

# STATE OF CALIFORNIA California Geological Survey

## Earthquake Zones of Required Investigation Hayward Quadrangle 2012

### PURPOSE OF MAP

THIS MAP SHOWS BOTH ALQUIST-PRIOLO EARTHQUAKE FAULT ZONES AND SEISMIC HAZARD ZONES, IF EVALUATED.

This map shows the location of Alquist-Priolo (AP) Earthquake Fault Zones and Seismic Hazard Zones, collectively referred to here as Earthquake Zones of Required Investigation. The Geographic Information System (GIS) digital files of these regulatory zones released by the California Geological Survey (CGS) are the "Official Maps". GIS files are available at the CGS website [www.conservation.ca.gov/cgs](http://www.conservation.ca.gov/cgs). These zones will assist cities and counties in fulfilling their responsibilities for protecting the public from the effects of surface

fault rupture and earthquake-triggered ground failure as required by the AP Earthquake Fault Zoning Act (Public Resources Code Sections 2621-2630) and the Seismic Hazards Mapping Act (Public Resources Code Sections 2690-2699.5). For information regarding the general approach and recommended methods for preparing these zones, see California Geological Survey (CGS) Special Publication 42, *Fault-Rupture Hazard Zones in California*, and Special Publication 118, *Recommended Criteria for Delineating Seismic Hazard Zones in California*.

For information regarding the scope and recommended methods to be used in conducting required site investigations refer to CGS Special Publication 42, Appendix C *Guidelines for Evaluating the Hazard of Surface Rupture*, and CGS Special Publication 117A, *Guidelines for Evaluating and Mitigating Seismic Hazards in California*. For a general description of the AP and Seismic Hazards Mapping acts, the zoning programs, and related information, please refer to the website at [www.conservation.ca.gov/cgs](http://www.conservation.ca.gov/cgs).

### MAP EXPLANATION

#### EARTHQUAKE FAULT ZONES

**Active Fault Traces**  
Faults considered to have been active during Holocene time and to have potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

#### SEISMIC HAZARD ZONES

**Earthquake Fault Zones**  
Zones are areas delineated as straight-line segments that connect encircled turning points encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as defined in Public Resources Code Section 2621.5(a) would be required.

#### Liquefaction

Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

#### Earthquake-Induced Landslides

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

#### OVERLAPPING ZONES

**Overlap of Earthquake Fault Zone and Liquefaction Zone**  
Areas that are covered by both Earthquake Fault Zone and Liquefaction Zone. Note: Mitigation methods differ for each zone - AP Act only allows avoidance; Seismic Hazard Mapping Act allows mitigation by engineering/geotechnical design as well as avoidance.

**Overlap of Earthquake Fault Zone and Earthquake-Induced Landslide Zone**  
Areas that are covered by both Earthquake Fault Zone and Earthquake-Induced Landslide Zone. Note: Mitigation methods differ for each zone - AP Act only allows avoidance; Seismic Hazard Mapping Act allows mitigation by engineering/geotechnical design as well as avoidance.

#### REFERENCES USED TO COMPILE FAULT DATA

Hayward Quadrangle  
Herd, D., 1978. Map of Quaternary faulting along the northern Hayward fault zone: U.S. Geological Survey Open-File Report 78-308.  
Lienkaemper, J., 2006. digital database of recently active traces of the Hayward Fault, California: U.S. Geological Survey Data Series 177 <http://pubs.usgs.gov/ds/2006/177/>.  
Nason, R. D., 1971. Investigation of fault creep slippage in northern and central California: PhD thesis, University of California, San Diego.  
Radbruch-Hall, D.H., 1974. Map showing recently active breaks along the Hayward fault zone and the southern part of the Calaveras fault zone, California: U.S. Geological Survey Miscellaneous Investigations Map 1813.  
Rubin, R.S., 2011. Ashland Fault, Alameda County, California: California Geological Survey Fault Evaluation Report FER-255 (unpublished).  
Rubin, R.S., 2011. Eastern Trace of the Hayward Fault, Alameda County, California: California Geological Survey Supplement No. 1 Fault Evaluation Report FER-255 (unpublished).  
Smith, T.C., 1981. Hayward Fault (Hayward segment), Alameda County, California Division of Mines and Geology Fault Evaluation Report FER-103, 41 p., in Fault Evaluation Reports Prepared Under the Alquist-Priolo Earthquake Fault Zoning Act, Region 1 - Central California, California Geological Survey CGS CD 2002-01 (2002).  
Woodward-Clyde Consultants, 1978. Geologic/seismic hazards evaluation, Fairmont Hospital-Juvenile Hall, San Leandro, California: Unpublished consulting report for Alameda County Public Works Agency, Hayward, California.

For additional information on faults in this map area, the rationale used for zoning, and additional references consulted, refer to unpublished Fault Evaluation Reports on file at regional offices of CGS.

#### DATA AND METHODOLOGY USED TO DEVELOP SEISMIC HAZARD ZONES ARE PRESENTED IN THE FOLLOWING:

Seismic Hazard Zone Report of the Hayward 7.5-minute Quadrangle, Alameda County California: California Geological Survey, Seismic Hazard Zone report 091 [http://gmsw.consrv.ca.gov/smp/download/evalp/hayw\\_eval.pdf](http://gmsw.consrv.ca.gov/smp/download/evalp/hayw_eval.pdf)

For additional information on seismic hazards in this map area, the rationale used for zoning, and additional references consulted, refer to: [www.conservation.ca.gov/cgs/](http://www.conservation.ca.gov/cgs/)

### EARTHQUAKE FAULT ZONES

Delineated in compliance with  
Chapter 7.5 Division 2 of the California Public Resources Code  
(Alquist-Priolo Earthquake Fault Zoning Act)

### HAYWARD QUADRANGLE REVISED OFFICIAL MAP

Released: September 21, 2012

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STATE GEOLOGIST

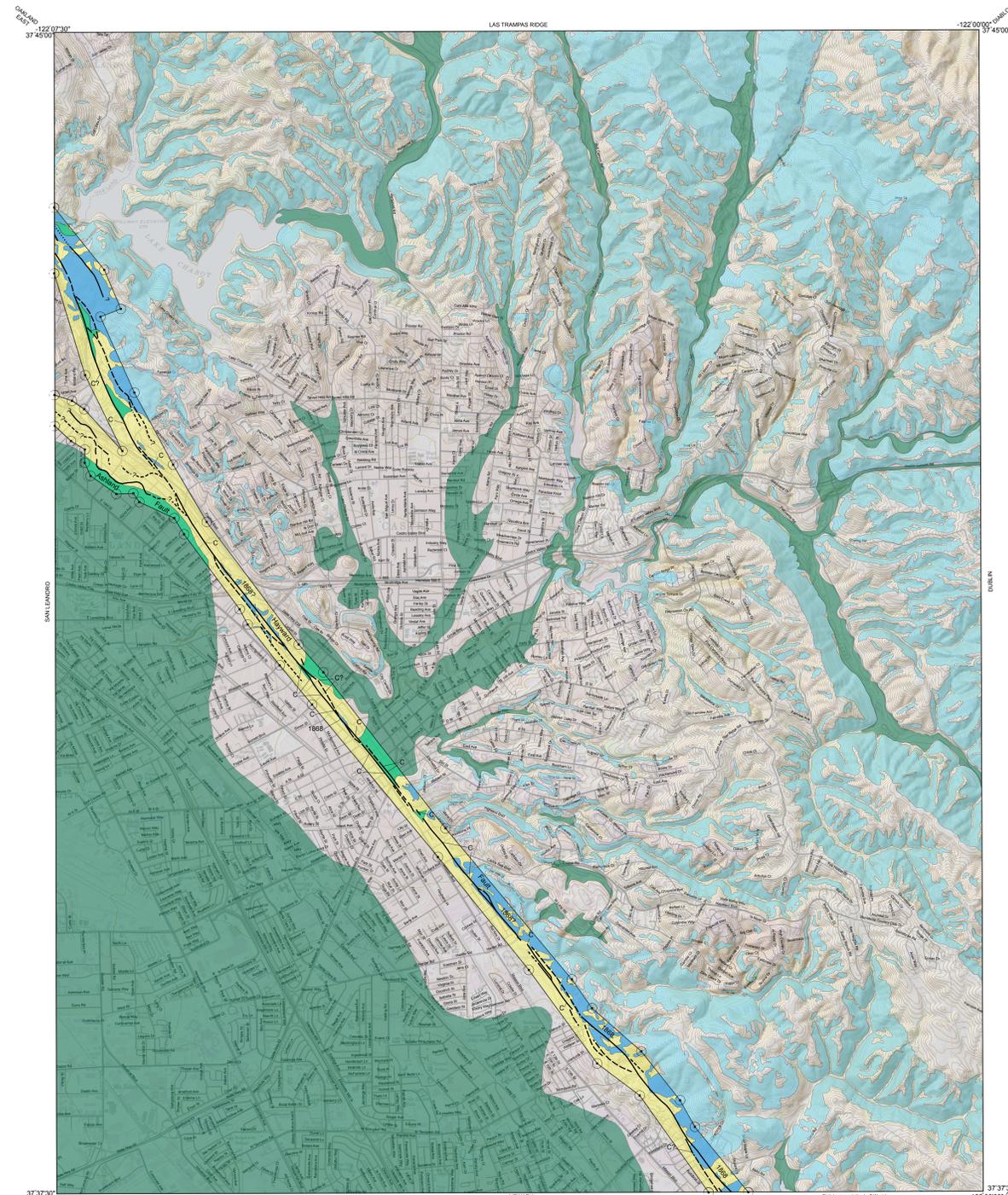
### SEISMIC HAZARD ZONES

Delineated in compliance with  
Chapter 7.8 Division 2 of the California Public Resources Code  
(Seismic Hazards Mapping Act)

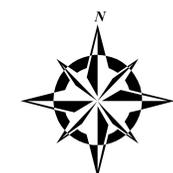
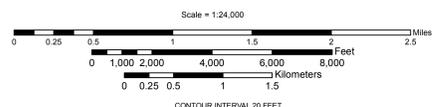
### HAYWARD QUADRANGLE OFFICIAL MAP

Released: July 2, 2003

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Projection: Universal Transverse Mercator, Zone 10 North, GCS North American Datum of 1983  
Topographic contours derived from USGS 10 meter National Elevation Dataset (NED). Shaded topographic relief derived from USGS 10 meter NED.



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