harrison Mtn. 7½-minute quadrangle (S.E. Carson and J.C. Matti, unpublished mapping, 1980–1986); the San Bernardino South quadrangle (Dibblee, 1964; S.E. Carson, unpublished mapping, 1980–1986); the Redlands quadrangle (Morton, 1978b; J.C. Matti and S.E. Carson, unpublished mapping, 1980–1986); the Yucaipa quadrangle (J.C. Matti, D.M. Morton, B.F. Cox, S.E. Carson, and T.J. Yerter, unpublished mapping, 1975–1986); the Sunnymead quadrangle (Morton, 1978c); and the El Casco quadrangle (J.C. Matti and D.M. Morton, unpublished mapping, 1975–1986).

LIQUEFACTION SUSCEPTIBILITY MAP OF THE SAN BERNARDINO VALLEY AND VICINITY FOR AN M_S=8.0 EARTHQUAKE ON THE SAN ANDREAS FAULT