



Soils Report Requirements

BACKGROUND:

California adopts both a residential code and building code. The California Residential Code applies to construction, alteration, movement, enlargement, replacement, repair, removal or demolition of detached one and two family dwellings and townhouses not more than three stories above grade and their accessory buildings. The California Building Code applies to construction projects on all other buildings and structures including but not limited to multifamily dwellings and commercial construction.

Section 1803.2 of the California Building Code (CBC) requires that a geotechnical investigation shall be conducted. The purpose of a geotechnical investigation and report is to assure the site is suitable for building, that there aren't unstable soils or soils subject to excessive settlement or differential movement, faulting or spreading. The investigation will determine lateral pressures on basement and retaining walls due to earthquake motions, assess potential consequences of soil strength loss or liquefaction, and determine peak ground acceleration. By exception, the code allows the building official to not require a soils investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for these identified conditions: questionable soil, expansive soil, ground water table, deep foundations, and rock strata.

The requirements for soils reports in the California Residential Code (CRC) are different from the CBC. Section R401.4 states that where quantifiable data indicate expansive, compressible, shifting or other questionable soil characteristics are likely to be present, the building official will determine whether to require a soil test. Section R401.4.1 states that in lieu of a complete geotechnical evaluation, the load-bearing values in Table R401.4.1 shall be assumed. Table R401.4.1 includes presumptive load-bearing values based on the type of underlying soil material.

Both the building and residential codes require that buildings located on and/or not setback adequately from steep slopes have a soils investigation. CBC Section 1808.7 and CRC Section R403.1.7 regulate building footings adjacent to slopes greater than one to three (vertical to horizontal). Buildings must be set back from both the toe and heel of slopes. The codes specify minimum setbacks. Where these setbacks cannot be achieved, the building official may approve alternate setbacks based on the recommendation of a geotechnical engineer. A soils report is needed to justify the suitability of the slope and foundation design.

DISCUSSION:

Based on the generally good soil in Truckee and the intent to keep housing affordable, geotechnical engineering reports are not required for detached single-family dwellings and duplexes not over three stories above grade, their accessory structures, and additions and alterations to these buildings. To be eligible for this exemption, the design professional of record shall visit the site, determine the site to be suitable, find no expansive, compressible, shifting or other questionable soil characteristics to be present, and attest to that by following exception number two below.

Deck projects are exempt from any investigation, letter, or geotechnical report provided a maximum soil bearing capacity of 2000 pounds per square foot is used.

PROCEDURE:

In general, for single-family and duplex projects where expansive, compressible, shifting or other questionable soil characteristics are present; attached multifamily dwellings of three or more units and commercial or mixed use projects, a geotechnical or soils report¹ is required.

A copy of soils report shall be submitted with the application package for permit. Exceptions:

1. If there is an existing soils report for the subdivision or area and it includes the requisite information for the site, it may be used. If it lacks currently required information, it may need to be updated.
2. For projects including detached single-family dwellings and duplexes not over three stories above grade, their accessory structures, and additions and alterations to these buildings, where the design professional in responsible charge or project engineer has visited the site, has knowledge of the soils in the area, determines the site to be suitable, finds no expansive, compressible, shifting or other questionable soil characteristics to be present, and summarizes this in a professional report or letter, a soils report is not required.

To use this exception:

1. Use site Class D and a maximum bearing capacity of 2,000 pounds per square foot in design.
2. The design professional in responsible charge must be familiar with soils in the area and shall have visited the site.
3. The design professional in responsible charge shall summarize the following in writing:
 - That the site has been visited and has been found to be suitable for the proposed project,
 - That there are no expansive, compressible, shifting or other questionable soil on site,
 - That there is no high ground water table,
 - That Site Class E and F (identified in CBC Table 1613.2.3(1)) have been determined not to exist on the site.
 - That the soil has been identified or classified; the design professional will include the identified soil type.

If upon excavation, questionable soil or a high ground water table is observed and there was no soils report, one may be required by the building official.

When a soils or geotechnical report is required, it shall be based on a site investigation, exploratory boring and sampling in accordance with generally accepted engineering practice. At a minimum, the soils report shall include:

1. A plot showing the location of the soil investigations.
2. A complete record of the soil boring and penetration test logs and 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. Deep foundation information in accordance with Section 1803.5.5.
8. Special design and construction provisions for foundations of structures founded on expansive soils, as necessary.
9. Compacted fill material properties and testing in accordance with Section 1803.5.8.
10. Controlled low-strength material properties and testing in accordance with Section 1803.5.9.
11. Assignment of Site Class in accordance with CBC Section 1613.2.2 and Table 1613.2.3(1).
12. Determination of lateral pressures on basement and retaining walls due to earthquake motions in accordance with Section 1803.5.12(1).
13. Evaluation of potential geologic hazards including slope instability, liquefaction and soil strength loss, differential settlement, and surface displacement due to faulting or lateral spreading in accordance with Sections 1803.5.12(2), (3) and (4).

A soils or geotechnical report is always needed to justify an alternate setback from a steep slope in accordance with CBC Section 1808.7 and CRC Section R403.1.7. The report shall include consideration of the material, height of slope, slope gradient, load intensity and erosion characteristics of slope material.

On steep mountain sites, to protect the project site and adjoining properties, a surface or subsurface hydrology study may be required where change to existing drainage courses is proposed. Geologic and slope stability studies may be required on a case-by-case basis (CBC J104 and J109).

¹The terms soils report and geotechnical report are used interchangeably.