

**Impact GEO-2** Future seismic events could result in liquefaction of soils in portions of the Calabasas plan area. Development in these areas could be subject to liquefaction hazards. Compliance with the CBC would generally address liquefaction hazards, but the draft General Plan does not include any specific policy requirements relating to liquefaction. Impacts would therefore be Class II, *significant but mitigable*.

As identified in the Calabasas General Plan Safety Element, liquefaction hazard potential zones are located in portions of the City (see Figure 4.5-4). The 2030 General Plan could accommodate additional or expanded development within some of these areas. As shown on Figure 4.5-4, areas in both the western and eastern portions of the City are within the liquefaction zones identified by the U.S. geological Survey (USGS). In particular, areas in the vicinity of Las Virgenes Creek, including portions of the proposed "West Village" Mixed Use district and the Las Virgenes 1 and 2 sites, are within an identified liquefaction hazard zone. These areas could potentially accommodate future residential and non-residential development/ redevelopment that could be subject to liquefaction hazards.

The unconsolidated alluvium and shallow groundwater conditions in the areas specified above are conducive to seismically-induced liquefaction. To more accurately determine the potential for liquefaction, site-specific geologic studies would be required.

The Safety Element of the draft 2030 General Plan includes Policy VII-2 (listed under Impact GEO-1), which is specifically intended to identify potential hazardous geologic conditions. The CBC also includes specific requirements to address liquefaction hazards. However, because the Safety Element does not include any specific policy statements to ensure that liquefaction hazards would be addressed, impacts are considered potentially significant.

**Mitigation Measures.** The following measure would address the potential liquefaction hazard.

**GEO-2** Add the following policy to the 2030 General Plan Safety Element:

- *Prior to approval of development projects within the liquefaction or landslide hazard zones depicted on Figure VII-2 or other areas identified by the City Engineer as having significant liquefaction or landslide hazards, require applicants to prepare site-specific liquefaction and/or landslide studies and mitigation. Such studies shall be subject to review and approval by the City Engineer.*

**Significance After Mitigation.** Impacts would be less than significant with implementation of the CBC requirements and polices contained in the Safety Element.



**Impact GEO-3** The Calabasas plan area contains numerous steep slopes, which present a moderate slope stability hazard. Landsliding has the potential to damage and destroy structures, roadways and other improvements as well as to deflect and block drainage channels, causing further damage and erosion. Compliance with the CBC would generally address landslide hazards. However, because the draft General Plan does not include specific requirements to address landslide hazards, impacts would be Class II, *significant but mitigable*.

Calabasas is characterized by hillside terrain and valleys. Slope instability hazards are present throughout the hillside portions of the plan area. As shown on Figure 4.5-4, areas of the City are within the landslide zones identified by the U.S. geological Survey (USGS). Generally speaking, allowable development intensities in areas of the City that are within landslide hazard zones are low, thereby minimizing the potential for landslide-related property damage. Nevertheless, any development within identified landslide hazard zones would have the potential for landslide-related damage. The draft land use map also includes certain areas where relatively intense development could occur within or adjacent to identified landslide hazard zones. These include the Las Virgenes 2 site east of the Las Virgenes Road/Agoura Road intersection (which is part of the larger "Messenger" property) and the Calabasas Highlands. As compared to the current (1995) General Plan, the draft land use map actually reduces the potential development area for the Messenger property from about 77 acres to roughly 16 acres, with the more steeply sloped portions of the property re-designated as Open Space-Resource Protection (OS-RP). In addition, the draft land use map would not increase allowable development intensity within the Calabasas Highlands as compared to the current General Plan land use map. Nevertheless, development that could occur in these areas would continue to be subject to potential landslide hazards.

Slope instability may result in landslides, mudslides, or debris flows that can cause substantial damage and disruption to buildings and infrastructure. Impacts from these types of soil hazards are generally reduced to less than significant levels by the standard development review process. Standard building and grading procedures would mitigate most soil hazards. Geotechnical engineering of any landslide areas would be necessary to ensure that slopes would not become destabilized during grading activities. Onsite soil investigations identify local hazard conditions, which are then mitigated through implementation of appropriate construction techniques and through proper siting improvements.

In general, the primary remedial measure to be employed during grading is the removal of the slump or debris slide from the top to the toe. The potential for destabilization or activation of mass wastage areas increases with an increase in the amount of proposed earthwork. Debris flows typically form in response to local intense rainfall in steep swale areas that are filled with saturated, fine-grained soils. Portions of the plan area, because of their relatively steep topography, are considered to have a moderate debris flow potential.



The General Plan Safety Element includes the following policy, which is specifically intended to minimize human exposure to landslide areas:

**Policy VII-4** *Discourage development within potential landslide areas with severe soil limitations as the City's preferred management strategy, and a higher priority than attempting to implement engineering solutions.*

The Safety Element does not, however, include a policy statement specifically requiring study and mitigation of development projects within landslide hazard zones. Therefore, impacts would be potentially significant.

**Mitigation Measures.** Measure GEO-2 under Impact GEO-2 would require applicants for projects within identified landslide hazard zones to prepare site-specific landslide studies and identify and implement appropriate mitigation for such hazards. This measure would reduce impacts to a less than significant level.

**Significance After Mitigation.** Landslide impacts would be reduced to a less than significant level with implementation of Measure GEO-2.

**Impact GEO-4** **Expansive soil conditions could result in foundation and building distress problems and cracking of concrete slabs. However, implementation of draft General Plan policies would reduce impacts relating to soil expansion to a Class III, *less than significant*, level.**

Expansive soils are generally clayey and swell when wetted and shrink when dried. Wetting can occur naturally in a number of ways, (e.g., absorption from the air, rainfall, groundwater fluctuations, lawn watering and broken water or sewer lines). In hillside areas, as expansive soils expand and contract, gradual downslope creep may occur, eventually causing landsliding. Clay soils also retain water and may act as lubricated slippage planes between other soil/rock strata, also producing landslides, often during earthquakes or by unusually moist conditions. The shrink-swell characteristics of soils can vary widely within short distances, depending on the relative amount and type of clay. Expansive soils are also often prone to erosion. Foundations of structures placed on expansive soils may swell during the wet season and shrink during the succeeding dry season, potentially resulting in foundation damage.

Soils throughout much of Calabasas have moderate to high shrink-swell potential due to relatively high clay content. Areas with moderate to high potential include portions of each of the proposed mixed use districts. Areas where single and multiple family residential development could occur, including the Rancho Pet Kennel site and the Las Virgenes 1 and 2 sites, also have the potential for soil expansion. However, as discussed above, detailed geologic studies are required prior to development to evaluate the potential for geologic and soil hazards, including expansive soils, and these conditions must be minimized or corrected

