

**CHAPTER 18  
SOILS AND FOUNDATIONS**

2001 CBC	PROPOSED ADOPTION	OSHPD		Comments
		2	3	
	Adopt entire chapter without amendments		X	
	Adopt entire chapter with amendments listed below	X		
	Adopt only those sections listed below			
	1802.2	X		
	1802.6	X		
1804.8 CA	1802.7 CA	X		Relocated existing California Building Standards into IBC format
1802.9 CA	1802.8 CA	X		Relocated existing California Building Standards into IBC format

**EXPRESS TERMS**

**SECTION 1801 GENERAL**

**1801.1 Scope.** The provisions of this chapter shall apply to building and foundation systems in those areas not subject to scour or water pressure by wind and wave action. Buildings and foundations subject to such scour or water pressure loads shall be designed in accordance with Chapter 16.

**SECTION 1802 FOUNDATION AND SOIL INVESTIGATIONS**

**1802.1 General.** Foundation and soils investigations shall be conducted in conformance with Sections 1802.2 through ~~1802.68~~. Where required by the building official, the classification and investigation of the soil shall be made by a registered design professional.

**1802.2 Where required.** The owner or applicant shall submit a foundation and soils investigation to the building official where required in Sections 1802.2.1 through 1802.2.7.

**Exception:** The building official need not require a foundation or soils investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the conditions in Sections 1802.2.1 through 1802.2.6.

*[For OSHPD 2] Geotechnical reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371m<sup>2</sup>) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from ~~California Division of Mines and Geology (DMG)~~ the California Geological Survey (CGS). Allowable foundation and lateral soil pressure values may be determined from Table 1804.2.*

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**1802.6 Reports.** The soil classification and design load-bearing capacity shall be shown on the construction document. Where required by the building official, a written report of the investigation shall be submitted that includes, but need not be limited to, the following information:

1. A plot showing the location of test borings and/or excavations.

2. A complete record of the soil samples.
3. A record of the soil profile.
4. Elevation of the water table, if encountered.
5. Recommendations for foundation type and design criteria, including but not limited to: bearing capacity of natural or compacted soil; provisions to mitigate the effects of expansive soils; mitigation of the effects of liquefaction, differential settlement and varying soil strength; and the effects of adjacent loads.
6. Expected total and differential settlement.
7. Pile and pier foundation information in accordance with Section 1808.2.2.
8. Special design and construction provisions for footings or foundations founded on expansive soils, as necessary.
9. Compacted fill material properties and testing in accordance with Section 1803.5.
10. [For OSHPD 2] The report shall consider the effects of seismic hazard per section 1802A.7 & 1802A.8.

**1802.7 (Relocated from 1804.8, 2001 CBC) [For OSHPD 2] Engineering geologic reports.**

**1802.7.1 Geologic and earthquake engineering reports shall be required for all proposed construction.**

**EXCEPTIONS:** 1. Reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371m<sup>2</sup>) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from ~~California Division of Mines and Geology (DMG)~~ the California Geological Survey (CGS); nonstructural, associated structural or nonrequired structural alterations and incidental structural additions or alterations, and structural repairs for other than earthquake damage ( See section 3402A.1 for definitions of terms in this section).

2. A previous report for a specific site may be resubmitted, provided that a reevaluation is made and the report is found to be currently appropriate.

**1802.7.2** ~~The purpose of the engineering geologic report shall be to identify geologic and seismic conditions that may require project mitigations. The reports shall contain data which provide an assessment of the nature of the site and potential for earthquake damage based on appropriate investigations of the regional and site geology, project foundation conditions and the potential seismic shaking at the site. The report shall be prepared by a California-certified engineering geologist in consultation with a California-registered geotechnical engineer. The engineering geologic report shall not contain design criteria, but shall contain basic data to be used for a preliminary earthquake engineering evaluation of the project.~~

~~The preparation of the engineering geologic report shall be done in conformance with the most recent Division of Mines and Geology (DMG) Notes 44, 42 and 43; Guidelines for preparing Engineering Geologic Reports, and Guidelines to Geologic/Seismic Reports, respectively consider the most recent ~~DMG~~ CGS Note 48; Checklist for the Review of Engineering Geology and Seismology Reports for California Public School, Hospitals, and Essential Services Buildings. Upperbound earthquakes, proposed in the Engineering Geologic Report, must be fully supported by satisfactory data and analysis. In addition, the most recent version of ~~DMG~~ CGS Special Publication 42, Fault Rupture Hazard Zones in California, shall be considered for project sites proposed within an Alquist-Priolo Earthquake Fault Zone. The most recent version of ~~DMG~~ CGS Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California, shall be considered for project sites proposed within a Seismic Hazard Zone. All conclusions shall be fully supported by satisfactory data and analysis.~~

The report shall include, but shall not be limited to, the following:

1. Geologic investigation.
2. Evaluation of the known active and potentially active faults, both regional and local. ~~including estimates of their upperbound earthquakes and maximum probable earthquake, as defined in DMG Note 43, and estimates of the peak ground accelerations at the site resulting from these earthquakes.~~
3. Ground-motion parameters, as required by Section 1613 and ASCE 7.
4. Evaluation of slope stability at or near the site and
5. The liquefaction and settlement potential of the earth materials in the foundation.

~~1804.8.3~~ The engineering geologic report shall be submitted to the Office of Statewide Health Planning and Development for review and approval. The review shall determine whether potential geologic problems and hazards are adequately identified and described in order to provide a timely completion of the subsequent geotechnical report, described in Section 1804.9, following. The Office of Statewide Health Planning and Development, with consultation of its advisors, may require additional information, analysis and/or clarification of potential geologic problems affecting the proposed building site before approval is given. The results of the approved engineering geologic report shall be used as a basis for further investigations for the geotechnical report. Approval of the engineering geologic report by the Office of Statewide Health Planning and Development shall be required prior to the submission of the geotechnical report.

**1802.8 (Relocated from 1804.9, 2001 CBC) [For OSHPD 2] Geotechnical and Supplemental Ground-response Reports.**

**1802.8.1 Geotechnical report.** The geotechnical report shall provide completed evaluations of the foundation conditions of the site and the potential geologic / seismic hazards affecting the site. The geotechnical report shall include, but shall not be limited to, site-specific evaluations of design criteria related to the nature and extent of foundation materials, groundwater conditions, liquefaction potential, settlement potential and slope stability. The report shall contain the results of the analyses of problem areas identified in the engineering geologic report. The geotechnical report shall incorporate estimates of the characteristics of site ground motion provided in the engineering geologic report. ~~The estimates of ground motion shall not be structural design criteria, but shall be provided to characterize the seismic environment of the site, with consideration of the upper bound earthquakes reported in the engineering geologic report. The ground motion estimates shall include, but shall not be limited to, peak ground motions and predominant period. The estimates should be derived by accepted methods of current seismological practice, and fully documented in the geologic report.~~

The geotechnical report shall be prepared by a geotechnical engineer registered in the state of California with the advice of the certified engineering geologist and other technical experts, as necessary. The approved engineering geologic report shall be submitted with or as part of the geotechnical report.

~~1804.9.1.2~~ The geotechnical report shall be submitted to the Office of Statewide Health Planning and Development for review and approval. The review shall determine whether potential geologic hazards and foundation problems have been adequately evaluated. The Office of Statewide Health Planning and Development, with the consultation of its advisors, may require additional information, analysis or clarification of potential geotechnical issues affecting the proposed building site before approving the geotechnical report. Approval of the geotechnical report by the Office of Statewide Health Planning and Development shall be required prior to the completion of the supplemental ground-response report, if required, as described in Section 1804.9.1.3. The need for a supplemental ground-response report shall be determined during the review of the geotechnical report. The results of the geotechnical report shall be used as a guide for further investigations for the supplemental ground-response report.

**1802.8.2 Supplemental ground-response report.** If site-specific ground-motion procedures, as set forth in ASCE 7 Chapter 21, or ground-motion time-history analysis, as set forth in ASCE 7 Chapter 16 or Section 17.3, are used for design, then a supplemental ground-response report may be required containing a ground-motion element and an advanced geotechnical element. All conclusions and ground-motion parameters shall be fully supported by satisfactory data and analysis.

~~180A.8.2.1~~ The ground-motion element shall be prepared when required by the approved geotechnical report, or when required for dynamic analysis procedure described under Section 1631.2. The ground-motion element shall be prepared by a registered geotechnical engineer or geophysicist (depending on the scope of the element), or engineering geologist licensed in the state of California, and having professional specialization in earthquake analyses. The ground-motion element shall present a detailed characterization of earthquake ground motions for the site, which incorporates data given in the geotechnical report. The level of ground motion considered by the ground-motion element shall be as described in ~~Section 1631.2~~ ASCE 7 Chapter 21. The characterization of ground motion in the ground-motion element shall be given, according to the requirements of the analysis, in terms of:

~~1. Peak acceleration, bracketed duration and predominant period.~~

1. Elastic structural response spectra.

2. Time-history plot of predicted ground motion at the site.
3. Other analyses in conformance with accepted engineering and seismological practice.

1802A.8.2.2 The advanced geotechnical element shall contain the results of dynamic geotechnical analyses specified by the approved geotechnical report. Where site response analysis, as set forth in ASCE 7 Section 21.1, is required, the response model shall be fully explained. The input data and assumptions shall be fully documented, and the surface ground motions recommended for design shall be clearly identified.

The supplemental ground-response report shall be submitted to the Office of Statewide Health Planning and Development for review and approval. The review shall determine whether the ground-motion response evaluations of the site are adequately represented. The enforcement agency, under consultation with its advisors, may require additional information, analysis or clarification of potential ground-response issues reported in the supplemental ground-response report for the proposed building site.

**Notation [For OSHPD]:**

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275 and 129850

**SECTION 1807 DAMPPROOFING AND WATERPROOFING**

**1807.1 Where required.** Walls or portions thereof that retain earth and enclose interior spaces and floors below grade shall be waterproofed and dampproofed in accordance with this section, with the exception of those spaces containing groups other than residential and institutional where such omission is not detrimental to the building or occupancy.

Ventilation for crawl spaces shall comply with Section 1203.4.

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**1807.4 Subsoil drainage system.** Where a hydrostatic pressure condition does not exist, dampproofing shall be provided and a base shall be installed under the floor and a drain installed around the foundation perimeter. A subsoil drainage system designed and constructed in accordance with Section 1807.1.3 shall be deemed adequate for lowering the ground-water table.

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**1807.4.3 Drainage discharge.** The floor base and foundation perimeter drain shall discharge by gravity or mechanical means into an approved drainage system that complies with the California International Plumbing Code.

**Notation [For OSHPD]:**

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275 and 129850