CHAPTER 5.3

GEOLOGY

The initial study did not identify any impacts that may be associated with geological resources. The following section is a compilation of geological information from several information sources including, the Final EIR for the Lucia Mar Unified School District High School Number Two, the County's Safety Element, the Department of Water Resources – Water Resources of the Arroyo Grande – Nipomo Mesa Area, and the EIR for the South County Area Plan.

A. Existing Conditions

The Nipomo Mesa is the most prominent feature located in this area. The Mesa is bounded on the south by a steep bluff that rises to approximately 200 feet high near the southern boundary of the Nipomo Urban area. The bluff decreases in height as you move to the west and is only about 40 feet high at Highway 1. The Santa Maria River cuts into the bluff and travels west to the Pacific Ocean near Osos Flacos Lakes.

The northern portion of the Mesa is more irregular in shape and height. It is approximately 350 feet high at Nipomo Hill, 250 feet high east of Los Berros and about 300 feet high along the Dune Lakes to the northwest. Los Berros Creek cuts through the northeast portion of the Mesa and Arroyo Grande Creek shaped the northwest flank of the Mesa.

The surface of the Mesa is underlain by old (at least 40,000 years) sand dunes that predate the last Ice Age. The dune shapes are still evident in the surface topography of the Mesa. The dunes are characterized by linear ridges and intervening closed depressions. This topography and the sandy soils of the Mesa are an important factor in groundwater recharge.

Black Lake Canyon is designated as a sensitive resource area in the County General Plan and is located on the Mesa. This Canyon was apparently cut by sapping from a large spring or springs during the last Ice Age. The ponds and marshes in the Canyon support habitat and provide a source of water for wildlife in the area.

Areas having significant geologic hazards are relatively limited in the South County Planning Area. The Combining designation Maps identify a geologic study area only in the agricultural area of Rancho Suey. This area is located in the southeasterly portion of the planning area. Steep, moderately unstable slopes are also present on the northerly, westerly and southern flanks of the Nipomo Mesa. These slopes are composed of wind-blown sand with a high angle of natural repose, and landslide hazards are minimal.

The Arroyo Grande-Nipomo Mesa study area lies within a west-northwest-trending region of the southern central coastal area of California that forms a structural and geomorphic transition between the adjoining north-northwest-trending Coast Ranges Geomorphic Province to the northeast and the west-trending Transverse Ranges Geomorphic Province to the south. Nitchman (1988) and Namson and Davis (1990) have described this area as an active fold and thrust belt.

This region developed as the result of two temporally distinct tectonic regimes that operated during Cenozoic' time: (1) a late Oligocene to late Miocene phase characterized by right lateral strike-slip faulting, with concurrent subsidence of fault-bounded blocks forming marine depositional basins (Hall, 1978, 1981; Blake et al., 1978; Stanley and Surdam, 1984), followed by late Miocene to early Pliocene continued strike-slip faulting, but with shortening between faults forming large-scale folds (Hall, 1978, 1981; Stanley and Surdam, 1984); and (2) late Pliocene to Holocene north-northeast crustal shortening accommodated by displacement along a new generation of parallel west-northwest-striking reverse and thrust faults and local folding, and by uplift, subsidence, or tilting of intervening crustal blocks (Nitchman, 1988; Clark et al., 1994; Vittori et al., 1994; Lettis et al., 1994).

Three geologic depositional basins--Pismo, Santa Maria, and Huasna Basins--created by these tectonic regimes underlie the study area. These basins contain thick, mostly marine sedimentary Tertiary deposits that uncomfortably lie on a basement of Jurassic -Cretaceous Complex.

The triangularly shaped Santa Maria Basin opens toward the west and extends offshore to the Hosgri fault zone. The basin is bounded on the north by the San Rafael Mountains and is in contact with the mountains along the largely concealed system of the Santa Maria River-Foxen Canyon-Little Pine faults. On the south, the basin is bounded by the Santa Ynez Mountains of the Transverse Ranges and is in contact with the mountains along the Santa Ynez River fault.

The Pismo Basin, smaller than the Santa Maria, is flanked by strike-slip faults and trends west- northwest. The basin is bounded on the northeast by the West Huasna fault zone and on the southwest by the Santa Maria River fault (Hall, 1981; Heasler and Surdam, 1984; Stanley and Surdam, 1984). The basin extends west offshore to the Hosgri fault zone (Heasler and Surdam, 1984; Kablanow and Surdam, 1984; Clark et al., 1994). The study area overlies the southern portion *of* the basin.

The Huasna Basin lies between the West Huasna fault zone on the west and the East Huasna fault zone on the east (outside the study area) (Hall and Corbato, 1967; Heasler and Surdam, 1984; Kablanow and Surdam, 1984). The Huasna Basin underlies only three percent *of* the study area at the upper watershed *of* Tar Spring Creek and east *of* the West Huasna fault zone.

Rock Types

Rocks in the study area are predominantly marine sediments and pyroclastics, which range in age from Jurassic to Holocene. The lithologic units are grouped into three categories: (1) basement complex, (2) volcanic rocks, and (3) sedimentary rocks.

Basement Complex

The oldest rocks found in the study area are those referred to as basement complex. These rocks include the Jurassic Franciscan and Knoxville Formations and unnamed Cretaceous strata. The basement complex unconformably underlies the younger Tertiary and Quaternary deposits. Outcrops are found along an area between the West Huasna and Edna faults near Lopez Reservoir, along Los Berros Creek, and in the southern end of the Nipomo Valley near the junction *of* Highways 101 and 166. These rocks are grouped with Tertiary formations.

The Franciscan Complex is notable for its vast extent throughout the Coast Ranges of California and its enigmatic character. The complex is a heterogeneous assemblage of both marine and continental metasedimentary materials. The predominant rock is graywacke, but shale, altered mafic volcanic rock, chert, and minor limestone are also present (Woodring and Bramlette, 1950; Worts, 1951; Hall and Corbato, 1967; Hall, 1973; Hanson, et al., 1994).

Regional Faulting and Seismicity

Several faults in the region are considered geologically active or potentially active and are capable of causing significant ground motion in the vicinity of the project site. An active fault is defined by the California Division of Mines and Geology (CDMG) as a fault which has "had surface displacement within Holocene time (about the last 11,000 years). A potentially active fault is a fault with evidence of surface displacement during Quaternary time" (last 2 million years) (Hart, 1988). A review of geologic hazard zones or applicable zoning and building regulations appearing in the latest edition of the San Luis Obispo County Seismic Safety Element to General Plan is incorporated into this report.

Principal known active faults or fault zones with surface expression near the site include the San Andreas Fault System, Coast Range-Sierran Block, Hosgri Fault Zone, Los Alamos, Santa Lucia, and the Los Osos faults. Also located near the site are the potentially active Wilmar Avenue/Santa Maria River fault, Oceano fault, Pecho fault, Oceanic--West Huasna Fault Zone, San Luis Bay fault, and the Casmalia-Orcutt-Little Pine fault.

The southwestern margin of the San Luis Range is bordered by a complex zone of late Quaternary reverse faults that separates the San Luis Range from the subsiding onshore Santa Maria Valley to the Southwest. Major structures within this zone include the Wilmar Avenue, San Luis Bay, Pecho, and Oceano faults (Lettis, 1990). Because each of these faults lies partially or wholly offshore, and because onshore reaches have poor geomorphic expression or are buried beneath extensive alluvial and eolian deposits, structural and behavioral fault characteristics have been identified by direct or indirect methods. The locations, displacements, and slip rates for the San Luis Bay and Wilmar Avenue Faults are based upon disruption of late Quaternary marine terraces. This data is supported by shallow borehole data, lithologic logs, analysis of water and oil well data, and analysis of onshore and offshore geophysical data (Lettis, 1990).

There are two magnitudes of earthquakes that are commonly used in the analysis of ground motion. The Maximum Credible Earthquake (deterministic) is the largest rational and believable earthquake that can occur within the presently known tectonic framework. The Maximum Probable Earthquake (probabilistic) is the maximum earthquake that is likely to occur during a 100-year interval (CDMG, 1975). It is to be regarded as a probable occurrence, not as an assured event that will occur at a specific time. The postulated magnitude should not be lower than the maximum that has occurred within historic time.

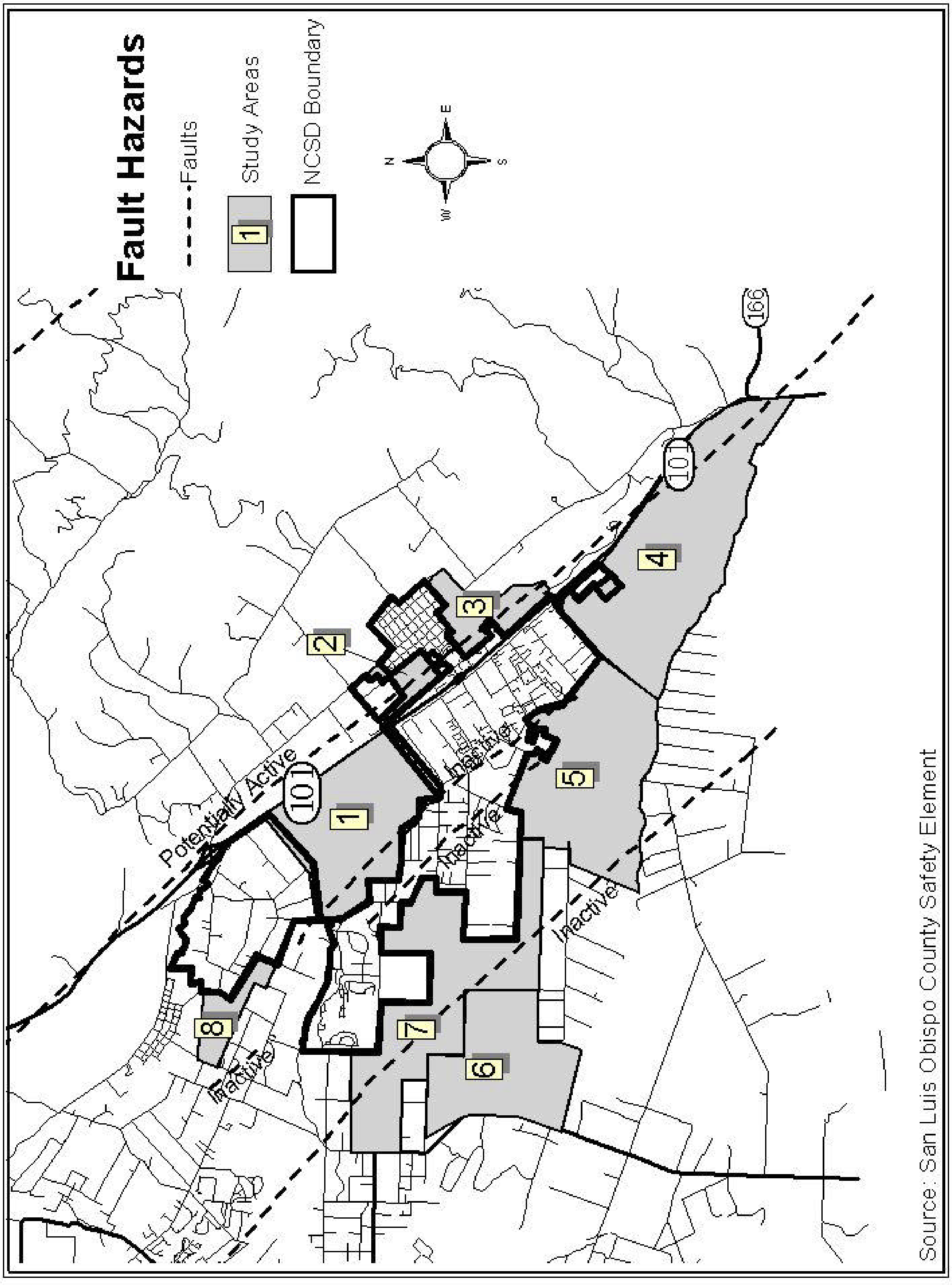

Figure 5.3-1: Fault Hazards

B. Thresholds of Significance

The proposed project would represent a significant geologic impact if it exposed people to hazardous geologic conditions.

C. Project Impacts

Expanding the District's Sphere of Influence would not expose people to hazardous geological conditions (Class IV-No Impacts). Although the proposed Sphere of Influence Update and Municipal Service Review does not expose people to risk of a geologically related event, the proposed project could represent the first step in the development of the areas within the SOI. Future development of this property could adversely impact geological resources in these areas. Future discretionary approvals such as Specific Plans, General Plan Amendments, Conditional Use Permits, Tract and Parcel maps, and Annexations, etc., would require the preparation and certification of additional environmental documentation to address these potential geological impacts on a site-specific basis. This Program EIR represents the first-tier environmental document for these related actions. Once the Program EIR is prepared, subsequent activities within this program must be evaluated in order to determine the extent of the required additional CEQA documentation.

The proposed project would not directly result in any changes in land use for the involved properties. The precise nature and extent of future development within the proposed SOI is subject to speculation and cannot be determined at this time. The above-listed discretionary approvals would also require the preparation of additional environmental documentation (CEQA) to address any potential land use and planning impacts.

D. Cumulative Impacts

The CEQA Deskbook defines Cumulative Impacts as "two or more individual impacts that, when considered together are considerable or that compound or increase other environmental impacts." The District's SOI is a contributing factor to continued growth and development in the Nipomo area. However, it should be noted that Nipomo has grown significantly over the last two decades without the prior expansion of the District's Sphere of Influence. Typically, development projects were approved by the County for development and then approved by LAFCO and the District for inclusion into the District's SOI and service area. The growth in the area has been driven by approvals at the County level. The approvals usually anticipate the project itself providing public services such as water and sewer. Major development approvals such as this include:

- Black Lake Development-Within the District's SOI/Service Area
- The Woodlands-Outside the District's SOI/Service Area
- Maria Vista-Within the District's SOI/Service Area
- Knollwood-Within the District's SOI/Service Area

E. Mitigation Measures

No mitigation measures are necessary because the Sphere of Influence will not expose people to hazardous geologic conditions.

F. Residual Impacts

Impacts related to geological problems are not considered to be significant (Class III Impact). Establishing the Sphere of Influence would not cause the types of geological problems evaluated in the initial study.