



COMMUNITY DEVELOPMENT DEPARTMENT POLICY & PROCEDURE

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TITLE: The City Policy for Site Specific Seismic Fault Investigation

PURPOSE:

The purpose of this policy is to ensure that non-exempt developments initiate a site-specific fault-rupture investigation according to the California Building Code in effect and following procedures of the California Geological Survey (CGS; 2018a). The major purpose of the site-specific seismic fault investigation is to identify and to prohibit construction of structures intended for human occupancy across the traces of active faults, and thereby to mitigate the hazard of surface and near-surface fault rupture.

Prior to issuance of building permits, current City regulations and practice require that applicants (typically owners/developers) for proposed developments conduct an appropriate site-specific fault-investigation, the ultimate intent of which is to ensure public health, safety and welfare. In January 2018, the CGS designated the Santa Monica fault as an "Earthquake Fault Zone" (EFZ) likely underlain by active faults capable of surface ground rupture (CGS, 2018b). Other nearby EFZs (Hollywood, Inglewood and West Pico) currently project into the City and similarly require geological evaluation. Accordingly, as a matter of public safety and policy, the City, as the decision-making (lead) agency, follows the authority given to the City Building Official by the 2016 California Building Code, including recommendations and guidelines established by the CGS (2018a), the pertinent provisions are outlined as follows:

1. The 2017 California Building Code, Chapter 18 Soils and Foundations, Section 1803 Geotechnical Investigations, subsection 1803.5.11 Seismic Design Categories C through F, states "For structures assigned to Seismic Design Category C, D, E, or F, a geotechnical investigation shall be conducted, and shall include an evaluation of all of the following potential geologic and seismic hazards:

- i. Slope instability.
 - ii. Liquefaction.
 - iii. Total and differential settlement.
 - iv. Surface displacement due to faulting or seismically induced lateral spreading or lateral flow.
2. The Alquist-Priolo (AP) Act was enacted in 1972 following the February 1971 Sylmar earthquake (summarized in CGS, 2018a). The main intent of the AP is to prevent construction of habitable structures across an “active fault,” presently defined by the State as “*a fault that has had surface displacement within Holocene time (about the last 11,700 years), hence constituting a potential hazard to structures that might be located across it.*” [14 Cal. Code Regs. Section 3601(a)].
3. The State Geologist (CGS) is mandated to establish earthquake fault zones (EFZ) across known or reasonably inferred active faults. A project affected by the AP (PRC Section 2621.6) generally includes any structure for human occupancy with the *exception* of the following:
 - A) Single-family, wood-frame or steel-frame dwellings to be built on parcels of land for which geologic reports have been approved by the lead agency, in this case, the City of Beverly Hills];
 - B) A single-family wood-frame or steel-frame dwelling not exceeding two stories when that dwelling is not part of a development of four or more dwellings.
4. The City may impose investigation requirements more restrictive than those imposed by State regulations. Additionally, the City may require that applicants for developments of four or more “units,” whether in or out of an EFZ, conduct appropriate, site-specific fault investigations that employ current professional standards-of-practice; and that these reports be subject to peer review by a technically qualified geologist retained by the agency.

PROCESSES AND PROCEDURES:

The owner/developer is responsible to conduct the required fault-activity investigations. The documentation (usually draft and final reports) is then submitted to the City for review and potential approval. The City does not employ a staff geologist; thus, all fault investigation reports are evaluated by an external, State licensed, technically qualified reviewer who specializes in fault assessments. This reviewer is retained by the City to assess the scope and technical documentation provided by the consultants-of-record, including their professional opinions and conclusions, as to the possible presence and relative impact of active faults within and adjacent to the proposed development. The reviewer also determines whether or not the particular site-specific investigation meets the current geologic standard-of-practice for evaluating potential surface-fault rupture.

When all fault issues have been adequately addressed, the City's reviewer briefly summarizes the investigation scope and conclusions, and whether or not these conform to current building codes and geologic standards-of-practice. Ultimately, if warranted, the reviewer then provides the City with a formal "Recommendation for Acceptance." Under current practice, and as common in other lead agencies, the local Building Official relies on the geological review to make an informed decision about acceptance. In the interest of public health and safety and as provided in the 2017 California Building Code (see above), other geologic and geotechnical concerns may also have to be addressed; e.g., potential ground deformation owing to seismically induced liquefaction. The appropriate investigations for these seismic and other pertinent geotechnical issues are then reviewed by the City's in-house staff or by a contracted specialist as needed. When all code-mandated investigations have been completed and accepted, the City Building Official may then issue a building permit.

REFERENCES:

California Geological Survey, 2018a, Earthquake Fault Zones: A guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California: Special Report 42, 82 p. [available online]

California Geological Survey, 2018b [B. Olson, author], The Hollywood, Santa Monica and Newport-Inglewood faults in the Beverly Hills and Topanga 7.5' quadrangles, Los Angeles, County, California: California Geological Survey Fault Evaluation Report (FER) 259, 74 p. [available online]

City of Beverly Hills, 2018, Guidelines for Evaluating Potential Surface-Fault Rupture Within the City of Beverly Hills, California, 3 p. [available online]



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GUIDELINES FOR EVALUATING POTENTIAL SURFACE-FAULT RUPTURE WITHIN THE CITY OF BEVERLY HILLS, CALIFORNIA

(Revised May 2018)

As the decision-making (Lead) agency, the City of Beverly Hills has the duty to protect the health, safety, and welfare of the public by minimizing the potential adverse effects of surface-fault rupture. Accordingly, the City requires that the owners/developers (applicant) for proposed development of habitable structures of four or more occupants complete an appropriate “standard-of-practice” geological investigation to ensure that active faults do not underlie the site or, if present, are appropriately mitigated by avoidance (structural setbacks). All sites are different, and hence a wide variety of geological investigation techniques may be appropriate for a specific location. The following Guidelines and general information recognize this reality, and enumerate general procedures to assist the permit applicant and the consultants-of-record to conduct adequate and yet reasonable investigations consistent with maintenance of public health and safety.

1. An “active fault” is currently defined by the California Geological Survey (CGS) as one having surface or near-surface ground rupture within the last ~11,700 years, regardless of recurrence interval or amount of displacement per event (CGS, 2018a). Further, new CGS investigation criteria now state that “faults within a formally designated Earthquake Fault Zone (EFZ) are presumed to be active until determined otherwise” (CGS, 2018a, p. 27). The City follows these definitions and investigation criteria, but recognizes that in certain situations, on a site-specific basis, well documented engineering mitigation may be appropriate.

2. Fault-rupture investigations must meet current geologic standards-of-practice. Such practice changes over time. It is therefore the duty of the geologic consultants to keep abreast of and to employ the latest investigation techniques. Many such techniques are provided in CGS Note 49 “Guidelines for Evaluating the Hazard of Surface Fault Rupture;” a document that is periodically revised and readily available via the CGS website. **Important:** Both the Applicant and the Consultants-of-Record are strongly urged to obtain, review, understand and comply with the recommended fault-investigation procedures now spelled out in the latest revision of CGS Publication 42 (CGS, 2018a). At present, the CGS has designated the “Santa Monica Fault Zone” as an EFZ (CGS, 2018b).

This, and other relevant CGS documents are readily available on the CGS website. However, new zones have been and will likely be identified that impinge upon the City. Accordingly, for their specific project, the applicant's consultants should also evaluate the possible impact of the Hollywood, Inglewood, West Pico and other EFZs that currently project into the City (CGS, 2018b (Fault Evaluation Report]).

3. Well documented trenches of sufficient length and depth are currently regarded as the most useful indicator of potential fault presence and relative activity. Trenching is the "standard" and is a general requirement in Beverly Hills and in adjacent jurisdictions. Presumably, trench locations will "shadow" faults in existing EFZ's, but also will consider other EFZ faults reasonably projected into the City (CGS, 2018b). Such subsurface exploration, as needed for a specific site, may also require emplacement, collection and interpretation of continuous cores, advancement and interpretation of cone penetrometer tests (CPT), and – if appropriate – geophysical surveys. Trench depth and number of cores or applicability of other exploratory techniques will vary from site to site, and thus no specific procedures are specified other than the requirement to carry out standard-of-practice investigations, which invariably change with time and place. The applicant's (owner/developer) geological consultants should be aware of and employ appropriate investigation techniques, many of which are spelled out in CGS Note 49 and revised Special Publication 42 (2018a), both of which are available on the CGS website.

The City recognizes that trenching may be spatially constrained in highly urbanized areas and that, for safety, only closely spaced CPTs and continuous cores might be appropriate for the initial investigation. Accordingly, based on the permit applicant's request and technical justification, the consultant's "preliminary report" can be submitted for potential "*Recommendation for Conditional Approval.*" Formal "*Recommendation for Approval,*" in lieu of traditional site trenching and documentation, will then await lot clearance followed by on-site trench(es) or detailed geological documentation of foundation cuts. Should this procedure be requested, the applicant's geological consultants should discuss the potential option with the City reviewer.

4. The geological investigation and related report(s) are to be performed, and signed, by a Professional Geologist (PG) licensed in the State of California. Specialists in numeric, relative, or other fault and sediment-dating techniques are expected to substantiate their investigation methods and conclusions in one or more Appendix reports as needed.

5. For trench exposures, continuous cores and other site-specific geologic data, applicants' consultants should request field observations by the City reviewer for identifying possible technical issues early in the investigation. The City, as Lead Agency, will make the final judgment as to whether the Consultant's report(s) comply with current standard-of-practice, fault investigations.

6. In accordance with City regulations, the designated reviewer will commence communications with the applicant and consultant, upon City receipt of review fees and formal authorization by a designated Building Official.

It is strongly recommended that the applicant's geological consultants meet with the City reviewer to discuss the proposed investigation plan. Consultant communication with the reviewer is encouraged throughout the investigation, primarily to avoid or reduce any problems that may arise.

7. The applicant(s), through the geological consultant, will ultimately submit a formal report to the City (for transmittal to the designated reviewer) that describes the investigation procedures and technical conclusions. The reviewer will then comment on the report and likely meet with the consultant(s) to discuss any issues to be resolved. The reviewer will recommend "approval" when the report complies with the City's requirements. As requested, the reviewer will also respond to the consultants' technical questions during the entire review process.

9. These Guidelines apply only to investigation of potential surface-fault rupture. Requirements to investigate, identify and mitigate other possible geological or geotechnical hazards, such as high seismic accelerations, liquefaction and related ground deformation, or landslides and mudflows, are currently subsumed within the latest California Building Codes and thus subject to review by City officials or by a designated external peer reviewer. These Guidelines may be subject to change based on acquisition of new data and on local experience. Accordingly, the applicant and consultants should periodically communicate with the City and/or reviewer as appropriate.

10. Trench excavation shall be done in a safe manner. The following is required by the Department:

a) Consulting firms conducting trench exploration are required to have their annual CalOSHA permit current. Proof of the annual permit and notification to CalOSHA of the specific project shall be on site at all times.

b) Underground Service Alert must be notified at least 2 days prior to excavation. Consideration should also be given for the use of a private utility locator utilizing electromagnetic utility locating techniques and/or ground penetrating radar to map out the location of known or suspected utilities.

c) Permits from the Department of Public Works are required for excavations in the public right-of-way.

d) CalOSHA regulations regarding trench safety shall be followed, with appropriate shoring and/or benching, ladders and/or exit ramps, etc.

e) Trenches left overnight shall be secured by locked fencing. In some cases it may be appropriate to cover the trenches with steel plates or chain link fencing for an added precaution. (See [BH-113](#) for "Steel Plate For Open Trench Detail")

f) The Department's reviewing geologist shall be invited to observe the trench after they are secured; shored or benched; cleaned; and a string line or grid reference system is in place. A completed field log is preferred but not necessary.

g) For major projects, invitation to CGS geologists and other paleoseismic experts to view trenches is strongly encouraged.

h) A grading permit is required for trench excavation as well as backfilling the trench with primary or secondary certified fill. Otherwise, backfill will be considered uncertified.

i) Spoil piles should be protected from erosion during the rainy season and not encroach neighboring property.

j) Trenches should not remove lateral support from adjoining property, buildings on or off the site, or public right-of-way.

k) Below is the link to City of Beverly Hills Public Right-of-Way use and Hauling regulations, approved heavy haul routes, and required permits. <http://www.beverlyhills.org/business/constructionlanduse/publicrightofwayhauling/>

PERTINENT REFERENCES

California Geological Survey, 2002, Guidelines for evaluating the hazard of surface fault rupture: Technical Note 49, 4 p.,

California Geological Survey, 2018a, Earthquake Fault Zones: A guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California: Special Report 42, 82 p.

California Geological Survey, 2018b [B. Olson, lead author], The Hollywood, Santa Monica and Newport-Inglewood faults in the Beverly Hills and Topanga 7.5' quadrangles, Los Angeles, County, California: California Geological Survey Fault Evaluation Report (FER) 259, 74 p.