CHAPTER 2 • PHYSICAL ENVIRONMENT

A. CLIMATE

The climate of the Firebaugh area is relatively cool and moist in the winter and warm and dry in the summer. Relative humidity readings of 15 percent are common on summer afternoons, and readings as low as 8 percent have been recorded. In contrast to this, humidity readings average 90 percent during the morning hours of December and January. Average monthly temperatures range from 45.3°F in January to 80.6°F in July. Summer weather is typically at or above 90°F over 100 days per year. Temperatures of 32°F and below occur only about 27 days per year.

Central California's weather is mainly influenced by the North Pacific High Pressure system. During the summer, a high pressure ridge develops over the Pacific Ocean blocking the penetration of moist air from the Pacific. This high pressure system tends to weaken during the winter months thereby opening the door to Pacific storms. Nearly 90 percent of Firebaugh's annual precipitation falls in the six months between November and April. The mean annual rainfall is 8.27 inches.

Air movement through the San Joaquin Valley is usually in a northwest to southeast direction. Wind enters the Valley over the passes east of the San Francisco Bay and exits through mountain passes at the southern end of the San Joaquin Valley, principally Tehachapi.

B. TOPOGRAPHY

The Firebaugh planning area is located on topography that is nearly level, with a gradual slope downward to the northeast towards the San Joaquin River. Local variations in slope of six to ten feet to the mile are typical. An exception is the banks for the San Joaquin River which drop 10 to 15 feet in the steepest locations.

C. SOILS

The U.S. Department of Agriculture and Natural Resources Conservation Service rates soils according to a classification system to demonstrate the suitability of soils for most types of crops. The rating system uses Roman numerals from I to VIII, where Class I soils have slight limitations that restrict use and Class VIII soils have the greatest limitations for commercial crop production.

There are no Class I soils in the Firebaugh city limits, however there are some Class II soils that are considered prime agricultural soils when they are irrigated (for example, the Elnido sandy loam soil). Seven other local soils are considered farmland of statewide importance, including the Tachi Clay and Wekoda Clay soils.

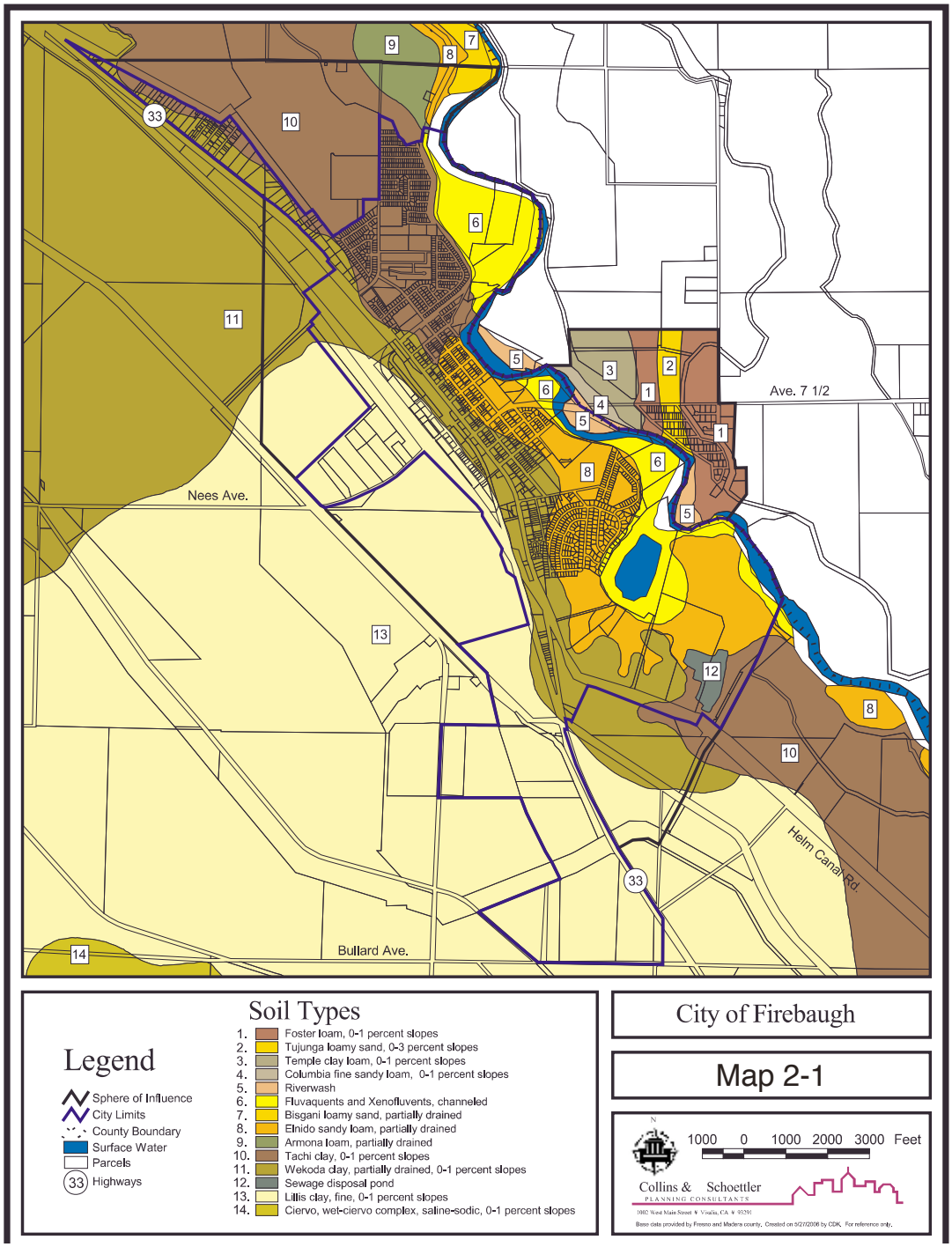
Firebaugh's Sphere of Influence (SOI) is unique as it extends north across the San Joaquin River into Madera County. In the Madera County area within Firebaugh's SOI, there are prime agricultural soils, including the Foster, Temple and Columbia series.

Soils in the Firebaugh area are described by the Soil Survey of Western Fresno County and the Soil Survey of Madera County, prepared by the Soil Conservation Service, Department of Agriculture. The general soil maps of these surveys show nine major soil groups in the Firebaugh area: the Armona, Tachi, Tranquility, Bisgani, Elnido, Palazzo, Ciervo and Wekoda series. These series and specific soils are described in more detail below.

The **Tachi-Armona-Wekoda** series consists of very deep, nearly level, poorly and very poorly drained, saline-sodic soils. These soils were formed in alluvium from igneous and/or sedimentary rock sources; on flood plains and basin floors on the west side of the San Joaquin River and Fresno Slough.

The **Tranquility-Ciervo, saline-sodic-Calfax** series consists of very deep, nearly level, somewhat poorly drained and moderately well drained, saline-sodic soils. These soils formed in alluvium from calcareous sedimentary rock sources on fan skirts adjacent to the western edge of the basin floor.

The **Bisgani** series consists of very deep, poorly drained soils on bars, flood plains, and basin floors. These soils formed in alluvium derived from igneous rock.


Nees Ave.
Ave. 7 1/2
Bullard Ave.
Helm Canal Rd.
Soil Types
1. Foster loam, 0-1 percent slopes
2. Tujunga loamy sand, 0-3 percent slopes
3. Temple clay loam, 0-1 percent slopes
4. Columbia fine sandy loam, 0-1 percent slopes
5. Riverwash
6. Fluvaquents and Xenofluvents, channeled
7. Bisgani loamy sand, partially drained
8. Elnido sandy loam, partially drained
9. Armona loam, partially drained
10. Tachi clay, 0-1 percent slopes
11. Wekoda clay, partially drained, 0-1 percent slopes
12. Sewage disposal pond
13. Lillis clay, fine, 0-1 percent slopes
14. Ciervo, wet-ciervo complex, saline-sodic, 0-1 percent slopes
Legend
Sphere of Influence
City Limits
County Boundary
Surface Water
Parcels
33 Highways
City of Firebaugh
Map 2-1
1000 0 1000 2000 3000 Feet
Collins & Schoettler
PLANNING CONSULTANTS

The **Elnido** series consists of very deep, poorly drained soils in channels and on flood plains and basin floors. These soils formed in mixed alluvium derived dominantly from igneous rock.

The **Ciervo** series consists of very deep, moderately well drained soils on fan skirts. These soils formed in alluvium derived dominantly from sedimentary rock.

The **Foster** series consists of a coarse-loamy mixed, noncalcareous, thermic family of Aquic Haploxerolls. The soils have gray to light gray, sandy loam A horizons which become mottled and calcareous in the lower part; light gray to light olive gray, calcareous C horizons. These soils are formed in alluvium from acid igneous rocks.

The **Tujunga** series consists of very deep, somewhat excessively drained soils formed in alluvium weathered mostly from granitic sources. These soils are found on alluvial fans and flood plains.

The **Temple** series consists of (minimal) Humic Gley soils developed from stratified moderately coarse and moderately fine textured predominantly granitic alluvium. They occur on nearly level to depressional recently deposited floodplains under moisture living grass and herbaceous vegetation.

The C**olumbia** series consists of very deep, moderately well drained soils. These soils were formed in alluvium from mixed sources. These soils are on flood plains and natural levees.

The **Lillis** series consists of very deep, poorly drained soils on fan skirts. These saline-sodic soils formed in alluvium derived dominantly from igneous rock, sedimentary rock, or both.

The **Fluvaquents** consist of very deep, poorly drained soils on flood plains. These soils formed in alluvium derived dominantly from sedimentary rock.

Individual soil types in the Firebaugh area are as follows:

Armona loam, partially drained has poor drainage and available water capacity is high. Its permeability is moderately slow and the runoff is low. The soil is

classified as Farmland of Statewide Importance and has a Storie Index rating of 23.

Tachi Clay (0 to 1 percent slopes) soils are very poorly drained. Available moisture holding capacity is moderate. Within the planning area this soil is found on the western edge of the San Joaquin River. The soil is classified as Farmland of statewide importance and has a Storie Index rating of 14. Limitations for urban development are severe, with slow subsoil permeability. This limitation can be overcome by importing suitable soil.

Tranquility-Tranquility, wet, complex, saline-sodic (0 to 1 percent slopes) is somewhat poorly-drained and permeability is slow. Available water holding capacity is high and the runoff is high. The soil is classified as Farmland of statewide importance and has a Storie Index rating of 5.

Bisgani-Elnido Association (0 to 1 percent slopes) is poorly-drained and permeability is rapid. Available water holding capacity is low and the runoff is negligible. The soil is classified as Farmland of statewide importance and a Storie Index rating of 29. This soil is found contiguous to the San Joaquin River.

Elnido Sandy Loam (0 to 1 percent slopes) has poor drainage and available water capacity is moderate. Its permeability is moderately rapid and the runoff is negligible. The soil is classified as Prime farmland, if irrigated, and has a Storie Index rating of 72.

Palazzo sandy loam, drained (0 to 1 percent slopes) has moderately slow permeability and very low runoff. Available water holding capacity is high. This soil is considered Prime farmland, if irrigated, and has a Storie Index rating of 76.

Ciervo, wet-ciervo complex, saline-sodic (0 to 1 percent slopes) is moderately well drained with very slow permeability and high runoff. Available water capacity is moderate. The soil is classified as Farmland of statewide importance and has a Storie Index rating of 26.

Wekoda Clay (0 to 1 percent slopes) has high runoff and very slow permeability. Available water holding capacity

is high. The soil is classified as Farmland of statewide importanace and has a Storie Index rating of 23.

Foster loam (0 to 1 percent slopes) is poorly or very poorly drained with moderate permeability and ponded to very slow runoff. Many areas have altered drainage because of deep pumping for irrigation. The soil is classified as Prime farmland, if irrigated, and has a Storie Index rating of 100.

Tujunga loamy sand (0 to 3 percent slopes) consists of very deep, somewhat excessively drained soils formed in alluvium from granitic sources. It has negligible or very low runoff and rapid permeability. The soil is classified as Farmland of statewide importance and has a Storie Index rating of 56.

Temple clay loam (0 to 1 percent slopes) has poor drainage and its surface runoff is very slow. Its permeability is moderately slow to slow and soils are subject to overflow during seasonal flood periods where not protected by levees. Generally high water tables are present. It is classified as Prime farmland, if irrigated, and has a Storie Index rating of 77.

Columbia fine sandy loam (0 to 1 percent slopes) is deep, moderately well drained soil with negligible to medium runoff. Its permeability is moderately rapid. It is classified as Prime farmland, if irrigated, and has a Storie Index rating of 90.

Fluvaquents and Xenofluvents, channeled, consist of very deep, poorly drained soils on flood plains. These soils formed in alluvium derived dominantly from sedimentary rock and have a Storie Index rating of 5.

In conclusion, the majority of the soils in the planning area have significant value for agriculture. At the same time, none of the soils exhibit significant limitations for urban development.

D. GEOLOGY

Firebaugh is located in the west center of the Great Valley of California, a nearly flat northwest-southeast trending basin approximately 450 miles long by 50 miles wide. The basin is bordered by Mesozoic platonic, volcanic, and metamorphic rocks of the Sierra Nevada mountains on the

east and by Mesozoic and Cenozoic metamorphic and sedimentary rocks of the Coast Ranges on the west.

E. SEISMICITY

The Firebaugh area is subject to ground shaking from earthquakes generated by California's numerous faults. The closest significant fault is located near Coalinga and Panoche and is designated as the Alquist-Priolo Fault Line, approximately 50 miles west of Firebaugh.

According to the Five County Seismic Safety Element (FCSSE), there are a number of active and potentially active faults within and adjacent to Fresno County. Much of the valley floor of Western Fresno County is located in the V-3 Seismic Zone, as defined by the FCSSE.

The Firebaugh area is expected to be at less risk than other portions of Fresno County to the west (west of Interstate 5) which are closer to active faults and to the east (in the Sierra Nevada). However, the risk of damage from earthquakes is still present. Firebaugh did experience shaking from the 1983 earthquake that caused serious damage to Coalinga. As such, the community must remain ready to respond to such an event.

F. WATER

Information published by the California Department of Water Resources indicates that Firebaugh has a shallow water table. Because of this, the groundwater has exhibited contaminants that degrade its use for domestic purposes.

Firebaugh obtains all of its domestic water supply from the groundwater underneath the city. This supply has experienced elevated levels of iron and manganese and, as of January 2007, also exceeded the State levels for arsenic.

The City operates seven groundwater wells and a water treatment plant. Through a contract with Provost & Pritchard Engineering, the City is currently re-designing the treatment facility to begin utilizing hypochloride to treat the water as a replacement for the historic practice of using gas chloride. The combination of chemical treatment and booster filters allow the City to remove these chemicals from the drinking water. After treating

the water, testing is done to ensure the resulting blended water is within the public health parameters established by the State.

G. FLOODING

Portions of Firebaugh are subject to flooding according to Flood Insurance Rate Maps prepared by the Federal Emergency Management Agency (FEMA). Flooding in Firebaugh could result from a 100-year flood, localized flooding or dam and levee failure. Flooding occurred along the San Joaquin River, in the Firebaugh area, in 1958 and again in 1969. The flooding was localized and did relatively little damage to structures. Most recently the river nearly overtopped its banks in 2006. Only the quick placement of sand bags prevented flooding of certain neighborhoods.

The Firebaugh area is also subject to some localized flooding. Because the area has a high water table, during wet years some areas in the southern portion of the City near the river flood. Also, due to improper grading and lack of curbs, gutters and appropriate flood control measures, the Del Rio area is subject to some localized flooding.

Dam failure is also a concern in Firebaugh. There are a number of dams on both San Joaquin and Kings Rivers that could cause flooding in the event of dam failure. The extent of the flooding which could occur would depend on whether one or more dams failed simultaneously, where they are located, the time of the year, and several other factors. In the worst case situation, with all dams failing at once in late spring-early summer (when reservoirs and lakes are holding the maximum amount of water) flooding from the San Joaquin River would not reach Firebaugh for 24-36 hours; flooding from the Kings River would take several days. There would be adequate time for the City to be evacuated.