PRELIMINARY GEOLOGIC MAP OF THE ROSAMOND 7.5′ QUADRANGLE LOS ANGELES AND KERN COUNTIES, CALIFORNIA

VERSION 1.0

By
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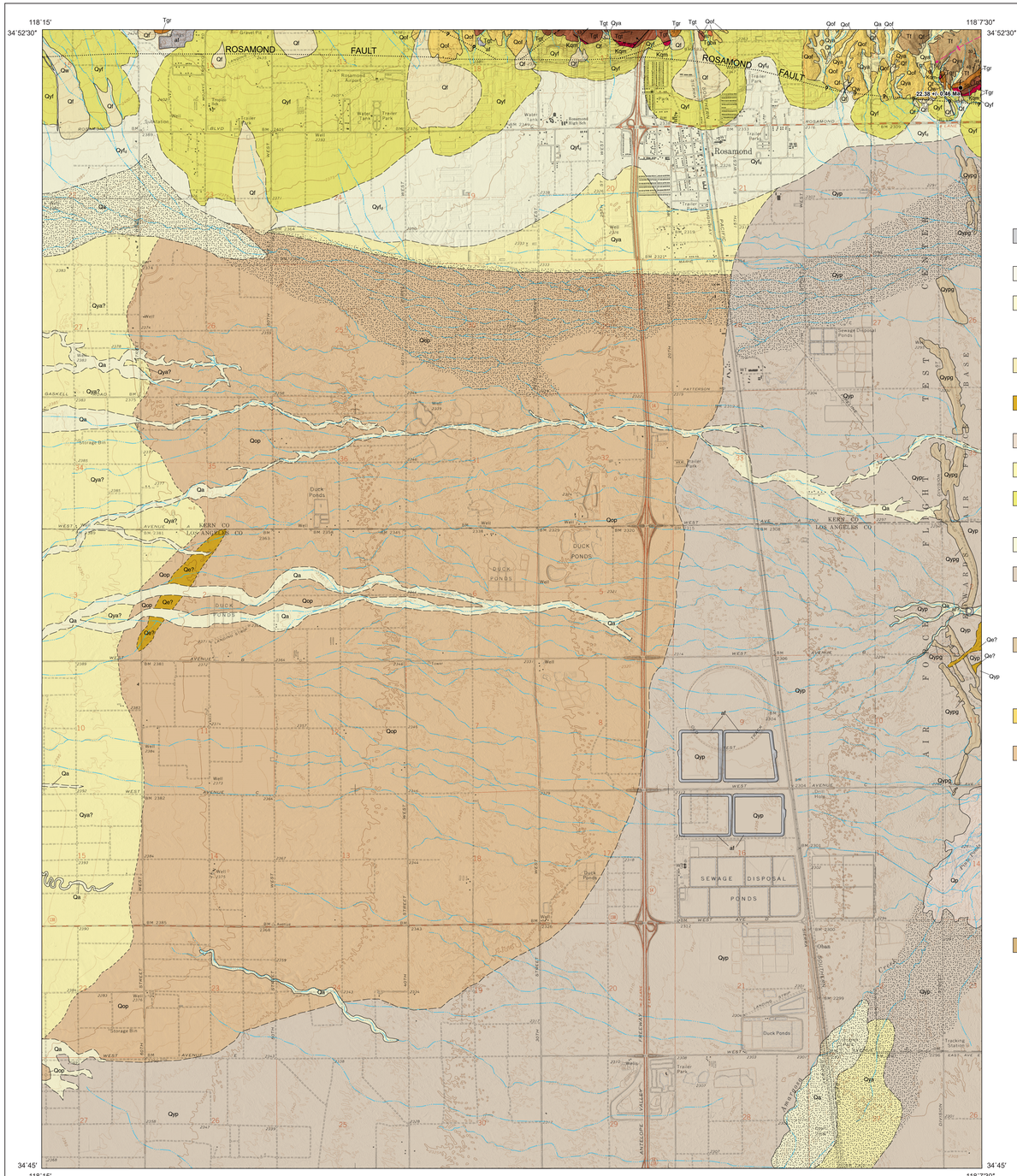
2026

Preliminary Geologic Maps available from:
https://www.conservation.ca.gov/cgs/maps-data/rgm/preliminary

California Department of Conservation
California Geological Survey



Coordinate System:
Universal Transverse Mercator, Zone 11N
North American Datum of 1927

Topographic base from U.S. Geological Survey
Rosamond 7.5-minute Quadrangle, 1973, 1977 edition.
Shaded relief image derived from USGS Lidar DEM 2017 and 2018
Basemap of hydrography derived from National Hydrology Dataset (NHD)

Scale 1:24,000

1 0 1 Miles
1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet
1 0 1 Kilometers

Contour Interval 5 Feet
National Geodetic Vertical Datum of 1929

11.57°
TRUE NORTH
MAGNETIC NORTH
Approximate Mean Declination, 2025

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DESCRIPTION OF MAP UNITS

QUATERNARY UNITS

af — **Artificial Fill (Holocene, historic)—**Consists of anthropogenic deposits of engineered and non-engineered earth-fill soils derived from local sources, including large berms and fill materials greater than 2 m thick placed for infrastructure and residential tracts; also includes mine tailings from the Tropico mine. Areas generally disturbed by grading and roads are indicated in the base map.

Qw — **Wash deposits (Holocene)—**Unconsolidated, generally pale-brown, fine- to medium-grained sand with some coarse sand, gravel, cobbles, and silt. Deposits derived from local bedrock or reworked from local Quaternary sources in the hills along the northern margin of the quadrangle.

Qa — **Alluvial deposits (Holocene)—**Unconsolidated to weakly consolidated, yellowish-gray to brown fluvial gravel, sand, and silt. In the northern portion of the quadrangle, deposits consist predominately of moderately sorted, medium- to very coarse-grained sand. Deposits in the north are associated with erosion of nearby slopes and alluvial fans. In the southern portions of the quadrangle, alluvial deposits appear as a thin veneer of overlying playa silts. The deposits consist of poorly sorted fine- to medium-grained silty sand with local coarse sand and gravel. Concentration of local coarse sand grains at the surface are likely dependent on flow transport during large runoff events. Alluvial deposits in the south are thin, patchy, and controlled by low sandy vegetated mounds that predominate the landscape.

Qf — **Alluvial fan deposits (Holocene)—**Unconsolidated to weakly consolidated, yellowish-brown to brown, poorly sorted, gravel, sand, and silt deposits forming typically undissected, active alluvial fans. Includes small to large cones at the mouths of stream canyons and broad aprons of coarse debris adjacent to mountain fronts. Topographically lower in elevation relative to adjacent Qof deposits, may be deposited over Qyf deposits.

Qe — **Eolian deposits (Holocene)—**Unconsolidated, yellowish-brown, windblown deposits of fine- to medium-grained sand. Deposits are concentrated at the base of vegetated grass mounds and brush. Local thin deposits mapped in the western portion of the quadrangle may be overprinted onto an older beach ridge deposit associated with the older playa deposits of Pleistocene Lake Thompson.

Qp — **Playa deposits (Holocene)—**Unconsolidated to moderately consolidated deposits of light brownish-gray to pale-brown clay and silt associated with Rosamond Dry Lake. Active deposition occurs during wet periods and mud cracks commonly overprint the surface of the deposits during dry periods.

Qya — **Younger alluvial deposits (Holocene to late Pleistocene)—**Unconsolidated to slightly consolidated, generally yellowish-brown silty sand and gravel deposited by previously active alluvial drainages. Transition from Qop to Qya deposits along the western quadrangle boundary is gradual and difficult to distinguish.

Qyf — **Younger alluvial fan deposits (Holocene to late Pleistocene)—**Unconsolidated to weakly consolidated, yellowish-brown to brown, fine- to medium-grained sand with fine to coarse gravel and cobbles in proximal areas. Clasts are sourced primarily from volcanics of the Gem Hill Formation and the underlying quartz monzonite. Deposits are slightly dissected and could be modified during large storm events. In the northern portion of the quadrangle, fan sediments are sourced from topographically high areas, including the nearby Rosamond Hills.

Qyf_1 — **Distal young alluvial fan deposits (Holocene to late Pleistocene)—**Distal, lower gradient portions of young alluvial fans (Qyf) composed primarily of sand and silt. Deposits form broad aprons that extend down gradient to gradational contacts with playa and younger alluvial deposits.

Qyp — **Younger playa deposits (Holocene to late Pleistocene)—**Moderately consolidated clayey silt to silty clay. Soils generally light brownish gray to pale brown to light yellowish brown (10YR 6/2 to 6/4). Younger playa deposits are associated with Pleistocene Lake Thompson (Orme, 2008). Deposits are locally dissected by surface flow around vegetated mounds of lightly consolidated, very-fine to medium-grained silty sand that appear to accumulate eolian material and may be covered with a thin veneer of alluvial deposits (Qa). Vegetated mounds vary in height up to 30 cm, are occupied by grasses and some small shrubs, and contain moderate to many fine rootlets. Low ground between mounds consistently displays mud cracks and local dark-brown, cracked algae deposits where ponded water appears to accumulate during wet periods.

Qypg — **Younger playa beach ridge gravels (Holocene to late Pleistocene)—**Unconsolidated, poorly sorted, gravelly sands, and medium- to coarse-grained silty sand deposits with gravels of granitoid origin, that form low, elongate ridgelines around Rosamond Dry Lake to the east; light yellowish brown (10YR 6/4 to 10YR 6/6) (Lancaster and Holland, 2011; Orme, 2008). Beach ridge deposits of Pleistocene Lake Thompson measure approximately 5 to 8 m thick west of Rosamond Dry Lake (located primarily east of quadrangle) (Orme, 2008); likely includes later veneer of eolian deposits. Deposits are poorly exposed; therefore, genetic characterization is primarily based on the geomorphic expression of subtle linear ridges observed using elevation data and on subsurface interpretations made by Orme (2004, 2008). Possible association with Joshua Trees based on lack of these trees elsewhere in the quadrangle.

Qof — **Older alluvial fan deposits (Pleistocene)—**Moderately consolidated, moderately dense, yellowish-brown to reddish-brown to strong-brown (10YR 5/6 to 5YR 4/4 to 7.5YR 5/6), medium- to coarse-grained sand with sparse gravel and uncommon cobbles. Gravel clasts are predominantly subangular to subrounded and of mixed volcanic and granitic origin.

Qop — **Older playa deposits (Pleistocene)—**Moderately to well-consolidated, light-yellowish-gray to light-grayish-brown to pale-brown (10YR 7/2 to 10YR 6/2-6/3) silty clay to clayey silt with minor fine sand and gravel. Playa deposits associated with shallow perennial Pleistocene Lake Thompson accumulated from around 16.2 ka to at least 12.6 ka (Orme, 2008). Deposits are locally dissected by surface flow around overlying, vegetated mounds of slightly consolidated, very fine- to medium-grained silty sand that appear to actively accumulate eolian material. Vegetated mounds vary in height from 30 to 60 cm, are occupied by grasses and some small shrubs, and contain moderate to abundant fine rootlets. Low ground between mounds consistently displays mud cracks when dry.

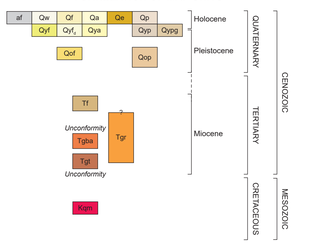
TERTIARY UNITS

TROPICO GROUP (MIOCENE)

Originally described as the “Rosamond series” (Hershey, 1902) and later as “Rosamond formation” (Simpson, 1934), before it was assigned the “Tropico Group” by Dibblee (1958, 1967). Includes nonmarine sedimentary, pyroclastic, and volcanic rocks exposed in the vicinity of Castle Butte, Kramer borate area, Kramer Hills, Mojave, and Rosamond (within the map area), with the type-section exposed in the Rosamond Hills north of the map area; maximum exposed thickness is about 2,800 ft (853 m) (Dibblee, 1958). Three subunits of the Tropico Group are exposed within the map area: (1) a basal pyroclastic tuffaceous sandstone unit; (2) the Bobtail Member of the Gem Hill Formation; and (3) the Fiss Fanglomerate. The Tropico Group is generally non-fossiliferous; however, one locality of diatom remains preserved in the upper portion of the group suggests an early Pliocene age; K-Ar dating of the volcanic sequence near Soledad Mountain indicates an age range of 21.5 to 16.9 Ma (McCusker, 1982). New U-Pb dating from the Rosamond Quadrangle indicates a slightly older age of about 22.4 Ma for rhyolite breccia within the Bobtail Member. The Tropico Group depositionally overlies, or intrudes, granitic basement rocks in the region (Dibblee, 1958, 1967).

Tf — **Fiss Fanglomerate (Miocene)—**Moderately indurated, medium- to coarse-grained sandstone, breccia, and conglomerate with subangular to subrounded sand grains, subangular volcanic clasts, and subrounded quartz monzonite clasts; clasts commonly range up to cobble size but locally include angular volcanic boulders; volcanic clasts are lithologically similar to members of the Bobtail Latite; sand grains include tuffaceous material, rhyolite, and quartz monzonite derived from nearby bedrock sources. The estimated maximum thickness is 1,750 ft (533 m) (Dibblee, 1963) but thins to about 300 ft (91 m) thick in the northeast foothills of the Rosamond Hills (Dibblee, 1967). Preferential erosion of tuffaceous material in the fanglomerate matrix results in local accumulations of larger clasts mantling distinctive, low, rounded hills (Roberts, 1951). Named after Fiss Hill in the western Rosamond Hills (Dibblee, 1958). Overlies the Gem Hill Formation and is unconformable in places (Dibblee, 1963) but may also be locally intruded by Tgr; has also been correlated with the lower part of Oso Canyon Formation and the Punchbowl Formation, both of Miocene age, elsewhere in the Mojave Desert (Dibblee, 1967).

CORRELATION OF MAP UNITS



Gem Hill Formation (Miocene)—Consists of a dominantly pyroclastic sequence present in Antelope Valley, Little Buttes, Middle Buttes, Soledad Mountain, Bissell Hills and Rosamond Hills (Dibblee, 1967). Named after Gem Hill, which is located about 5 km northwest of the Rosamond Quadrangle. Volcanic rocks of the Gem Hill Formation have been interpreted to possibly represent a caldera deposit (Burnett and Brady, 1990). Within the Rosamond Hills, the formation is about 1290 ft (393 m) thick and thins as it extends eastward. Within the map area, the Gem Hill Formation includes two members: 1) a basal tuffaceous sandstone and conglomerate member (Tgt) and 2) two facies of the Bobtail Quartz Latite Member - a rhyolite and rhyolite breccia facies with uncommon porphyritic rhyolite (Tgr), which intrudes through and interleaves with the tuffaceous basal member, and a local basalt facies (Tgba). Epithermal-type precious metals, consisting dominantly of gold and silver, were deposited within the fracture system that overprints the Gem Hill Formation northwest of the quadrangle, which has supported economic mining in the area (McCusker, 1982; Troxel and Morton, 1962).

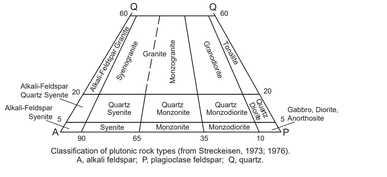
Tgr — **Bobtail Quartz Latite Member, rhyolite breccia with minor porphyritic rhyolite intrusions—**Named for the type locality at the Bobtail mines at Soledad Mountain (Dibblee, 1967) and mapped as red rhyolite (“Tr”) by Roberts (1951). Mapped by Dibblee (1967) as felsite breccia and porphyry (“Tgf”); however, based on field observations the unit is limited to rhyolite breccia (felsite breccia (Tgb) of Dibblee (1967)) within the quadrangle. Consists of a grayish-purple aphanitic matrix with varying abundance of grayish-purple to reddish-purple, angular to subangular clasts of banded rhyolite. Clasts up to 10 cm are common but locally range up to 30 cm. Breccia outcrops are commonly resistant to weathering and form rough, jagged, irregular knobs in the foothills in the northeastern portion of the quadrangle. Breccia matrix is dominantly microcrystalline, with uncommon thin bands of reddish-purple to dark-red porphyritic rhyolite with closely spaced phenocrysts of plagioclase, quartz, and rhyolite fragments. Deposits are hypabyssal (shallowly intruded) through the quartz monzonite and into tuffaceous deposits of Tgt. New U-Pb dating of 28 zircons yielded a mean age of 22.38 +/-0.12 [0.46] Ma (age +/-2SE [2%] uncertainty); MSWD = 1.7. Analysis conducted at the UCSB Laser Ablation Laboratory (J. Schwartz, written commun., 2025).

Tgba — **Bobtail Quartz Latite Member, basalt—**Diabasic basalt composed of plagioclase, augite, and iron oxides; unaltered and non-vesicular; moderately resistant to weathering, and weathers to a greenish-black soil, forming few outcrops (Dibblee, 1963). Included by Roberts (1951) as part of Tgr. Occurs as one small exposure in the northern portion of the quadrangle, east of the State Route 14.

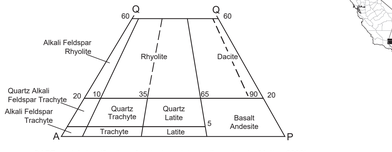
Tgt — **Pyroclastic tuffaceous sandstone—**Consists of interbedded, light-gray to yellowish-green to white pyroclastic tuffaceous sandstone (Dibblee, 1963; McCusker, 1982). Clasts and sand grains are angular to subangular and composed of flow-banded rhyolite, pumiceous rhyolite lapillac, and quartz monzonite debris. Indurated matrix with clast size decreasing and roundness increasing westward, suggesting an eastern source for the material (Roberts, 1951; Dibblee, 1963). Deposited on an erosional surface of the underlying quartz monzonite (Kqm), this unit is considered the basal part of the Tropico Group and the Gem Hill Formation; however, thin hypabyssal tuffaceous dikes were also locally observed cutting the quartz monzonite. Typically forms distinctive outcrops that are nearly free of vegetation. Beds generally dip 15-20° to the south in exposures north of the quadrangle, but dip northward on the south limb of a southwest-plunging syncline in the northeastern corner of the quadrangle. Mapped as green volcanic conglomerate (“Tg”) and white volcanic conglomerate (“Tw”) by Roberts (1951), and as pyroclastic tuffaceous sandstone (“Tgt”) by Dibblee (1967) , which has been adopted here.

MESOZOIC INTRUSIVE ROCKS

Kqm — **Quartz monzonite (Cretaceous)—**Quartz monzonite composed of medium- to locally coarse-grained feldspar and plagioclase with subordinate quartz and minor biotite. Kqm is cut by pegmatitic dikes and has local green alteration present near the intrusion of hypabyssal tuff (Tgt) in the northeastern portion of the map area. Reported to have an age of 95 ±10 Ma (lead-alpha ratios in zircon) based on a sample analyzed from the Rosamond Hills (Dibblee, 1967). Weathered surfaces yield subdued landscapes with mantles of decomposed debris (Roberts, 1951).



Classification of plutonic rock types (from Streckeisen, 1973; 1976).
A, alkali feldspar; P, plagioclase feldspar; Q, quartz.



QAPF modal classification of plutonic rock types (based on Le Maitre, 2002).
This diagram must not be used for rocks in which the mafic mineral content, M, is greater than 90%.
A, alkali feldspar; P, plagioclase feldspar; Q, quartz

Rosamond 7.5-minute Quadrangle



SOURCES OF MAP DATA

1. Dibblee, 1959*
2. Dibblee, 1963*
3. Lancaster and others, 2012*
4. Roberts, 1951
5. Rodriguez and Swanson, 2025*

*Data source covers entire quadrangle

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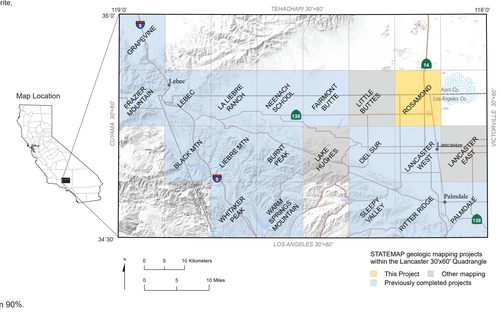
MAP SYMBOLS

- Contact between map units—Solid where accurately located; long dash where approximately located; short dash where inferred; dotted where concealed; queried where identity or existence is uncertain
- Fault—Solid where accurately located; short dash where inferred; dotted where concealed; queried where identity or existence is uncertain. Arrow indicates dip direction of the fault plane
- Syncline—Long dash where approximately located; arrow showing plunge direction
- Sediment transport reach, including areas of distal, disorganized sheet flow that convey reworked fine sediments across Lake Thompson playa deposits; delineated based on tonal changes in imagery
- U-Pb Geochronology point (one sample)
- Strike and dip of geologic structure; number indicates dip angle in degrees
- Bedding



STATEMAP geologic mapping projects within the Lancaster 30'x60' Quadrangle
This Project
Other mapping
Previously completed projects

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