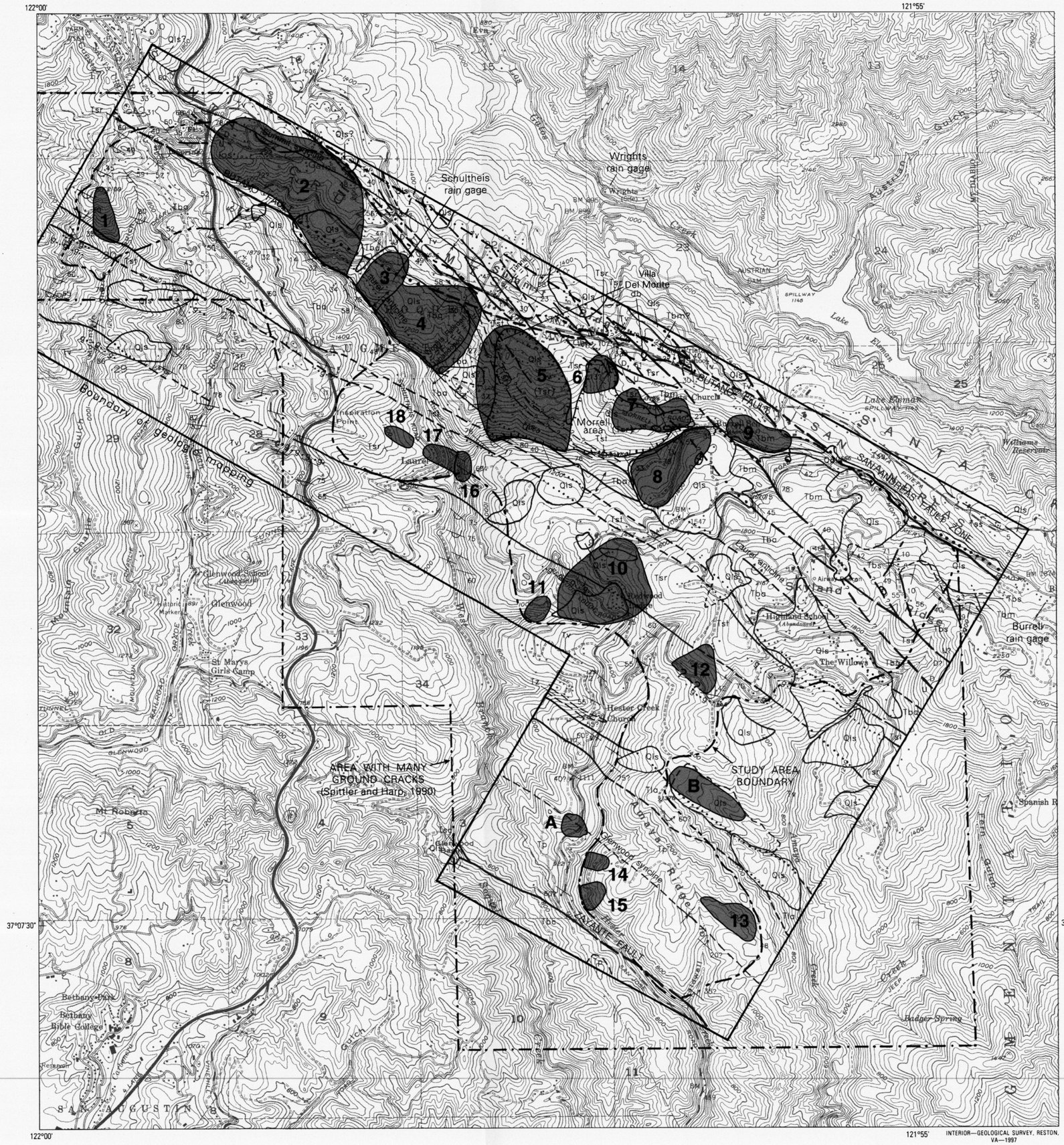
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PROFESSIONAL PAPER 1551–C
PLATE 3



Base from U.S. Geological Survey, Los Gatos, 1953 (photorevised 1980); Laurel, 1955 (photorevised 1968)

Polyconic projection

SCALE 1:24 000

1 1/2 0 1 MILE

1 .5 0 1 KILOMETER

CONTOUR INTERVALS 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Compiled from Clark and others (1989, with landslide boundaries revised by R.J. McLaughlin and J.C. Clark, unpub. data, 1990) and McLaughlin and others (1991)

Drafted by Raymond R. Eis

121°55' INTERIOR—GEOLOGICAL SURVEY, RESTON, VA—1997

EXPLANATION

6 **Large (>1 ha) landslide generated by 1989 Loma Prieta earthquake**—Generalized boundaries; dashed and queried where uncertain. Landslides adjacent to study area are lettered (see table 1)

1	**Majestic Drive**
2	**Old Santa Cruz Highway complex**
3	**Upper Schultheis Road**
4	**Ralls Drive**
5	**Villa Del Monte**
6	**Taylor Gulch**
7	**Upper Morrell Road**
8	**Lower Morrell Road**
9	**Burrell**
10	**Upper Redwood Lodge Road**
11	**Long Branch**
12	**Stetson Road**
13	**Amaya Ridge**
14	**Hester Creek North**
15	**Hester Creek South**
16	**Lower Redwood Lodge**
17	**Lower Schultheis Road East**
18	**Lower Schultheis Road West**
A	**Soquel-San Jose Road**
B	**Comstock Mill Road**

Limit of area with abundant coseismic ground cracks—From Spittler and Harp (1990)

Boundary of study area

DESCRIPTION OF MAP UNITS

[Modified from Clark and others, 1989; shown in relation to study area]

SURFICIAL DEPOSITS

Qal **Alluvium (Holocene and upper Pleistocene)**—Unconsolidated stream-deposited gravel, sand, and silt

Qls **Landslide deposits (Holocene and Pleistocene)**—Mixture of colluvium and intact masses of rock, displaced downslope by gravity

ROCKS SOUTHWEST OF SAN ANDREAS FAULT

Tp **Purisima Formation (Pliocene)**—Thick-bedded to massive, locally crossbedded, weakly consolidated, bluish-gray, fine- to medium-grained sandstone that contains abundant andesitic detritus. Also includes very thick bedded, yellowish-gray, tuffaceous, diatomaceous siltstone

Tsc **Santa Cruz Mudstone (upper Miocene)**—Medium-bedded, faintly laminated, pale-yellowish-brown, siliceous organic mudstone

Tla **Lambert Shale (lower Miocene)**—Thin- to medium-bedded, faintly laminated, olive-gray organic mudstone, with pale-yellowish-brown phosphatic laminae and lenses in lower part. Unit grades upward to thin-bedded sandy siltstone with thin to thick interbeds of micaceous, fine- to medium-grained arkosic sandstone

Tv **Vaqueros Sandstone (lower Miocene and Oligocene)**—Thick-bedded to massive, yellowish-gray, fine- to coarse-grained arkosic sandstone, with thick glauconitic sandstone bed in lower part

Tz **Zayante Sandstone (lower Miocene and Oligocene)**—Thick-bedded to very thick bedded, poorly sorted, red muddy sandstone, green sandy siltstone, and cobble conglomerate, which contains abundant granitic detritus, probably nonmarine. Locally intertongues with Vaqueros Sandstone

San Lorenzo Formation (Oligocene and upper Eocene)—Divided into:

Tsr **Rices Mudstone Member (Oligocene and upper Eocene)**—Upper part is light-gray nodular mudstone, locally bioturbated and glauconitic. Along Soquel Creek, lower part is massive, fine-grained, glauconitic arkosic sandstone. Where covered by Qls, unit label shown in parentheses

Tst **Twobar Shale Member (upper Eocene)**—Thin-bedded, laminated, olive-gray shale, with very thin lenses and laminae of very fine grained arkosic sandstone

Butano Sandstone (upper, middle, and lower Eocene)—Divided into:

Tba **Sandstone and siltstone**—Yellowish-gray, medium-bedded to massive, fine- to medium-grained arkosic sandstone containing thin interbeds of olive-gray siltstone and shale

Tbm **Mudstone**—Dark-gray, thin-bedded nodular mudstone, which commonly has fish scales along bedding planes, interbedded with thin to thick, locally graded arkosic sandstone

Tbs **Sandstone**—Thick-bedded to massive, fine- to coarse-grained arkosic sandstone

Tbc **Sandstone and conglomerate**—Very thick bedded to massive, light-gray, granular, medium- to coarse-grained arkosic sandstone that has thick to very thick interbeds of sandy pebble conglomerate, which contains granitic boulders as much as 1 m in diameter

MAFIC BASEMENT(?) ROCKS BETWEEN ZAYANTE AND SAN ANDREAS FAULT ZONES

db **Diabase and gabbro of Laurel Creek (Jurassic?)**—Fine- to medium-grained diabase and gabbro, brecciated and sheared, locally chloritized, and cut by quartz veinlets

ROCKS NORTHEAST OF SAN ANDREAS FAULT

Tss **Marine sandstone and shale (Eocene)**—Thin-bedded to massive, fine- to coarse-grained, quartzofeldspathic sandstone, silty sandstone, and silty mudstone. Unit is extensively hydrothermally altered and contains numerous quartz veins

Contact—Dashed where approximately located; dotted where concealed

Fault—Dashed where approximately located; dotted where concealed; queried where uncertain. D, downthrown side; U, upthrown side; queried where uncertain

Syncline—Showing trace of axial surface. Dashed where approximately located

Anticline—Showing trace of axial surface. Dashed where approximately located

Overturned anticline—Showing trace of axial surface

Strike and dip of bedding

60 **Inclined**—Dip queried where uncertain

55 **Approximated inclined**—Approximated from aerial photographs or long-distance sighting, or averaged in area where strike or dip varies widely. Dip queried where uncertain

Vertical—Ball denotes facing direction as determined by sedimentary features

40 **Overturned**

60? **Approximated overturned**—Approximated from aerial photographs or long-distance sighting, or averaged in area where strike and dip varies widely

g··g··g··g **Glauconitic marker bed**

Travertine spring

Oil seep

Closed depression

Large landslide—One or more blocks of intact rock rotationally displaced downslope from a prominent main scarp. Hachures indicate boundary of landslide. Stratigraphy and structure of intact blocks delineated where mapped

LARGE LANDSLIDES, COSEISMIC GROUND CRACKS, AND GEOLOGY IN THE SUMMIT RIDGE AREA, SANTA CRUZ MOUNTAINS, CALIFORNIA

Keefer, David K. ed., The Loma Prieta, California, earthquake of October 17, 1989—landslides: U.S. Geological Survey Professional Paper 1551–C.

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