3.9 Seismic and Geologic Hazards

This section discusses the general topographical, geologic and seismic issues related to the implementation of the proposed Lemoore 2030 General Plan. The City's geologic setting and location relative to faults are described, as well as how underlying materials could contribute to erosion, subsidence, settlement, and seismic hazards such as ground shaking, liquefaction, and landslides.

ENVIRONMENTAL SETTING

GEOLOGY

Lemoore is part of the Great Valley geomorphic province, commonly known as the Central Valley of California, which includes both the Sacramento and San Joaquin Valley areas. The Central Valley stretches 500 miles in a generally northwest to southeast direction and averages about 40 miles in width between the Coast Ranges in the west and the Sierra Nevada in the east. This area is generally characterized by flat-lying sedimentary rocks overlain by alluvial soils.

There are no minerals of any known significance in the Lemoore Planning Area.

SOIL CHARACTERISTICS AND HAZARDS

Soil properties have a significant bearing on land planning and development. Sixteen soil types have been mapped by the U.S. Department of Agriculture in the Lemoore area. Based on soil properties, the U.S. Department of Agriculture has evaluated the level of risk of erosion, settlement, subsidence and/or shrink and swell expansion. Soils with severely restrictive features for building site development have been denoted on **Figure 3.9-1**.[1] Generally, Kimberlina and Nord soil types have the most favorable properties for development while Gepford, Goldberg, Pitco, and Vanguard soils have the least favorable properties. Soils with only slight or moderate soil restrictions comprise 8,900 acres or 73 percent of the Planning Area. These soils are concentrated on the eastern portion of the Planning Area. Much of the western portion of the Planning Area contains soils that are susceptible to cutbanks caves[2], flooding, shrinking and swelling/expansion, excess wetness, excess salt, or excess sodium.[3]

None of the soils in the Planning Area comprise a significant direct health or safety hazard to residents. More details on soil types and development site restrictions are contained in the erosion discussion.

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[1] The building site limitations are considered "severe" if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance is required.

[2] Cutbanks caves: the walls of excavations tend to cave in or slough.

[3] US Department of Agriculture, *Soil Survey of Kings County California*, 1986.

Table 3.9-1 Soil Types by Average Building Site Development Restriction

Map No.	*Soil Name*	*Average Building Site Development Restriction (K factor)*	*Total Acres*	*Percent of Planning Area*	*Acres in UGB*	*Percent of UGB*
103	Boggs Sandy Loam	Moderate (.37)	44	<1	42	1
104	Cajon Sandy Loam	Moderate (.15-.28)	465	4	371	5
112	Excelsior Sandy Loam	Moderate (.24-.43)	10	<1	0	0
115	Gepford Clay	Severe (.28-.32)	127	1	0	0
118	Goldberg Loam	Severe (.32-.37)	1,526	13	944	13
119	Grangeville Sandy Loam	Moderate (.32)	2,535	21	1699	23
130	Kimberlina Fine Sandy Loam	Slight (.37)	652	5	458	6
134	Lakeside Loam	Moderate (.37)	2,312	19	662	9
137	Lemoore Sandy Loam	Moderate (.43)	1,602	13	1190	16
148	Nord Fine Sandy Loam	Slight (.37-.43)	1	<1	0	0
149	Nord Complex	Slight (.37-.43)	1,240	10	786	10
153	Pitco Clay	Severe (.37)	53	<1	33	<1
167	Urban Land	-	1,217	10	1,208	16
168	Vanguard Sandy Loam	Severe (.32-.37)	342	3	0	0
181	Water	-	73	1	47	1
179	Whitewolf Coarse Sandy Loam	Moderate (.20)	28	<1	17	<1
TOTAL			**12,227**	**100**	**7,533**	**100**

Source: US Department of Agriculture, Soil Survey of Kings County, 1986.

Settlement

Settlement is the depression of the bearing soil when a load, such as that of a building or new fill material, is placed upon it. Soils tend to settle at different rates and by varying amounts depending on the load weight, which is referred to as differential settlement. Differential settlement can be a greater hazard than total settlement if there are variations in the thickness of previous and new fills or natural variations in the thickness and compressibility of soils across an area. Settlement commonly occurs as a result of building construction or other large projects that require soil stockpiles. If these areas are comprised of soil stockpiles or other areas of unconsolidated fill materials, they have the potential to respond more adversely to additional load weights as compared to adjacent native soils.

Insert Figure 3.9-1: Soils

Back of figure

Erosion

Soil erosion is a process whereby soil materials are worn away and transported to another area, either by wind or water. Soil erosion matters for agricultural land because it causes the fertile topsoil to wash away. Rates of erosion can vary depending on the soil material and structure, placement, and human activity. Soil containing high amounts of silt can be easily eroded, while sandy soils are less susceptible. In terms of building site restrictions, excessive soil erosion can eventually damage building foundations and roadways. Erosion is most likely to occur on sloped areas with exposed soil, especially where unnatural slopes are created by cut-and-fill activities. Soil erosion rates can be higher during the construction phase of development. Typically, the soil erosion potential is reduced once the soil is graded and covered with concrete, structures, or asphalt. In the case of agricultural or open space uses, erosion potential is reduced with vegetative coverage.

Soil erosion potential or susceptibility is partially defined by a soil's "K Factor". The "K-Factor" provides an indication of a soil's inherent susceptibility to erosion, without accounting for slope and groundcover factors. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet erosion by water. Soils high in clay have low K values, about 0.05 to 0.15, because they are resistant to detachment. Coarse textured soils, such as sandy soils, have low K values, about 0.05 to 0.2, because of low runoff even though these soils are easily detached. Medium textured soils, such as the silt loam soils, have a moderate K values, about 0.25 to 0.4, because they are moderately susceptible to detachment and they produce moderate runoff. Soils having high silt content are the most susceptible to erosion of all soils. They are easily detached; tend to crust and produce high rates of runoff. Values of K for these soils tend to be greater than 0.42. Soils with high K factor values should be conserved.[4]

In the Planning Area the majority of soils—10,909 acres or 89 percent—are moderately or highly susceptible to erosion, with K values greater than 0.25. Of those soils, the K values for many fall between 0.37 and 0.43. The risk of erosion is further increased during grading and construction activities when soils are loosened and bare of vegetation.

Expansive Soils

Expansive soils possess a "shrink-swell" characteristic. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying. Structural damage may occur over a long period of time, usually the result of inadequate soil and foundation engineering, or the placement of structures directly on expansive soils. Several portions of the Planning Area have soils with high to moderate shrink-swell potential, such as Goldberg and Lakeside soils.

Subsidence

Subsidence is the gradual settling or sinking of the earth's surface with little or no horizontal motion. Subsidence typically occurs in areas that overlie an aquifer where the groundwater level is gradually and consistently decreasing. Additionally, subsidence may also occur in the

[4] Institute of Water Research, Michigan State University, website: http://www.iwr.msu.edu/rusle/kfactor.htm. Viewed April 13, 2007; Minnesota Department of Natural Resources, Natural Resources Conservation Service

presence of oil or natural gas extraction. Areas of substantial subsidence occur on the west side of the Kings river, outside the Planning Area, and predominately relate to groundwater withdrawal.

SEISMIC AND GEOLOGIC HAZARDS

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults or even along different strands of the same fault. Surface rupture can damage or collapse buildings, cause severe damage to roads and other paved areas, and cause failure of overhead as well as underground utilities. Future faulting is generally expected along different strands of the same fault (CGS, 1997b). Ground rupture is considered more likely along active faults.

No active or potentially active faults are known to exist within the Planning Area or Kings County, nor are there any Alquist-Priolo earthquake fault zones mapped in the Planning Area. The closest active fault is the Nunez fault located in western Fresno County. The Nunez fault is a 4.2-km-long, north-south-trending, right-reverse, oblique-slip fault situated about 8 miles northwest of Coalinga. Surface rupture occurred along this fault in 1983 with magnitude of 6.7, and again in 1985 with magnitude of 6.0. The location of this fault however, is far away from Lemoore. Other known regional faults include the San Andreas Fault located approximately four miles west of the Kings County line, the Owens Valley group on the east side of the Sierra Nevada, and the White Wolf Fault to the south of Kings County. Regional faults are depicted in **Figure 3.9-2**.

Ground Shaking

Ground movement during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material. The composition of underlying soils, even those relatively distant from faults, can intensify ground shaking. Areas that are underlain by bedrock tend to experience less ground shaking than those underlain by unconsolidated sediments such as artificial fill or unconsolidated alluvial fill.

The Modified Mercalli (MM) intensity scale is commonly used to measure earthquake effects due to ground shaking. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total); intensities ranging from IV to X could cause moderate to significant structural damage (see **Table 3.9-2**).

The Kings County General Plan indicates that Lemoore is within the 1997 Uniform Building Code Seismic Zone V1. The State of California Department of Conservation, Division of Mines and Geology indicates that in the V1 zone the risk of shaking that would affect low- to medium-rise structures is relatively high, but the distance to the fault systems is sufficiently great that the effect should be minimal. Should a major earthquake occur on a fault near Lemoore, structural damage in the City from ground shaking is possible.

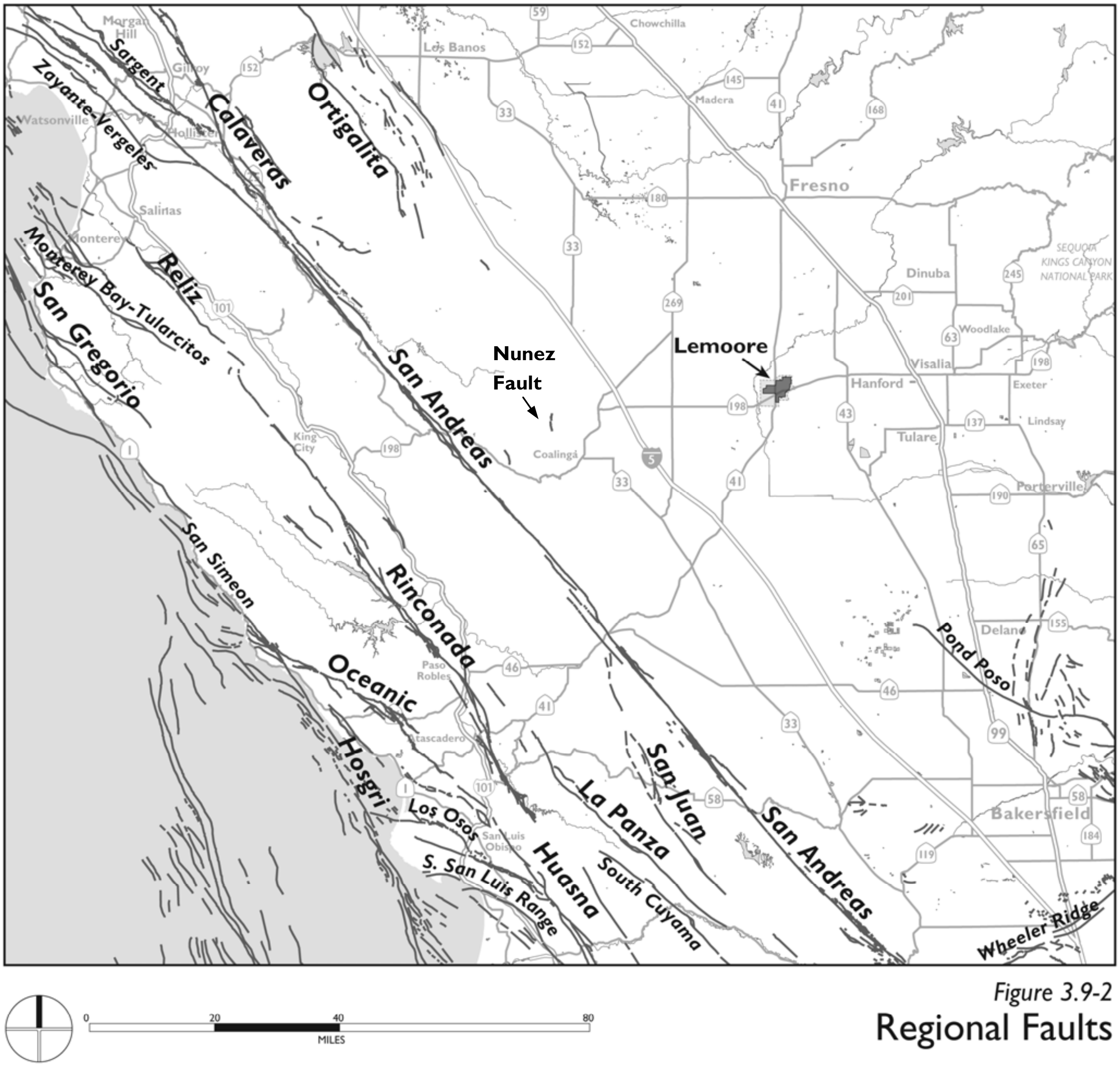

Figure 3.9-2
Regional Faults

Source: Department of Conservation, California Geological Survey, 2005.

Table 3.9-2 Modified Mercalli Intensity Scale

Intensity Value	*Intensity Description*	*Average Peak Acceleration*
I	Not felt except by a very few persons under especially favorable circumstances.	0.0017 g*
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	< 0.014 g
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck. Duration estimated.	< 0.014 g
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	0.014–0.039 g
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	0.039–0.092 g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight	0.092–0.18 g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.	0.18–0.34 g
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed	0.34–0.65 g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	0.65–1.24 g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 1.24 g
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 1.24 g
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24 g

* g (gravity) = 980 centimeters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

Source: Bolt, 1988; California Geological Survey, 2003.

Liquefaction

Liquefaction is a phenomenon whereby unconsolidated and/or near-saturated soils lose cohesion as a result of severe vibratory motion. The relatively rapid loss of soil shear strength during strong earthquake shaking results in temporary, fluid-like behavior of the soil. Soil liquefaction causes ground failure that can damage roads, pipelines, underground cables, and buildings with shallow foundations. Liquefaction more commonly occurs in loose, saturated materials.

Although no specific liquefaction hazard areas have been identified in Lemoore, the potential for liquefaction is recognized throughout the San Joaquin Valley where unconsolidated sediments and high water tables coincide. It is reasonable to assume that liquefaction hazards exist in and around many of Kings County's wetland areas.

Slope Failure and Earthquake-Induced Landslides

A landslide or slope failure is a mass of rock, soil and debris displaced down slope by sliding, flowing, or falling. Slope failure is dependent on topography and underlying geologic materials, as well as factors such as rainfall, excavation, or seismic activities which can precipitate slope instability. Earthquake motions can induce significant horizontal and vertical dynamic stresses along potential failure surfaces within a slope. Steep slopes and down-slope creep of surface materials characterize areas most susceptible to failure. Engineered slopes have a tendency to fail during an earthquake if not properly designed, constructed, or compacted.

The Lemoore Planning Area is relatively flat; therefore, the risk of slope failure and earthquake-induced landslides is considered low.

Earthquake-Induced Settlement

Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid compaction and settling of subsurface materials (particularly loose, non-compacted, and variable sandy sediments) due to the rearrangement of soil particles during prolonged ground shaking. Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Typically, areas underlain by artificial fills, unconsolidated alluvial sediments, slope wash, and areas with improperly engineered construction fills are susceptible to this type of settlement. During an earthquake, some settlement of soil materials in Lemoore may occur.

REGULATORY SETTING

State Regulations

Surface Mining and Reclamation Act. The California Surface Mining and Reclamation Act (SMARA) of 1975 requires that all cities incorporate into their general plans mapped mineral resources designations approved by the State Mining and Geology Board. SMARA was enacted to limit new development in areas with significant mineral deposits. The State Geologist classifies land in California based on availability of mineral resources. There are no mapped mineral resources in the Planning Area, and no regulated mine facilities on the AB3098 list as of July, 2007.[5]

Alquist-Priolo Earthquake Fault Zoning Act. The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zones Act), signed into law in December 1972, requires the delineation of zones along active faults in California. The purpose of the Alquist-Priolo Act is to regulate development on or near fault traces to reduce the hazard of fault rupture and to prohibit the location of most structures for human occupancy across these traces. Cities and counties must regulate certain development projects within the zones by, for example, withholding permits until geologic investigations demonstrate that development sites are not threatened by future surface displacement (Hart, 1997). The risk of surface fault rupture is not necessarily restricted to the area within a Fault Rupture Hazard Zone, as designated under the Alquist-Priolo Act.

Hospital Facilities Seismic Safety Act of 1973. To ensure that hospitals in California conform to high construction standards, the Alfred E. Alquist Hospital Facilities Seismic Safety Act (HSSA) was passed in 1973. The intent of the HSSA is to assure that hospitals are reasonably capable of providing services to the public after a disaster. The HSSA requires the establishment of rigorous seismic design regulations for hospital buildings and requires that new hospitals and additions to hospitals have the capacity, as far as is practical, to remain functional after a major earthquake.

State law requires that all existing hospital buildings providing general acute care as licensed under provisions of Section 1250 of the California Health and Safety Code, be in compliance with the intent of the HSSA by the year 2030.

Seismic Hazards Mapping Act. The Seismic Hazards Mapping Act, passed in 1997 primarily as a result of the 1994 Northridge Earthquake, was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a Seismic Hazard Zone, a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the project design. Geotechnical investigations conducted within Seismic Hazard Zones must incorporate standards specified by CGS Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards (CGS, 1997c). Currently, Lemoore has not been mapped for seismic hazards.

California Building Code. The California Building Code has been codified in the California Code of Regulations as Title 24, Part 2, which is a portion of the California Building Standards Code. The California Building Standards Commission is responsible for coordinating building standards under Title 24. Under State law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to provide minimum standards to

[5] In April of 2007 there were still two mine facilities on the SMARA AB3098 list with addresses given for Lemoore, both owned by Stoney's Sand & Gravel, LLC. However, in the current list the only regulated facility in Kings County in located in Avenal. (http://www.consrv.ca.gov/OMR/ab_3098_list/current_list.htm)

safeguard property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of building and structures within its jurisdiction.

The Uniform Building Code, published by the International Conference of Building Officials, is a widely adopted building code in the United States. The CBC is based on the 1997 UBC, with necessary California amendments. These amendments include significant building design criteria that have been tailored for California earthquake conditions. The national standards adopted into Title 24 apply to all occupancies in California, except for modifications adopted by State agencies and local governing bodies.

Local Regulations

The City of Lemoore has adopted the 2001 California Building Code parts 1 and 2 as the City's building code and ordinance. (*Title 8, Chapter 1: Building Codes*).

The existing Lemoore Subdivision Ordinance requires three (3) copies of a preliminary soils report, prepared by a civil engineer registered in the state and based on adequate test borings or excavations. At least three (3) test borings shall be done for subdivisions of up to three (3) acres, and thereafter at least one test boring shall be done for each additional three (3) acres or fraction thereof. (*Title 8, Chapter 7, Article B-3: Tentative Map Application)*

IMPACT ANALYSIS

SIGNIFICANCE CRITERIA

Implementation of the proposed General Plan would have a potentially significant impact if it increased exposure of people or structures to the risk of property loss, injury, or death involving:

- Strong seismic ground shaking;
- Seismic-related ground failure, including liquefaction;
- Landslides or mudflows;
- Substantial erosion or unstable soil conditions from excavation, grading or fill; or
- Risk from settlement and/or subsidence of the land, or expansive soils.

There are no know earthquake faults in the vicinity of the Planning Area, thus exposure of people or structures to the risk of property loss, injury, or death involving surface rupture of a known earthquake fault is not evaluated as a potential impact of this proposed General Plan.

METHODOLOGY AND ASSUMPTIONS

The potential for geologic and seismic impacts as a result of implementation of the proposed General Plan was reviewed and evaluated using readily available background information, such as pertinent geologic and seismic hazard maps. Key sources of information included the

California Department of Conservation, Division of Mines and Geology (CDMG) and the United States Geologic Survey (USGS).

In order to reduce or mitigate potential hazards from earthquakes or other local geologic hazards, the City ensures that development will continue to be completed in compliance with local and State regulations. The regulations include the California Building Code, the Uniform Building Code, the Alquist-Priolo Earthquake Fault Zoning Act, and the Seismic Hazard Mapping Act. Policies and implementation measures developed for the proposed General Plan include continued conformance with these applicable local and State building regulations.

SUMMARY OF IMPACTS

Implementation of the proposed Lemoore General Plan, in particular development in West Lemoore, could result in the exposure of people or structures to potentially adverse impacts associated with earthquake-related ground shaking, soil erosion, liquefaction, and shrink-swell hazards. The greatest building site restrictions exist in the western portion of the Planning Area, as a result of a high water table and erosive soils. However, proposed General Plan policies ensure that impacts are reduced to levels that are less than significant.

IMPACTS AND MITIGATION MEASURES

Impact

3.9-1 Implementation of the proposed General Plan has the potential to expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death resulting from ground shaking, seismic related ground failure, landslides or liquefaction. ***(Less than Significant)***

The continued construction of buildings, overpasses, underpasses, and other structures that meet current development codes would minimize the potential for severe damage and loss of life in the event of earthquake-related ground shaking or ground failure. The Planning Area is generally flat; therefore, the risk of landslides is minimal. No specific liquefaction hazard areas have been identified in the Planning Area; however the potential for liquefaction is recognized throughout the San Joaquin Valley. The water table is particularly high in West Lemoore, making that area slightly more susceptible to liquefaction.

Proposed General Plan Policies that Reduce the Impact

SN-I-1 Review proposed development sites at the earliest stage of the planning process to locate any potential geologic or seismic hazard.

Following receipt of a development proposal, engineering staff will review the plans to determine whether a geotechnical review is required. If the review is required, then the applicant will be referred to geotechnical experts for further examination.

SN-I-2 Maintain and enforce appropriate building standards and codes to avoid or reduce risks associated with geologic constraints and to ensure that all new construction is designed to meet current safety regulations.

SN-I-3 Facilitate stricter safety provisions for important or critical-use structures (such as hospitals, schools, fire, police, and public assembly facilities; substations and utilities) through input during site selection and a comprehensive geotechnical investigation.

SN-I-4 Require mitigation for structural alterations on load-bearing and un-reinforced masonry buildings to ensure structural safety.

Measures include requiring a professional structural engineer to verify the structural integrity of the building and potential impacts to surrounding buildings through the submission of an Engineering Analysis Report (EAR), requiring shoring, bracing, anchoring, foundation support, or construction of a metal perimeter safety fence on site, and/or other measures deemed necessary by the structural engineer.

SN-I-5 Require utilities be designed to withstand probable seismic forces to be encountered in Lemoore.

This policy applies to underground utilities, overhead utilities including utility poles and utility equipment at sub-stations.

SN-I-7 Establish location standards and inspection requirements for above-ground storage tanks to minimize potential risks to life and property.

Above ground storage tanks (AST) include storage of water, agriculture products, petroleum, or other materials. These tanks must be located at an appropriate distance from residential areas, and inspected annually, to ensure compliance with appropriate State and federal codes.

Implementation of the policies listed above would maintain potential Impact 3.9-1 at a level that is less than significant. No additional mitigation is needed.

Impact

3.9-2 Implementation of the proposed Lemoore General Plan has the potential to result in substantial soil erosion or the loss of topsoil. ***(Less than Significant)***

Overall, implementation of the proposed General Plan would result in construction activities related to development projects that would involve groundbreaking and could lead to increased erosion rates. Increased soil erosion rates, especially for soils with moderate to high erosion potential, can lead to unstable ground surfaces. Future development and creation of new impervious surfaces also has the potential to contribute to increased stormwater runoff, which could make soil erosion more severe if stormwater is not handled properly. Soil erosion at construction sites can increase sedimentation in nearby streams and drainage channels. The proposed General Plan offers specific new policies to reduce the risk of topsoil loss due to erosion.

Proposed General Plan Policies that Reduce the Impact

COS-I-5 Adopt soil conservation measures to reduce erosion caused by landscaping, construction of new roadways and paths, building construction, and off-road vehicles.

COS-I-6 Require erosion and sedimentation plans for new development activities, including:

- The location and description of existing soil features and characteristics;
- The location and description of proposed changes to the site; and
- A schedule for the installation of control measures for each phase of development.

SN-I-6 Control erosion of graded areas with vegetation or other acceptable methods.

Plant materials should not be limited to hydro seeding and mulching with annual grasses. Trees add structure to the soil and take up moisture while adding color and diversity.

Implementation of the policies summarized above would reduce potential impact 3.9-2 to a level that is less than significant. No additional mitigation is needed.

Impact

3.9-3 Implementation of the proposed Lemoore General Plan has the potential to create structural damage from placing development on a potentially unstable geologic unit or soil. ***(Less than Significant)***

The Planning Area's topography is relatively flat and is not located within a delineated Alquist-Priolo Earthquake Fault Zone. Although no specific liquefaction hazard areas have been identified in Lemoore, the potential for liquefaction is recognized throughout the San Joaquin Valley where unconsolidated sediments and high water tables coincide. It is reasonable to assume that liquefaction hazards exist in and around many of Kings County's wetland areas, and a large wetland complex exists adjacent to West Lemoore. Subsidence in the Planning Area from groundwater removal occurs on a regional scale, so differential settlement of an individual building is unlikely. Continued compliance with all applicable development requirements (i.e., Uniform Building Code, etc.) is critical to assuring liquefaction, subsidence, and differential settlement risks associated with future development are eliminated. Furthermore, implementation of the proposed General Plan policies summarized under Impact 3.9-1 would further reduce this impact to a level that is less than significant.

Impact

3.9-4 Implementation of the proposed Lemoore General Plan may have the potential to create risk to life or property by placing development on expansive soils. ***(Less than Significant)***

Soils with moderate to high shrink-swell potential do exist within the proposed General Plan area. Expansive soils require particular engineering design, site preparation, and construction practices in order to prevent structure damage from soil movement associated with moisture level changes. When these practices are employed on a project-by-project basis the potential for structural damage is minimal. Furthermore, implementation of the proposed General Plan policies summarized under Impact 3.9-1 would further reduce this impact to a level that is less than significant. No additional mitigation is needed.

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