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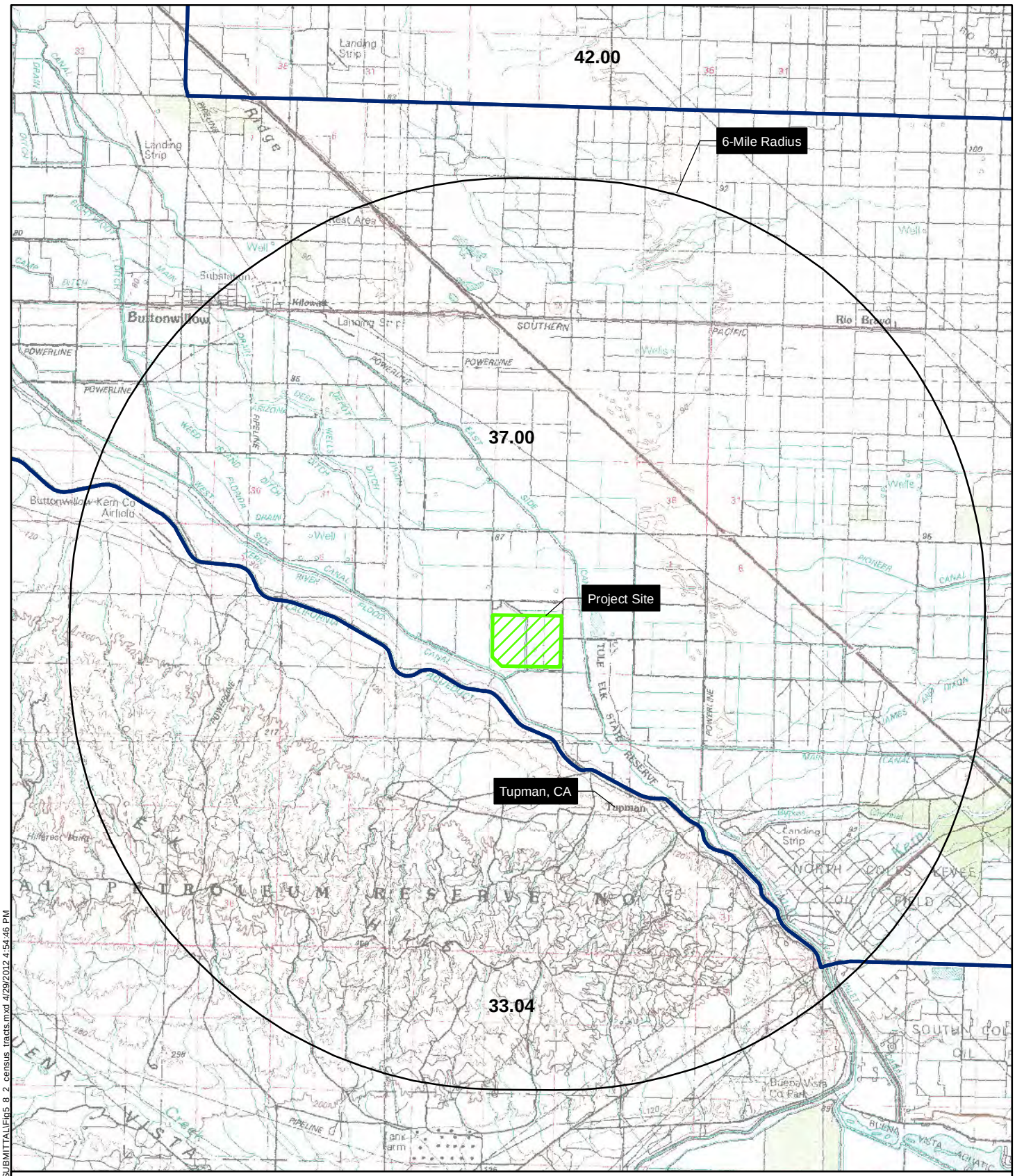

CENSUS TRACTS WITHIN A 6-MILE RADIUS OF THE PROJECT SITE

April 2012
28067571

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.8-2

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5.9 SOILS

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle (IGCC) polygeneration project (HECA or Project). The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR). CO_2 from HECA will be transported by pipeline for use in EOR in the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI). The EOR process results in sequestration (storage) of the CO_2.

Terms used throughout this section are defined as follows:

- **Project or HECA.** The HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes, including its linear facilities.

- **Project Site or HECA Project Site.** The 453-acre parcel of land on which the HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes (excluding off-site portions of linear facilities), will be located.

- **OEHI Project.** The use of CO_2 for EOR at the EHOF and resulting sequestration, including the CO_2 pipeline, EOR processing facility, and associated equipment.

- **OEHI Project Site.** The portion of land within the EHOF on which the OEHI Project will be located and where the CO_2 produced by HECA will be used for EOR and resulting sequestration**.**

- **Controlled Area.** The 653 acres of land adjacent to the Project Site over which HECA will control access and future land uses.

This introduction provides brief descriptions of both the Project and the OEHI Project. Additional HECA Project description details are provided in Section 2.0. Additional OEHI Project description details are provided in Appendix A of this Application for Certification (AFC) Amendment.

HECA Project Linear Facilities

The HECA Project includes the following linear facilities, which extend off the Project Site (see Figure 2-7, Project Location Map):

- **Electrical transmission line.** An approximately 2-mile-long electrical transmission line will interconnect the Project to a future Pacific Gas and Electric Company (PG&E) switching station east of the Project Site.

- **Natural gas supply pipeline.** An approximately 13-mile-long natural gas interconnection will be made with PG&E natural gas pipelines located north of the Project Site.

- **Water supply pipelines and wells.** An approximately 15-mile-long process water supply line and up to five new groundwater wells will be installed by the Buena Vista Water Storage District (BVWSD) to supply brackish groundwater from northwest of the Project Site. An approximately 1-mile-long water supply line from the West Kern Water District (WKWD) east of the Project Site will provide potable water.

- **Coal transportation.** HECA is considering two alternatives for transporting coal to the Project Site:

  — **Alternative 1, rail transportation.** An approximately 5-mile-long new industrial railroad spur that will connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market.

  — **Alternative 2, truck transportation.** An approximately 27-mile-long truck transport route via existing roads from an existing coal transloading facility northeast of the Project Site. This alternative was presented in the 2009 Revised AFC.

OEHI Project

OEHI will be installing the CO_2 pipeline from the Project Site to the EHOF, as well as installing the EOR Processing Facility, including any associated wells and pipelines needed in the EHOF for CO_2 EOR and sequestration. The following is a brief description of the OEHI Project, which is described in more detail in Appendix A of this AFC Amendment:

- **CO_2 EOR Processing Facility.** The CO_2 EOR Processing Facility and 13 satellites are expected to occupy approximately 136 acres within the EHOF. The facility will use 720 producing and injection wells: 570 existing wells and 150 new well installations. Approximately 652 miles of new pipeline will also be installed in the EHOF.

- **CO_2 pipeline.** An approximately 3-mile-long CO_2 pipeline will transfer the CO_2 from the HECA Project Site south to the OEHI CO_2 EOR Processing Facility.

This section describes the potential environmental consequences of the Project on soils in accordance with California Energy Commission (CEC) requirements. Impacts to agricultural land uses are evaluated in Section 5.4, Land Use and Agriculture. The analysis included in this section focuses on the HECA Project as well as the CO_2 pipeline associated with the OEHI Project. The analysis of the CO_2 EOR Processing Facility associated with the OEHI Project is included in Appendix A-1, Section 4.6, Geology and Soils, and Appendix A-2, Section 2.9, Soils, of this AFC Amendment. No soil impacts related to coal transportation Alternative 2 (Truck Transportation) are expected because the coal transloading facility is an existing use and trucks would use existing roads. Therefore, coal transportation Alternative 2 (Truck Transportation) is not further evaluated in section.

5.9.1 Affected Environment

5.9.1.1 Regional Setting

Section 5.15, Geological Hazards and Resources, provides details on the geology of the Project Site and vicinity. The Project Site is on an alluvial fan complex on the southwestern side of the San Joaquin Valley in the southern end of the Great Valley geomorphic province, which separates the Coast Range to the west from the Sierra Nevada Range to the east. The regional geology consists of Quaternary alluvium (approximately 6,000 to 7,000 feet thick) underlain by a sequence of sediments up to 30,000 feet deep (URS, 2007).

The Project Site covers the majority of Section 10 in Township 30 South, Range 24 East, on the U.S. Geological Survey (USGS) East Elk Hills, California Quadrangle Map.

The Project Site is bounded by Tupman Road to the east, an irrigation canal to the south, and Dairy Road to the west; agricultural land and Adohr Road is located to the north. The Project Site is currently used for farming purposes, including the cultivation of cotton, alfalfa, and onions. Land within the Controlled Area to the north, west, and south of the Project Site is also currently used for the cultivation of these crops. A manufacturing plant, Port Organics Products, Ltd. (Port Organics), was previously located adjacent to the northwest of the Project Site in the Controlled Area. The West Side Canal, Kern River Flood Control Channel, and California Aqueduct are located approximately 500, 700, and 1,900 feet, respectively, to the south of the Project Site. The land southwest of the California Aqueduct is used for mineral and petroleum purposes. The Elk Hills Oil Field is approximately 1 mile south of the Project Site.

The East Side Canal is 1,300 feet east of the northeastern corner of the Project Site (at the intersection of Adohr and Tupman roads) and extends generally from the north to the south, semi-parallel to the eastern border of the Project Site. The northern boundary of Tule Elk State Reserve is 1,700 feet east of the Project Site on Station Road, between the East Side Canal and Morris Road, east of Tupman Road. The reserve extends generally from the north to the south, with the reserve's southern boundary just east of the unincorporated community of Tupman, California.

5.9.1.2 Soil Resources

The soil resource information presented in this section is based primarily on the Soil Survey of Kern County, California, Northwestern Part, prepared by the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS, 1988). Additionally, information for the Soil Survey of Kern County, California, Southwestern Part, was obtained through review of the Soil Survey of Kern County, California, Southwestern Part, prepared by the USDA Natural Resource Conservation Services (USDA NRCS, 2009). Additional soil data was generated the USDA NRCS Web Soil Survey (WSS) database (NRCS, 2012). The WSS database (WSS, 2012) contains official USDA soil survey information as viewable maps and tables for more than 2,300 soil surveys in the United States and its territories. The boundaries of the different soil units for the Project Site and associated linears are shown graphically on Figure 5.9-1, Soil Types. Section 5.14, Water Resources, and Section 5.15, Geological Hazards and Resources, describe the characteristics of the subsurface soil at the Project Site.

The predominant soils at the Project Site and along the associated linears consist of clays, loamy sands, gravely sandy loams, silt loams, fine sandy loams, and sandy loams. The soil mapping units at the Project Site include Buttonwillow clay, 0 to 2 percent slopes; and Lokern clay, 0 to 2 percent slopes.

The soil mapping units in the proposed BVWSD well field and along the process water linear includes Lokern clay, 0 to 2 percent slopes; Lokern clay – saline-alkali, 0 to 2 percent slopes; and Buttonwillow clay, 0 to 2 percent slopes.

The soil mapping units along the transmission linears include Buttonwillow clay, 0 to 2 percent slopes; and Lokern clay, 0 to 2 percent slopes.

The soil mapping units along the potable water linear include the Buttonwillow clay, 0 to 2 percent slopes; and Lokern clay, 0 to 2 percent slopes.

The soil mapping units along the CO_2 linear include the Lokern clay, 0 to 2 percent slopes; Buttonwillow clay, 0 to 2 percent slopes; Elkhills sandy loam, 9 to 50 percent slopes; Cajon loamy sand, 0 to 2 percent slopes; and Cajon loamy sand, 2 to 5 percent slopes.

The soil mapping units along the natural gas linear include Lokern clay, 0 to 2 percent slopes; Buttonwillow clay, 0 to 2 percent slopes; Kimberlina fine sandy loam, 0 to 2 percent slopes; Garces silt loam, 0 to 2 percent slopes; Milham sandy loam, 0 to 2 percent slopes; Garces silt loam, hard substratum, 0 to 2 percent slopes; Westhaven fine sandy loam, 0 to 2 percent slopes; Cajon loamy sand, 0 to 2 percent slopes; and Panoche clay loam, saline-alkali, 0 to 2 percent slopes.

The soil mapping units along the industrial railroad spur linear include the Lokern clay, 0 to 2 percent slopes; Buttonwillow clay, 0 to 2 percent slopes; Kimberlina fine sandy loam, 0 to 2 percent slopes; Garces silt loam, 0 to 2 percent slopes; and Milham sandy loam, 0 to 2 percent slopes.

Table 5.9-1 summarizes the estimated areas of disturbance associated with the Project. Representative soil types and descriptions for the Project Site and associated linears are presented below, and soil properties are summarized in Table 5.9-2.

Buttonwillow Clay, Drained (123), 0 to 2 Percent Slopes

This soil type is a deep, somewhat poorly drained soil in basins, and was formed in alluvium derived dominantly from granitic rock with slopes of 0 to 2 percent. The representative profile is 0 to 60 inches. The surface layer is typically dark-gray clay about 28 inches thick. The upper 27 inches of the underlying material is light-gray to gray, fine sandy loam; and the lower part to a depth of 60 inches is very dark gray. Permeability of this Buttonwillow soil is moderately rapid between depths of 28 and 55 inches, and slow below a depth of 55 inches. Available water capacity is moderate or high, runoff is very slow, and the hazard of water erosion is slight. This unit is suited to irrigated crops and pasture, and most areas of this unit are used for irrigated crops, including alfalfa, barley, cotton, and sugar beets. This soil unit is considered Prime Farmland, if irrigated (USDA SCS, 1988).

Cajon Loamy Sand (125), 0 to 2 Percent Slopes

This soil type is a deep, somewhat excessively drained soil on alluvial fans, and was formed in alluvium derived dominantly from granitic rock. The representative profile is 0 to 60 inches. The surface layer is typically pale-brown loamy sand about 9 inches thick. The upper 35 inches of the underlying material are light-gray sand, and the lower part to a depth of 60 inches or more is stratified light–brownish-gray sandy loam. The vegetation in areas that are not cultivated is mainly annual grasses and forbs. Permeability of this Cajon soil is rapid. Available water capacity is low, runoff is very slow, and the hazard of water erosion is slight. This unit is suited to irrigated crops, but is limited mainly by low available water capacity and the high hazard of soil blowing. Most areas of this unit are used for irrigated crops—mainly, alfalfa, cotton, grapes, and small grain. Among the other crops grown are onions and potatoes. Some areas of this unit are used for urban development. This soil unit is designated as Prime Farmland, if irrigated (USDA SCS, 1988).

Granoso Loamy Sand (121), 2 to 5 Percent Slopes

This soil type is a deep, somewhat excessively drained soil on alluvial fans, and was formed in alluvium derived from mixed rock sources with slopes of 2 to 5 percent. The representative profile is 0 to 62 inches. The surface layer consists of loamy sand about 10 inches thick. The upper 26 inches of the underlying material are loamy sand to sandy loam, and the lower part to a depth of 62 inches is typically sand with some fine sand to loamy sand. Permeability of this Granoso soil is moderate. The soil has a slightly sodic horizon within 30 inches of the soil surface. Available water capacity is low, runoff is slow, and the hazard of water erosion is slight. This unit is suited to irrigated crops. This soil is considered Farmland of Statewide Importance (NRCS, 2009).

Cajon Loamy Sand (126), 2 to 5 Percent Slopes

This soil type is a deep, somewhat excessively drained soil on alluvial fans, and was formed in alluvium derived dominantly from granitic rock. The representative profile is 0 to 60 inches.

The surface layer is typically pale-brown loamy sand about 9 inches thick. The upper 35 inches of the underlying material are light-gray loamy sand, and the lower part to a depth of 60 inches or more is stratified light–brownish-gray sandy loam. The vegetation in most areas that are not cultivated is mainly annual grasses, forbs, and shrubs. Permeability of this Cajon soil is rapid. Available water capacity is low, runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This unit is suited to livestock grazing irrigated crops, but the production of forage is limited by low available water capacity, the high hazard of soil blowing, and low rainfall. This soil unit is designated as Prime Farmland, if irrigated (USDA SCS, 1988).

Elkhills Sandy Loam (146), 9 to 50 Percent Slopes

This soil type is a deep, well-drained soil found primarily on uplifted, dissected old areas of valley fill, and was formed in alluvium derived dominantly from sedimentary and granitic rock. The representative profile is 0 to 65 inches. The surface layer is typically a pale-brown sandy loam about 7 inches thick. The subsurface layer is light–yellowish-brown, fine sandy loam about

22 inches thick. The upper 20 inches of the underlying material are very pale-brown, coarse sandy loam, and the lower part to a depth of 65 inches or more is light gray, stratified gravelly coarse sand, sand, and loamy sand. The vegetation in areas not cultivated is mainly annual grasses, forbs, and scattered shrubs. Permeability of this Elkhills soil is moderately rapid. Available water capacity is moderate or high, runoff is medium, and the hazard of water erosion is moderate. This unit is suited to livestock grazing, but the production of forage is limited by low rainfall and steepness of slope. This soil is not considered Prime Farmland (USDA SCS, 1988).

Garces Silt Loam (156), 0 to 2 Percent Slopes

This soil type is a deep, well-drained, saline-alkali soil on basin rims, and was formed in alluvium derived dominantly from granitic rock. The representative profile is 0 to 60 inches. The surface layer is typically pale-brown silt loam about 2 inches thick. The subsurface layer is very pale-brown silt loam about 3 inches thick. The upper 32 inches of the underlying subsoil material is light–yellowish-brown clay loam and pale-brown loam; and the lower substratum to a depth of 60 inches or more is very pale-brown loam and light-gray, fine sandy loam. The vegetation in areas not cultivated is mainly salt-tolerant annual grasses, forbs, and shrubs. Permeability of this Garces soil is very slow. Available water capacity is low to high, runoff is very slow, and the hazard of water erosion is slight. Most areas of this unit are used for irrigated crops—mainly, barley, cotton, and sugar beets, as well as almonds, alfalfa, and wheat. Some areas are used for irrigated pasture, livestock grazing, and urban development. This soil unit is designated as Farmland of Statewide Importance (USDA SCS, 1988).

Garces Silt Loam, Hard Substratum (158), 0 to 2 Percent Slopes

This soil type is a deep, well-drained, saline-alkali soil on basin rims, and was formed in alluvium derived dominantly from granitic rock. The surface layer is typically light-gray silt loam about 5 inches thick. The upper part of the subsoil is grayish-brown silty clay loam about 10 inches thick; and the lower 27 inches are light–yellowish-brown loam and sandy clay loam. The substratum to a depth of 60 inches or more is stratified, weakly cemented dark–yellowish-brown sandy loam and loam. In some areas, the surface is sandy loam or loam. The soil is moderately to strongly saline-alkali. Permeability of this Garces soil is very slow. Available water capacity is low to moderate, runoff is very slow, and the hazard of water erosion is slight. The effective rooting depth is 60 inches or more, but is somewhat restricted by the weakly cemented substratum. Toxic levels of boron are present in some places. Most areas of this unit are used for livestock grazing. A few areas are used for irrigated crops, irrigated pasture, and urban development. This unit is suited to irrigated, salt-tolerant crops. It is limited mainly by the saline-alkali condition of the soil, the very slow permeability, and depth to the weakly cemented layer (USDA SCS, 1988).

Kimberlina Fine Sandy Loam (174), 0 to 2 Percent Slopes

This soil type is a deep, well-drained soil on alluvial fans and plains, and was formed in alluvium derived dominantly from granitic and sedimentary rock. The representative profile is 0 to 71 inches. The surface layer is typically a brown, fine sandy loam about 9 inches thick. The upper 36 inches of the underlying material are pale-brown, fine sandy loam; and the lower part to

a depth of 71 inches is pale-brown silt loam. The vegetation in areas not cultivated is mainly annual grasses, forbs, and a few scattered shrubs. Permeability of this Kimberlina soil is moderate. Available water capacity is high, runoff is slow, and the hazard of water erosion is slight. This unit is suited to irrigated crops and has few limitations. Most areas of this unit are used for irrigated crops—mainly, almonds, alfalfa, cotton, and grapes. Other crops grown include potatoes, sugar beets, pistachios, and onions. Some areas are also used for irrigated pasture, limited livestock grazing, and urban development. This soil is considered Prime Farmland, if irrigated (USDA SCS, 1988).

Kimberlina Fine Sandy Loam (179), Saline-Alkali, 0 to 2 Percent Slopes

This soil type is a deep, well-drained soil on recent alluvial fans and plains, and was formed in alluvium derived dominantly from granitic and sedimentary rock. The representative profile is 0 to 71 inches. The surface layer is typically a brown, fine sandy loam up to 9 inches thick. The upper 36 inches of the underlying material are brown, fine sandy loam; and the lower part to a depth of 71 inches is pale-brown silt loam. The native vegetation is mainly salt-tolerant annual grasses, forbs, and a few scattered shrubs. The soil is slightly to moderately saline-alkali, and permeability of the Kimberlina soil is moderately slow. Available water capacity is very low to moderate, runoff is slow, and the hazard of water erosion is slight. This unit is well-suited to irrigated crops that are saline-alkali tolerant, and is commonly used for row and field crops such as cotton, alfalfa, and barley. This soil is considered Farmland of Statewide Importance (USDA SCS, 1988).

Lokern clay (187), Drained, 0 to 2 Percent Slopes

This soil type is a deep, somewhat poorly drained soil in basins, and was formed in alluvium derived from mixed rock sources, dominantly granitic rock. The representative profile is 0 to 60 inches. The surface layer is dark-gray clay about 21 inches thick. The upper 27 inches of the underlying material are gray and dark-gray clay; and the lower part to depths of 60 inches or more is light–brownish-gray, fine sandy loam. The vegetation in areas not cultivated is mainly annual grasses, forbs, and shrubs. Permeability of this Lokern soil is slow. Available water capacity is high, runoff is very slow, and the hazard of water erosion is slight. This soil is subject to rare periods of flooding, but is protected by dams or levees. This unit is suited to irrigated row and field crops, as well as irrigated pasture. Most areas of this unit are used for irrigated crops, including cotton, alfalfa, sugar beets, barley, rice, and wheat. This soil unit is considered Prime Farmland, if irrigated (USDA SCS, 1988).

Lokern Clay (188), Saline-Alkali, Drained, 0 to 2 Percent Slopes

This soil type is a deep, somewhat poorly drained soil in basins, and was formed in alluvium derived dominantly from mixed rock sources, dominantly granitic rock. The representative profile is 0 to 60 inches. The surface layer is typically dark-gray clay about 21 inches thick. The upper 27 inches of the underlying material are gray and dark-gray clay; and the lower part to a depth of 60 inches or more is light–brownish-gray, fine sandy loam. The soil is moderately to strongly saline-alkali. The vegetation in areas not cultivated is mainly annual grasses, forbs, and shrubs. Permeability of this Lokern soil is slow. Available water capacity is moderate or high, runoff is very slow, and the hazard of water erosion is slight. This soil is subject to rare periods

of flooding, but is protected by dams or levees. Toxic levels of boron are present in places. This unit is suited to irrigated row and field crops that are salt-tolerant, as well as irrigated pasture. Most areas of this unit are used for irrigated crops—mainly, cotton and alfalfa. This soil unit is not considered Prime Farmland (USDA SCS, 1988).

Milham Sandy Loam (196), 0 to 2 Percent Slopes

This soil type is a deep, well-drained soil on recent alluvial fans, plains, and low terraces, and was formed in alluvium derived dominantly from granitic and sedimentary rock. The representative profile is 0 to 60 inches. The surface layer is light–brownish-gray sandy loam about 4 inches thick. The upper 6 inches of the subsoil are pale-brown sandy loam; and the lower 39 inches are yellowish-brown loam and clay loam. The substratum to a depth of 60 inches or more is pale-olive sandy loam. The vegetation in areas not cultivated is mainly annual grasses and forbs, with a few scattered shrubs. Permeability of the Milham soil is moderately slow. Available water capacity is high, runoff is very slow, and the hazard of water erosion is slight. This unit is suited to hay and pasture, as well as to irrigated crops, with few limitations. Most areas of this unit are used for irrigated crops—mainly, cotton, alfalfa, almonds, grapes, pistachios, olives, onions, peppers, and wheat. Some areas are used for irrigated pasture or livestock grazing. This soil is considered Prime Farmland, if irrigated (USDA SCS, 1988).

Kimberlina Fine Sandy Loam (212), Saline-Sodic, 0 to 2 Percent Slopes

This soil type is a deep, well-drained soil on alluvial fans, and was formed in alluvium derived from granitic and sedimentary rock. The representative profile is 0 to 71 inches. The surface layer is typically a fine sandy loam up to 9 inches thick. The upper 36 inches of the underlying material are fine sandy loam to sandy loam, and the lower part to a depth of 71 inches is stratified silt loam to sandy clay loam. The soil has a slightly saline horizon within 30 inches of the soil surface, and a moderately sodic horizon within 30 inches of the soil surface. Permeability of the Kimberlina soil is moderate. Available water capacity is moderate, runoff is slow, and the hazard of water erosion is slight. This unit is well-suited to irrigated crops that are saline-sodic. This soil is considered Farmland of Statewide Importance (NRCS, 2009).

Torriorthents, Stratified, Eroded-Elkhills Complex (232), 9 to 50 Percent Slopes

This soil type is a deep, well-drained soil found primarily in areas of uplifted, dissected valley fill and on hills, and was formed in alluvium derived dominantly from sedimentary and granitic rock. The surface layer ranges from loamy sand to silty loam. The next layer is stratified silty loam to clay over stratified gravelly sand to silty clay loam. Many areas are saline-alkali. This soil supports little—if any—vegetation. Permeability of the Torriorthents is moderate to slow. Available water capacity is moderate to high, runoff is rapid, and the hazard of water erosion is high. This unit is poorly suited to livestock grazing, because the production of forage is limited by low rainfall, the hazard of erosion, salt content, and steepness of slope. This soil is not considered Prime Farmland (USDA SCS, 1988).

Westhaven Fine Sandy Loam (245), 0 to 2 Percent Slopes (245)

This soil type is a deep, moderately well-drained soil found on flood plains and alluvial fans, and was formed in alluvium derived mainly from granitic rock. The surface layer is typically light–brownish-gray, fine sandy loam about 11 inches thick. The upper 17 inches of the underlying material are pale-brown silt loam; and the lower part to a depth of 61 inches is brown clay and white clay loam. In some areas, the surface layer is loamy fine sand or silty loam. Permeability is moderately slow. Available water capacity is high or very high. Runoff is slow, and the hazard of water erosion is slight. This unit is suited to irrigated crops—mainly, cotton, alfalfa, and sugar beets. Some areas are used for duck ponds (USDA SCS, 1988).

Soil maps and surveys are available from NRCS for the Northwest and Southwest Section of Kern County, which includes the Project Site and associated linears (NRCS Maps Number CA666 and CA691).

5.9.1.3 Agriculture and Important Farmlands

Information regarding Agriculture and Important Farmlands is presented in Section 5.4, Land Use, of this AFC Amendment.

5.9.2 Environmental Consequences

Appendix G of the California Environmental Quality Act (CEQA) identifies the following criteria for determining the significance of impacts to soils resources. The Project would result in a significant impact if:

- It would result in substantial soil erosion or loss of topsoil, degradation of soils or farmland, changes in topography, or unstable soil conditions.
- It is an unstable soil or soil that would become unstable because of the Project, and potentially result in landslide, lateral spreading, subsidence, liquefaction, or collapse.
- It is located on expansive soil, creating substantial risks to life or property.
- It would place septic tanks or alternative wastewater disposal systems on soils incapable of adequately supporting these systems, where sewers are unavailable for the disposal of wastewater.

The assessment of Project impacts to the soil resource is based on soils information presented in SSURGO data and the Phase I Environmental Site Assessment report prepared by URS in April 2012 (see Appendix L, Phase I Environmental Site Assessment), and consideration of best management practices (BMPs). URS conducted a geotechnical investigation for the Project Site in 2009 (URS, 2009), and filed it in Appendix P of the 2009 Revised AFC. Information related to the geotechnical investigations and associated findings are provided in Section 5.15, Geological Hazards and Resources, in this AFC Amendment.

The Universal Soil Loss Equation is typically used to quantify water-induced soil loss in agricultural areas. The Revised Universal Soil Loss Equation (RUSLE2) was used to estimate the potential amount of soil erosion under existing conditions, during construction, and during plant operation from the Project Site, the construction laydown area north of the Project Site (controlled area), and the industrial railroad spur. The results of the RUSLE2 soil erosion calculations are summarized in Table 5.9-3. Under existing conditions, the estimated soil erosion is 9.6 tons per acre per year for the Project Site, 1.5 tons per acre per year for the construction laydown area, and 4.6 tons per acre per year for the railroad spur. During construction, the Project Site and the construction laydown area (depicted on Figure 2-5, Plot Plan) and the railroad spur (Alternative 1, Rail Transportation) (Figure 5.9-1 pages 4 and 5) will be stripped of vegetation. Under these conditions the vegetative cover will be eliminated and the soil erosion during construction activities is estimated at approximately 41.7 tons per acre per year for the Project Site, 0.7 ton per acre per year for the construction laydown area, and 4.6 tons per acre per year for the railroad spur. However, during construction the use of BMPs will minimize the potential for soil erosion so that the impact will be less than significant. Once the Project has been constructed, the Project Site will either be covered with facilities, asphalt, concrete, or rock surfacing or revegetated in some areas. During operation soil erosion is estimated at 5.2 tons per acre per year for the Project Site, 1.5 tons per acre per year for the construction laydown area, and 0.3 ton per acre per year for the railroad spur. Additionally, after construction, storm water will be managed such that there will be zero liquid discharge from the site. In summary, during construction, the potential for erosion would be greater than for the period of operations but will be managed through the implementation of BMPs to minimize impacts; and after construction, the potential for erosion will be less than significant due to surface coverage and storm water management.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The two main soil mapping units at the Project Site are the Buttonwillow clay and the Lokern clay, which have wind erodibility groups of 8 and 7, respectively. As such, the soils have a low potential for wind erosion. The implementation of mitigation measures presented in Section 5.9.4 will reduce the potential for wind erosion from the Project Site during construction and operational activities.

5.9.2.1 Construction-Related Impacts

Minor construction-related impacts to the soil resources are associated with development of the Project, including minor grubbing, grading, and trenching for installation, operation, and maintenance of above-ground electrical-power transmission line and underground pipelines for process water, CO_2, natural gas, and potable water. Approximately 800 acres of land will be disturbed during construction activities (including the linear facilities), of which 453 acres will be on the Project Site (see Table 5.9-1).

An update of the Phase I Environmental Site Assessment (ESA) of the Project Site, originally prepared in 2009, has been conducted in accordance with American Society for Testing and Materials (ASTM) guidance document *ASTM Standards on Environmental Site Assessments for Commercial Real Estate*, Designation Practice E 1527, as required by the California Energy Commission (CEC) for an AFC. The ESA report is included in this AFC Amendment as

Appendix L. The objective of the Phase I ESA was to identify Recognized Environmental Conditions (RECs) that may exist on the Project Site. The ASTM guidance document defines RECs as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property."

Based on information generated for the Phase I ESA prepared by URS (2012), the following RECs were identified at the Project Site:

- The 2010 Phase II investigation conducted by AECOM identified elevated concentrations of petroleum hydrocarbons and other contaminants on the former equipment wash area immediately north of the Project Site boundary (AECOM, 2010). Because the vertical and horizontal extent of contamination were not defined by the Phase II ESA, and this wash area discharged into a ditch south of the Farm Operations Area boundary, the contamination is considered a potential off-site REC to the Project Site.

- Stained soils were observed during the Project Site visit, as detailed in Section 6.3.13 of the Phase I ESA. The soil staining is likely to derive from handling of fuels, lubricating oils, and/or pesticides. The AECOM 2010 Phase II ESA sampled in the vicinity of the stained soil and identified selected contaminants; however, the extent of any subsurface impacts is not defined.

In addition to the above RECs, the following potential environmental issues were noted, which in URS' opinion are not considered RECs:

- Surficial samples collected from the agricultural fields on the Project Site identified concentrations of the pesticides dieldrin, endrin, and endosulfan that exceed the Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESLs), but did not exceed the state California Human Health Screening Level (CHHSL) or federal Regional Screening Levels (RSLs). These results are consistent with the historical agricultural use, and no consistent spatial pattern of pesticides above ESLs was observed.

- An agency database lists five former USTs at Palm Farms, Inc., on Adohr Road. Because the Project Site is also located on Adohr Road, and the property was purchased from Palm Farms, Inc., the USTs may have historically been on or adjacent to the Project Site. The 2010 AECOM Phase II ESA investigated selected potential locations for these USTs, and identified no USTs and no contamination associated with USTs.

URS recommended further investigation be conducted at the Project Site to determine the presence and/or extent of potential environmental contamination associated with the RECs. The investigation should address potential contamination arising from each REC, and environmental issues listed above, including the following areas:

- Performing step-out sampling to investigate the vertical and horizontal extent of contamination in the area adjacent to the former equipment wash area, including sampling surficial soil and sediment along the drainage ditch where washwater was discharged, to evaluate potential impact to the Project Site.

- Performing step-out sampling to investigate the vertical and horizontal extent of contamination in the stained-soil area adjacent to the drainage ditch, including sampling surficial soil.

The existing Project Site topography is generally flat, but some grading will be required to provide a level area for the Project. The surficial soils will likely be excavated and re-compacted or replaced with granular soils in and adjacent to the areas of Project facilities. Preliminary grading plans indicate that approximately 500,000 cubic yards of soil required for construction will be derived from off-site sources. Several potential borrow sites for the Project have been identified within a 5-mile radius of the Project Site, including Syndex Ready Mix. Additionally, soil removed through grading activities is expected to be reused on site to construct berms at the northwestern and northeastern portions of the Project Site; therefore, no on-site or off-site fill disposal is expected. However, it may be necessary to dispose of vegetative matter and excavated debris. Disposal site options are described in Section 5.13, Waste Management, of this AFC Amendment. Additional details related to the construction and installation of the electrical transmission line and pipelines for water supply, natural gas, and CO_2 are provided below under Section 5.9.2.3, Linear Facilities Impacts.

Potential impacts during construction activities on soil resources may include alteration of the existing soil profile, increased soil erosion, and soil compaction. Alteration of the existing soil profiles, including the mixing of soils, will alter the physical, chemical, and biological characteristics of native soils and underlying geology. Soil erosion causes the loss of topsoil and can increase the sediment load in surface-receiving waters downstream of the construction site. Soil action can decrease infiltration rates, resulting in increased runoff and erosion rates. The magnitude, extent, and duration of construction-related impacts depend on the erodibility of the soil; the proximity of the construction activity to a receiving water body; and the construction methodologies, duration, and season. The mitigation measures outlined in Section 5.9.4, Mitigation Measures, will reduce the potential for impacts to soil resources, resulting from construction of the Project, to less-than-significant levels.

5.9.2.2 Project Site Impacts

Project construction activities (including site preparation) at the Project Site will be partially overlapped by commissioning activities before the Project is operational. Land disturbances related to development activities are expected to be conducted on the Project Site. Excavation work will consist of the removal, storage, and/or disposal of earth, sand, gravel, vegetation, organic matter, loose rock, boulders, and debris as necessary for construction. Disposal site options are described in Section 5.13, Waste Management, of this AFC Amendment. Materials suitable for backfill will be stockpiled at designated locations using proper erosion protection methods. During the construction phase of the Project, erosion and sediment control measures such as mulching, jute netting, culverts, sediment detention basins, etc., will be temporarily installed as required by local regulations.

Areas to be backfilled will be prepared by removing unsuitable material and rocks. The bottom of an excavation will be examined for loose or soft areas. If observed, these areas will be excavated fully; backfilled with suitable material; and compacted. Backfilling will be done in layers of specified thickness (lift). Soil in each lift will be properly moistened to facilitate

compaction to achieve the specified density. To verify compaction, representative field-density and moisture-content tests will be performed during compaction.

Existing topsoil will be removed as needed. Graded areas will be smoothed, compacted, free from irregular surface changes, and sloped to drain. Structures and their foundations and equipment anchors will be designed according to the International Building Code (IBC), and the Kern County Building Code. Should there be a conflict in code requirements, the more conservative requirements will be implemented. Project-related soil erosion will be minimized through implementation of erosion control measures described in Section 5.9.4, Mitigation Measures. Therefore, impacts from soil erosion are expected to be less than significant.

5.9.2.3 Linear Facilities Impacts

The Project will include the construction, installation, operation, and maintenance of new under- and above-ground linear facilities, including a railroad spur, electrical power transmission line, as well as a potable water, process water, natural gas, and CO_2 pipeline.

Construction, installation, operation, and maintenance of the underground process water pipeline will result in minor, mostly temporary soils impacts. The source of the process water is the proposed BVWSD well field located approximately 15 miles northwest of the Project Site. The approximate well field location is a northwest-oriented rectangular area on the western side of the BVWSD service area near Seventh Standard Road and the California Aqueduct (Figure 5.9-1 Page 1). While the exact location of the wells has yet to be determined, the conceptual design is for a northwesterly trending line of five wells (three operational and two redundant). The wells are expected to be spaced at approximate intervals of 0.25 mile, although final spacing will be determined during well field installation and testing activities. The proposed wells are expected to extend to depths of 300 to 400 feet below grade. Each well site is expected to temporarily disturb an area of approximately 100 feet by 150 feet and to permanently disturb an area of approximately 100 feet by 100 feet (Krieger, 2009). Construction of the BVWSD well field will likely result in minor, mostly temporary soils impacts. Project construction-related soil erosion will be minimized through implementation of BMPs and erosion control measures described in Section 5.9.4, Mitigation Measures.

A natural gas pipeline will interconnect with a PG&E natural gas pipeline north of the Project Site. The interconnect will consist of one tap off the existing natural gas line and one metering station at the beginning of the natural gas linear adjacent to the PG&E Inlet. The metering station will be 100 feet by 100 feet, surrounded by a chain-link fence. In addition, there will be a metering station at the end of the natural gas linear, on the western side of the Project Site, and a pressure-limiting station on the Project Site. Construction, installation, operation, and maintenance of the underground natural gas pipeline will result in minor, mostly temporary soils impacts. Project construction-related soil erosion will be minimized through implementation of BMPs and erosion control measures described in Section 5.9.4, Mitigation Measures.

The approximately 5-mile new railroad spur (Alternative 1, Rail Transportation) will connect the Project Site to the existing SJVRR Buttonwillow railroad line, north of the Project Site. Construction of the railroad spur will involve grading, possible soil excavation and compaction and the placement of railroad ballast for the spur tracks. Although there will be permanent soil

disturbance along the railroad spur, the soil will be covered by the ballast thus reducing the potential for water erosion along the spur alignment. Additionally, land that may have been available for agricultural use will no longer be available for this intended use. However, the overall anticipated amount of permanent disturbance is approximately 33 acres along the approximate 5-mile alignment. Project construction-related soil erosion will be minimized through implementation of erosion control measures described in Section 5.9.4, Mitigation Measures. Additionally, because the spur alignment will be covered in ballast material to support the tracks, soil erosion during operation of the spur will be reduced. Therefore, impacts from soil erosion are expected to be less than significant.

Construction of the transmission line will require installing approximately 26 (15 off-site and 11 on-site) tubular-steel transmission structures and the supporting foundations. Construction will also involve stringing the conductor and the optical ground wires. After the line is completed, regular preventive maintenance and inspections will be required. Temporary access roads will need to be constructed within the transmission line ROW, except where the line runs parallel to existing roads. A small area around each structure site will need to be disturbed temporarily during the construction period. The approximate area that may be temporarily disturbed is quantified in Section 4.8.3. Roadway matting may be used on the road and around the area of each structure to minimize the effects of the construction vehicles and the construction activity. The time to construct the entire transmission line is estimated to be approximately 3 months. Construction, installation, operation, and maintenance of the above-ground electrical transmission line will result in minor, mostly temporary soils impacts. Project construction-related soil erosion will be minimized through implementation of BMPs and erosion control measures described in Section 5.9.4, Mitigation Measures.

The potable water supply linear will be approximately 1 mile in length, and be located in the electrical transmission line ROW. The potable water pipeline will cross the East Side Canal using standard industrial installation methods. When feasible, crossing of the canal will be performed when the canal is dry, using dry-ditch techniques. If water is present at the time of crossing the canal, conventional open-cut, flume variation of open-cut, or dam-and-pump variation of open-cut may be used. BMPs to be implemented with conventional open-cut waterbody crossings include, but are not limited to, the following: material excavated from the trench will be stockpiled above the canal banks; excavated trench material will generally be used as backfill; and the canal will be returned to its pre-construction contours to the extent practicable. Construction, installation, operation, and maintenance of the potable water supply line will result in minor, mostly temporary soils impacts. Project construction-related soil erosion will be minimized through implementation of BMPs and erosion control measures described in Section 5.9.4, Mitigation Measures.

Alternative 2 for the transportation of coal to the Project Site is truck transport via existing roads from an existing coal transloading facility located in Wasco northeast of the Project Site. The truck route distance is approximately 27 miles.

Products produced as part of the Project will be transported off site via truck (and/or rail if Alternative 1 is implemented). With the exception of Alternative 1 (Rail Transportation), no off-site linear under- or above-ground facilities will be constructed, installed, operated, or maintained to transport these materials off site. Therefore, with the exception of Alternative 1

(Rail Transportation), no resulting off-site linear soil impacts will be created. The disturbed acreage associated with on-site access roads has been accounted for in the disturbed acreage of the Project Site.

Table 5.9-1, Project Disturbed Acreage, indicates the anticipated acreage that will be disturbed through the process of installing the linear facilities required to operate the Project, and is broken down into temporary disturbance area (resulting from construction and installation), and permanent disturbance area (resulting from operation and maintenance).

The general process for constructing and installing the underground linear facilities will involve clearing brush, grading and trench excavation, installation of the pipelines, connecting linear facilities, lowering facilities into trenches, backfilling, compaction, and revegetation, if required. Once pipelines are covered, hydrostatic testing will commence to ensure structural integrity.

Horizontal Direction Drilling (HDD) will be used to install the CO_2 pipeline under the Westside/ Outlet Canal, the Kern River Flood Control Channel (KRFCC), and the California Aqueduct. BMPs for HDD would include silt fencing around the drill sites, energy dissipation devices for discharging water from hydrostatic testing of the pipeline, selecting drilling fluids for environmental compatibility, and removing spent fluids from the areas immediately adjacent to the aqueduct and canal for safe disposal. In addition, soil erosion control measures would be implemented to prevent runoff and impacts to water quality.

Construction and installation of above-ground linear facilities (the 230-kilovolt (kV) electrical transmission line) will follow a sequence similar to that of underground facilities, with trench excavation being replaced by augering of holes to facilitate placement of the utility poles, followed by backfilling and compaction. Grade cuts will be restored to their original contours, and affected areas will be restored to their original state to minimize the potential for erosion. To the extent possible, the material excavated from trenches and auger holes will be used to backfill around the poles and in the trenches. Additional excess material that cannot be reused along the easement corridor, because it will be susceptible to increased erosion, will be transported to another reuse area or disposed of at an off-site landfill facility. During construction and installation, the soil in the alignment for the linear facilities may become more susceptible to erosion. The extent of this construction-related impact on soils and agricultural lands, however, will be temporary, and appropriate BMPs will be implemented to minimize potential impacts. With the implementation of mitigation measures described in Section 5.9.4, Mitigation Measures, no significant impacts to native soil, receiving-water bodies, or area agricultural lands are anticipated at or near linear facilities.

5.9.2.4 Materials and Equipment-Staging Area Impacts

With the exception of the construction staging area north of the Project Site in the Controlled Area, and the construction staging area for the railroad spur (for Alternative 1, Rail Transportation), temporary construction areas will be located entirely within the 453-acre Project Site, and will be used for equipment staging and storage, construction staff parking, and job trailers. The worker parking and equipment staging will not be paved, but crushed aggregate material will be placed on the laydown to minimize the potential for erosion. Additionally, soil stabilizers will be used in traffic areas to reduce the potential for the generation of fugitive dust

from traffic in unpaved areas. Erosion control measures (more fully described in Section 5.9.4, Mitigation Measures) such as track-out areas and silt fencing, will be implemented during construction activities to help maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation. With the implementation of mitigation measures described in Section 5.9.4, no significant impacts to native soils, receiving-water bodies, or area agricultural lands are anticipated at or near the Project Site.

5.9.2.5 Operation-Related Impacts

Routine vehicle traffic during Project operation will be limited to existing paved roads and the Project Site access road, which will be paved. Permanent storm-water management measures will be implemented at the Project Site, such as a perimeter drainage berm(s), storm-water retention, and other appropriate BMPs. In addition, with the implementation of mitigation measures described in Section 5.9.4, Mitigation Measures, Project operation will not disturb soil or result in increased erosion or compaction.

5.9.2.6 Effects of Emissions on Soil-Vegetation Systems

Emissions from electrical generating facilities, including nitrogen oxide (NO_X) from the combustors or drift from the cooling towers, may have an adverse effect on soil-vegetation systems in the facility vicinity. This is primarily a concern when environments that are highly sensitive to nutrients or salts, such as serpentine layers (soils and bedrock that are acidic, dry, erodible, and nutrient-poor) are downwind from the facilities. No known occurrences of ultramafic (serpentinite) bedrock have been identified in the Project area. State-of-the-art air emissions control and monitoring equipment will be installed to reduce, control, and measure air emissions (e.g., NO_X). The addition of small amounts of nitrogen to the surrounding agricultural use areas created by air emissions from the Project is considered negligible, given the likely use of nitrogen-rich fertilizers used by farmers for crop enhancement. A Continuous Emissions Monitoring System (CEMS) will be installed to monitor the emissions, as required by laws, ordinances, regulations, and standards (LORS). Cooling towers will be equipped with high-efficiency mist eliminators to reduce particulate-matter emissions. Given the use of air emission control technology equipment and the likely use of nitrogen-rich fertilizers for crop enhancement, the effects of emissions on soil vegetation systems is considered to be less than significant. For further discussion, please refer to Section 5.1, Air Quality, in this AFC Amendment.

Also, because serpentinite has not been identified in the Project area, there are no concerns related to naturally occurring asbestos (Churchill, 2008) such as release of asbestos during soil disturbance activities.

5.9.2.7 OEHI Project

An analysis of the potential of the OEHI Project to impact soils is included in Appendix A-1, Section 4.6, Geology and Soils, and Appendix A-2, Section 2.9, Soils, of this AFC Amendment. Appendix A concludes that with implementation of recommended mitigation measures, the OEHI Project will not have significant adverse impacts to soils.

5.9.3 Cumulative Impacts Analyses

Under certain circumstances, CEQA requires consideration of a project's cumulative impacts (CEQA Guidelines § 15130). A "cumulative impact" consists of an impact that is created as a result of the combination of the project under review together with other projects causing related impacts (CEQA Guidelines § 15355). CEQA requires a discussion of the cumulative impacts of a project when the project's incremental effect is cumulatively considerable (CEQA Guidelines § 15130[a]). "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines § 15065 [a][3]).

When the combined cumulative impact associated with a project's incremental effect and the effects of other projects is not significant, further discussion of the cumulative impact is not necessary (CEQA Guidelines § 15130[a]). It is also possible that a project's contribution to a significant cumulative impact is less than cumulatively considerable and thus not significant (CEQA Guidelines § 15130[a]).

The discussion of cumulative impacts should reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great a level of detail as is provided for the effects attributable to the project under consideration (CEQA Guidelines § 15130[b]). The discussion should be guided by standards of practicality and reasonableness (CEQA Guidelines § 15130[b]).

A cumulative impact analysis starts with a list of past, present, and probable future projects within a defined geographical scope with the potential to produce related or cumulative impacts (CEQA Guidelines § 15130[b]). Factors to consider when determining whether to include a related project include the nature of the environmental resource being examined, the location of the project, and its type (CEQA Guidelines § 15130[b]). For purposes of this AFC Amendment, Kern County was contacted to obtain a list of related projects, which is contained in Appendix I. Depending on its location and type, not every project on this list is necessarily relevant to the cumulative impact analysis for each environmental topic.

Soil loss from non-agricultural uses will likely reduce soil erosion due to use as a developed area for commercial, industrial or residential land uses. Land use in the area is mainly agricultural with oil production to the southwest. Continued use or proposed use of land for agricultural purposes will not likely increase soil loss. Based on review of the projects identified in Appendix I, overall soil loss in the area will be reduced due to the change in land use from agricultural uses to developed areas, such as commercial and industrial uses. Therefore, no significant cumulative impacts to soils are expected. Cumulative impacts related to agricultural land conversion are addressed in Section 5.4, Land Use and Agriculture.

An analysis of the potential of the OEHI Project to impact soils is included in Appendix A-1, Section 4.6, Geology and Soils, of this AFC Amendment. Appendix A-1 concludes that with implementation of recommended mitigation measures, the OEHI Project will not have significant adverse cumulative impacts to soils.

5.9.4 Mitigation Measures

This section describes mitigation measures that will be implemented to reduce potential Project-related impacts to soils.

The following mitigation measures will be implemented, thereby mitigating potential Project impacts to less-than-significant levels. These mitigation measures are consistent with those identified in BVWSD's Final Environmental Impact Report which included BVWSD's well field (Krieger and Stewart, 2010). An acceptable level of soil erosion, as used herein, is defined as that amount of soil loss that will not affect (i.e., limit) the potential long-term beneficial uses of the soil as a growth medium, or adversely affect water resources because of accelerated erosion and subsequent sedimentation. Refer to Section 5.14, Water Resources, for mitigation measures related to potential impacts to water quality associated with soil erosion.

- **Soil-1.** Conduct grading operations in compliance with good industry standard practice and Kern County grading permit requirements.

- **Soil-2.** Conduct construction and operational activities in accordance with a construction-phase Storm Water Pollution Prevention Plan (SWPPP) and associated monitoring program.

- **Soil-3.** Temporary Erosion Control Measures. Typically, temporary erosion control measures include revegetation, slope stabilizers, dust suppression, construction of berms and ditches, and sediment barriers. Vegetation is the most desirable form of erosion control because it stabilizes the soil and maintains the landscape, and implementation of vegetation is feasible due to the quality of soil.

During construction of the Project, employment of control measures will minimize the wind-blown erosion of soil from construction areas, such as dust suppression (spraying water) and timely vegetation of barren construction areas. BMPs identified in the Erosion Control Plan and SWPPP will be in place prior to the commencement of ground-disturbing activities. At this time, these plans do not exist, but they will be developed and implemented prior to initiation of any on- or off-site ground-disturbing activities.

Sediment barriers such as straw bales or silt fences will slow runoff and trap sediment. Generally, placement of barriers will occur at the base of exposed slopes below disturbed areas. Placing barriers around the Project and the property boundary serves as prevention against sediment leaving the Project Site. Runoff retention basins, drainage diversions, and other large-scale sediment traps are not expected to be needed because of the relatively level topography. Soil stockpiles generated during construction will be covered, and protected from precipitation if left on site for extended periods of time.

- **Soil-4. Permanent Erosion Control Measures.** Following construction of the Project, permanent control measures will be implemented to minimize water and wind-blown erosion of soil from the Project, such as wind barriers, vegetation of barren post-construction areas and earthen berms, and conducting periodic monitoring (inspections) for erosion due to wind or water impacts and initiation of corrective actions to address issues discovered though monitoring. BMPs identified in the Erosion Control Plan and SWPPP will be in place prior

to the initiation of operations. These plans will be developed and implemented prior to commencing operation of the completed Project.

With implementation of the mitigation measures listed above, impacts to the soils resources will be less than significant due to construction and operation of the Project.

5.9.5 Laws, Ordinances, Regulations, and Standards

The following LORS are applicable to protection of soil resources and protection of surface water quality from potential Project-induced erosion impacts. Table 5.9-4 provides a summary of these applicable LORS. As presented in Section 5.9.7, Permits Required and Permit Schedule, the Project will be constructed and operated in accordance with applicable LORS and permit conditions.

5.9.6 Involved Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to soils resources are shown in Table 5.9-5, Agency Contacts.

5.9.7 Permits Required and Permit Schedule

Table 5.9-6, Applicable Permits, lists all applicable permits for the Project in the area of soils.

5.9.7.1 Federal Authorities and Administering Agencies

The federal LORS applicable to this Project, as detailed in Table 5.9-4, Summary of LORS – Soils, were authorized by the U.S. Environmental Protection Agency (USEPA) and USDA. The Clean Water Act empowers the USEPA with regulation of wastewater and storm-water discharges into surface waters by using National Pollutant Discharge Elimination System (NPDES) permits and pretreatment standards. The administering agency for LORS authorized by USEPA is the RWQCB, Central Valley Region, under the direction of the State Water Resources Control Board (SWRCB); however, the USEPA may retain jurisdiction at its discretion.

The USDA prescribes standards of technical excellence for the SCS, now called the NRCS, for the planning, design, and construction of soil conservation practices. The administering agency for LORS authorized by the USDA (Farmland Protection Policy Act) is the NRCS.

5.9.7.2 State Authorities and Administering Agencies

The state LORS applicable to this Project and listed in Table 5.9-4, Summary of LORS—Soils, are administered by the California Environmental Protection Agency (Cal/EPA). With respect to the Project, the California Public Resources Code provides for protection of environmental quality by requiring entities to submit information to the CEC concerning potential environmental impacts. The CEC is the administering agency, and the CEC's decision on the AFC must include consideration of environmental protection.

The CEQA guidelines pertaining to potential impacts to soils, as found in the Act, specify that an impact may be considered significant from a soils standpoint if the project results in substantial soil erosion or loss of topsoil. The CEC is the administering agency for potential impacts to soils.

The California Porter–Cologne Water Quality Control Act of 1952 requires adequate protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls. An NPDES California General Activities Construction Permit is necessary if an area greater than 1 acre will be disturbed. Because the facility will recycle storm water during operation, an operational NPDES permit will not be required.

5.9.7.3 Local Authorities and Administering Agencies

The local LORS applicable to this Project as shown in Table 5.9-3 are administered by Kern County.

5.9.8 References

AECOM, 2010. Phase II Environmental Site Assessment Report, Proposed Hydrogen Energy California Project Site, Adohr and Dairy Roads, Kern County, California. December.

Churchill, Ronald, 2008. Personal telephone conversation between Eric Barndt, URS Corporation, and Mr. Ronald Churchill, State of California Department of Conservation Senior Engineer Geologist.

Krieger and Stewart, Incorporated (Krieger), 2009. Final Environmental Impact Report for the Buena Vista Water Storage District Buena Vista Water Management Program. December.

Soil Conservation Service, U.S. Department of Agriculture (USDA SCS), 1988. Soil Survey of Kern County Northwestern Part. September 1988.

URS (URS Corporation), 2007. Final Phase I Environmental Site Assessment, BPAE and Area Kern Front Parcels, Kern Front Oil Field. May 18, 2007.

URS (URS Corporation), 2009. Preliminary Geotechnical Investigation, Proposed Hydrogen Energy California Project (HECA), Kern County, California, URS Job No. 289067571.

URS (URS Corporation), 2012. Phase I Environmental Site Assessment, HECA Project Site, Buttonwillow, California.

USDA NRCS (U.S. Department of Agriculture, Natural Resources Conservation Service), 2009. Soil Survey of Kern County Southwestern Part.

Web Soil Survey (WSS), 2008. U.S. Department of Agriculture, Natural Resources Conservation Service. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/.

Table 5.9-1
Disturbed Acreage

Project Component	Size	Approx. Linear Length (miles)	ROW Construction	ROW Permanent	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Project Site	453 acres	NA	NA	NA	453	453
Electrical transmission line	Temporary disturbance: 25-foot wide road throughout linear length, plus up to 25-foot-diameter structural base for each of 15 poles. Permanent disturbance: Only the up to 25-foot-diameter structural base for each of 15 poles.	2.1	100 feet	100 feet	7	0.17
Natural gas linear	Temporary disturbance: 50 feet wide along linear length, plus 100-foot by 100-foot metering station at the inlet. Permanent disturbance: Only the metering station at the inlet.	13	50 feet	25 feet	79	0.23
BVWSD well field and process water pipeline	Temporary disturbance: 50 feet wide along linear length, plus 50-foot by 50-foot area of disturbance around each of 5 wells. Permanent disturbance: Only the areas around each well.	15	50 feet	25 feet	91.2	0.29
Potable water pipeline	Temporary disturbance: 10 feet wide along linear length. Permanent disturbance: None.	1	10 feet	N/A	1.25	NA
Railroad spur	Single track railroad. Temporary disturbance: 75 feet wide along linear length, plus 3 acres of laydown area. Permanent disturbance: 60 feet wide along linear length.	5.3	75 feet	60 feet	51.2	38.6

Table 5.9-1
Disturbed Acreage (Continued)

Project Component	Size	Approx. Linear Length (miles)	ROW Construction	ROW Permanent	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Temporary Construction Areas	Temporary disturbance: 91 acres in the Controlled Area. Permanent disturbance: None.	NA	NA	NA	91	None
OEHI CO_2 pipeline	Temporary disturbance: 50 feet along linear length, plus 4 entry/exit pits (100-foot by 150-foot each) for HDD, plus two 50-foot by 50-foot valve box areas. Permanent disturbance: Only the two 50-foot by 50-foot valve box areas.	3.4	50 feet	25 feet	22.1	0.11
Total Disturbance					**795.5**	**492.3**

Source: HECA Project.

Notes:

BVWSD = Buena Vista Water Storage District
CO_2 = carbon dioxide
NA = not applicable
ROW = right-of-way

Table 5.9-2
Soil Mapping Units—Descriptions and Properties

Soil Series	Surface Texture	Depth to Bedrock or Restrictive Feature[1]	Drainage	Runoff	Hydrologic Soil Group[2]	Land Capability Class (Non-Irrigated)[3]	Erosion Factor T[4]	Erosion Factor K[5]	Surface pH	Risk of Corrosive Action on Steel[6]	Farmland Category
Kern County Northwestern Part											
Buttonwillow clay, drained, 0 to 2% slopes (123)	Clay	No restrictive feature within 200 cm	Somewhat poorly drained	High	C	7s	5	0.24	7.9–8.4	High	Prime Farmland if irrigated
Cajon loamy sand, 0 to 2% slopes (125)	Loamy sand	No restrictive feature within 200 cm	Somewhat excessively drained	Negligible	A	7s	5	0.15	7.4–8.4	Moderate	Prime Farmland if irrigated
Cajon loamy sand, 2 to 5% slopes (126)	Loamy sand	No restrictive feature within 200 cm	Somewhat excessively drained	Negligible	A	7e	5	0.15	7.4–8.4	Moderate	Prime Farmland if irrigated
Elkhills sandy loam, 9 to 50% slopes, eroded (146)	Gravely sandy loam	No restrictive feature within 200 cm	Well drained	Medium	B	7e	5	0.20	7.4–8.4	High	Not Prime Farmland
Garces silt loam, 0 to 2% slopes (156)	Silt loam	No restrictive feature within 200 cm	Well Drained	Very High		7s	4	0.49	7.9-9.0	High	Farmland of state-wide importance
Garces silt loam, hard substratum, 0 to 2% slopes (158)	Silt loam	N/A	Well drained	Very slow	B	N/A	N/A	N/A	N/A	N/A	N/A
Kimberlina fine sandy loam, 0 to 2% slopes (174)	Fine sandy loam	No restrictive feature within 200 cm	Well drained	Very low	B	7c	5	0.24	6.6–8.4	High	Prime Farmland if irrigated
Kimberlina fine sandy loam, saline-alkali, 0 to 2% slopes (179)	Fine sandy loam	No restrictive feature within 200 cm	Well drained	Medium	B	7s	5	0.24	7.9–8.4	High	Farmland of State-Wide Importance

Table 5.9-2
Soil Mapping Units—Descriptions and Properties (Continued)

Soil Series	Surface Texture	Depth to Bedrock or Restrictive Feature[1]	Drainage	Runoff	Hydrologic Soil Group[2]	Land Capability Class (Non-Irrigated)[3]	Erosion Factor T[4]	Erosion Factor K[5]	Surface pH	Risk of Corrosive Action on Steel[6]	Farmland Category
Lokern clay, drained, 0 to 2% slopes (187)	Clay	No restrictive feature within 200 cm	Moderately well drained	High	C	7s	5	0.28	7.9–8.4	High	Prime Farmland if irrigated
Lokern clay, saline-alkali, drained, 0 to 2% slopes (188)	Clay	No restrictive feature within 200 cm	Moderately well drained	Very High	D	7s	5	0.28	7.9–8.4	High	Not Prime Farmland
Milham sandy loam, 0 to 2% slopes (196)	Sandy loam	No restrictive feature within 200 cm	Well drained	Medium	B	7c	5	0.32	7.4–8.4	High	Prime Farmland if irrigated
Panoche clay loam, 0 to 2% slopes (211)	Clay loam	No restrictive feature within 200 cm	Well drained	Low	B	7c	5	0.43	7.4–8.4	High	Prime Farmland if irrigated
Panoche clay loam, saline-alkali, 0 to 2% slopes (214)	Clay loam	No restrictive feature within 200 cm	Well drained	Medium	B	7s	5	0.43	7.4–8.4	High	Farmland of State-Wide Importance
Torriorthents stratified, eroded-Elkhills complex, 9 to 50% slopes (232)	Sandy loam, gravelly sandy loam	No restrictive feature within 200 cm	Well drained	Medium to high	C	7e	5	0.20	7.4–8.4	High	Not Prime Farmland
Westhaven fine sandy loam, 0 to 2% slopes (245)	Sandy loam	No restrictive feature within 200 cm	Moderately well drained	Medium	B	7c	5	0.37	7.4-8.4	High	Prime farmland if irrigated
Kern County, Southwestern Part											
Granoso loamy sand, 2 to 5% slopes (121)	Loamy sand	No restrictive feature within 200 cm	Somewhat excessively drained	Very low	A	7e	5	0.17	7.4–8.4	Low	Farmland of State-Wide Importance

Table 5.9-2
Soil Mapping Units—Descriptions and Properties (Continued)

Soil Series	Surface Texture	Depth to Bedrock or Restrictive Feature[1]	Drainage	Runoff	Hydrologic Soil Group[2]	Land Capability Class (Non-Irrigated)[3]	Erosion Factor T[4]	Erosion Factor K[5]	Surface pH	Risk of Corrosive Action on Steel[6]	Farmland Category
Kimberlina fine sandy loam, saline-sodic, 0 to 2% slopes (212)	Fine sandy loam	No restrictive feature within 200 cm	Well drained	Low	B	7s	3	0.24	7.9–8.4	High	Farmland of State-Wide Importance

Source: USDA SCS, 1988; NRCS, 2009.

Notes:

[1] *Depth to Bedrock or Restrictive Feature:* Represents a restrictive layer that is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

[2] *Hydrologic Soil Groups:* Are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms. The four hydrologic soil groups are:
Group A – Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well-drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
Group B – Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well-drained or well-drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
Group C – Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
Group D – Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

[3] *Land Capability Classes: Class 7* soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forest land, or wildlife. *Subclass s* indicates that the soil is limited mainly because it is shallow, droughty, or stony; *Subclass c* indicates that the soil is limited by climates that are very cold or very dry; and *Subclass e* indicates susceptibility to erosion is the dominant problem or hazard affecting use with erosion susceptibility and past erosion damage comprising the major soil factors that affect soils in this subclass; Subclass s indicates that the soil is limited mainly because it is shallow, droughty, or stony.

[4] *T Factor:* is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

[5] *Erosion Factor K:* indicates the susceptibility of a soil to sheet and rill erosion by water. *Factor K* is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of *K* range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

[6] *Risk of Corrosion:* pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer. For uncoated steel, the risk of corrosion—expressed as “low,” “moderate,” or “high” —is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

cm = centimeter
% = percent
N/A = not available

Table 5.9-3
Summary of Soil Erosion Loss Calculations

Feature	Area (acres)	Activity	Estimated Soil Loss due to Water Erosion (tons/year)
Project Site	453	Existing	9.6
		Construction	41.7
		Operation	5.2
Laydown Area	91	Existing	1.5
		Construction	0.7
		Operation	1.5
Railroad Spur	51.2	Existing	4.6
		Construction	4.6
		Operation	0.3

Source: HECA Project, 2012.
Note:
Soil losses (tons/acre/year) are estimated using RUSLE2 software available online: http://fargo.nserl.purdue.edu/rusle2_dataweb/. The soil characteristics were estimated using RUSLE2 soil profiles corresponding to the mapped NRCS soil unit. Estimates of actual soil losses use the RUSLE2 soil erosion value multiplied by the affected area.

Table 5.9-4
Summary of LORS—Soils

LORS	Applicability	Conformance
Federal Jurisdiction		
The Federal Water Pollution Control Act of 1972; Clean Water Act of 1977 (including its 1987 amendments)	Establishes requirements for any facility or activity that has or will discharge waste (including sediment due to accelerated erosion) that may interfere with the beneficial uses of receiving waters.	Sections 5.9.2, Environmental Consequences, and 5.9.2.1, Construction-Related Impacts
U.S. Department of Agriculture, SCS. National Engineering Handbook (1983), Sections 2 and 3	Planning, design, and construction of soil conservation practices.	Sections 5.9.2, Environmental Consequences, and 5.9.2.1, Construction-Related Impacts
State Jurisdiction		
California Public Resources Code 25523(a): 20 CCR Chapter 6; §1752, §1752.5, §§2300-2309, and Chapter 2, Subchapter 5, Article 1, Appendix B, Part (i)	Protection of environmental quality.	Sections 5.9.2, Environmental Consequences, and 5.9.2.2, Project Site Impacts
California Environmental Quality Act, California PRC Chapter 21000 *et seq.*; Guidelines for Implementation of the CEQA, 14 CCR Chapter 3; §§15000-15387, and Appendix G	Substantial soil erosion or loss of topsoil, degradation or loss of available agricultural land, agricultural activities, or agricultural land productivity in the Project area, alteration of agricultural land characteristics due to plant air emissions, or conversion of prime or unique farmland, or farmland of state-wide importance, to non-agricultural use.	Sections 5.9.2, Environmental Consequences, and 5.9.2.2, Project Site Impacts
The California Porter-Cologne Water Quality Control Act of 1952; California Water Code, §§1326 – 13269; and 23 CCR Chapter 9	Requires adequate protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls.	Sections 5.9.2, Environmental Consequences, and 5.9.2.2, Project Site Impacts
Local Jurisdiction		
Kern County Building Inspection Division Building Permit – Kern County Zoning Ordinance, Chapter 17.08	A building permit is required for any construction which physically changes or adds structures to your property or for work regulated by local Codes or Ordinances.	Section 5.9.2, Environmental Consequences
Kern County Building Inspection Division Grading Permit – Kern County Zoning Ordinance, Chapter 17.08 and 17.28.070	No person shall do any grading or cause the same to be done without first having obtained a grading permit from the building official.	Section 5.9.2, Environmental Consequences

Source: HECA Project, 2012.

Notes:

CCR = California Code of Regulations
CEQA = California Environmental Quality Act of 1970
LORS = laws, ordinances, regulations, and standards
PRC = Public Resources Code
SCS = Soil Conservation Service

Table 5.9-5
Agency Contacts

Agency	Contact	Address	Telephone
Natural Resource Conservation Service (NRCS) Area 3 Office	Edd Russell, Soil Scientist	4974 E Clinton Way, Ste. 114 Fresno, CA 93727	(559) 252-2191 x 104
NRCS Richard E. Lyng USDA Service Center	Christopher Paris, Soil Scientist	430 G Street Davis, CA 95616	(530) 792-5634
Regional Water Quality Control Board Central Valley Region	Doug Patterson	1685 E Street Fresno, CA 93706	(559) 445-5156
Kern County Planning Department	Lorelei H. Oviatt, AICP Division Chief	Public Services Building 2700 "M" Street, Suite 1000 Bakersfield, CA 93301	(661) 862-8866
Kern County Land Division	Holly Nelson, Supervising Planner	Public Services Building 2700 "M" Street, Suite 1000 Bakersfield, CA 93301	(661) 862-8625
Kern County Building Inspection Division	Charles Lackey, Director	Public Services Building 2700 "M" Street, Suite 1000 Bakersfield, CA 93301	(661) 862-8650

Source: HECA Project, 2012.

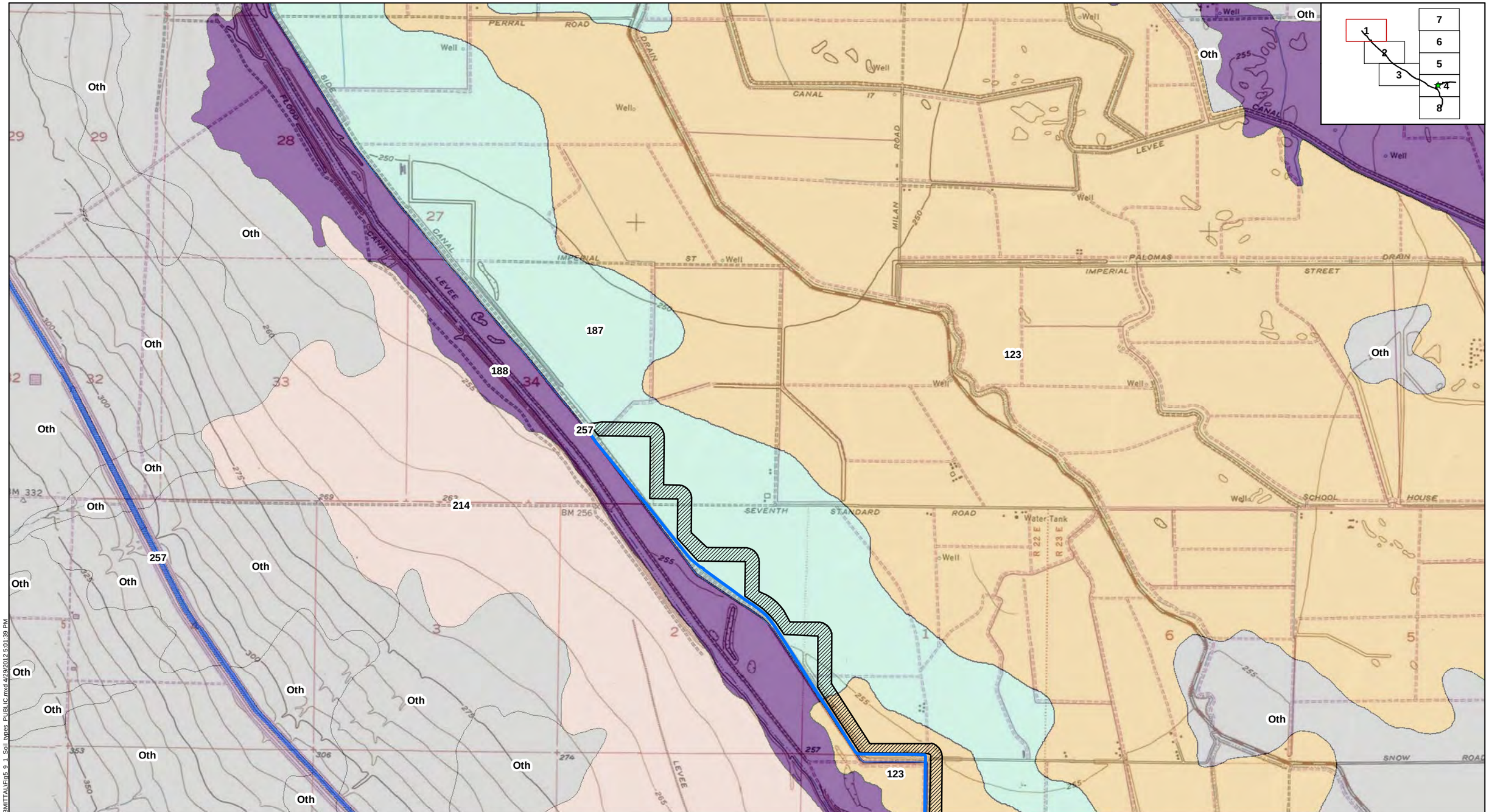
Note:

NRCS = Natural Resource Conservation Service

Table 5.9-6
Applicable Permits

Responsible Agency	Permit	Schedule
Regional Water Quality Control Board Central Valley Region	NPDES Construction	Notice of Intent filed 30 days prior to construction
Kern County Building Inspection Division	Building Permit	Prior to initiation of construction
Kern County Building Inspection Division	Grading Permit	Prior to initiation of construction

Source: HECA Project, 2012.



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Proposed NG Valve Station[1]
Rail Laydown Yard[1]

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Soil Types
Oth - Other Soils
121 - Granoso Loamy Sand
123 - Buttonwillow Clay, Drained
125 - Cajon Loamy Sand
126 - Cajon Loamy Sand
146 - Elkhills Sandy Loam, Eroded
156 - Garces Silt Loam
158 - Garces Silt Loam, Hard Substratum
174 - Kimberlina Fine Sandy Loam
179 - Kimberlina Fine Sandy Loam, Saline-Alkali
187 - Lokern Clay, Drained
188 - Lokern Clay, Saline-Alkali, Drained
196 - Milham Sandy Loam
212 - Kimberlina Fine Sandy Loam, Saline-Sodic
214 - Panoche Clay Loam, Saline- Alkali 0 to 2 percent slope
232 - Torriorthents Stratified, Eroded-Elkhills Complex
245 - Westhaven Fine Sandy Loam
257 - Water / W - Water

Note:
1. Feature temporarily designated as confidential

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Source: Aerial Imagery, Bing Maps, 2009.

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SOIL TYPES

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Kern County, California

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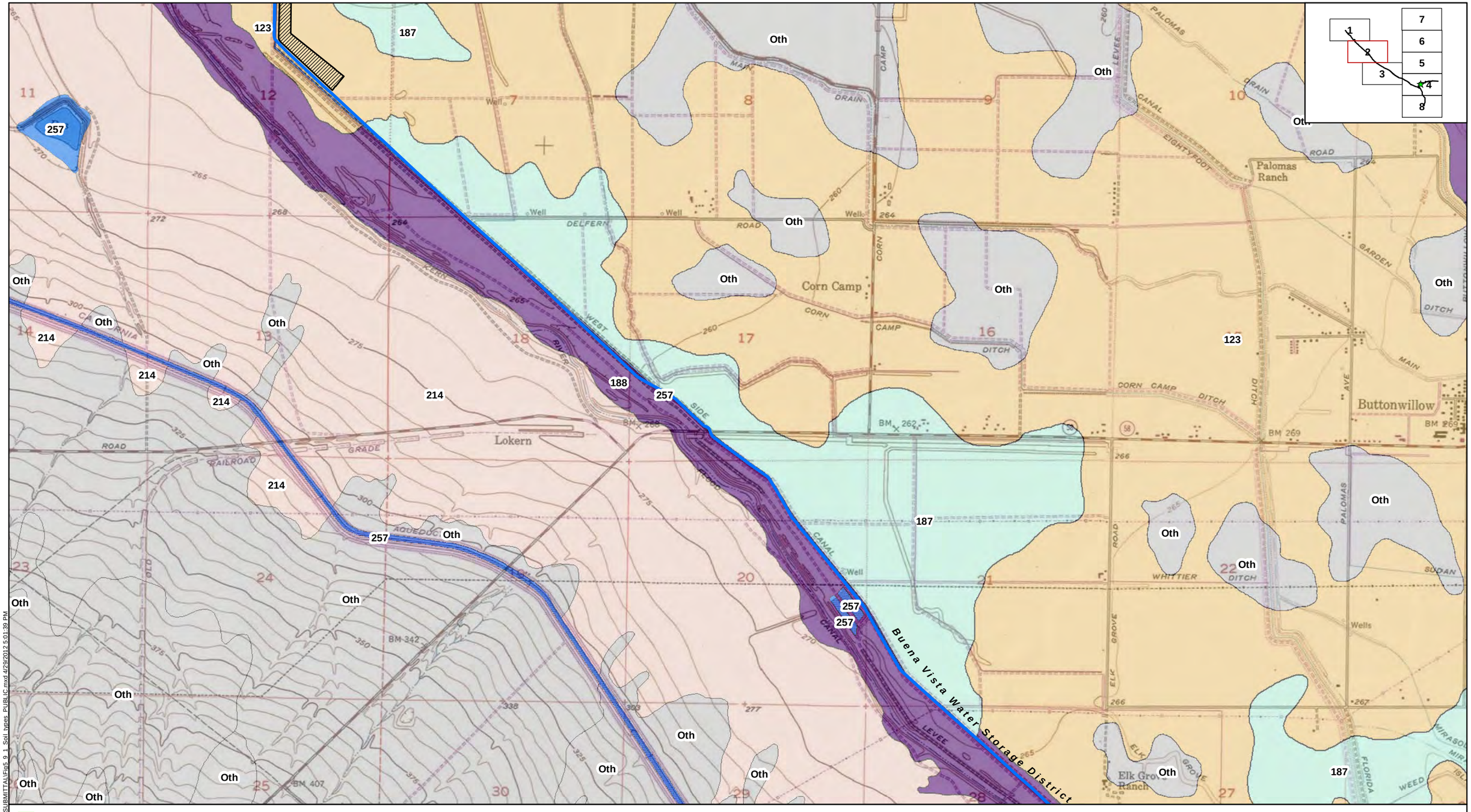
FIGURE 5.9-1(1)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Proposed NG Valve Station[1]
Rail Laydown Yard[1]

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Soil Types
Oth - Other Soils
121 - Granoso Loamy Sand
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245 - Westhaven Fine Sandy Loam
257 - Water / W - Water

Note:
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Source: Aerial Imagery, Bing Maps, 2009.

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SOIL TYPES

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Kern County, California

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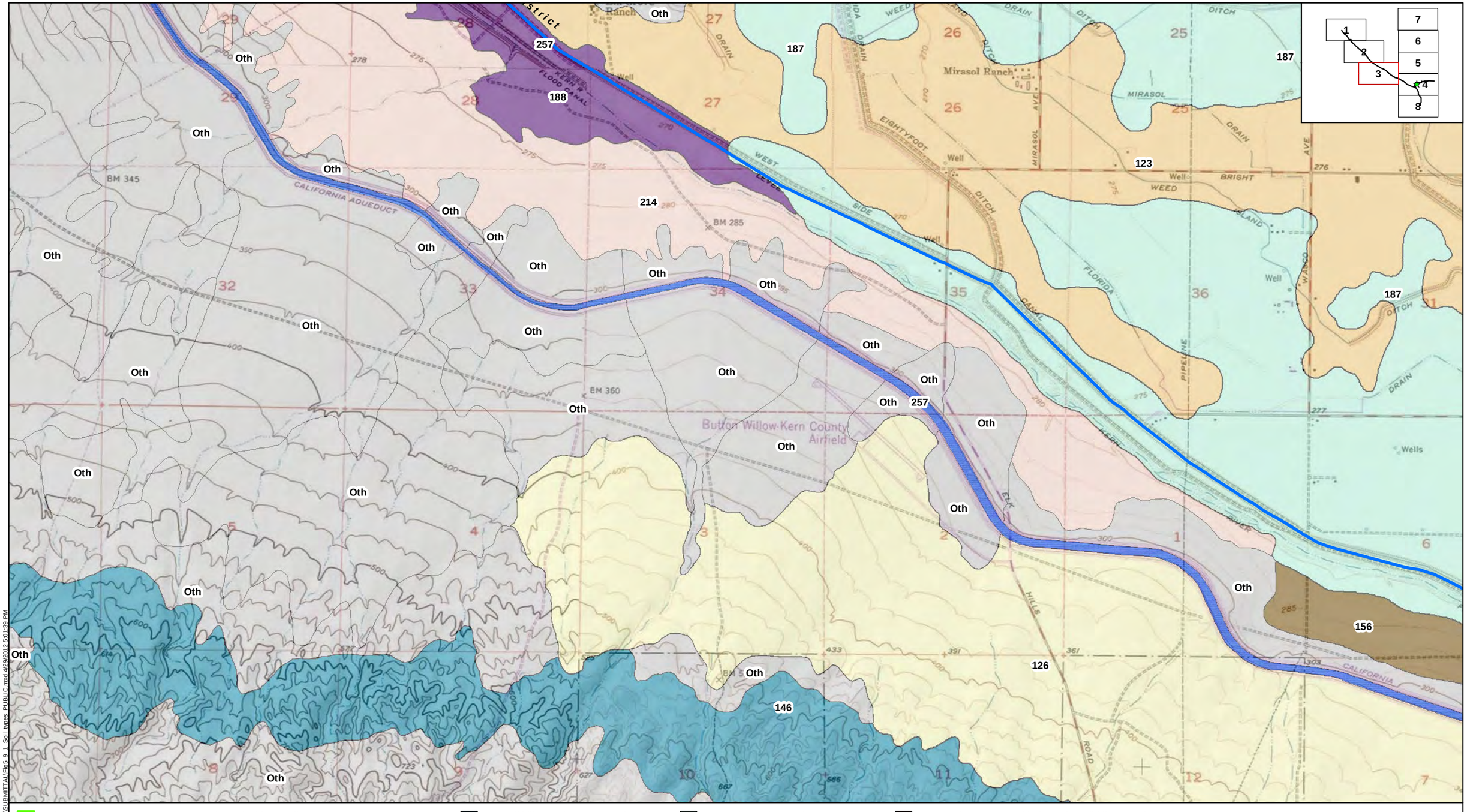
FIGURE 5.9-1(2)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Proposed NG Valve Station[1]
Rail Laydown Yard[1]

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Soil Types
Oth - Other Soils
121 - Granoso Loamy Sand
123 - Buttonwillow Clay, Drained
125 - Cajon Loamy Sand
126 - Cajon Loamy Sand
146 - Elkhills Sandy Loam, Eroded
156 - Garces Silt Loam
158 - Garces Silt Loam, Hard Substratum
174 - Kimberlina Fine Sandy Loam
179 - Kimberlina Fine Sandy Loam, Saline-Alkali
187 - Lokern Clay, Drained
188 - Lokern Clay, Saline-Alkali, Drained
196 - Milham Sandy Loam
212 - Kimberlina Fine Sandy Loam, Saline-Sodic
214 - Panoche Clay Loam, Saline- Alkali 0 to 2 percent slope
232 - Torriorthents Stratified, Eroded-Elkhills Complex
245 - Westhaven Fine Sandy Loam
257 - Water / W - Water

Note:
1. Feature temporarily designated as confidential

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Source: Aerial Imagery, Bing Maps, 2009.

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Kern County, California

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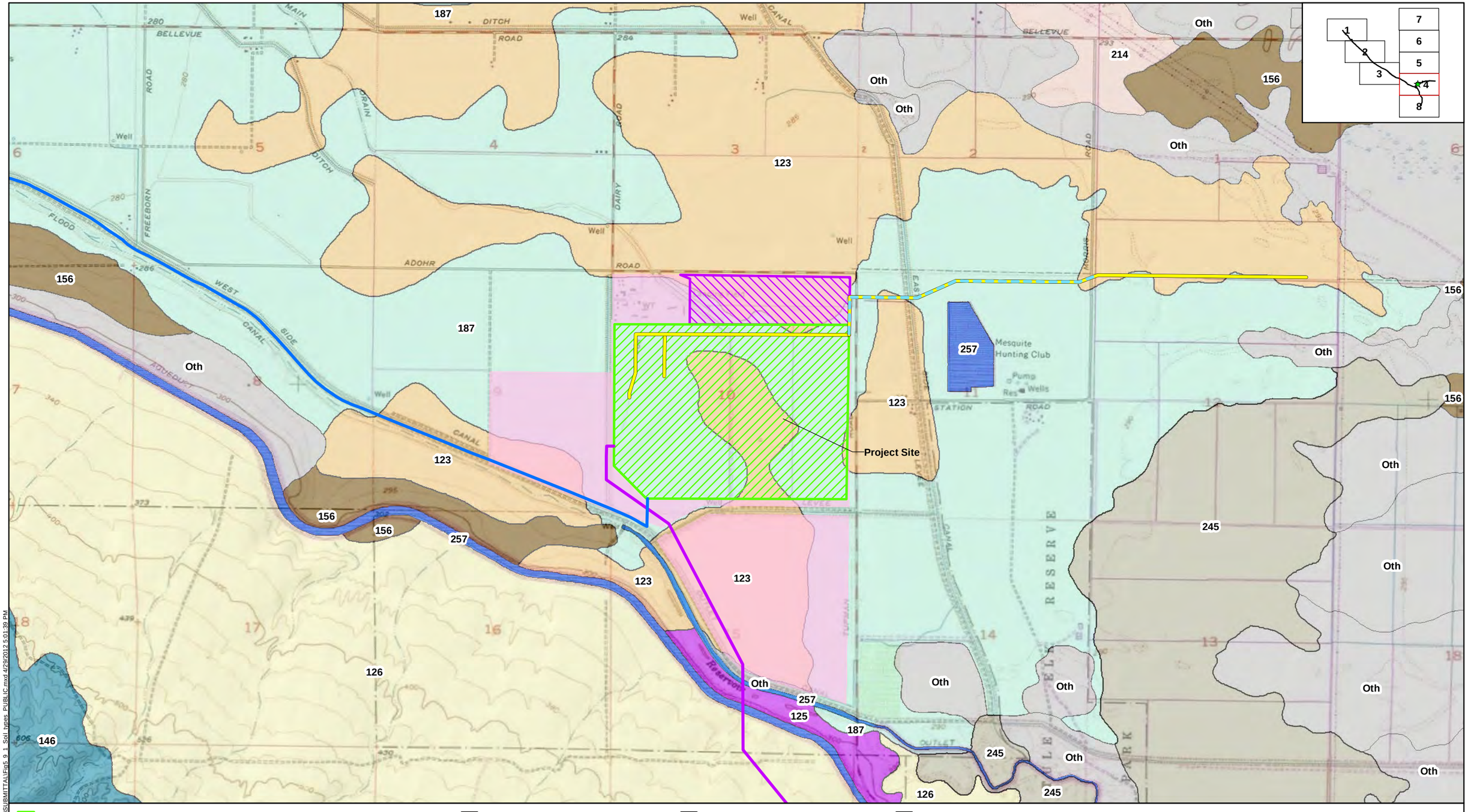
FIGURE 5.9-1(3)



Project Site	Carbon Dioxide	Soil Types	146 - Elkhills Sandy Loam, Eroded	187 - Lokern Clay, Drained	232 - Torriorthents Stratified, Eroded-Elkhills Complex
Construction Staging Area	Natural Gas[1]	Oth - Other Soils	156 - Garces Silt Loam	188 - Lokern Clay, Saline-Alkali, Drained	245 - Westhaven Fine Sandy Loam
Controlled Area	Potable Water	121 - Granoso Loamy Sand	158 - Garces Silt Loam, Hard Substratum	196 - Milham Sandy Loam	257 - Water / W - Water
BVWSD Well Field	Process Water	123 - Buttonwillow Clay, Drained	174 - Kimberlina Fine Sandy Loam	212 - Kimberlina Fine Sandy Loam, Saline-Sodic	
Proposed NG Valve Station[1]	Railroad[1]	125 - Cajon Loamy Sand	179 - Kimberlina Fine Sandy Loam, Saline-Alkali	214 - Panoche Clay Loam, Saline- Alkali 0 to 2 percent slope	
Rail Laydown Yard[1]	Transmission	126 - Cajon Loamy Sand			

Note:
1. Feature temporarily designated as confidential

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Kern County, California

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FIGURE 5.9-1(4)

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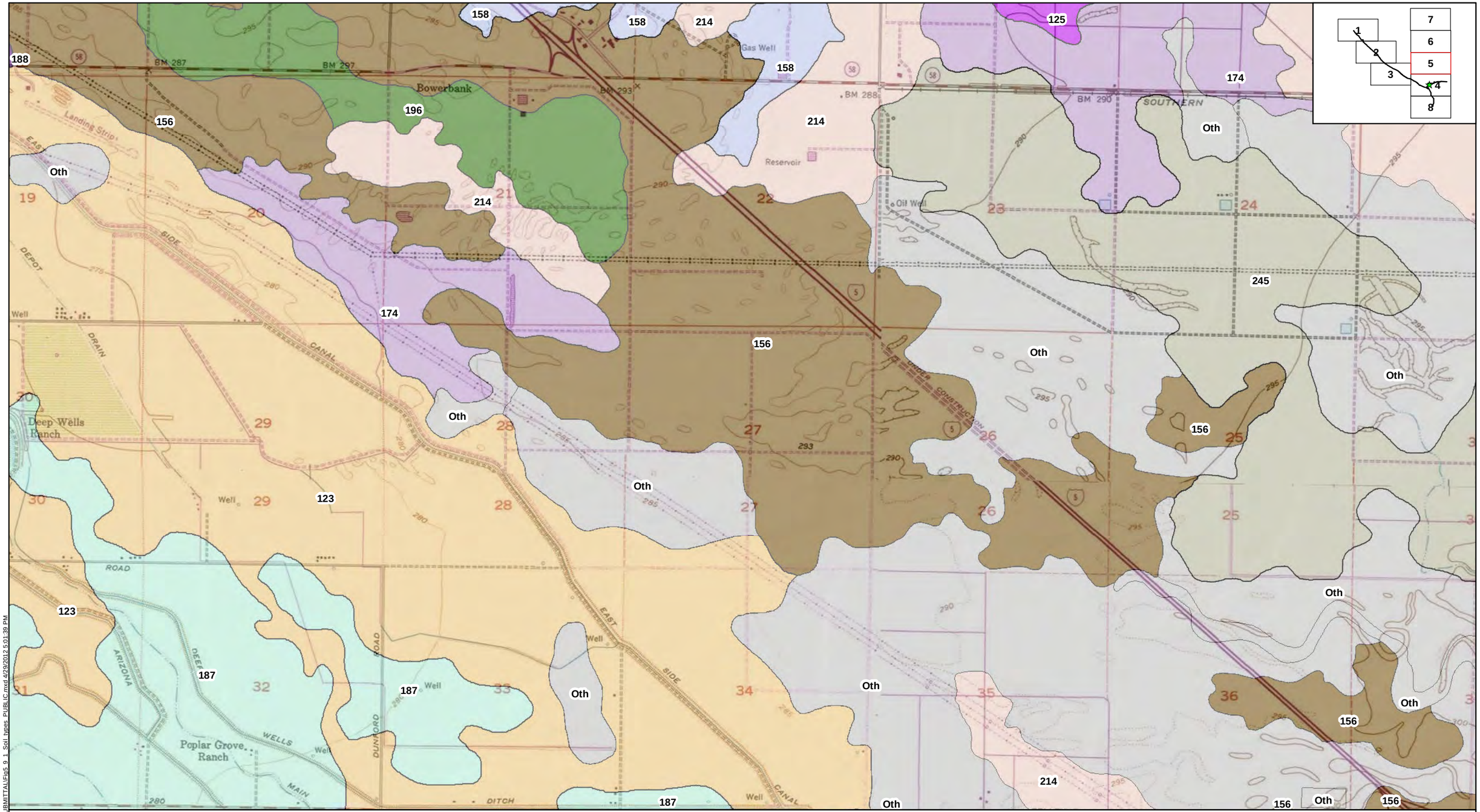
Source: Aerial Imagery, Bing Maps, 2009.



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Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Proposed NG Valve Station[1]
Rail Laydown Yard[1]

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Soil Types
Oth - Other Soils
121 - Granoso Loamy Sand
123 - Buttonwillow Clay, Drained
125 - Cajon Loamy Sand
126 - Cajon Loamy Sand
146 - Elkhills Sandy Loam, Eroded
156 - Garces Silt Loam
158 - Garces Silt Loam, Hard Substratum
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179 - Kimberlina Fine Sandy Loam, Saline-Alkali
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188 - Lokern Clay, Saline-Alkali, Drained
196 - Milham Sandy Loam
212 - Kimberlina Fine Sandy Loam, Saline-Sodic
214 - Panoche Clay Loam, Saline- Alkali 0 to 2 percent slope
232 - Torriorthents Stratified, Eroded-Elkhills Complex
245 - Westhaven Fine Sandy Loam
257 - Water / W - Water

Note:
1. Feature temporarily designated as confidential

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Source: Aerial Imagery, Bing Maps, 2009.

SOIL TYPES

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Hydrogen Energy California (HECA)
Kern County, California

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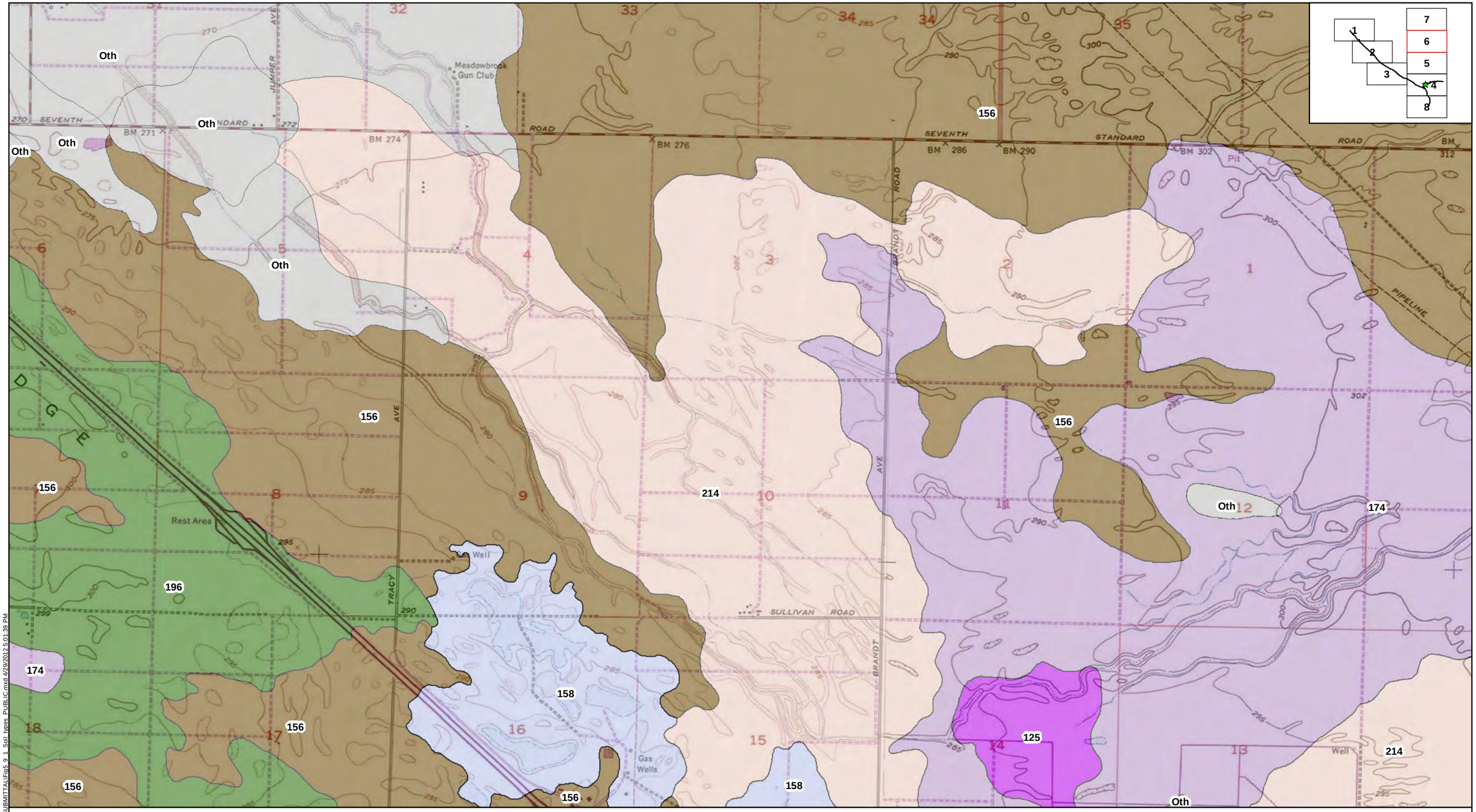
FIGURE 5.9-1(5)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Proposed NG Valve Station[1]
Rail Laydown Yard[1]

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Soil Types
Oth - Other Soils
121 - Granoso Loamy Sand
123 - Buttonwillow Clay, Drained
125 - Cajon Loamy Sand
126 - Cajon Loamy Sand
146 - Elkhills Sandy Loam, Eroded
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188 - Lokern Clay, Saline-Alkali, Drained
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212 - Kimberlina Fine Sandy Loam, Saline-Sodic
214 - Panoche Clay Loam, Saline- Alkali 0 to 2 percent slope
232 - Torriorthents Stratified, Eroded-Elkhills Complex
245 - Westhaven Fine Sandy Loam
257 - Water / W - Water

Note:
1. Feature temporarily designated as confidential

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Source: Aerial Imagery, Bing Maps, 2009.

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SOIL TYPES

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Kern County, California

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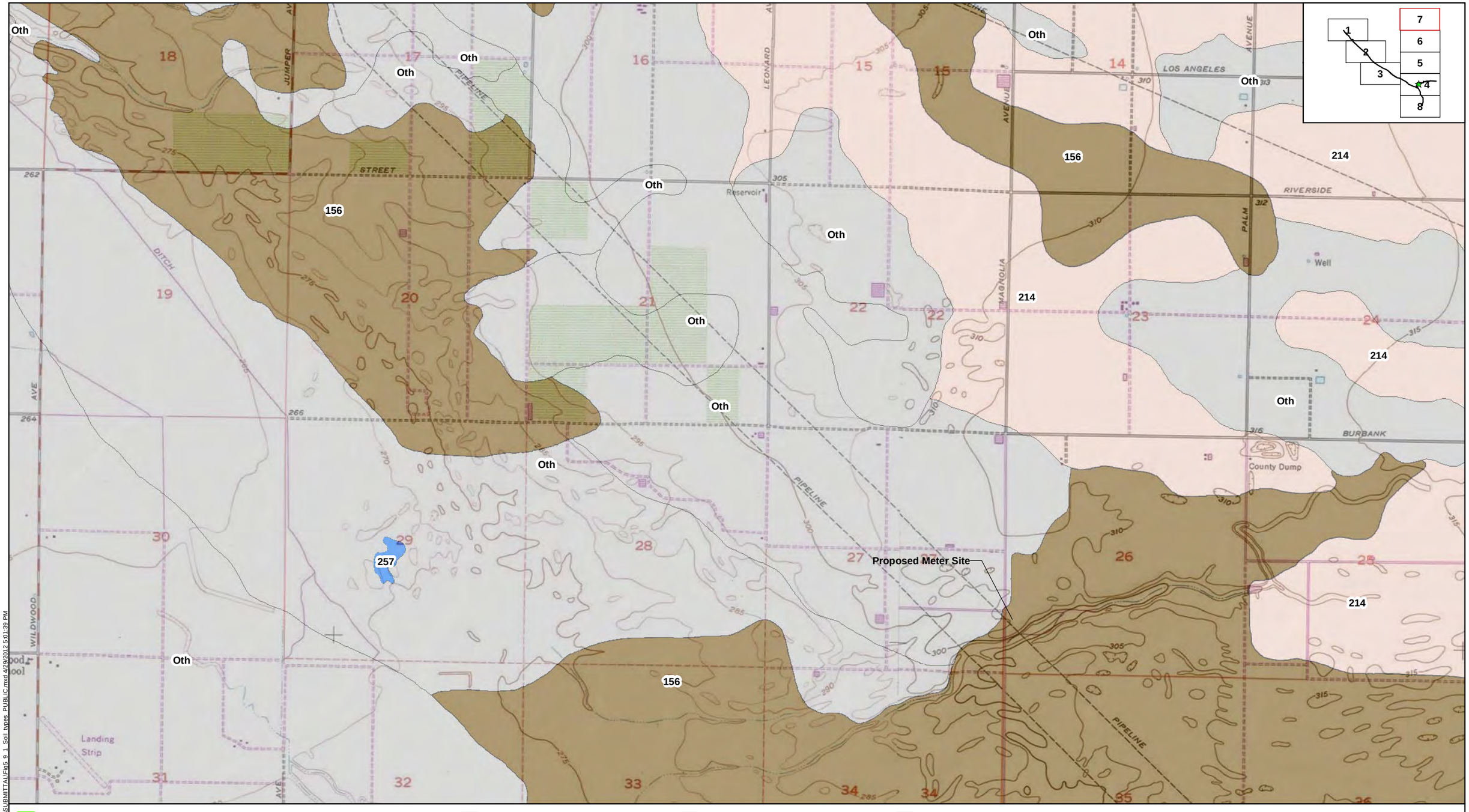
FIGURE 5.9-1(6)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Proposed NG Valve Station[1]
Rail Laydown Yard[1]

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Soil Types
Oth - Other Soils
121 - Granoso Loamy Sand
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232 - Torriorthents Stratified, Eroded-Elkhills Complex
245 - Westhaven Fine Sandy Loam
257 - Water / W - Water

Note:
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Source: Aerial Imagery, Bing Maps, 2009.

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Hydrogen Energy California (HECA)
Kern County, California

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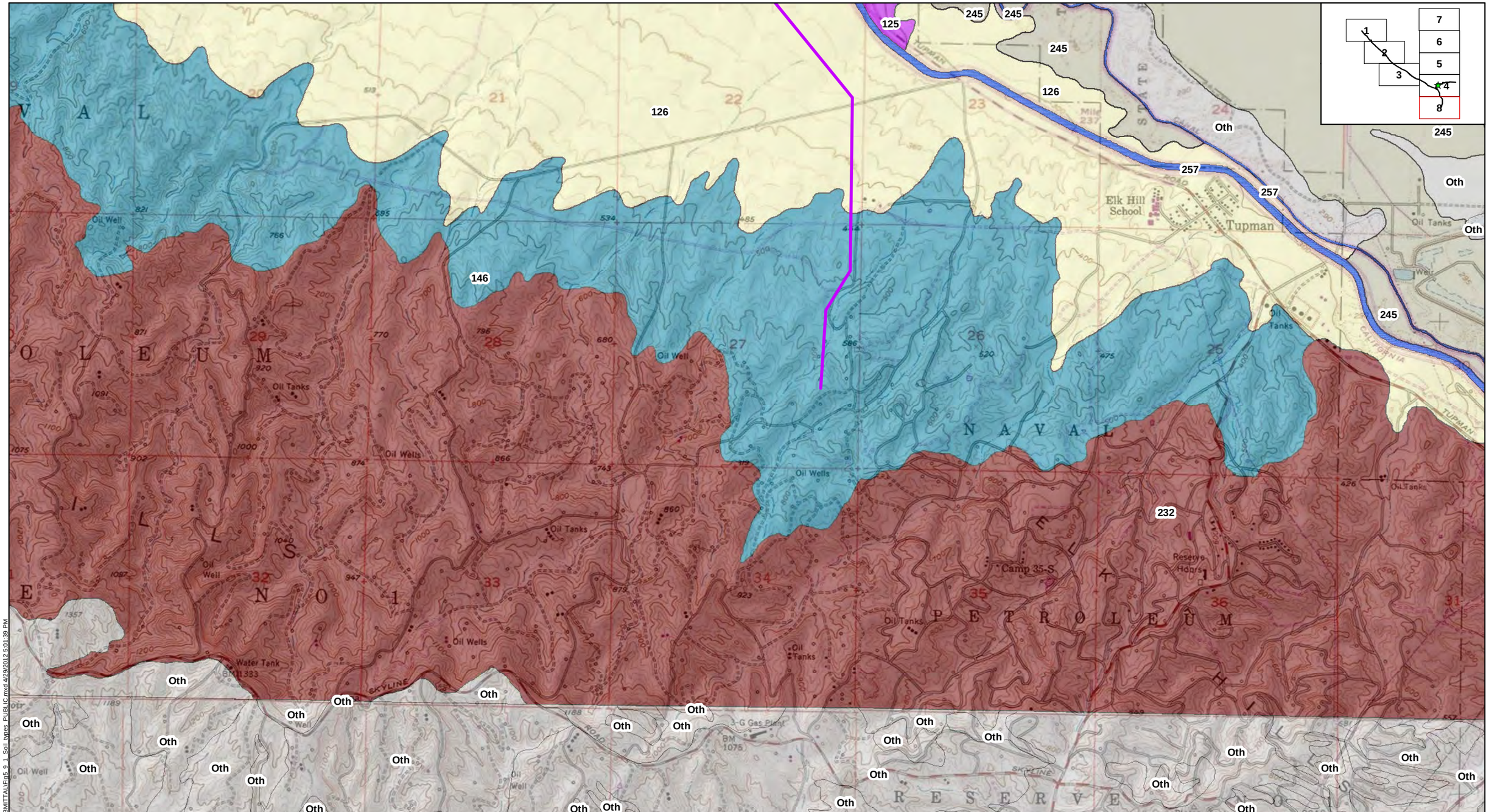
FIGURE 5.9-1(7)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
Proposed NG Valve Station[1]
Rail Laydown Yard[1]

Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Railroad[1]
Transmission

Soil Types
Oth - Other Soils
121 - Granoso Loamy Sand
123 - Buttonwillow Clay, Drained
125 - Cajon Loamy Sand
126 - Cajon Loamy Sand

146 - Elkhills Sandy Loam, Eroded
156 - Garces Silt Loam
158 - Garces Silt Loam, Hard Substratum
174 - Kimberlina Fine Sandy Loam
179 - Kimberlina Fine Sandy Loam, Saline-Alkali

187 - Lokern Clay, Drained
188 - Lokern Clay, Saline-Alkali, Drained
196 - Milham Sandy Loam
212 - Kimberlina Fine Sandy Loam, Saline-Sodic
214 - Panoche Clay Loam, Saline- Alkali 0 to 2 percent slope

232 - Torriorthents Stratified, Eroded-Elkhills Complex
245 - Westhaven Fine Sandy Loam
257 - Water / W - Water

Note:
1. Feature temporarily designated as confidential

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Source: Aerial Imagery, Bing Maps, 2009.

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SOIL TYPES

April 2012
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Hydrogen Energy California (HECA)
Kern County, California

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FIGURE 5.9-1(8)

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Figures

5.10 TRAFFIC AND TRANSPORTATION

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle (IGCC) polygeneration project (HECA or Project). The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR). CO_2 from HECA will be transported by pipeline for use in EOR in the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI). The EOR process results in sequestration (storage) of the CO_2.

Terms used throughout this section are defined as follows:

- **Project or HECA.** The HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes, including its linear facilities.

- **Project Site or HECA Project Site.** The 453-acre parcel of land on which the HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes (excluding off-site portions of linear facilities), will be located.

- **OEHI Project.** The use of CO_2 for EOR at the EHOF and resulting sequestration, including the CO_2 pipeline, EOR processing facility, and associated equipment.

- **OEHI Project Site.** The portion of land within the EHOF on which the OEHI Project will be located and where the CO_2 produced by HECA will be used for EOR and resulting sequestration**.**

- **Controlled Area.** The 653 acres of land adjacent to the Project Site over which HECA will control access and future land uses.

This introduction provides brief descriptions of both the Project and the OEHI Project. Additional HECA Project description details are provided in Section 2.0. Additional OEHI Project description details are provided in Appendix A of this Application for Certification (AFC) Amendment.

HECA Project Linear Facilities

The HECA Project includes the following linear facilities, which extend off the Project Site (see Figure 2-7, Project Location Map):

- **Electrical transmission line.** An approximately 2-mile-long electrical transmission line will interconnect the Project to a future Pacific Gas and Electric Company (PG&E) switching station east of the Project Site.

- **Natural gas supply pipeline.** An approximately 13-mile-long natural gas interconnection will be made with PG&E natural gas pipelines located north of the Project Site.

- **Water supply pipelines and wells.** An approximately 15-mile-long process water supply line and up to five new groundwater wells will be installed by the Buena Vista Water Storage District (BVWSD) to supply brackish groundwater from northwest of the Project Site. An approximately 1-mile-long water supply line from the West Kern Water District (WKWD) east of the Project Site will provide potable water.

- **Coal transportation.** HECA is considering two alternatives for transporting coal to the Project Site:

  — **Alternative 1, rail transportation.** An approximately 5-mile-long new industrial railroad spur that will connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market.

  — **Alternative 2, truck transportation.** An approximately 27-mile-long truck transport route via existing roads from an existing coal transloading facility northeast of the Project Site. This alternative was presented in the 2009 Revised AFC.

OEHI Project

OEHI will be installing the CO_2 pipeline from the Project Site to the EHOF, as well as installing the EOR Processing Facility, including any associated wells and pipelines needed in the EHOF for CO_2 EOR and sequestration. The following is a brief description of the OEHI Project, which is described in more detail in Appendix A of this AFC Amendment:

- **CO_2 EOR Processing Facility.** The CO_2 EOR Processing Facility and 13 satellites are expected to occupy approximately 136 acres within the EHOF. The facility will use 720 producing and injection wells: 570 existing wells and 150 new well installations. Approximately 652 miles of new pipeline will also be installed in the EHOF.

- **CO_2 pipeline.** An approximately 3-mile-long CO_2 pipeline will transfer the CO_2 from the HECA Project Site south to the OEHI CO_2 EOR Processing Facility.

This section assesses traffic and transportation impacts associated with the construction and operation of the Project. The analysis included in this section focuses on the HECA Project as well as the CO_2 pipeline associated with the OEHI Project. The analysis of the CO_2 EOR Processing Facility associated with the OEHI Project is included in Appendix A-1, Section 4.15, Transportation and Traffic, and Appendix A-2, Section 2.10, Traffic and Transportation, of this AFC Amendment. The study area for this traffic and transportation analysis, as depicted on Figure 5.10-2, Transportation Setting of the Local Project Area and Affected Roadways, was developed in consultation with Kern County. The analysis primarily examines impacts on roadway circulation system levels of service (LOS) within the study area during the construction and operation of the Project. This section also identifies and reviews applicable laws, ordinances, regulations, and standards (LORS) relevant to traffic and transportation activities.

Information sources include data collected from the California Department of Transportation (Caltrans) traffic count database; field review and observations; and communications with local, regional, and federal agencies. URS staff performed reconnaissance on February 26, 2008, for a former candidate site that is near the Project Site to document roadway characteristics, identify physical constraints, and assess general traffic conditions. Additional field reconnaissance to update previously obtained data was conducted on February 1, 2012. New traffic counts for the 25 study intersections were collected in February 2012.

5.10.1 Affected Environment

5.10.1.1 Regional Setting

The affected environment relative to the Project Site is discussed in both a regional and local context. The regional setting includes the existing and planned public and private roads, rail lines, and pipelines considered in the transportation impact analysis. Figure 5.10-1, Regional Vicinity, depicts the affected environment as discussed below and illustrates the relationship of the Project to local and major roads and highways in the study area. Figure 5.10-2, Transportation Setting of the Local Project Area and Affected Roadways, depicts the location of the study area.

The following plans and programs describe the framework for managing the transportation resources in the study area.

Kern Council of Governments' Regional Transportation Plan

Kern County's Regional Transportation Plan (RTP), also known as Destination 2030, is a planning guide projecting the following in the next 24-year period: (1) transportation and air quality goals; (2) policies and actions for now and into the future; and (3) programs and projects for congestion management, transit, airports, bicycles, pedestrians, roadways, and freight.

Key functions and roles of the RTP are further summarized below:

- Provide a discussion of all mechanisms used to finance transportation and air quality program implementation.

- Provide a multi-modal plan representing Kern Council of Governments' (COG) vision for a better transportation system to the planning horizon of 2030.

- Provide the basic policy and program framework for long-term investment in a vast regional transportation system in a coordinated, cooperative, and continuous manner.

- Provide a regional long-range and comprehensive plan that coordinates local transportation plans for all communities within the Kern County region.

Kern County Airport Land Use Compatibility Plan

Kern County has adopted an Airport Land Use Compatibility Plan (ALUCP) and alternative process to comply with the State Aeronautics Act (Public Utilities Code commencing with Section 21670). Pursuant to Public Resources Code Section 21675, in each county containing a public use airport, an Airport Land Use Commission (ALUC) is required to assist local agencies in ensuring compatible land uses in the vicinity of existing or proposed airports; to coordinate planning at state, regional, and local levels; to prepare and adopt an airport land use plan; to review plans, regulations, or locations of agencies and airport operators; and to review and make recommendations regarding the land uses, building heights, and other issues relating to air navigation safety and promotion of air commerce.

Kern County is designated as the agency responsible for carrying out functions of the Kern County ALUC. The Airport Land Use Policy Plan of the Kern County ALUC provides the criteria for evaluating land-use compatibility between proposed development in the vicinity of the county's public-use general aviation airport facilities. The Kern County ALUCP (Figure 9—Circulation Element Kern Region Airports) covers a total of 14 public-use airports, 3 private airports, and 2 military airports. There are five public airport facilities within the immediate vicinity of the Project Site:

- **Elk Hills–Buttonwillow Airport.** Approximately 26,400 feet (5 miles) northwest of the Project Site.
- **Taft Airport.** Approximately 63,360 feet (12 miles) southwest of the Project Site.
- **Minter Field.** Approximately 89,760 feet (17 miles) northeast of the Project Site.
- **Meadows Field.** Approximately 105,600 feet (20 miles) northeast of the Project Site.
- **Bakersfield Municipal.** Approximately 110,880 feet (21 miles) east of the Project Site.

A landing strip is shown on the northwest quadrant of the Project Site in topographic maps; however, this landing strip was private, is no longer used, and will be removed upon purchase of the property for the Project Site.

Kern County General Plan Circulation Element

The authority and purpose of the Kern County General Plan Circulation Element is quoted in its entirety below:

> State of California Government Code 65302(b) includes requirements and authority for the Circulation Element. The Circulation Element is one of seven mandated elements each local government must maintain in its general plan.
>
> The general plan shall include a Circulation Element consisting of the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, and other local public utilities and facilities, all correlated with the Land Use Element of the plan.
>
> The purpose of a Circulation Element is to set up local Goals and guiding Policies about building transportation improvements. A Circulation Element introduces planning tools

essential for achieving the local transportation Goals and Policies. Several California Court decisions have compelled local governments to make their Circulation Element consistent with the Land Use Element.

A Circulation Element consists of the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, and other local public utilities and facilities, all correlated with the Land Use Element of the plan.

City of Wasco General Plan Circulation Element

According to the City of Wasco General Plan Circulation Element, the City of Wasco intends to design their circulation systems to account for projected traffic volume and to maintain city-adopted LOS standards. Because the City of Wasco has not adopted significance criteria and performance levels, Kern County criteria are assumed to apply within the City of Wasco.

City of Shafter General Plan Transportation Program

According to the City of Shafter General Plan Transportation Program, the City of Shafter aims to maintain a roadway system that "operates at Level of Service C on a daily and peak hour basis except in the vicinity of freeway interchanges where Level of Service D is acceptable."

California Public Utilities Commission Rail Safety Action Plan

The proposed transportation and conveyance of feedstock via a dedicated rail facility may be subject to the CPUC Rail Safety Action Plan.

5.10.1.2 Highways and Roadways

The transportation network within the Project study area is composed of a mix of interstate, county highways, and local roadways. The circulation system plays a major role in the movement of farm products originating from the San Joaquin Valley, Kern County, and outlying agricultural communities that require access and rely on the state and county roadways.

As illustrated on Figure 5.10-1, Regional Vicinity, the Project study area is primarily served by Interstate 5 (I-5) to the east. The majority of the existing roadways serving the Project are relatively straight, and the terrain is flat to moderate, with adequate sight distance in both directions.

Regional Roadway Facilities

Interstate 5. I-5 is a major north-south interstate freeway through the Central Valley and the length of California, extending north from San Diego County toward the states of Oregon and Washington. Located approximately 4 miles east of the Project Site, I-5 provides two mainline lanes in each direction with wide shoulders and a center median. I-5 has separate acceleration/ deceleration lanes at the interchange of I-5/State Route (SR) 119, I-5/Stockdale Highway, and I-5/SR 58. It is posted at 70 miles per hour (mph) for cars and 55 mph for trucks in the vicinity

of the Project. The annual average daily traffic (AADT) on the segment of I-5 in the study area is 31,000 vehicles per day, and the truck traffic percentile is 25 percent.

State Route 119. SR 119 is an east-west state highway located approximately 7 miles south of the Project Site that provides regional and emergency egress and workforce commute to the Project. SR 119 connects to State Route 99 (SR 99) on the east with State Route 33 (SR 33) on the west. It has a two-lane (one lane in each direction) cross section with an 8- to 12-foot shoulder on both sides. SR 119 is posted at 55 mph in the vicinity of the Project. The average daily traffic (ADT) on the roadway just west of the I-5 southbound ramps is 10,000 vehicles per day and the truck traffic percentile is 20 percent. As a proactive measure, the Project does not plan to use SR 119 as the primary access route during construction and operation activities; this measure will therefore minimize Project-added traffic through the unincorporated community of Tupman.

State Route 58. SR 58 is an east-west state highway located approximately 4 miles north of the Project Site. It is a two-lane highway posted at 55 mph. SR 58 is designated as a state truck route. It is a two-lane conventional state highway with 4- to 8-foot shoulders on flat terrain and moderate grades. The I-5 southbound ramp/SR 58 interchange is currently signalized. The ADT on the segment of SR 58 west of SR 43 is 6,900 vehicles per day, and the truck traffic percentile is 21 percent.

State Route 43. SR 43 is a north-south highway in Kern County approximately 7 miles from the Project Site. North of its intersection with Stockdale Highway, it is a two-lane road. SR 43 becomes Central Valley Highway in the city of Shafter, California, and widens to a four-lane undivided highway. North of Shafter, SR 43 becomes a four-lane divided highway with a 65 mph speed limit. In Kern County, SR 43 is a designated Terminal Access Truck Route. The ADT on the segment of SR 43 north of Stockdale Highway is 9,000 vehicles per day, and the truck traffic percentile is 21 percent.

Local Roadway Facilities

The primary local north-south roadways near the vicinity of the Project include Tupman Road, Dairy Road, and Morris Road. Station Road and Adohr Road provide local east-west access adjacent to and north of the Project Site. In consultation with the Kern County Roads Department, the traffic analysis will focus on the a.m. and p.m. peak hour intersection operations, as illustrated on Figure 5.10-3, Existing Traffic Volumes (a.m./p.m. Peak). The local roadway characteristics are briefly described below. Figure 5.10-4, Existing Intersection Geometrics, shows the roadway circulation network and intersection lane configurations in the Project vicinity.

Stockdale Highway. Stockdale Highway is an east-west highway 1 mile north of the Project Site. It starts near Wasco Way on the west and continues to the east through metropolitan Bakersfield. An unsignalized freeway interchange provides connection to I-5. The segment of Stockdale Highway in the vicinity of the Project Site has two through lanes (one lane in each direction) with no shoulders. The roadway segment is relatively straight and the terrain is flat with good sight distance in both directions. The speed limit on Stockdale Highway is currently 55 mph in the vicinity of the Project Site.

Tupman Road. Tupman Road is a north-south, two-lane primary road adjacent to the eastern boundary of the Project Site. Tupman Road is classified as a collector road by the Kern County General Plan Circulation Element. Tupman Road starts at SR 119 on the south and ends at Adohr Road on the north. It has two through lanes (one in each direction) with 2-foot shoulders on both sides. The intersection of Tupman Road and SR 119 is unsignalized, with stop signs on Tupman Road. Heading north from SR 119, the terrain has a relatively flat to moderately rolling grade. Some segments have limited horizontal sight visibility to opposing traffic. The posted speed limit is 55 mph in the vicinity of the Project Site.

Station Road. Station Road is a two-lane, east-west local roadway. It starts at Tupman Road on the west and ends at Morris Road on the east. The intersection of Tupman Road and Station Road is controlled by a stop sign on Station Road. The roadway segment is relatively straight, and the terrain is flat with good sight distance in both directions.

Morris Road. Morris Road is a two-lane, north-south local roadway. It starts at Station Road on the south and ends at Stockdale Highway on the north. The intersection of Stockdale Highway and Morris Road is controlled by a stop sign on Morris Road. The roadway segment is relatively straight, and the terrain is flat with good sight distance in both directions.

Dairy Road. Dairy Road is a two-lane, north-south local roadway. It starts at Adohr Road on the south and ends at Stockdale Highway on the north. The intersection of Stockdale Highway and Dairy Road is controlled by a stop sign on Dairy Road. The roadway segment is relatively straight, and the terrain is flat with good sight distance in both directions.

Adohr Road. Adohr Road is a two-lane, east-west roadway and is classified as a major (arterial) highway by the Kern County General Plan Circulation Element. It starts at Freeborn Road on the west and ends at Tupman Road on the east. The roadway segment is relatively straight, and the terrain is flat with good sight distance in both directions.

9th Street. 9th Street is a two-lane, east-west street in Wasco, California, extending from H Street to J Street on the north side of Wasco Coal Terminal. The street is 55 feet wide, and parking is allowed on both sides of the street. The roadway segment is relatively straight, and the terrain is flat with good sight distance in both directions.

H Street. H Street is a two-lane, north-south street in Wasco, California, extending north from J Street on the west side of Wasco Coal Terminal. The street is 55 feet wide, and parking is allowed on both sides of the street. The roadway segment is relatively straight, and the terrain is flat with good sight distance in both directions.

J Street. J Street is a four-lane, north-south street in Wasco, California, extending from Poso Avenue on the east side of Wasco Coal Terminal. The street is 56 feet wide; no parking is allowed on either side of the street. Before it intersects with H Street, J Street narrows to one lane in each direction. The roadway segment is relatively straight, and the terrain is flat with good sight distance in both directions.

Wasco Avenue. Wasco Avenue is a two-lane, north-south street in Wasco, California. It extends from Poso Avenue to Kimberlina Road on the east side of the railroad tracks. North of Poso

Avenue, Wasco Avenue turns and becomes J Street. The roadway segment is relatively straight, and the terrain is flat with good sight distance in both directions.

Poso Avenue. Poso Avenue is a two-lane, east-west street in Wasco, California. It intersects SR 43 at an All Way STOP controlled intersection. Between SR 43 and Wasco Avenue there is an at-grade rail crossing with gates and flashing lights. The roadway segment is relatively straight, and the terrain is flat with good sight distance in both directions.

5.10.1.3 Railroads

The following railroad lines currently serve the Project study area:

- Both Burlington Northern Santa Fe (BNSF) and Union Pacific Railroad (UPRR) provide interstate and transcontinental connection and service. The railroad tracks are located east of I-5 and the Project Site.
- SJVRR provides local train connection to areas west of Bakersfield and I-5.
- AMTRAK California San Joaquin Route connects downtown Bakersfield to Sacramento and the Bay Area.
- Various short spur lines serve former and current commercial- and industrial-related operations in the area.

A key component of Alternative 1 will be a new rail spur that will be constructed to the Project Site to facilitate feedstock and equipment delivery as well as low-carbon nitrogen-based product and other product off-take. The rail spur will run approximately 5 miles from the SJVRR to the Project Site. Public and private at-grade crossings will be required. Several private crossings will be needed for farmers' access to crop lands and the irrigation canal. Irrigation piping and ditches will be relocated as required to maintain existing field irrigation.

5.10.1.4 Public Transportation

Kern Regional Transit. Kern Regional Transit provides transit service to the unincorporated communities of Buttonwillow, Lamont, Kern River Valley, Frazier Park, Rosamond, and Mojave. In addition, the county has agreements with several small cities to share the cost of providing transit service to county areas surrounding incorporated places (i.e., Delano, Ridgecrest, Shafter, Taft, Tehachapi, and Wasco).

5.10.1.5 Pipelines

A network of gas and oil production lines is currently in place within the Project study area. A new gas line will supply natural gas from an existing PG&E pipeline located north of the Project Site. In addition, two new water lines will supply process water and potable water from Buena Vista Water Storage District and West Kern Water District, respectively. A new pipeline will also supply CO_2 from the Project Site to the EHOF. The pipeline linear routes are shown on Figure 5.10-2, Transportation Setting of the Local Project Area and Affected Roadways.

5.10.1.6 Bicycle Routes and Pedestrian Circulation

No existing or planned bicycle facilities are within the immediate vicinity of the Project Site. The 2001 Kern County Bicycle Plan (Kern Council of Governments, 2001) describes the existing and planned bicycle facilities for the metropolitan Bakersfield area, Wasco, Taft, and other cities and communities in Kern County.

5.10.1.7 Level of Service Concept

LOS is identified through a letter designation and is an indicator of operating conditions on a roadway or at an intersection. LOS is defined in categories ranging from A to F (i.e., LOS A to LOS F). These categories can be viewed much like school grades, with A representing the best traffic flow conditions and F representing poor conditions. LOS A indicates free-flowing traffic, while LOS F indicates substantial congestion with stop-and-go traffic and long delays at intersections.

Table 5.10-1, Intersection Level of Service Description, describes the LOS performance designations for both signalized and unsignalized intersections.

5.10.1.8 Existing Traffic Conditions

As previously described, the Project will be located 1.5 miles northwest of the unincorporated community of Tupman. The regional vicinity map of the Project within the surrounding region is depicted on Figure 5.10-1, Regional Vicinity. The Project location, including major roads, local streets, and highways in the immediate vicinity of the Project, is illustrated on Figure 5.10-2, Transportation Setting of the Local Project Area and Affected Roadways. The existing traffic volumes in the vicinity of the Project are shown on Figure 5.10-3, Existing Traffic Volumes (a.m./p.m. peak). The existing geometric configuration of roadway segments and intersections in the vicinity of the Project Site is shown on Figure 5.10-4, Existing Intersection Geometrics. The existing traffic volumes are based on traffic counts collected by National Data Services (NDS) in February 2012. The intersection turning movement counts are included in Appendix R, Traffic Data.

Existing Intersection Level of Service

Table 5.10-2, Existing Intersection Levels of Service, presents results for peak hour intersection LOS and average vehicle delay under existing conditions. The LOS calculation worksheets are provided in Appendix R, Traffic Data. Figure 5.10-3, Existing Traffic Volumes (a.m./p.m. Peak), shows existing a.m. and p.m. peak-hour turning movement volumes at each study area intersection.

As shown in Table 5.10-2, Existing Intersection Levels of Service, all study intersections are currently operating at acceptable LOS C or better, with the exception of SR 119/Tupman Road, which is operating at LOS F during the p.m. peak hour.

5.10.2 Environmental Consequences

5.10.2.1 Significance Criteria

The Kern County California Environmental Quality Act (CEQA) Implementation Document and the Kern County Environmental Checklist provide seven significance criteria for evaluating a project's impact on transportation and traffic, of which two are relevant to the Project. The Project will have the potential to result in adverse impacts for the following two significance criteria:

1. Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections).

2. Exceed, either individually or cumulatively, an LOS standard established by the county congestion management agency or adopted county threshold for designated roads or highways. Specifically, would implementation of the project cause the LOS for roadways and/or intersections to decline below the following standards or further degrade already degraded segment(s)?

State Level of Service Standard

For Caltrans facilities (intersections, roadway segment, freeway segments, and freeway ramp junctions), a degradation in the level of service from an acceptable level (LOS C/D threshold or better) to an unacceptable level (LOS D, E, or F) is a significant impact. The Caltrans standard for state highways is LOS C-D.

County Facilities Level of Service Standard

The Kern County General Plan Circulation Element policies consider LOS D acceptable within the General Plan area for county-maintained roads.

5.10.2.2 Project Trip Generation and Distribution

Project Construction Trip Generation

During Project construction, the study area will experience short-term increases in traffic that are associated primarily with construction worker commute trips and material and equipment delivery trips. The traffic analysis evaluated the worst-case Project construction scenario by analyzing the peak month worker commute plus material and equipment delivery trips.

Construction Workers

The construction trade projections provided by the Project design engineer estimate that during the peak construction month approximately 2,500 workers will be working on site on a daily basis. The traffic analysis assumed that some workers would carpool and that one-third of the

worker vehicles would arrive during the morning peak hour (7:00 a.m. to 9:00 a.m.), and also assumed that all would depart during the evening peak hour (4:00 p.m. to 6:00 p.m.).

Truck Deliveries

The construction equipment and material delivery projections provided by the Project design engineer indicate that during the peak construction month, there will be 50 truck deliveries daily, a total that is equal to 100 daily one-way truck trips per day. These trips were subsequently converted into passenger car equivalent (PCE) trips at 3 PCE per truck (or 300 PCE trips). Even though truck deliveries will likely arrive and depart throughout the day, to represent the worst-case scenario the truck trips were conservatively assumed to occur during the morning peak hour. Additionally, the analysis assumed that there will be minimal deliveries during the evening peak hour (e.g., deliveries of time-critical equipment and materials and specialty loads).

Soil Fill Deliveries

During Project construction, soil fill materials will be imported to the Project Site. The soil fill material deliveries are assumed to originate from local sources. The soil fill projections provided by the Project design engineer indicate that during the peak construction month, there will be on average 160 truck deliveries daily, or 320 one-way daily truck trips per day. As with the truck delivery trips described above, these trips were subsequently converted into PCE trips at 3 PCE per truck (or 960 trips). Specific details of the soil fill delivery assumptions are described in greater detail in the footnotes of Table 5.10-3, Anticipated Project Construction Trip Generation. See Section 5.9, Soils, regarding the local borrow pit site.

The Project construction trip generation data in Table 5.10-3, Anticipated Project Construction Trip Generation, show the trips that would be generated by construction personnel, by construction equipment and material delivery trucks, and by soil fill delivery trucks.

Project Operations Trip Generation

During Project operations, the Project study area will experience increases in traffic associated primarily with operation worker commute trips, feedstock deliveries, process materials and products truck trips, and operation and maintenance (O&M) trips.

Operations

According to the Project design engineer, during Project operations each shift normally consists of one shift supervisor, three inside operators, and seven outside operators. A number of maintenance workers and supervisors may be on site during the day shift, and fewer maintenance personnel would be on site during the off-hour shifts. Workers on site, other than the O&M personnel, are not expected to make frequent routine trips to the Project Site.

To evaluate the worst-case scenario, these vehicle trips were assumed to arrive during the morning peak period (7:00 a.m. to 9:00 a.m.) and to depart during the evening peak period (4:00 p.m. to 6:00 p.m.).

Deliveries

To sustain and support Project operations, regular deliveries of feedstock, O&M supplies, and shipments of product off site are anticipated at the Project Site. Delivery trips will likely arrive and depart throughout the day. The Project operations traffic impact analysis evaluated two alternatives for transporting coal: Alternative 1 (rail) and Alternative 2 (truck). The respective alternatives are presented in Table 5.10-4 and Table 5.10-5.

Project Trip Distribution

Trip Distribution and Assignment

Consistent with the information presented in Section 5.8, Socioeconomics and Environmental Justice, it is assumed that the majority of workers will come from metropolitan Bakersfield and adjoining communities. It is anticipated that construction and operation staff will be originating from the geographical area shown in Table 5.10-6, Workforce and Material Distribution.

5.10.2.3 Planned Roadway and Circulation Improvements

Based on information shared by Caltrans staff, there are no applicable roadway and circulation improvements to be considered at this time and during the course of the Project construction for inclusion in the traffic analysis scenarios conducted for this Project. Recent applicable improvements along SR 119 were incorporated in the existing conditions discussion of this report. Additional consultation with the Kern County Roads Department confirmed that there are no anticipated roadway and circulation improvements within the Project study area.

5.10.2.4 Future Baseline Traffic Projections

Based on consultation with the Kern County Roads Department and on information from the Planning Department staff, no significant cumulative projects were identified within the immediate vicinity of the Project that could potentially contribute cumulative added trips.

Consistent with the Kern County Roads Department requirements and data from recently conducted traffic studies, an annual ambient traffic growth of 2 percent was used to establish No Project baselines for Year 2016 Construction and Year 2017 Project Operations analysis scenarios. This assumption is conservative and will adequately account for any unforeseen traffic growth or development occurring during the aforementioned future traffic analysis scenarios.

Both the Years 2016 and 2017 No Project traffic conditions shown on Figures 5.10-5 and 5.10-7, were derived by applying the 2 percent annual growth rate per year to existing traffic volumes.

5.10.2.5 Project Impacts

Construction of the Project will result in a temporary increase in traffic associated with the movement of construction vehicles, equipment, and personnel on the transportation network serving the study area. Where warranted, the Project will use proper signs and traffic control

measures in accordance with Caltrans and Kern County requirements during the construction period. The Project will also coordinate construction activities with appropriate Caltrans, California Highway Patrol (CHP) and Kern County departments, and other jurisdictions to maintain traffic flow and safety, including the transport of oversized and overweight loads on state and county roadways.

Operation of the Project will result in the addition of traffic associated with employees, feedstock deliveries, and O&M trips serving the Project.

The key concern of Kern County Roads Department staff regarding the Project is the structural integrity of the local roadways to handle construction and operations traffic, specifically heavy construction equipment and feedstock deliveries during Project operations. Both Project construction and operation scenarios are discussed in detail below as they relate to potential traffic and transportation effects in the study area.

Project Construction Impacts

Project construction is expected to start in 2013 and to be completed in late 2016 with varying levels of manpower, construction delivery, and equipment use. The majority of Project construction activities are expected to occur during normal daytime work hours. Possible exceptions may include limited night construction activities that are considered time-critical or continuous in nature (such as concrete pours), and that may require extension of work hours based on inherent process requirements or material-driven characteristics. These nighttime construction activities are considered non-recurring events that would generate a minimal number of trips, retain a small number of workers on site, and would likely have a minimal effect on evening peak hour traffic. Therefore, nighttime work is anticipated to be a non-critical trip generation factor in the Project construction phase, with no significant effects.

During Project construction, the local roadways adjacent to the Project Site could potentially be subjected to heavy loads from material delivery carriers that would also need wider turning radii at the local intersections near the Project Site. HECA will work and coordinate with the Kern County Roads Department to remedy potential pavement deterioration associated with heavy loadings, improve the local intersections to facilitate traffic flow via the introduction of dedicated turn lanes, and improve the turn radius at the affected intersections. The design and implementation of these proposed improvements will be subject to the Kern County Roads Department oversight and standards. These proactive mitigation measures are discussed in Section 5.10.4, TRA-1 Roadway Improvements and TRA-2 Intersection Improvements for Dairy Road/Stockdale Highway and Dairy Road/Adohr Road intersections.

The aforementioned proactive measures will also continue to benefit the Project during operations, ensuring more efficient traffic circulation and movement of feedstock material deliveries and of operations and maintenance trips to and from the Project Site.

During the Project construction, small quantities of hazardous materials will be delivered, and construction waste products will be hauled from the Project Site. A more detailed discussion on Project handling of hazardous materials and waste management is presented in Section 5.12, Hazardous Materials Handling, and Section 5.13, Waste Management, respectively. All applicable LORS will be observed during the course of Project construction.

Intersection Level of Service During Project Construction

Table 5.10-7, Peak-Hour Intersection LOS—Year 2016 No Project Conditions, presents peak hour intersection LOS and average vehicle delay results under Year 2016 No Project conditions. The intersection LOS presented in Table 5.10-7 is the baseline for which Project construction impacts were evaluated. The LOS calculation worksheets are provided in Appendix R, Traffic Data. Figure 5.10-5, Year 2016 No Project Traffic Volumes, shows Year 2016 No Project morning and evening peak-hour turning-movement volumes at each study area intersection.

As shown in Table 5.10-7, Peak-Hour Intersection LOS—Year 2016 No Project Conditions, all study intersections are forecast to operate at LOS C or better with the exception of SR 43/ Stockdale Highway and SR 119/Tupman Road which operate at LOS E and F, respectively, during the evening peak hour.

Table 5.10-8, Peak-Hour Intersection LOS—Year 2016 Project Construction Conditions, presents the peak-hour intersection LOS and average vehicle delay results under Year 2016 Project Construction conditions for both Project Alternatives 1 and 2. The LOS calculation worksheets are provided in Appendix R, Traffic Data. Figure 5.10-6, Year 2016 No Project Traffic Plus Project Construction Traffic Volumes, shows Year 2016 Project construction conditions for morning and evening peak-hour turning-movement volumes at each study area intersection.

As shown in Table 5.10-8 the following intersections will be significantly impacted by Project construction activities.

- **SR 43/Stockdale Highway.** Will be significantly impacted during the p.m. peak hour when LOS E without Project construction becomes LOS F with Project construction.

- **SR 119/Tupman Road.** Will be significantly impacted during the p.m. peak hour when LOS F without Project construction remains LOS F with Project construction, but the increase in delay exceeds the reporting range.

The proposed mitigation measures for the aforementioned construction traffic impacts are discussed in Section 5.10.4.

Project Operations Impacts

The Project is expected to be in full operation by Year 2017. During the operations of the Project, a fulltime employee workforce will oversee Project O&M. There will be regular deliveries of feedstock to sustain Project operations. Occasional delivery- and maintenance-related trips are anticipated as part of normal Project operations. During Project operations, small quantities of hazardous materials will be delivered and products will be shipped from the Project Site. More detailed discussions on Project handling of hazardous materials and on waste management are presented in Section 5.12, Hazardous Materials Handling, and Section 5.13, Waste Management, respectively.

The following sections describe the operational effects of the Project.

Intersection Level of Service during Project Operations

Table 5.10-9, Peak-Hour Intersection LOS, Year 2017 No Project Conditions, presents peak-hour intersection LOS and average vehicle delay under Year 2017 No Project conditions. The intersection LOS presented in Table 5.10-9 is the baseline for which Project operations impacts were evaluated. The LOS calculation worksheets are provided in Appendix R, Traffic Data. Figure 5.10-7, Year 2017 No Project Traffic Volumes, shows Year 2017 No Project conditions for morning and evening peak-hour turning-movement volumes for each traffic study area intersection.

As shown in Table 5.10-9, Peak-Hour Intersection LOS, Year 2017 No Project Conditions, all study intersections are forecast to operate at LOS C or better with the exception of SR 43/ Stockdale Highway and SR 119/Tupman Road, which operate at unacceptable LOS E and F, respectively, during the evening peak-hour.

The above finding does not include the proposed construction mitigation of providing traffic signals at the two impacted intersections (SR 43/Stockdale Highway and SR 119/Tupman Road).

Alternative 1 Project Operations

Table 5.10-10 presents the peak-hour intersection LOS and average vehicle delay results under Year 2017 Project Operations Conditions for Project Alternative 1. The LOS results shown in Table 5.10-10 include the incorporation of the mitigation for the construction traffic impacts at SR 43/Stockdale Highway and SR 119/Tupman Road, which is discussed in greater detail in Section 5.10.4. The LOS calculation worksheets are provided in Appendix R, Traffic Data.

Figure 5.10-8, Year 2017 No Project Traffic Plus Project Operations Traffic Volumes – Alternative 1, shows Year 2017 Project operations morning and evening peak-hour turning-movement volumes for each study area intersection.

As shown in Table 5.10-10, all traffic study area intersections are forecast at LOS D or better under Year 2017 Project operations conditions for Alternative 1.

It must be noted that during Project operations, the intersection of SR 43/Stockdale Highway would operate at LOS B (a.m.) and LOS F (p.m.), and the intersection of SR 119/Tupman Road would operate at LOS C (a.m.) and LOS F (p.m.), without any mitigation measures. Nevertheless, the traffic signals that will be installed for construction impact mitigation (see Mitigation Measure TRA-3) will remain during operations. Based on these findings, no significant traffic effects would occur at the traffic study area intersections during Project operations.

Alternative 2 Project Operations

Table 5.10-11 presents peak-hour intersection LOS and average vehicle delay results under Year 2017 Project operations conditions under Project Alternative 2—Truck Option. The LOS results shown in Table 5.10-10 include the incorporation of the mitigation for the construction traffic impacts at SR 43/Stockdale Highway and SR 119/Tupman Road, which is discussed in greater

detail in Section 5.10.4. The LOS calculation worksheets are provided in Appendix R, Traffic Data.

Figure 5.10-9, Year 2017 No Project Traffic Plus Project Operations Traffic Volumes – Alternative 2, shows Year 2017 Project operations morning and evening peak-hour turning-movement volumes for each study area intersection.

As shown in Table 5.10-11, all traffic study area intersections are forecast at LOS D or better under Year 2017 Project operations for Alternative 2—Truck Option.

It must be noted that during Project operations, the intersection of SR 43/Stockdale Highway would operate at LOS C (a.m.) and LOS F (p.m.), and the intersection of SR 119/Tupman Road would operate at LOS C (a.m.) and LOS F (p.m.), without any mitigation measures. Nevertheless, the traffic signals that will be installed for construction impact mitigation (see Mitigation Measure TRA-3) will remain during operations. Based on these findings, no significant traffic effects would occur at the traffic study area intersections during Project operations.

5.10.2.6 Project Impact Summary

Project Construction Traffic Impacts on Roadways

The roadways that will experience a short-term increase in traffic due to construction worker commute trips and truck deliveries will be Stockdale Highway, I-5, SR 43 (Enos Lane), SR 119 (Taft Highway), and Tupman Road. Additionally, some construction traffic will seek alternative routes to enter and leave the Project Site during peak construction activity. During Project construction, some roadways could be subjected to loads beyond their current use as local or farm access roads. In consultation with the Kern County Roads Department, county engineers will conduct pavement evaluations to ascertain the loading characteristics of these roadways. When this report was prepared, the results of the pavement evaluations had not yet been provided to URS. However, with the implementation of mitigation measures discussed in Section 5.10.4, below, impacts on roadway loading during construction would be reduced to less-than-significant levels.

Project Construction Traffic Impacts on Intersections

The results of the intersection LOS analysis shown in Table 5.10-8 indicate that two study intersections would operate at LOS E or F under Year 2016 Project construction conditions. The following intersections will be significantly affected by Project construction activities.

- **SR 43/Stockdale Highway.** Will be significantly impacted during the p.m. peak hour when LOS E without Project construction becomes LOS F with Project construction.

- **SR 119/Tupman Road.** Will be significantly impacted during the p.m. peak hour when LOS F without Project construction remains LOS F with Project construction, but the increase in delay exceeds the reporting range.

However, with the implementation of mitigation measures discussed in Section 5.10.4 below, impacts on all intersections during construction would be reduced to less-than-significant levels.

Project Operations Traffic Impacts on Roadways

Similar to construction conditions, the roadways that will experience Project operational traffic will be Stockdale Highway, I-5, SR 43 (Enos Lane), SR 119 (Taft Highway), and Tupman Road under both Project Alternatives 1 and 2 operations.

The projected added trips from operational workers, feedstock and maintenance deliveries, and visitors along the local roadways could potentially contribute to roadway wear-and-tear due to Project operational trips. However, with the implementation of mitigation measures discussed in Section 5.10.4, below, impacts on roadway wear-and-tear during operations would be reduced to less-than-significant levels.

Project Operations Traffic Impacts on Intersections

The results of the intersection LOS analysis for Project Alternative 1 and Alternative 2, shown in Table 5.10-10 and Table 5.10-11 respectively, indicate that all study intersections would operate at an acceptable LOS D or better during both morning and evening peak hours.

Based on these findings, no significant traffic effects would occur at the traffic study intersections during both Project Alternative 1 and Alternative 2 operations.

5.10.2.7 OEHI Project

An analysis of the potential of the OEHI Project to impact traffic is included in Appendix A-1, Section 4.15, Transportation and Traffic, and Appendix A-2, Section 2.10, Traffic and Transportation, of this AFC Amendment. Appendix A concludes that with implementation of recommended mitigation measures, the OEHI Project will not have significant adverse impacts to transportation or traffic.

5.10.3 Cumulative Impacts Analyses

Under certain circumstances, CEQA requires consideration of a project's cumulative impacts (CEQA Guidelines Section 15130). A "cumulative impact" consists of an impact which is created as a result of the combination of the project under review together with other projects causing related impacts (CEQA Guidelines Section 15355). CEQA requires a discussion of the cumulative impacts of a project when the project's incremental effect is cumulatively considerable (CEQA Guidelines Section 15130[a]). "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines Section 15065 [a][3]).

When the combined cumulative impact associated with a project's incremental effect and the effects of other projects is not significant, further discussion of the cumulative impact is not necessary (CEQA Guidelines Section 15130[a]). It is also possible that a project's contribution

to a significant cumulative impact is less than cumulatively considerable and thus not significant (CEQA Guidelines Section 15130[a]).

The discussion of cumulative impacts should reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great a level of detail as is provided for the effects attributable to the project under consideration (CEQA Guidelines Section 15130[b]). The discussion should be guided by standards of practicality and reasonableness (CEQA Guidelines Section 15130[b]).

A cumulative impact analysis starts with a list of past, present, and probable future projects within a defined geographical scope with the potential to produce related or cumulative impacts (CEQA Guidelines Section 15130[b]). Factors to consider when determining whether to include a related project include the nature of the environmental resource being examined, the location of the project, and its type (CEQA Guidelines Section 15130[b]). For purposes of this AFC Amendment, Kern County was contacted to obtain a list of related projects, which is contained in Appendix I. Depending on its location and type, not every project on this list is necessarily relevant to the cumulative impact analysis for each environmental topic.

Based on information provided by Kern County Roads Department staff, the Project's construction traffic would not coincide with any potential future project within the study area, so the Project's contribution to cumulative traffic impacts during construction would not be cumulatively considerable, and cumulative impacts of the Project would therefore be less than significant.

In addition, of the projects identified in Appendix I, only one project (a proposed dairy farm) is expected to occur within the traffic study area. The generally low trip-generation potential of dairy farming operations is not expected to contribute to a cumulative Project impact. As an added note, the dairy project has been on the cumulative project list for over 3 years.

The results of the traffic analysis showed that the Project's construction and operational traffic, combined with future ambient traffic growth, will not be cumulatively considerable, and cumulative impacts of the Project would therefore be less than significant.

Based on the above findings, it is expected that the Project will not result in cumulative construction and operational Project impacts.

An analysis of the potential of the OEHI Project to impact traffic is included in Appendix A-1, Section 4.15, Transportation and Traffic, and Appendix A-2, Section 2.10, Traffic and Transportation, of this AFC Amendment. Appendix A concludes that with implementation of recommended mitigation measures, the OEHI Project will not have significant adverse cumulative impacts to transportation or traffic.

5.10.4 Mitigation Measures

The following mitigation measures will be implemented by the Project Applicant.

5.10.4.1 Project Construction Mitigations

During Project construction, the following locations would potentially require improvements or mitigation:

- **Local roadways.** Would potentially be subjected to heavy loads.
- **SR 43/Stockdale Highway.** Will be significantly impacted during the p.m. peak hour when LOS E without Project construction becomes LOS F with Project construction.
- **SR 119/Tupman Road.** Will be significantly impacted during the p.m. peak hour when LOS F without Project construction remains LOS F with Project construction, but increases delay.

Specific details of the proposed mitigation measures are described below.

Mitigation Measures

The following proposed mitigation measures will be offered proactively to address Project-related activities during construction.

TRA-1 Roadway Improvements. The Project Applicant will coordinate with Kern County to identify and construct roadway improvements, if needed, to support construction traffic to ensure that roadway impacts are less than significant.

TRA-2 Intersection Improvements. The Project Applicant will coordinate with Kern County and Caltrans to identify and construct intersection improvements needed to support construction traffic so that intersection impacts are reduced to less-than-significant levels. The following intersections will require improvements:

- **Intersection of SR 43 (Enos Lane) and Stockdale Highway.** Signalization of the current 4-way-stop intersection would improve p.m. peak hour LOS F conditions to LOS B conditions during Project construction, thereby mitigating a significant Project construction traffic impact. A traffic signal warrant analysis was conducted to determine the need for a traffic signal. The result of the analysis shows that signalization is warranted. The peak-hour traffic-signal warrant sheet is included in Appendix R, Traffic Data.
- **Intersection of SR 119 and Tupman Road.** Signalization of the current 2-way-stop intersection would improve p.m. peak-hour LOS F conditions to LOS D conditions during Project construction, thereby mitigating a significant Project construction traffic impact. A traffic-signal warrant analysis was conducted to determine the need for a traffic signal. The result of the analysis shows that signalization is warranted. The peak-hour traffic-signal warrant sheet is included in Appendix R, Traffic Data.
- **Intersection of Dairy Road and Stockdale Highway.** Construct a separate left-turn lane on the westbound approach of Stockdale Highway, and construct a separate right-turn lane on

the northbound approach of Dairy Road. This improvement will facilitate the safe and efficient movement of construction and operations vehicles to and from the Project Site.

- **Dairy Road/Adohr Road:** Reconstruct the intersection to accommodate the turning radius needed by large trucks to make the turns. This improvement will facilitate the safe and efficient movement of construction and operations vehicles to and from the Project Site.

TRA-3 Traffic Control Measures. Use proper signs and traffic control measures in accordance with Caltrans and county requirements. All traffic signs, equipment, and control measures shall conform to the provisions specified in the Manual of Uniform Traffic Control Device (MUTCD), California Edition.

TRA-4 Lane Closures. Schedule potential traffic lane or road closures during off-peak hours whenever possible.

TRA-5 Limit Construction Traffic. Limit vehicular traffic to designated access roads, construction laydown and worker parking areas, and the Project construction site.

TRA-6 Implement Transportation Demand Management Measures (TDM). Encourage worker carpooling to minimize drive-alone worker trips. Provide incentives and develop a reward system to increase voluntary participation of various TDM measures.

Level of Significance after Mitigation

With the application of the mitigation measures described above, the impacted study intersections LOS and operational performance will improve reducing impacts to less-than-significant levels.

5.10.4.2 Project Operations Mitigation

Mitigation Measures

The following proposed mitigation measures will be offered proactively to address Project-related activities during operation. It must be noted that Project construction mitigation measure TRA-2 will also continue in place for the life of the Project:

TRA-7 Minimize Operations Traffic. Limit vehicular traffic to designated access roads. Encourage worker carpooling to minimize drive-alone worker trips.

Level of Significance after Mitigation

The study intersections are not significantly impacted based on the traffic impact threshold of significance; therefore, no mitigation is required to reduce impacts to less-than-significant levels. However, mitigation is proposed, as described above, to present a proactive approach to minimize operational traffic.

5.10.5 Laws, Ordinances, Regulations, and Standards

5.10.5.1 Federal

Title 49, Code of Federal Regulations (CFR), Parts 171-177. Governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.

The administering agencies for the above regulation are the CHP and the U.S. Department of Transportation (DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA).

The Project would conform to this law by requiring that shippers of hazardous materials use the required markings on their transportation vehicles.

Title 14, CFR, Section 77.13(2)(i). Requires an Applicant to notify the Federal Aviation Administration (FAA) of the construction of structures with a height (1) greater than 200 feet from grade or (2) greater than an imaginary surface extending outward and upward at a slope of 10 to 1 from the nearest point of the nearest runway of an airport with at least one runway more than 3,200 feet in length.

The administering agencies for the above regulation are the DOT and FAA.

The Project includes several structures taller than 200 feet. The Project's tallest structure, at 260 feet, is the CO_2 vent. FAA notification is required for all structures that exceed 200 feet (refer to Section 5.10.7, Permits Required and Permit Schedule—FAA Permit).

49 U.S.C. § 10501(b)(2). Preempts state regulatory authority over railroad operations.

49 U.S.C. § 10906. Precludes all regulation of industrial or spur tracks.

5.10.5.2 State

California Vehicle Code, Section 353. Defines hazardous materials as any substance, material, or device posing an unreasonable risk to health, safety, or property during transportation, as defined by regulations adopted pursuant to Section 2402.7.

The administering agency for the above statute is the CHP.

The Project would comply with these codes by continuing to classify all hazardous materials in accordance with their classification.

California Vehicle Code, Sections 2500-2505. Authorizes the Commissioner of Highway Patrol to issue licenses for the transportation of hazardous materials, including explosives.

The administering agency for the above statutes is the CHP.

The Project would comply with these codes by requiring that contractors and employees be properly licensed and endorsed when operating vehicles used to transport hazardous materials.

California Vehicle Code, Sections 13369, 15275, 15278. Addresses the licensing of drivers and the classification of license required for the operation of particular types of vehicles. Requires a commercial driver's license to operate commercial vehicles. Requires an endorsement issued by the Department of Motor Vehicles (DMV) to drive any commercial vehicle identified in Section 15278.

The administering agency for the above statutes is the DMV.

The Project would comply with these codes by requiring that contractors and employees be properly licensed and endorsed when operating such vehicles.

California Vehicle Code, Sections 31303-31309. Requires that the transportation of hazardous materials be on the state or interstate highway that offers the shortest overall transit time possible.

The administering agency for the above statutes is the CHP.

The Project would comply with this law by requiring that shippers of hazardous materials use the shortest route possible to and from the Project Site.

California Vehicle Code, Sections 31600-31620. Regulates the transportation of explosive materials.

The administering agency for the above statutes is the CHP.

It must be noted that the Project would not use explosive materials specifically defined in Section 12000 of the Health and Safety Code. However, the Project would comply with this law by requiring that shippers of other potentially explosive materials have the required licenses from the CHP.

California Vehicle Code, Sections 32000-32053. Authorizes the CHP to inspect and license motor carriers transporting hazardous materials of the type requiring placards.

The administering agency for the above regulation is the CHP.

The Project would comply with this law by requiring that motor carriers of hazardous materials be properly licensed by the CHP.

California Vehicle Code, Sections 32100-32109. Requires that shippers of inhalation hazards in bulk packaging comply with rigorous equipment standards, inspection requirements, and route restrictions.

The administering agency for the above regulation is the CHP.

If applicable, the Project would comply with this law by requiring shippers of these types of material to comply with all route restrictions, equipment standards, and inspection requirements.

California Vehicle Code, Sections 34000-34100. Establishes special requirements for vehicles having a cargo tank and for hazardous waste transport vehicles and containers, as defined in

Section 25167.4 of the Health and Safety Code. The commissioner shall provide for the establishment, operation, and enforcement of random on- and off-highway inspections of cargo tanks and hazardous waste transport vehicles and containers, and ensure that they are designed, constructed, and maintained in accordance with the regulations adopted by the commissioner pursuant to this code and Chapter 6.5 (commencing with Section 25100) of Division 20 of the Health and Safety Code.

The administering agency for the above regulation is the CHP.

The Project would comply with this law by requiring that shippers of hazardous materials maintain their hazardous material transport vehicles in a manner that ensures the vehicles will pass CHP inspections.

California Vehicle Code, Section 34500. Regulates the safe operation of vehicles, including those vehicles that are used for the transportation of hazardous materials.

The administering agency for the above regulation is the CHP.

The Project would comply with this law by requiring shippers of hazardous materials to have the necessary permits, inspections, and licenses issued by the CHP for the safe operation of the hazardous materials transport vehicles.

California Vehicle Code, Section 35550. Imposes weight guidelines and restrictions upon vehicles traveling on freeways and highways. The section holds that "a single axle load shall not exceed 20,000 pounds. The load on any one wheel or wheels supporting one end of an axle is limited to 10,500 pounds. The front steering axle load is limited to 12,500 pounds." Furthermore, California Vehicle Code Section 35551 defines the maximum overall gross weight as 80,000 pounds, and adds that "the gross weight of each set of tandem axles shall not exceed 34,000 pounds."

The administering agency for the above statute is Caltrans.

The Project would comply with this code by requiring compliance with weight restrictions and by requiring heavy haulers to obtain permits, if required, prior to delivery of any heavy haul load.

California Vehicle Code, Section 35780. Requires a Single-Trip Transportation Permit to transport oversized or excessive loads over state highways. The permit can be acquired through Caltrans.

The administering agency for the above statute is Caltrans.

The Project would comply with this code by requiring that heavy haulers obtain a Single-Trip Transportation Permit for oversized loads for each vehicle, prior to delivery of any oversized load.

California Streets and Highways Code, Section 117. Unless otherwise specifically provided in the instrument conveying title, the acquisition by the department of any right-of-way (ROW) over any real property for state highway purposes includes the right of the department to issue, under Chapter 3 (commencing with Section 660), permits for the location in the ROW of any

structures or fixtures necessary to telegraph, telephone, or electric power lines or of any ditches, pipes, drains, sewers, or underground structures.

The administering agency for the above statute is Caltrans.

If applicable, the Project would comply with this code by acquiring the necessary permits and approval from Caltrans with regard to use of public ROWs.

The California Streets and Highways Code, Sections 660, 670, 672, 1450, 1460, 1470, 1480, *et seq*. Defines highways and encroachment, and requires encroachment permits for projects involving excavation in state highways and county/city streets. This law is generally enforced at the local level.

The administering agencies for the above regulation are Caltrans, the Kern County Roads Department, and the City of Bakersfield Public Works Department.

The Project or its assigned contractors would apply for encroachment permits for any excavation in state and county roadways prior to construction.

California Health and Safety Code, Section 25160 *et seq*. Addresses the safe transport of hazardous wastes, requires a manifest for hazardous waste shipments, and requires a person who transports hazardous waste in a vehicle to have a valid registration issued by the Department of Toxic Substances Control (DTSC) in his or her possession while transporting the hazardous waste.

The administering agency for the above regulation is the DTSC.

The Project would comply with this law by requiring shippers of hazardous wastes to be properly licensed by the DTSC and hazardous waste transport vehicles to be in compliance with DTSC requirements.

California Manual on Uniform Traffic Control Devices, Section 6C.01. Requires a temporary traffic control plan to be provided for "continuity of function (movement of traffic, pedestrians, bicyclists, transit operations) and access to property/utilities" during any time the normal function of a roadway is suspended. Some important elements that cannot be conveniently shown in the plans will be incorporated in the Special Provisions of the temporary traffic control plan.

The administering agency for the above regulation is Caltrans and/or the Kern County Roads Department. If needed, the Applicant would file a temporary traffic control plan prior to the start of construction.

5.10.5.3 Local

Kern County General Plan

Circulation Element, 2.3 Highways, 2.3.3 Highway Plan, Policies. The goal of the General Plan is to provide a network of roadway systems for the county. The county requires new development to provide for local roads in areas where the traffic model estimates little growth through and beyond year 2010.

The administering agency for the above regulation is the Kern County Roads Department. If needed, the Applicant would build the necessary roadways to access the Project Site.

The applicable LORS related to traffic and transportation are summarized in Table 5.10-12, Summary of LORS—Traffic and Transportation.

City of Wasco General Plan

Circulation Element, 5.1 Street System, Goal 1, Policy 5. Established truck routes will be maintained. New truck routes should be limited to arterials and collectors.

The administering agency for the above regulation is the City of Wasco Public Department.

Project truck traffic will use only the city's designated truck routes or where permitted and allowed.

City of Shafter General Plan

Transportation Program, 3.2 Streets and Highways, Policy 1. Facilitate meeting the City's roadway performance objective through the implementation of the City's Circulation Plan.

The administering agency for the above regulation is the City of Shafter Public Works Department.

The Project is not anticipated to contribute to the deterioration of the City's roadway performance along the Project route.

Transportation Program, 3.3 Parking, Policy 1. Maintain an adequate parking supply.

The administering agency for the above regulation is the City of Shafter Public Works Department.

The Project is not anticipated to reduce or render inadequate the City's parking supply.

5.10.6 Involved Agencies and Agency Contacts

Table 5.10-13, Agency Contact List for LORS, provides agency contacts for traffic and transportation.

5.10.7 Permits Required and Permit Schedule

FAA Permit. FAA will be notified for structures exceeding 200 feet.

Encroachment Permit. Any connection to a county-maintained road is considered an encroachment. If a building permit involves the construction of a new driveway or improvement to an existing one, or the connection to utilities under the road, an encroachment permit will be required. Encroachment permits allow individuals, contractors, or utilities to do work within the public ROW. Permits are issued by the Kern County Roads Department Transportation and Encroachment Permit Division.

Pipeline permits are also issued as part of the encroachment permit process. Depending on road conditions, a determination is made as to whether a road may be open-cut or bored.

Transportation Permit. Required whenever the size or weight of a vehicle and/or load exceeds the maximums allowed by the California Vehicle Code. A transportation permit is written permission to move an oversized load on roads within Kern County's jurisdiction. A permit may be granted to a private company or an individual. Permits are issued by the Kern County Roads Department Transportation and Encroachment Permit Division. An applicant can apply for a single trip permit, or if qualified, for an annual blanket transportation permit.

Construction-Related Road Closures. Permits are issued when a road closure is necessary for public safety for any road construction. A detour plan is required as part of the permit application process.

Building Permit. Building permits issued within the jurisdiction of the county follow the Kern County Engineering and Survey Services Permit Process.

In addition to Kern County, Caltrans District 6, which has operational jurisdiction on I-5, SR 58, SR 119, and SR 33, also requires permits for work conducted within the state highway ROW. Table 5.10-14, Applicable Permits, shows the permits that need to be included.

5.10.8 References

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Kern County Planning Department, 2008. Telephone conversation with Mr. Randall Cates, Planner 2, Land Division Unit—Parcel Maps, Tract Maps, Lot Line Adjustments, Certificates Of Compliance, May 28, 2008, (661)862-8612

Kern County Roads Department, 2008. Telephone conversation and e-mail correspondence with Mr. Barry Nienke, P.E., Kern County Traffic Engineer, April 1, 3, 2008, (805)781-5252, email: barryn@co.kern.ca.us.

Kern County Roads Department, 2008. Telephone conversation and e-mail correspondence with Mr. Brian Blacklock, P.E., Kern County Roads Department, March to May, 2008, March 16, 2009, March 27, 2012 (661)862-8881, email: blacklockb@co.kern.ca.us.

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Transportation Research Board, 2000. *Highway Capacity Manual*.

Table 5.10-1
Intersection Level of Service Description

Description of Operation	Signalized Intersection Delay (seconds per vehicle)	Stop-Controlled Intersection Delay (seconds per vehicle)
LOS A describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	<10.0	<10.0
LOS B describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	10.1–20.0	10.1–15.0
LOS C describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	20.1–35.0	15.1–25.0
LOS D describes operations with high delay resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.	35.1–55.0	25.1–35.0
LOS E is considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.	55.1–80.0	35.1–50.0
LOS F describes a condition of excessively high delay; considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.	>80.0	>50.0

Source: HECA, 2012.
Notes:
< = less than
> = greater than
LOS = level of service

Table 5.10-2
Existing Intersection Levels of Service

Intersection	Control	Peak Hour (a.m.)		Peak Hour (p.m.)	
		Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-5 NB Ramp/Stockdale Highway	Unsignalized	8.8	A	11.5	B
2. I-5 SB Ramp/Stockdale Highway	Unsignalized	9.2	A	13.2	B
3. I-5 NB Ramp/SR 119	Unsignalized	11.2	A	17.7	C
4. I-5 SB Ramp/SR 119	Unsignalized	12.0	A	18.0	C
5. SR 119/SR 43	Signalized	25.3	C	23.0	C
6. SR 43/Stockdale Highway	Unsignalized	11.3	B	22.8	C
7. Stockdale Highway/Morris Road	Unsignalized	8.8	A	9.3	A
8. SR 119/Tupman Road	Unsignalized	19.3	C	65.4	F
9. Tupman Road/Grace Avenue	Unsignalized	7.0	A	7.0	A
10. Tupman Road/Station Road	Unsignalized	8.6	A	8.6	A
11. Dairy Road/Stockdale Highway	Unsignalized	8.7	A	10.4	B
12. Dairy Road/Adohr Road	Unsignalized	9.0	A	8.8	A
13. SR 43/Poso Avenue	Unsignalized	10.6	B	11.5	B
14. SR 43/Kimberlina Road	Signalized	23.8	C	20.9	C
15. SR 43/Shafter Avenue	Signalized	12.8	B	12.8	B
16. SR 43/Central Avenue	Signalized	9.0	A	10.4	B
17. SR 43/Lerdo Highway	Signalized	22.1	C	21.6	C
18. SR 43/7th Standard Road	Unsignalized	11.5	B	19.9	C
19. SR 43/SR 58 (Rosedale Hwy West)	Unsignalized	10.6	B	13.6	B
20. SR 43/SR 58 (Rosedale Hwy East)	Unsignalized	10.7	B	14.7	B
21. H Street/9th Street	Unsignalized	8.5	A	8.7	A
22. H Street/Wasco Avenue	Unsignalized	8.7	A	8.9	A
23. Wasco Avenue/Poso Avenue	Unsignalized	10.2	B	10.6	B
24. Wasco Avenue/Kimberlina Road	Unsignalized	10.2	B	10.2	B
25. J Street/9th Street	Unsignalized	8.5	A	8.6	A

Notes:
a.m./p.m. = morning/evening
I-5 = Interstate 5
LOS = level of service
NB = northbound
SB = southbound
sec/veh = seconds per vehicle
SR = State Route

Table 5.10-3
Anticipated Project Construction Trip Generation

Vehicle Type	Actual Vehicle Round Trips	Peak Daily Trips	Peak Hourly Trips (a.m.)			Peak Hourly Trips (p.m.)		
			Inbound	Outbound	Total	Inbound	Outbound	Total
Construction Worker Vehicles[1]	1,230	2,460	410	0	410	0	1,230	1,230
Truck Deliveries[2]	50	300	75	75	150	0	0	0
Soil Fill Deliveries[3]	160	960	48	48	96	0	0	0

Source: HECA, 2012.

Notes:

[1]. Note that 2.0 passenger occupancy per vehicle was assumed to account for the carpooling of approximately 2,461 workers conservatively analyzed during the peak construction month, yielding 1,230 vehicles for the construction workers. It was conservatively assumed that one-third of the worker vehicles will arrive during the a.m. (peak one hour between 7:00 to 9:00 a.m.) and all will leave during p.m. (peak one hour between 4:00 to 6:00 p.m.) peak hours.

[2]. Trucks deliveries shown in the table were adjusted into Passenger Car Equivalent (3 PCE) vehicles. The trip generation estimate was based on the average 24-hour and maximum 1-hour truck delivery trips during Project construction. There are 50 (average 24-hour) truck deliveries @ 3 PCE/truck = 150 PCE vehicles. Peak daily trips (including both the inbound and outbound trips) = 2 × 150 PCE vehicles = 300 PCE Trips. There are 25 (maximum 1-hour) truck deliveries @ 3 PCE/truck = 75 PCE vehicles. Therefore, peak hourly trips (assuming equal number of inbound and outbound trips) = 2 × 75 PCE vehicles = 150 PCE Trips. It was further assumed that there will no Project deliveries during the p.m. peak hour.

[3]. Average import fill delivery truck trips (at 18-cubic-yard capacity per truck), adjusted into PCE vehicles (3 PCE per truck). The trip generation estimate was based on the average 24-hour and 1-hour trips during Project construction site preparation. There are 160 (average 24-hour) truck deliveries @ 3 PCE/truck = 480 PCE vehicles. Peak daily trips (including both the inbound and outbound trips) = 2 × 480 PCE vehicles = 960 PCE Trips. There are 16 (average 1-hour) truck deliveries @ 3 PCE/truck = 48 PCE vehicles. Therefore, peak hourly trips (assuming equal number of inbound and outbound trips) = 2 × 48 PCE vehicles = 96 PCE Trips. It must be noted that applying the maximum number of fill material truck loads is not appropriate, as these trips are anticipated to decrease and taper off on the later months of the Project construction schedule. For construction analysis purposes, using the average number of fill material truck loads is very conservative when added to the peak construction workforce as well as construction material delivery trips as these peak construction activities overlap. Source data: HECA Project, 2012.

a.m. = morning
p.m. = evening

Table 5.10-4
Project Operations Trip Generation—Alternative 1, Train Option

Vehicle Type	Actual Vehicle Round Trips	Peak Daily Trips	Peak Hourly Trips (a.m.)			Peak Hourly Trips (p.m.)		
			Inbound	Outbound	Total	Inbound	Outbound	Total
Operations and Maintenance Trips[1]	154	308	110	0	110	22	132	154
Process Materials and Byproducts Trips[2, 3]	213	426	18	18	36	18	18	36
Feedstock Material Delivery Trips[3, 4]	165	330	15	15	30	15	15	30

Notes:
[1] Source: HECA, 2012.
[2] Total process materials and product truck trips, adjusted into Passenger Car Equivalent (PCE) vehicles (3 PCE per truck). The trip generation estimate is based on the maximum 24-hour and 1-hour trips during Project operation. There are 71 (maximum 24-hour) truck deliveries and shipments @ 3 PCE/truck = 213 PCE vehicles. Peak daily trips (including both the inbound and outbound trips) = 2 × 213 PCE vehicles = 426 PCE Trips. There are 6 (maximum 1-hr) truck deliveries and shipments @ 3 PCE/truck = 18 PCE vehicles. Therefore, peak hourly trips (assuming equal number of inbound and outbound trips) = 2 × 18 PCE vehicles = 36 PCE Trips.
[3] Source: HECA Project, 2012.
[4] Total feedstock material delivery truck trips (including petcoke and coal), adjusted into Passenger Car Equivalent vehicles (3 PCE per truck). The trip generation estimate is based on the maximum 24-hour and 1-hour trips during Project operation. There are 55 (maximum 24-hour) truck deliveries @ 3 PCE/truck = 165 PCE vehicles. Peak daily trips (including both the inbound and outbound trips) = 2 × 165 PCE vehicles = 330 PCE trips. There are 5 (maximum 1-hour) truck deliveries @ 3 PCE/truck = 15 PCE vehicles. Therefore, peak hourly trips (assuming equal number of inbound and outbound trips) = 2 × 15 PCE vehicles = 30 PCE trips. The feedstock trip assumption was based on the train delivery of coal and trucking of petcoke to the Project site.
a.m. = morning
p.m. = evening

Table 5.10-5
Project Operations Trip Generation—Alternative 2, Truck Option)

Vehicle Type	Actual Vehicle Round Trips	Peak Daily Trips	Peak Hourly Trips (a.m.)			Peak Hourly Trips (p.m.)		
			Inbound	Outbound	Total	Inbound	Outbound	Total
Operations and Maintenance Trips[1]	154	308	110	0	110	22	132	154
Process Materials and Byproducts Trips[2, 3]	399	798	36	36	72	36	36	72
Feedstock Material Delivery Trips[3, 4]	900	1,800	60	60	120	15	15	30

Notes:
[1] Source: HECA, 2012.
[2] Total process materials and products truck trips, adjusted into Passenger Car Equivalent (PCE) vehicles (3 PCE per truck). The trip generation estimate is based on the maximum 24-hour and 1-hour trips during Project operation. There are 133 (maximum 24-hour) truck deliveries and shipments @ 3 PCE/truck = 399 PCE vehicles. Peak daily trips (including both the inbound and outbound trips) = 2 × 399 PCE vehicles = 798 PCE trips. There are 12 (maximum 1-hour) truck deliveries and shipments @ 3 PCE/truck = 36 PCE vehicles. Therefore, peak hourly trips (assuming equal number of inbound and outbound trips) = 2 × 36 PCE vehicles = 72 PCE trips.
[3] Source: HECA Project, 2009.
[4] Total feedstock material delivery truck trips (including petcoke, and coal), adjusted into Passenger Car Equivalent vehicles (3 PCE per truck). The trip generation estimate is based on the maximum 24-hour and 1-hour trips during Project operation. There are 300 (maximum 24-hour) truck deliveries @ 3 PCE/truck = 900 PCE vehicles. Peak daily trips (including both the inbound and outbound trips) = 2 × 900 PCE vehicles = 1,800 PCE Trips. There are 20 (maximum 1-hour) truck deliveries @ 3 PCE/truck = 60 PCE vehicles. Therefore, peak hourly trips (assuming an equal number of inbound and outbound trips) = 2 × 60 PCE vehicles = 120 PCE trips. There will a break in coal trucking activities during the evening peak hour to minimize roadway conflicts with heavy vehicles; coal trucking activities will resume immediately after the peak evening traffic has dissipated.
a.m. = morning
p.m. = evening

Table 5.10-6
Workforce and Material Distribution

Origin of Vehicle Travel to Project Site	Construction Workforce (%)	Operation Workforce (%)	Material/Feedstock Petcoke (%)	Material/Feedstock Coal (%)
I-5 North (Kern County)	10	5	N/A	N/A
I-5 North (San Luis Obispo and Santa Barbara County)	N/A	N/A	45	N/A
I-5 South (Kern County)	8	5	N/A	N/A
I-5 South (Los Angeles County)	2	< 1	45	N/A
Stockdale Highway East (Metro Bakersfield)	35	50	5	N/A
SR 119 East (Metro Bakersfield)	30	25	5	N/A
SR 119 West (Taft and Buttonwillow)	5	5	N/A	N/A
SR 43 North (Wasco)[1]	5	5	N/A	100
Local (Tupman and others)	5	5	N/A	N/A

Source: HECA, 2012.
Notes:
[1] Coal will be transported via rail for Alternative 1 and via trucks for Alternative 2
% = percent
I-5 = Interstate 5
N/A = not applicable
SR = State Route

Table 5.10-7
Peak-Hour Intersection LOS—Year 2016 No Project Conditions

Intersection	Control	Peak Hour (a.m.)		Peak Hour (p.m.)	
		Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-5 NB Ramp/Stockdale Highway	Unsignalized	8.9	A	12.0	B
2. I-5 SB Ramp/Stockdale Highway	Unsignalized	9.3	A	14.3	B
3. I-5 NB Ramp/SR 119	Unsignalized	11.6	B	19.7	C
4. I-5 SB Ramp/SR 119	Unsignalized	12.5	B	20.4	C
5. SR 119/SR 43	Signalized	26.2	C	24.2	C
6. SR 43/Stockdale Highway	Unsignalized	12.5	B	36.4	E
7. Stockdale Highway/Morris Road	Unsignalized	8.8	A	9.5	A
8. SR 119/Tupman Road	Unsignalized	21.9	C	105.0	F
9. Tupman Road/Grace Avenue	Unsignalized	7.0	A	7.0	A
10. Tupman Road/Station Road	Unsignalized	8.7	A	8.6	A
11. Dairy Road/Stockdale Highway	Unsignalized	8.7	A	9.8	A
12. Dairy Road/Adohr Road	Unsignalized	9.0	A	8.9	A
13. SR 43/Poso Avenue	Unsignalized	11.2	B	12.4	B
14. SR 43/Kimberlina Road	Signalized	24.1	C	21.2	C
15. SR 43/Shafter Avenue	Signalized	12.9	B	13.2	B
16. SR 43/Central Avenue	Signalized	9.1	A	10.5	B
17. SR 43/Lerdo Highway	Signalized	22.3	C	21.8	C
18. SR 43/7th Standard Road	Unsignalized	12.4	B	27.5	D
19. SR 43/SR 58 (Rosedale Hwy West)	Unsignalized	11.3	B	15.4	C
20. SR 43/SR 58 (Rosedale Hwy East)	Unsignalized	11.3	B	17.2	C
21. H Street/9th Street	Unsignalized	8.6	A	8.7	A
22. H Street/Wasco Avenue	Unsignalized	8.7	A	9.0	A
23. Wasco Avenue/Poso Avenue	Unsignalized	10.4	B	10.8	B
24. Wasco Avenue/Kimberlina Road	Unsignalized	10.5	B	10.4	B
25. J Street/9th Street	Unsignalized	8.5	A	8.6	A

Notes:
a.m./p.m. = morning/evening
I-5 = Interstate 5
NB/SB = northbound/southbound
sec/veh = seconds per vehicle
SR = State Route

Table 5.10-8
Peak-Hour Intersection LOS—Year 2016 Project Construction Conditions
(Alternatives 1 and 2)

Intersection	Control	Peak Hour (a.m.)		Peak Hour (p.m.)	
		Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-5 NB Ramp/Stockdale Highway	Unsignalized	11.5	B	15.8	C
2. I-5 SB Ramp/Stockdale Highway	Unsignalized	10.8	B	32.4	D
3. I-5 NB Ramp/SR 119	Unsignalized	21.6	C	30.8	D
4. I-5 SB Ramp/SR 119	Unsignalized	14.0	B	34.7	D
5. SR 119/SR 43	Signalized	27.6	C	27.3	C
6. SR 43/Stockdale Highway	Unsignalized	15.9	C	142.2	F
7. Stockdale Highway/Morris Road	Unsignalized	10.7	B	13.5	B
8. SR 119/Tupman Road	Unsignalized	25.4	D	OVRFL	F
9. Tupman Road/Grace Avenue	Unsignalized	7.9	A	11.6	B
10. Tupman Road/Station Road	Unsignalized	9.4	A	14.5	B
11. Dairy Road/Stockdale Highway	Unsignalized	11.6	B	28.2	D
12. Dairy Road/Adohr Road	Unsignalized	16.2	C	14.1	B
13. SR 43/Poso Avenue	Unsignalized	11.4	B	13.0	B
14. SR 43/Kimberlina Road	Signalized	24.0	C	20.8	C
15. SR 43/Shafter Avenue	Signalized	12.8	B	13.2	B
16. SR 43/Central Avenue	Signalized	9.1	A	10.4	B
17. SR 43/Lerdo Highway	Signalized	22.2	C	22.1	C
18. SR 43/7th Standard Road	Unsignalized	12.6	B	33.0	D
19. SR 43/SR 58 (Rosedale Hwy West)	Unsignalized	11.7	B	21.8	C
20. SR 43/SR 58 (Rosedale Hwy East)	Unsignalized	11.7	B	32.2	D
21. H Street/9th Street	Unsignalized	8.6	A	8.7	A
22. H Street/Wasco Avenue	Unsignalized	8.7	A	9.0	A
23. Wasco Avenue/Poso Avenue	Unsignalized	10.4	B	10.8	B
24. Wasco Avenue/Kimberlina Road	Unsignalized	10.5	B	10.4	B
25. J Street/9th Street	Unsignalized	8.5	A	8.6	A

Notes:
a.m./p.m. = morning/evening
I-5 = Interstate 5
NB/SB = northbound/southbound
sec/veh = seconds per vehicle
SR = State Route
OVRFL = Overflow (seconds/vehicle delay exceeds reporting range)

Table 5.10-9
Peak-Hour Intersection LOS,
Year 2017 No Project Conditions

Intersection	Control	Peak Hour (a.m.)		Peak Hour (p.m.)	
		Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-5 NB Ramp/Stockdale Highway	Unsignalized	8.9	A	12.1	B
2. I-5 SB Ramp/Stockdale Highway	Unsignalized	9.3	A	14.6	B
3. I-5 NB Ramp/SR 119	Unsignalized	11.7	B	20.1	C
4. I-5 SB Ramp/SR 119	Unsignalized	12.6	B	21.0	C
5. SR 119/SR 43	Signalized	26.4	C	24.5	C
6. SR 43/Stockdale Highway	Unsignalized	12.8	B	40.9	E
7. Stockdale Highway/Morris Road	Unsignalized	8.8	A	9.5	A
8. SR 119/Tupman Road	Unsignalized	22.5	C	117.7	F
9. Tupman Road/Grace Avenue	Unsignalized	7.0	A	7.0	A
10. Tupman Road/Station Road	Unsignalized	8.7	A	8.6	A
11. Dairy Road/Stockdale Highway	Unsignalized	8.7	A	9.8	A
12. Dairy Road/Adohr Road	Unsignalized	9.0	A	8.9	A
13. SR 43/Poso Avenue	Unsignalized	11.3	B	12.6	B
14. SR 43/Kimberlina Road	Signalized	24.1	C	21.2	C
15. SR 43/Shafter Avenue	Signalized	13.0	B	13.3	B
16. SR 43/Central Avenue	Signalized	9.1	A	10.5	B
17. SR 43/Lerdo Highway	Signalized	22.4	C	21.9	C
18. SR 43/7th Standard Road	Unsignalized	12.6	B	29.7	D
19. SR 43/SR 58 (Rosedale Hwy West)	Unsignalized	11.4	B	15.8	C
20. SR 43/SR 58 (Rosedale Hwy East)	Unsignalized	11.5	B	17.9	C
21. H Street/9th Street	Unsignalized	8.6	A	8.8	A
22. H Street/Wasco Avenue	Unsignalized	8.7	A	9.0	A
23. Wasco Avenue/Poso Avenue	Unsignalized	10.4	B	10.9	B
24. Wasco Avenue/Kimberlina Road	Unsignalized	10.5	B	10.5	B
25. J Street/9th Street	Unsignalized	8.5	A	8.6	A

Notes:
a.m./p.m. = morning/evening
I-5 = Interstate 5
NB/SB = northbound/southbound
sec/veh = seconds per vehicle
SR = State Route

Table 5.10-10
Peak-Hour Intersection LOS,
Year 2017 Project Operations Conditions—Alternative 1

Intersection	Control	Peak Hour (a.m.)		Peak Hour (p.m.)	
		Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-5 NB Ramp/Stockdale Highway	Unsignalized	9.7	A	14.2	B
2. I-5 SB Ramp/Stockdale Highway	Unsignalized	9.7	A	17.8	C
3. I-5 NB Ramp/SR 119	Unsignalized	12.2	B	21.2	C
4. I-5 SB Ramp/SR 119	Unsignalized	13.0	B	22.5	C
5. SR 119/SR 43	Signalized	26.8	C	24.6	C
6. SR 43/Stockdale Highway	Signalized[1]	18.7	B	21.2	B
7. Stockdale Highway/Morris Road	Unsignalized	9.7	A	10.2	B
8. SR 119/Tupman Road	Signalized[1]	2.9	A	9.4	A
9. Tupman Road/Grace Avenue	Unsignalized	7.2	A	7.2	A
10. Tupman Road/Station Road	Unsignalized	9.5	A	10.3	B
11. Dairy Road/Stockdale Highway	Unsignalized	8.7	A	9.8	A
12. Dairy Road/Adohr Road	Unsignalized	10.3	B	9.3	A

Notes:
[1] Assumed to be signalized as part of Project Construction Mitigation.
a.m./p.m. = morning/evening
I-5 = Interstate 5
NB/SB = northbound/southbound
sec/veh = seconds per vehicle
SR = State Route

Table 5.10-11
Peak-Hour Intersection LOS,
Year 2017 Project Operations Conditions—Alternative 2

Intersection	Control	Peak Hour (a.m.)		Peak Hour (p.m.)	
		Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-5 NB Ramp/Stockdale Highway	Unsignalized	10.5	B	18.2	C
2. I-5 SB Ramp/Stockdale Highway	Unsignalized	10.6	B	27.7	D
3. I-5 NB Ramp/SR 119	Unsignalized	12.3	B	22.4	C
4. I-5 SB Ramp/SR 119	Unsignalized	13.0	B	24.1	C
5. SR 119/SR 43	Signalized	26.8	C	24.7	C
6. SR 43/Stockdale Highway	Signalized[1]	16.2	B	18.5	B
7. Stockdale Highway/Morris Road	Unsignalized	10.9	B	11.4	B
8. SR 119/Tupman Road	Signalized[1]	2.0	A	7.5	A
9. Tupman Road/Grace Avenue	Unsignalized	7.2	A	7.5	A
10. Tupman Road/Station Road	Unsignalized	9.9	A	12.2	B
11. Dairy Road/Stockdale Highway	Unsignalized	8.7	A	10.1	B
12. Dairy Road/Adohr Road	Unsignalized	10.3	B	9.7	A
13. SR 43/Poso Avenue	Unsignalized	11.6	B	12.7	B
14. SR 43/Kimberlina Road	Signalized	24.2	C	21.1	C
15. SR 43/Shafter Avenue	Signalized	12.6	B	13.3	B
16. SR 43/Central Avenue	Signalized	8.7	A	10.5	B
17. SR 43/Lerdo Highway	Signalized	22.1	C	21.9	C
18. SR 43/7th Standard Road	Unsignalized	14.2	B	31.0	D
19. SR 43/SR 58 (Rosedale Hwy West)	Unsignalized	12.5	B	16.1	C
20. SR 43/SR 58 (Rosedale Hwy East)	Unsignalized	12.6	B	18.2	C
21. H Street/9th Street	Unsignalized	8.7	A	8.8	A
22. H Street/Wasco Avenue	Unsignalized	8.9	A	9.0	A
23. Wasco Avenue/Poso Avenue	Unsignalized	11.5	B	10.9	B
24. Wasco Avenue/Kimberlina Road	Unsignalized	10.3	B	10.5	B
25. J Street/9th Street	Unsignalized	8.7	A	8.6	A

Notes:
[1] Assumed to be signalized as part of Project Construction Mitigation.
a.m./p.m. = morning/evening
I-5 = Interstate 5
NB/SB = northbound/southbound
sec/veh = seconds per vehicle
SR = State Route

Table 5.10-12
Summary of LORS—Traffic and Transportation

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact[1]
Federal Jurisdiction				
Title 49, Code of Federal Regulations, Section 171-177	Governs the transportation of hazardous materials, including the marking of transportation vehicles.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.1 Federal	CHP, USDOT Pipeline and Hazardous Materials Safety Administration	2, 3
Title 14, Code of Federal Regulations, Section 77.13(2)(i)	Requires Applicant to notify FAA of any construction greater than height limits defined by the FAA.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.1 Federal	FAA	1
State Jurisdiction				
California Vehicle Code, Section 353	Defines the hazardous materials.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CHP	3
California Vehicle Code, Sections 2500-2505	Authorizes the Commissioner of Highway Patrol to issue licenses for the transportation of hazardous materials, including explosives.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CHP	3
California Vehicle Code, Sections 13369, 15275, 15278	Addresses the licensing of drivers and the classification of license required for the operation of particular types of vehicles. In addition, these sections require the possession of certificates for permitting the operation of vehicles transporting hazardous materials.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	California Department of Motor Vehicles	4
California Vehicle Code, Sections 31303-31309	Requires transporters of hazardous materials to use the shortest route possible.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CHP	3

Table 5.10-12
Summary of LORS—Traffic and Transportation

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact[1]
California Vehicle Code, Sections 31600-31620	Regulates the transportation of explosive materials.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CHP	3
California Vehicle Code, Section 32000-32053	Regulates the licensing of carriers of hazardous materials and notice requirements.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CHP	3
California Vehicle Code, Section 32100-32109	Transporters of inhalation hazardous materials or explosive materials must obtain a hazardous materials transportation license.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CHP	3
California Vehicle Code, Section 34000-34100	Establish special requirements for flammable and combustible liquids over public roads and highways.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CHP	3
California Vehicle Code, Section 34500	Regulate the safe operation of vehicles, including those that are used for the transportation of hazardous materials.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CHP	3
California Vehicle Code, Section 35550	Imposes weight guidelines and restrictions on vehicles traveling upon freeways and highways.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	California Department of Transportation	4
California Vehicle Code, Section 35780	Requires approval for a permit to transport oversized or excessive load over state highways.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	California Department of Transportation	4

Table 5.10-12
Summary of LORS—Traffic and Transportation

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact[1]
California Streets and Highways Code, Sections 117	Permits for the location in the ROW of any structures or fixtures necessary to telegraph, telephone, or electric power lines or of any ditches, pipes, drains, sewers, or underground structures.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	California Department of Transportation	5
California Streets and Highways Code, Sections 660, 670, 672, 1450,1460,1470, 1480 et seq.	Defines highways and encroachment. Regulate ROW encroachment and the granting of permits with conditions for encroachment in state and county roads.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	California Department of Transportation, Kern County Roads Department	6, 7
California Health and Safety Code, Section 25160 et seq.	Addresses the safe transport of hazardous materials.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	California Department of Toxic Substance Control	8
California Manual on Uniform Control Devices (MUTCD), Section 6C.01	Requires traffic control plans to ensure continuity of traffic during roadway construction.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	California Department of Transportation, Kern County Roads Department	6, 7
CPUC Code Reference §§1001, 1007, 1008, 1904(a)	Requires an Application for Certificate of Public Convenience and Necessity (CPCN) to operate a rail facility.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 22-B	Reports of accidents on railroads	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 26-D	Clearances on railroads and street railroads as to side and overhead structures, parallel tracks and crossings	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9

Table 5.10-12
Summary of LORS—Traffic and Transportation

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact[1]
CPUC General Order 33-B	Construction, reconstruction, maintenance and operation of interlocking plants of railroads	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 72-B	Standard types of pavement construction at railroad grade crossings	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 75-D	Regulations Governing Standards for Warning Devices for At-Grade Highway-Rail Crossings	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 88-B	Rules for Altering Public Highway-Rail Crossings	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 95	Overhead electric line construction. Revised 1/12/2012 (D1201032)	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 108	Filing of railroad operating department rules	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 110	Radio communications in railroad operations	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 114	Minimum safety, health and comfort requirements for railroad cabooses	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9

Table 5.10-12
Summary of LORS—Traffic and Transportation

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact[1]
CPUC General Order 118-A	Construction, reconstruction and maintenance of walkways and control, of vegetation adjacent to railroad tracks.	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 125	Construction and filing of freight tariffs and classifications issued by railroads	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 126	Contents of first-aid kits provided by railroads	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 135	The occupancy of public grade crossings by railroads	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 145	Railroad crossings to be classified exempt from the mandatory stop requirements of Section 22452 of the Vehicle Code	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9
CPUC General Order 161	Transportation of hazardous materials by rail	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.2 State	CPUC	9

Table 5.10-12
Summary of LORS—Traffic and Transportation

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact[1]
Local Jurisdiction				
Kern County General Plan, Circulation Element	Provide a network of roadway systems for the county	Section 5.10.5, Laws, Ordinances, Regulations, and Standards 5.10.5.3 Local	Kern County Roads Department	6

Source: HECA, 2012.
Notes:
[1] Numbers in this column correspond to Agency Contacts listed in Table 5.10-11.
CHP = California Highway Patrol
CPUC = CPUC
FAA = Federal Aviation Administration
LORS = laws, ordinances, regulations, and standards
ROW = right-of-way
USDOT = United States Department of Transportation

Table 5.10-13
Agency Contact List for LORS

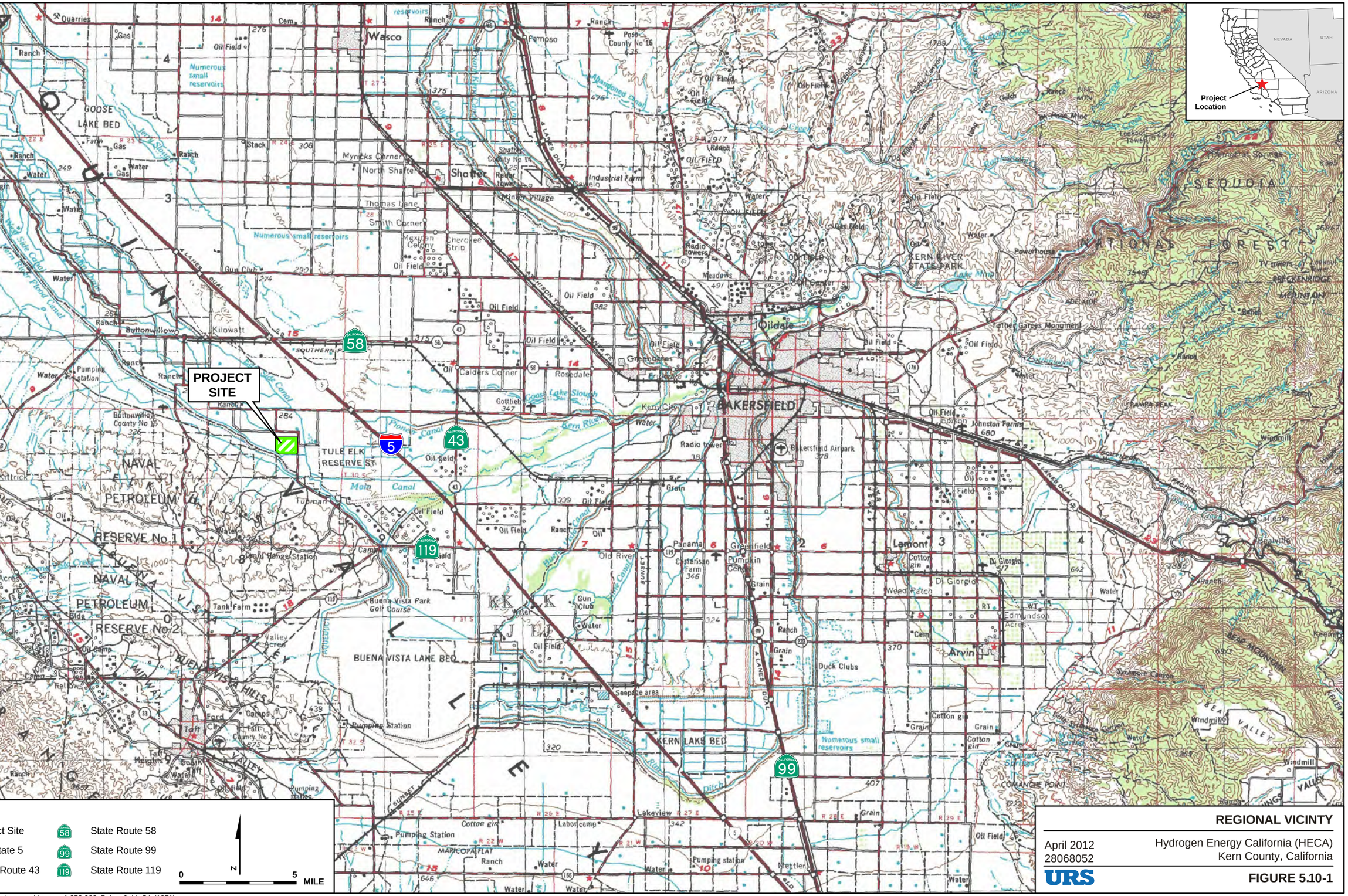
Number	Agency	Contact	Address	Telephone
1	Federal Aviation Administration	Karen McDonald, Obstruction Evaluation Specialist	Federal Aviation Administration Western Pacific Region AWP5202 15000 Aviation Boulevard Lawndale, CA 90261	(310) 725-6557
2	U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA)	Jeffrey Gilliam, Team Leader, California Office	3401 Centrelake Drive Suite 550B Ontario, CA 91761	(909) 937-3279 (720) 963-3160
3	CHP	Officer Justin Olson, Accident Investigator	29449 Stockdale Highway Bakersfield, CA 93312	(661) 764-5580
4	Caltrans North Region Permits Office MS# 41	Kien Le, Permits Manager	Caltrans North Region Permits Office MS# 41 1823 14th Street Sacramento, CA 94287	(916) 322-6001
5	Department of Motor Vehicles, Licensing Operations Division	Public Inquiry	2415 1st Avenue Mail Station F101 Sacramento, CA 95818	(916) 657-8698
6	Kern County Roads Department	Barry Nienke, P.E., County Traffic Engineer	2700 M Street, Suite 400 Bakersfield, CA 93301	(661) 862-8850
7	California Department of Transportation, District 6	Kurt Hatton, Transportation Engineer	1352 West Olive Avenue Fresno, CA 93728	(559) 243-3451
8	California Department of Toxic Substance Control	Gloria Conti, Information Officer	1001 I Street Mail: P.O. Box 806 Sacramento, CA 95812-0806	(800) 728-6942

Source: HECA, 2012.
Note:
CHP = California Highway Patrol
LORS = laws, ordinances, regulations, and standards

Table 5.10-14
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal Aviation Administration	Notification for structure heights exceeding 200 feet	TBD
Caltrans	State Highways Encroachment Permit	TBD
Caltrans	State Highways Transportation Permit	TBD
Kern County Roads Department Transportation and Encroachment Permit Division	Encroachment Permit Pipeline Permit	TBD
Kern County Roads Department Transportation and Encroachment Permit Division	Transportation Permit	TBD
Kern County Roads Department Transportation and Encroachment Permit Division	Construction-Related Roadway Closure	As needed
Kern County Engineering and Survey Services Department Building Inspection Division	Building Permit	TBD
CPUC	Construction of Rail Spur Line (Alternative 1)	TBD

Source: HECA, 2012.
Note:
TBD = to be determined



Source: USGS 1x2 min. topographic map, 1:250,000, Bakersfield, CA (1971)

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Kern County, California

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FIGURE 5.10-1

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R4 HWY

SR-58: State Highway facility located north of the project site. AADT is 16,000 vehicles per day. Peak-hour is 2,150 vehicles per hour. Trucks = 32%.

R5 HWY

Stockdale Highway: Highway facility located north of the project site. Two lanes (one in each direction) with a posted speed limit of 55 mph.

Project Site
Construction Staging Area
Railroad[1]
Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Transmission

Note:
1. Feature temporarily designated as confidential

0 1,000 2,000 FEET

Sources: USGS (7.5' quads: Buttonwillow 1976, East Elk Hills 1977, Tupman 1977, Stevens, 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. HECA Project Team (Traffic Data, 2009).

TRANSPORTATION SETTING OF THE LOCAL PROJECT AREA AND AFFECTED ROADWAYS

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Kern County, California

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FIGURE 5.10-2 (1)

R5 HWY — Stockdale Highway: Highway facility located north of the project site. Two lanes (one in each direction) with a posted speed limit of 55 mph.

R6 COL — Tupman Road: Collector facility located east of the project site. Two lanes (one in each direction) with a posted speed limit of 55 mph.

R7 COL — Station Road: Collector facility located southeast of the project site. Two lanes (one in each direction) with no posted speed limit.

R8 COL — Morris Road: Collector facility located northeast of the project site. Two lanes (one in each direction) with no posted speed limit.

R9 COL — Dairy Road: Collector facility located northwest of the project site. Two lanes (one in each direction) with no posted speed limit.

R10 COL — Adohr Road: Collector facility located north of the project site. Two lanes (one in each direction) with no posted speed limit.

Truck Route
Project Site
Construction Staging Area
Railroad[1]
Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Transmission

Note:
1. Feature temporarily designated as confidential

0 1,000 2,000 FEET

TRANSPORTATION SETTING OF THE LOCAL PROJECT AREA AND AFFECTED ROADWAYS

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FIGURE 5.10-2 (2)

Sources: USGS (7.5' quads: Buttonwillow 1976, East Elk Hills 1977, Tupman 1977, Stevens, 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. HECA Project Team (Traffic Data, 2009).

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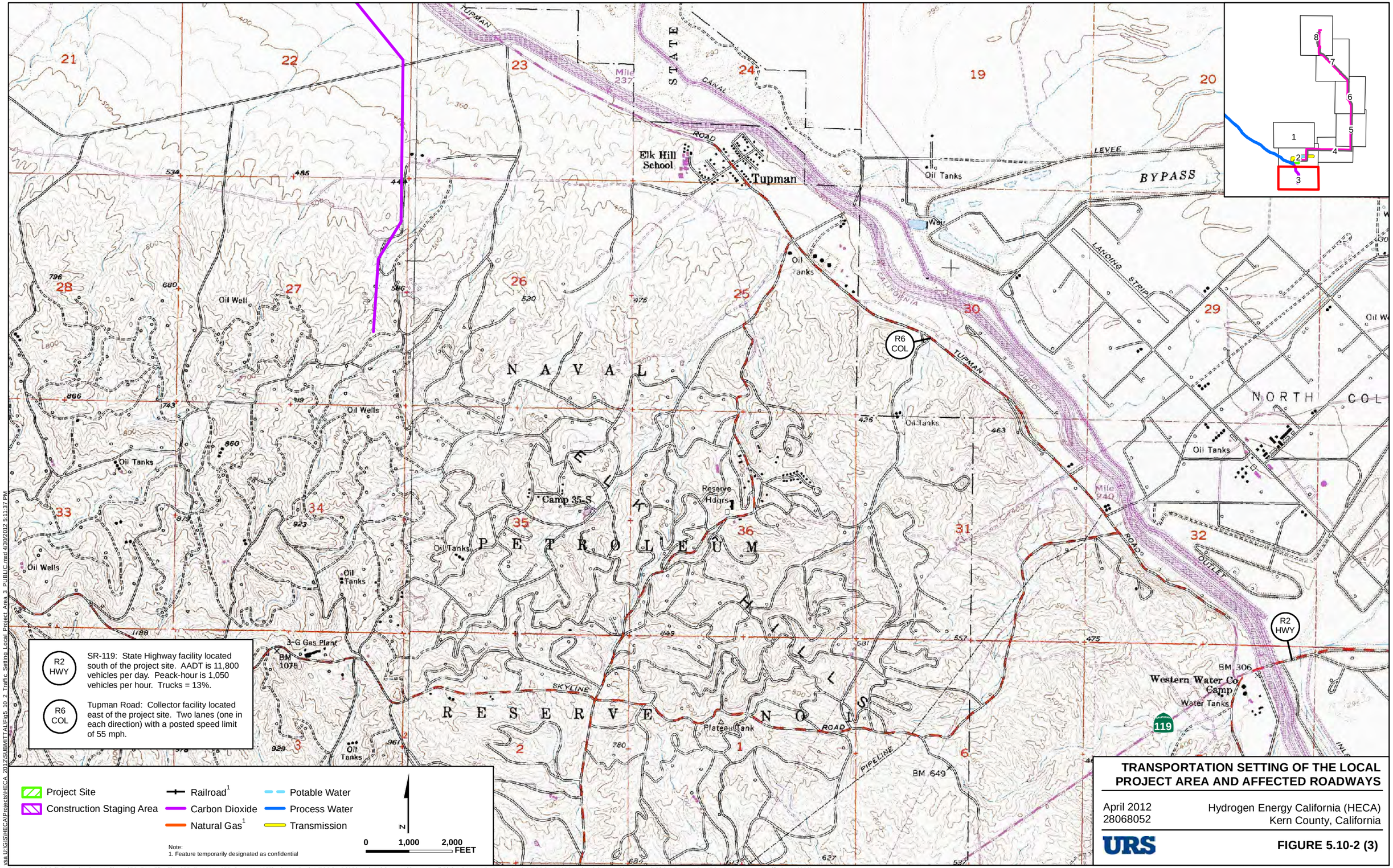

Sources: USGS (7.5' quads: Buttonwillow 1976, East Elk Hills 1977, Tupman 1977, Stevens, 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. HECA Project Team (Traffic Data, 2009).

TRANSPORTATION SETTING OF THE LOCAL PROJECT AREA AND AFFECTED ROADWAYS

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FIGURE 5.10-2 (3)

R1 FWY — I-5: Interstate Freeway facility located east of the project site. AADT is 31,000 vehicles per day. Peak hour is 4,900 vehicles per hour. Trucks = 25%.

R3 HWY — SR-43: State Highway facility located east of the project site. AADT is 5,500 vehicles per day. Peak hour is 630 vehicles per hour. Trucks = 21%.

R5 HWY — Stockdale Highway: Highway facility located north of the project site. Two lanes (one in each direction) with a posted speed limit of 55 mph.

R7 COL — Station Road: Collector facility located southeast of the project site. Two lanes (one in each direction) with no posted speed limit.

Truck Route
Project Site
Construction Staging Area
Railroad[1]
Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Transmission

Note:
1. Feature temporarily designated as confidential

N

0 1,000 2,000 FEET

TRANSPORTATION SETTING OF THE LOCAL PROJECT AREA AND AFFECTED ROADWAYS

April 2012
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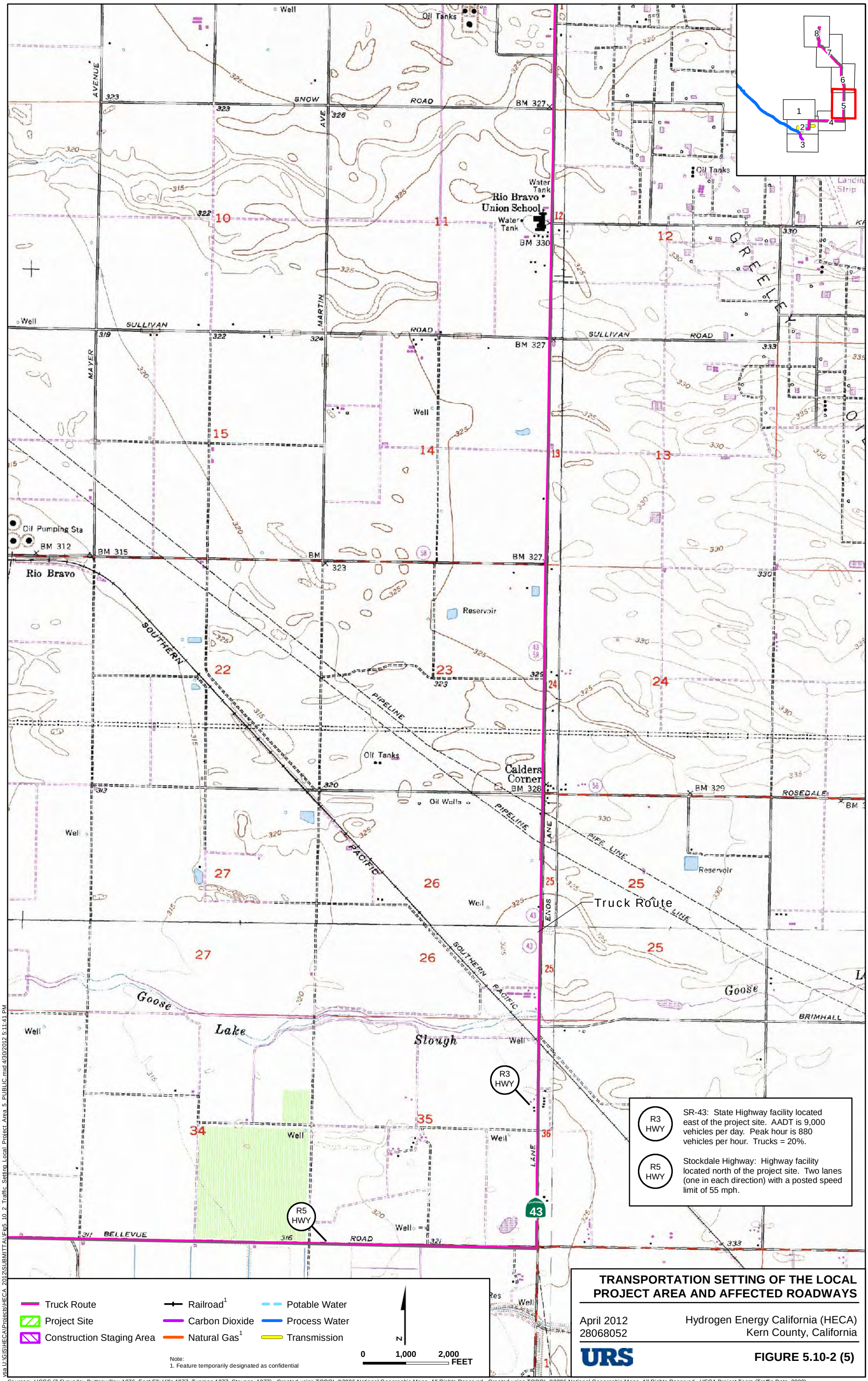
FIGURE 5.10-2 (4)

Sources: USGS (7.5' quads: Buttonwillow 1976, East Elk Hills 1977, Tupman 1977, Stevens, 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. HECA Project Team (Traffic Data, 2009).



Sources: USGS (7.5' quads: Buttonwillow 1976, East Elk Hills 1977, Tupman 1977, Stevens, 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. HECA Project Team (Traffic Data, 2009).

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Truck Route

R3 HWY

SR-43: State Highway facility located east of the project site. AADT is 14,000 vehicles per day. Peak hour is 1,250 vehicles per hour. Trucks = 16%.

Truck Route
Project Site
Construction Staging Area
Railroad[1]
Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Transmission

Note:
1. Feature temporarily designated as confidential

N
0 1,000 2,000 FEET

TRANSPORTATION SETTING OF THE LOCAL PROJECT AREA AND AFFECTED ROADWAYS

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FIGURE 5.10-2 (6)

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Sources: USGS (7.5' quads: Buttonwillow 1976, East Elk Hills 1977, Tupman 1977, Stevens, 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. HECA Project Team (Traffic Data, 2009).

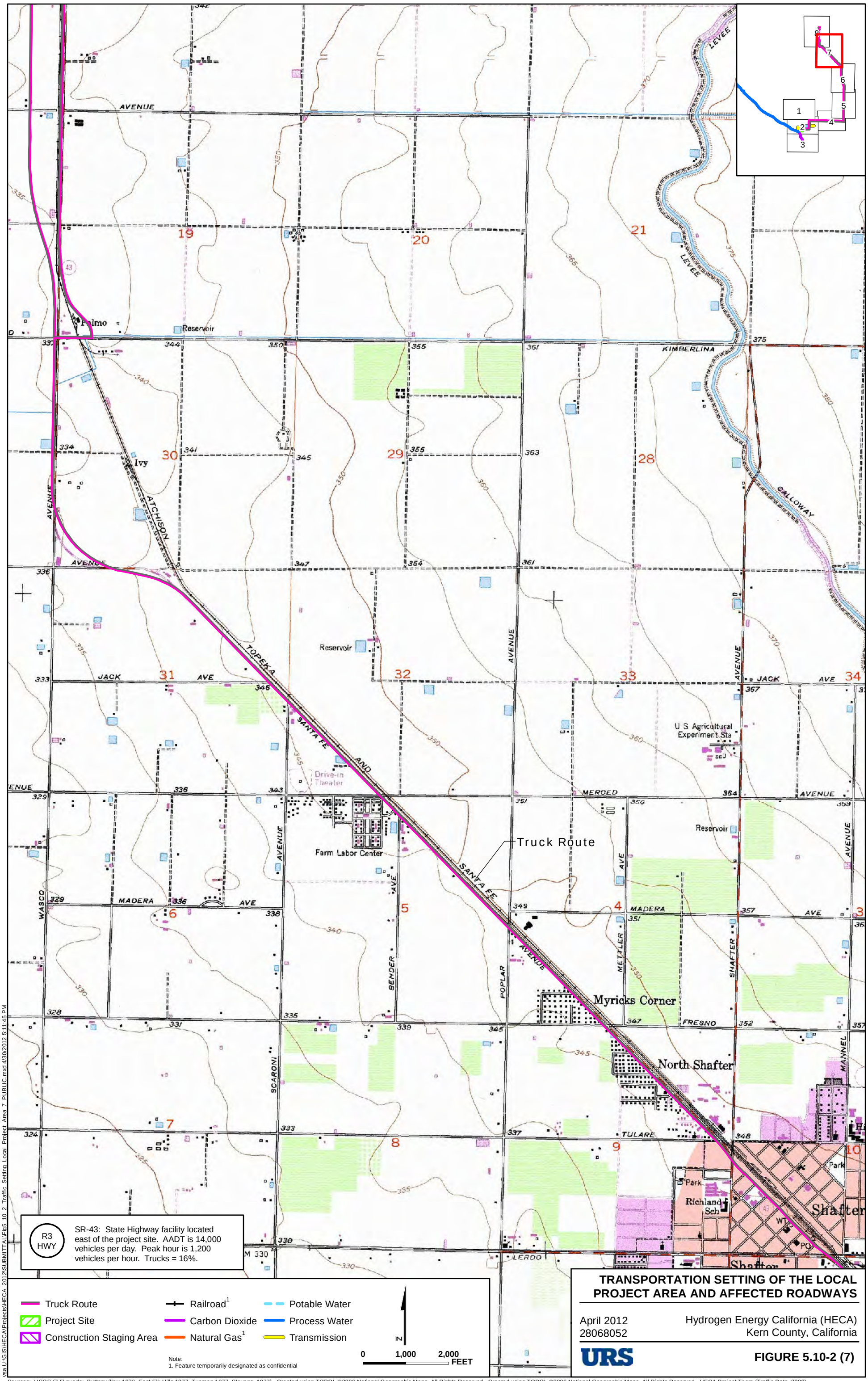
AVENUE
LEVEE
LEVEE
19
20
21
Palmo
Reservoir
KIMBERLINA
Ivy
ATCHISON
TOPEKA
SANTA FE
AND
SANTA FE
CALLOWAY
Reservoir
JACK
AVE
31
32
33
34
U S Agricultural Experiment Sta
Drive-in Theater
Farm Labor Center
MERCED
Reservoir
Truck Route
MADERA
AVE
6
5
4
3
WASCO
BENDER
POPLAR
METTLER
SHAFTER
Myricks Corner
FRESNO
North Shafter
MANNEL
SCARONI
7
8
9
10
TULARE
Park
Richland Sch
Shafter
LERDO
R3 HWY
SR-43: State Highway facility located east of the project site. AADT is 14,000 vehicles per day. Peak hour is 1,200 vehicles per hour. Trucks = 16%.
Truck Route
Project Site
Construction Staging Area
Railroad[1]
Carbon Dioxide
Natural Gas[1]
Potable Water
Process Water
Transmission
N
0
1,000
2,000
FEET
Note:
1. Feature temporarily designated as confidential
TRANSPORTATION SETTING OF THE LOCAL PROJECT AREA AND AFFECTED ROADWAYS
April 2012
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FIGURE 5.10-2 (7)
Sources: USGS (7.5' quads: Buttonwillow 1976, East Elk Hills 1977, Tupman 1977, Stevens, 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. HECA Project Team (Traffic Data, 2009).
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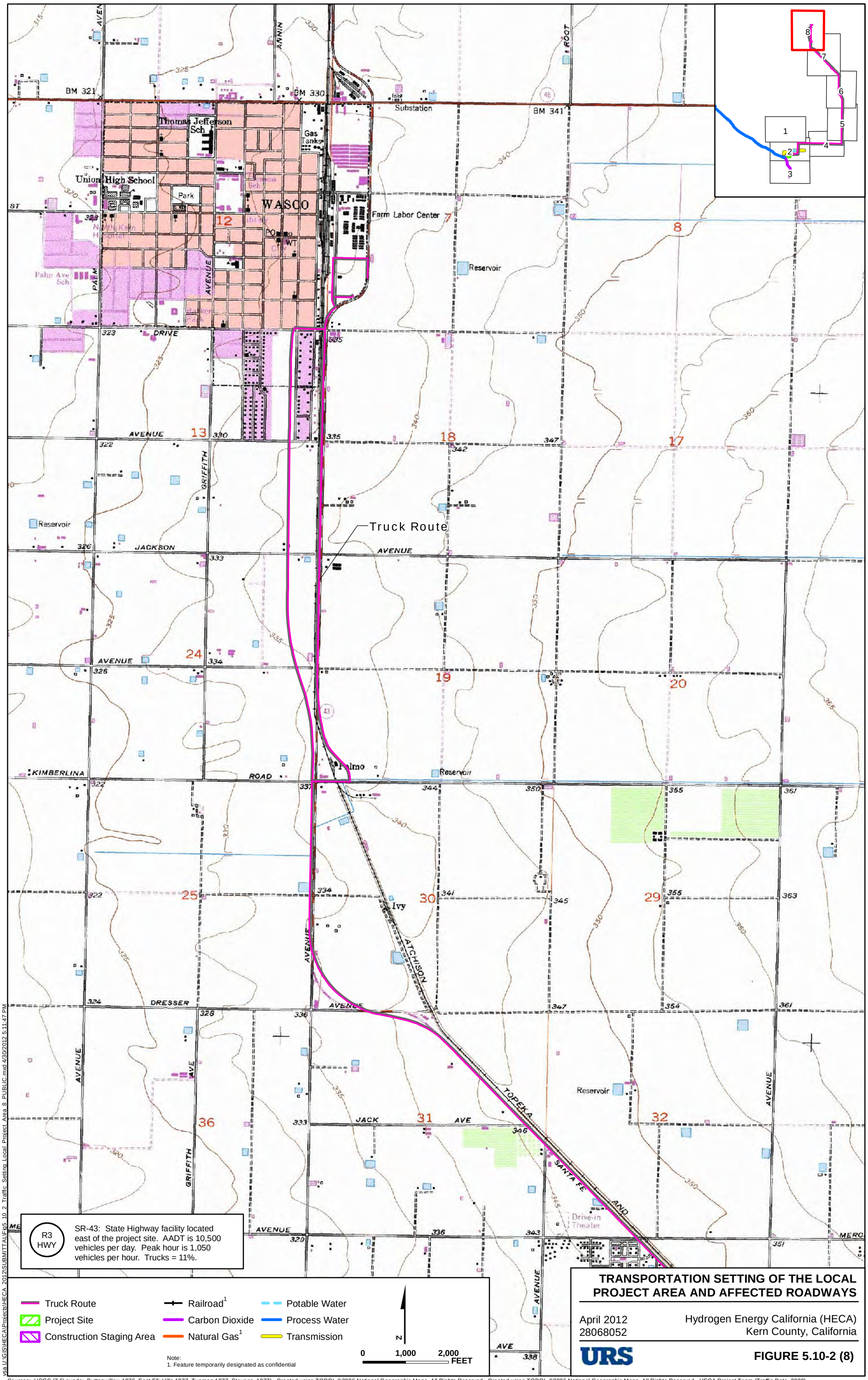
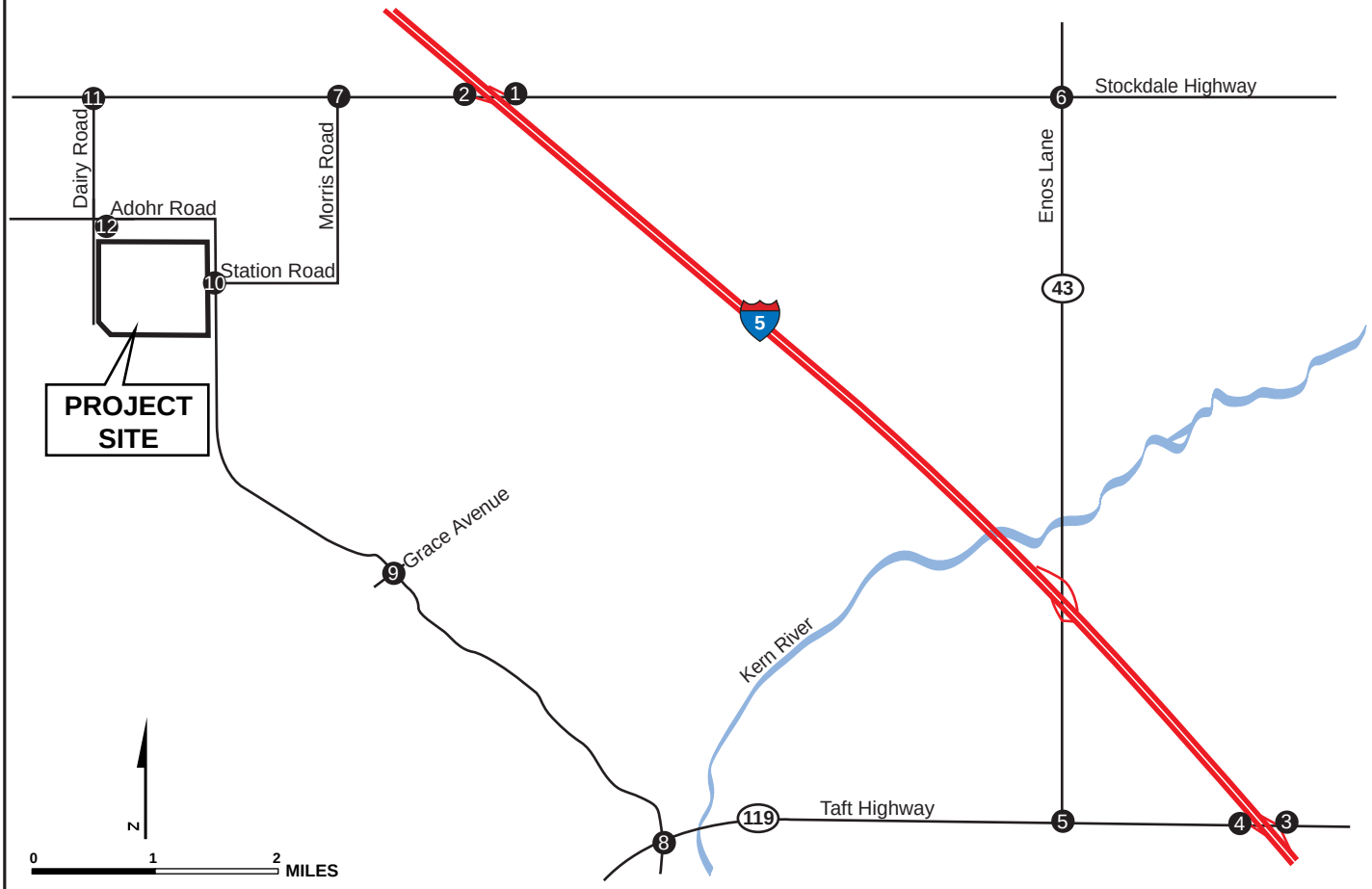
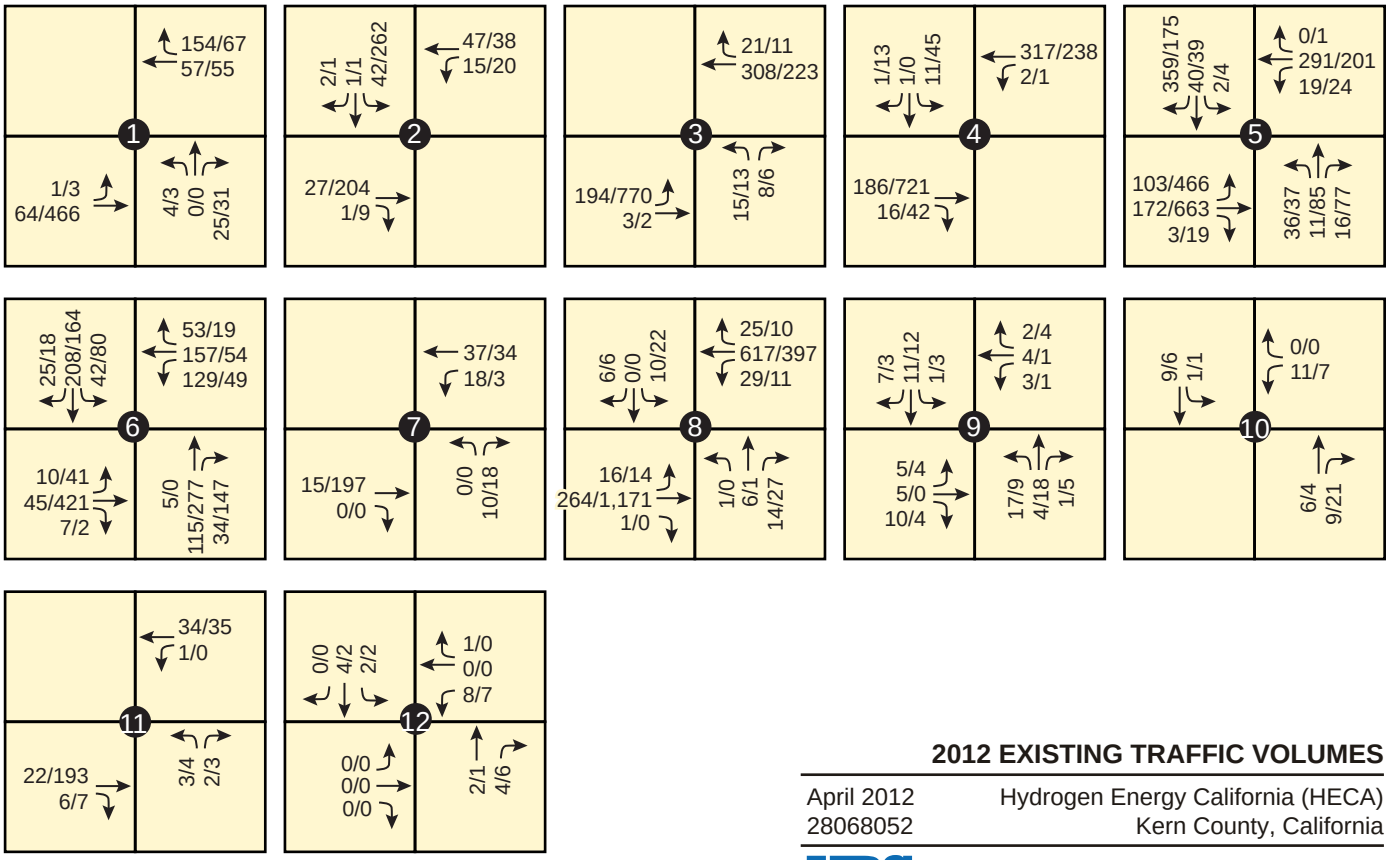


Sources: USGS (7.5' quads: Buttonwillow 1976, East Elk Hills 1977, Tupman 1977, Stevens, 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. HECA Project Team (Traffic Data, 2009).



NOTE: Intersection # 7 has been analyzed as a T-intersection. The north leg has minimum/negligible traffic volumes.



2012 EXISTING TRAFFIC VOLUMES

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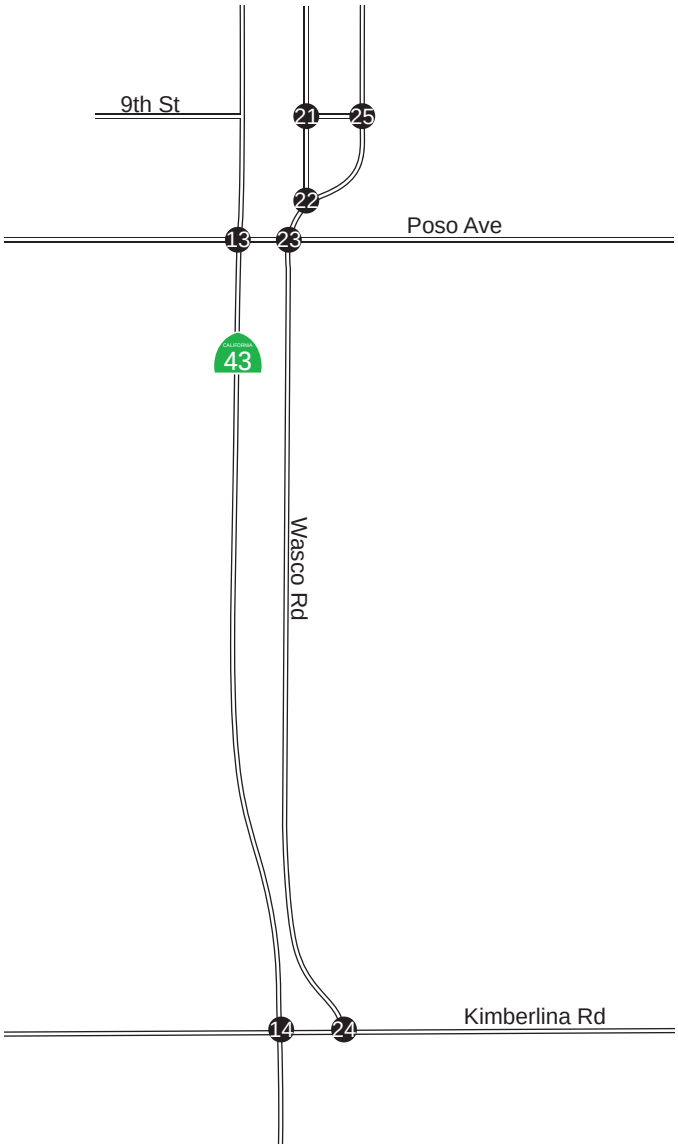
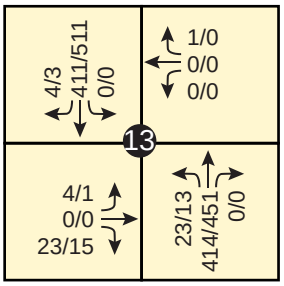
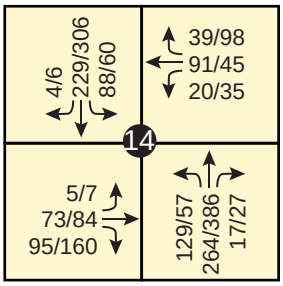
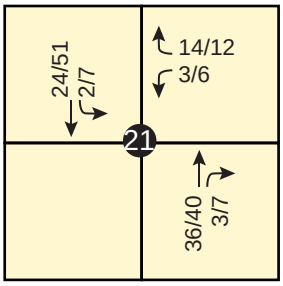
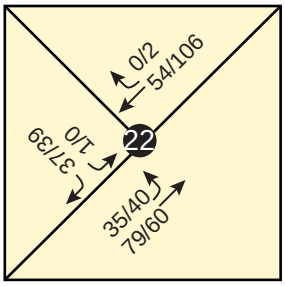
FIGURE 5.10-3a

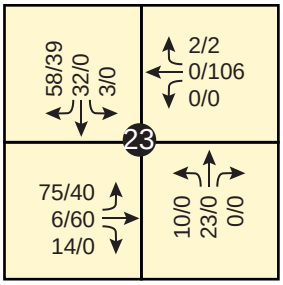


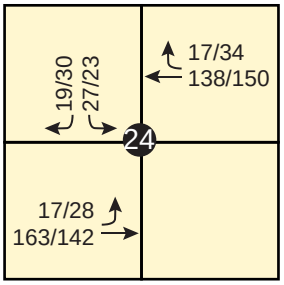


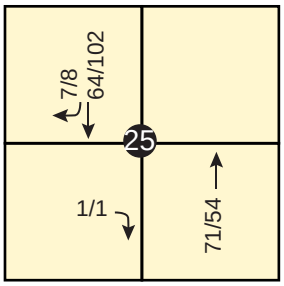












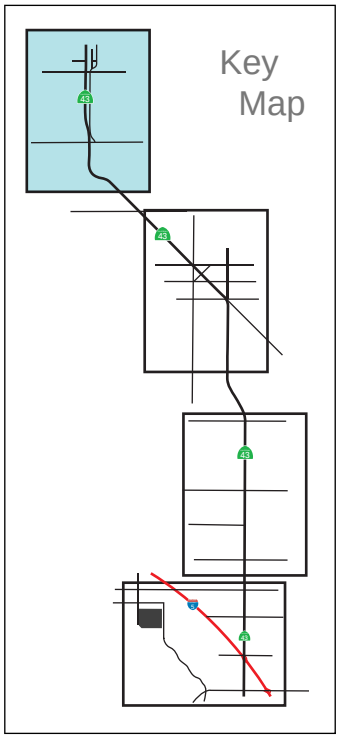


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FIGURE 5.10-3b

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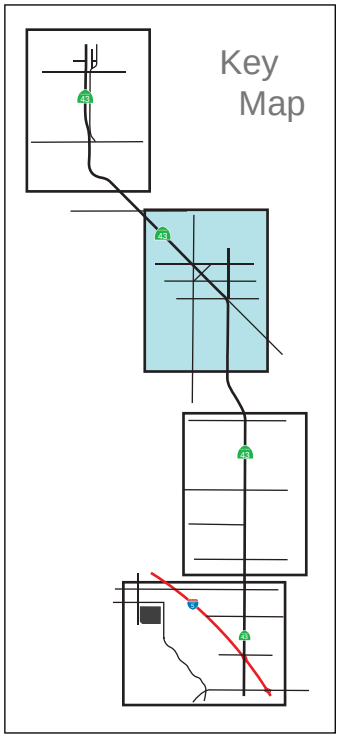

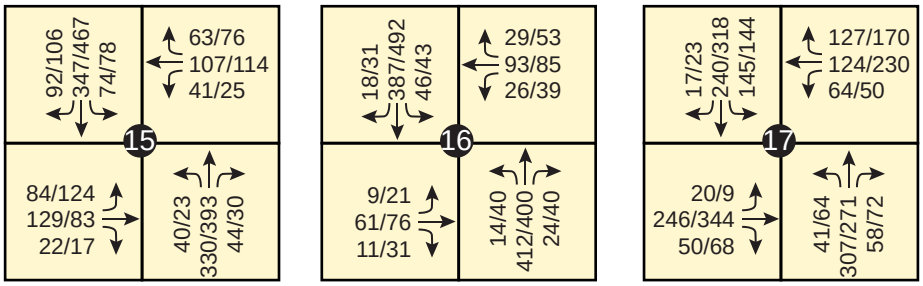

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2012 EXISTING TRAFFIC VOLUMES

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FIGURE 5.10-3c

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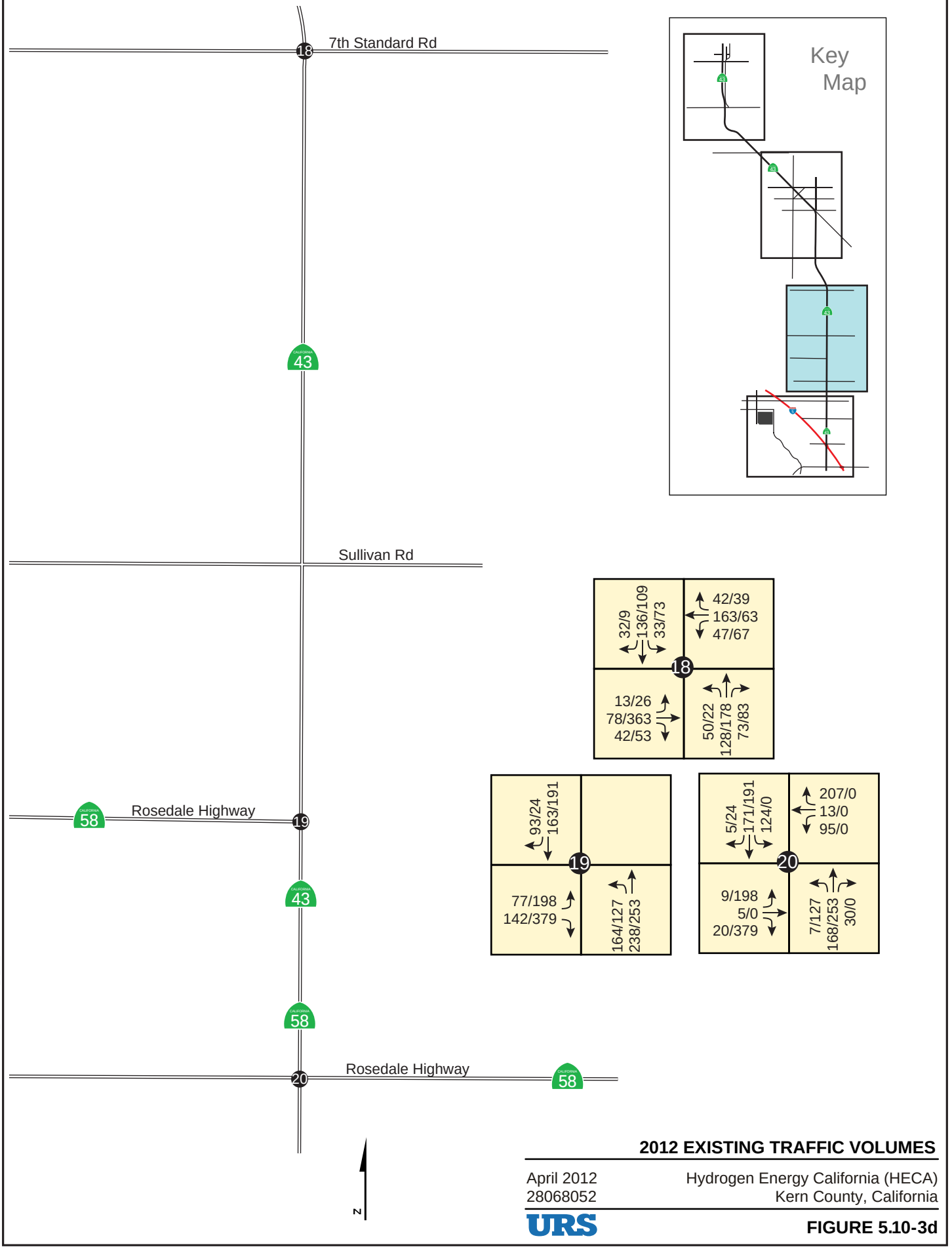

2012 EXISTING TRAFFIC VOLUMES

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FIGURE 5.10-3d

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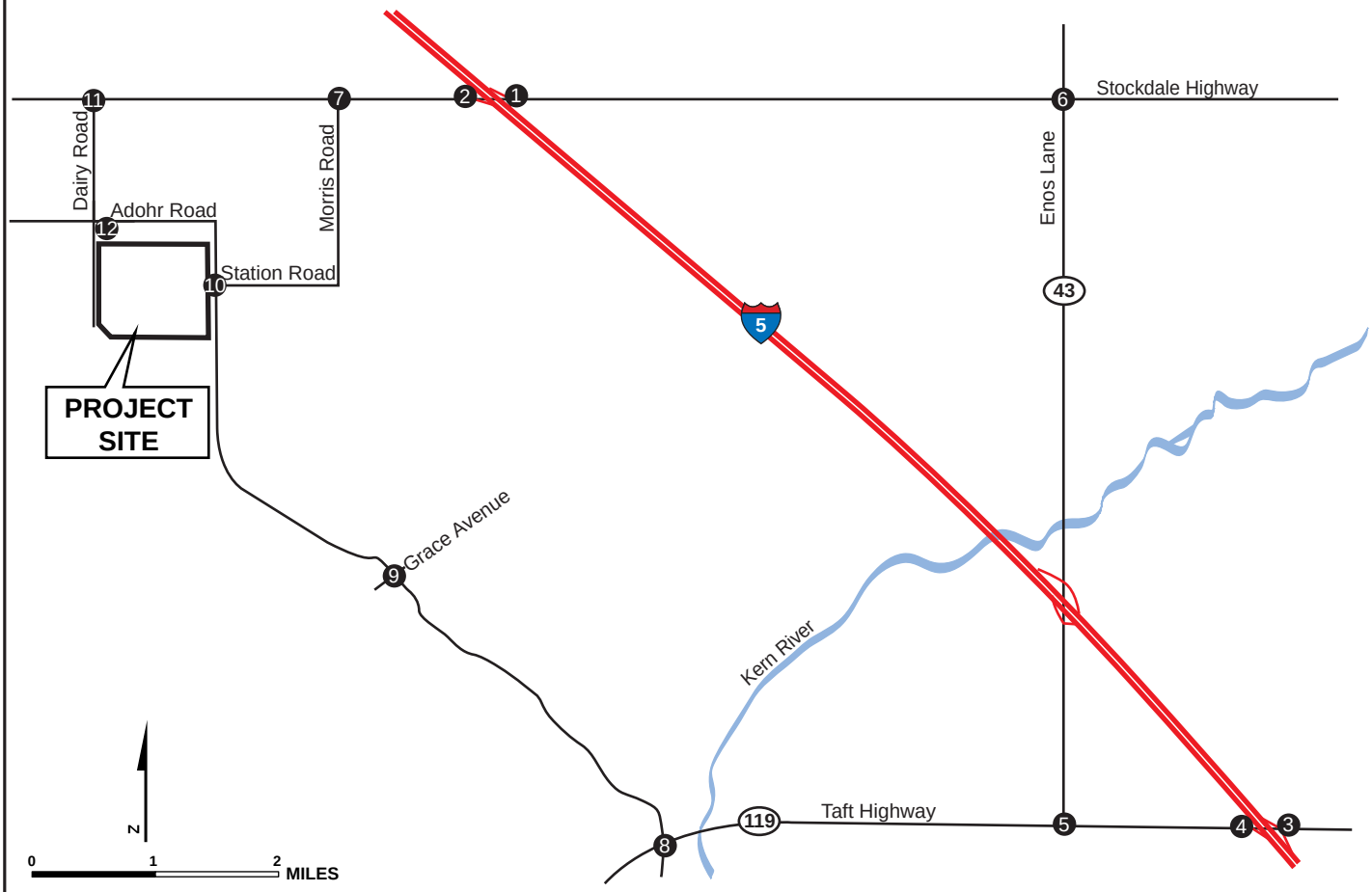

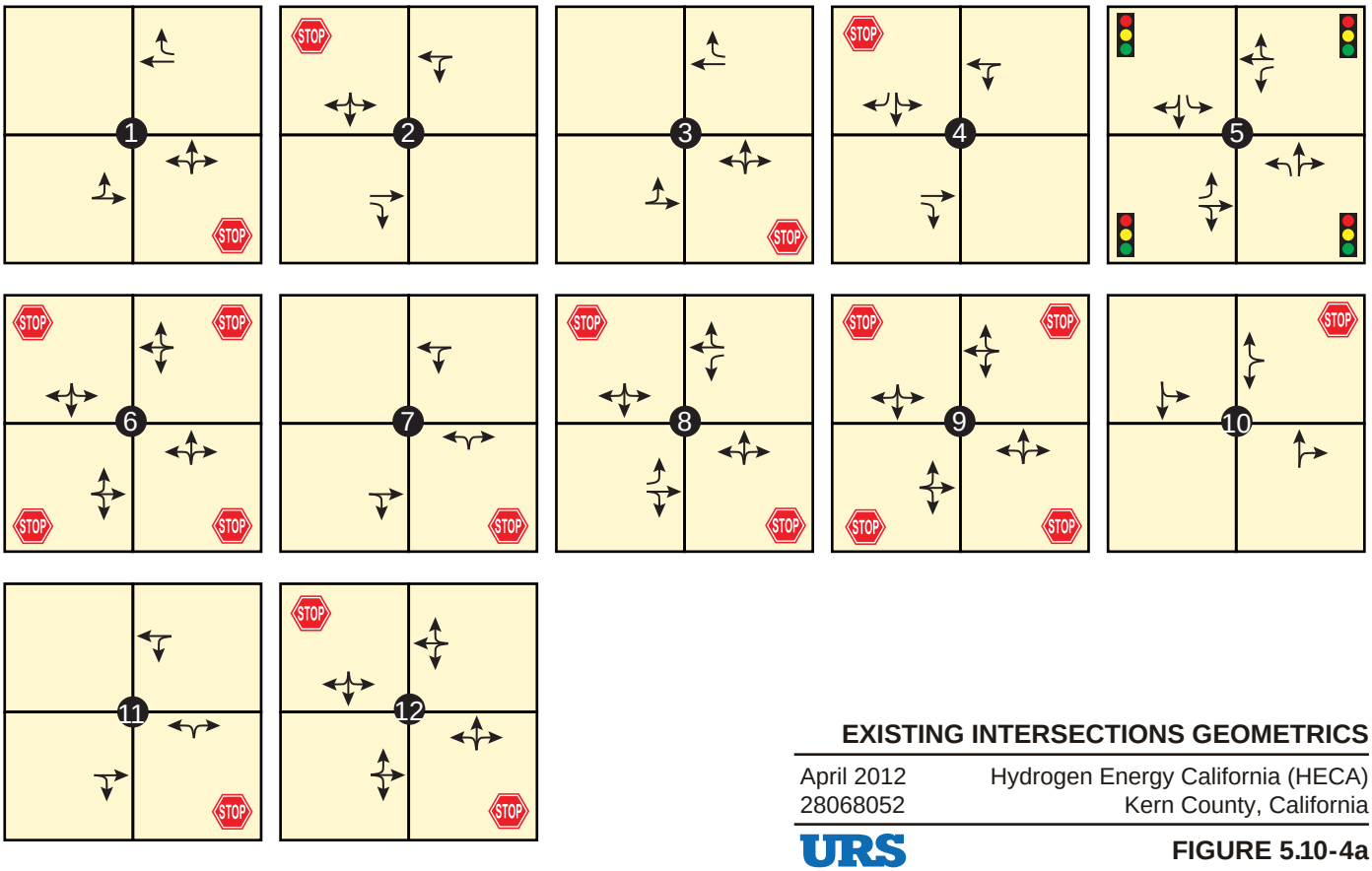

EXISTING INTERSECTIONS GEOMETRICS

April 2012 — Hydrogen Energy California (HECA)
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FIGURE 5.10-4a

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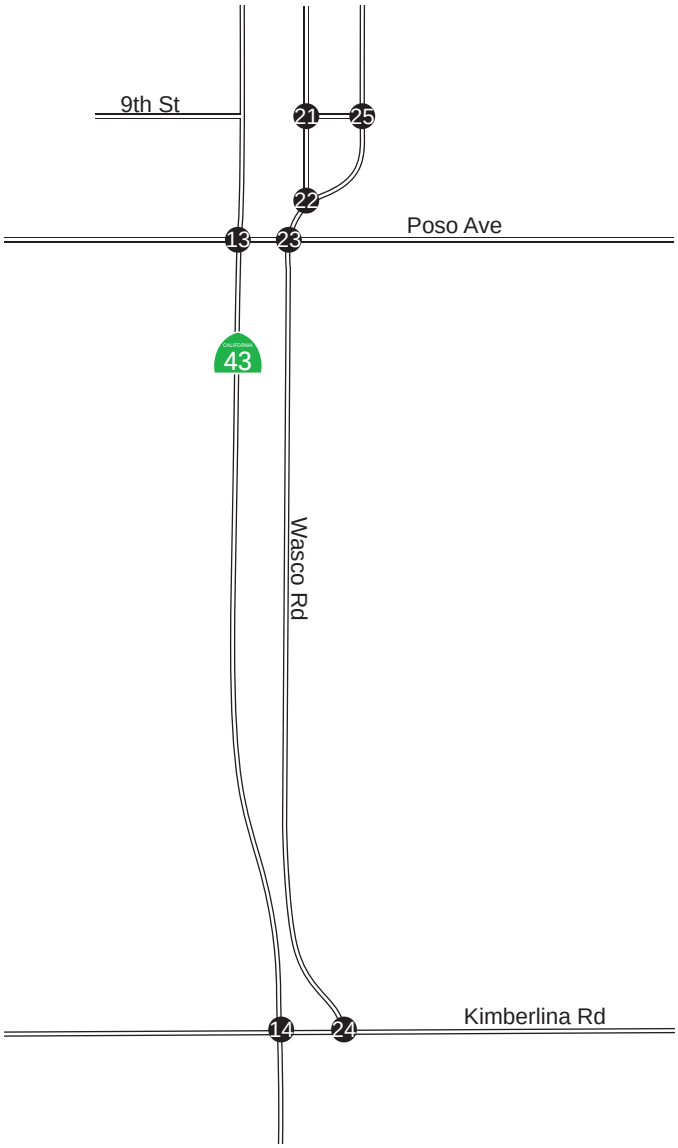

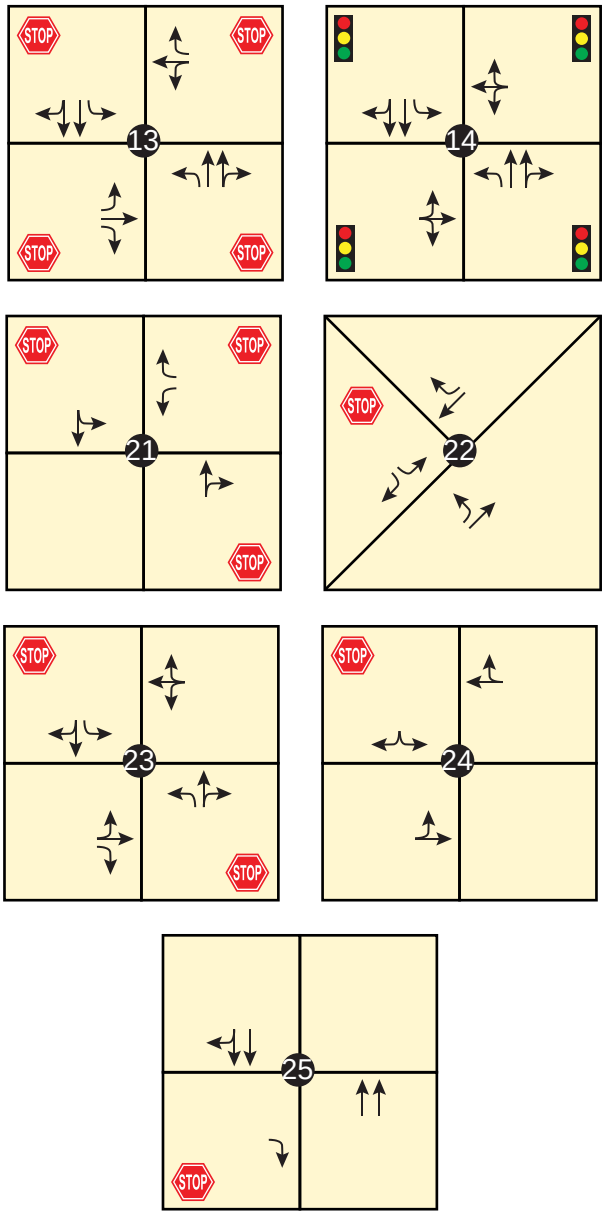

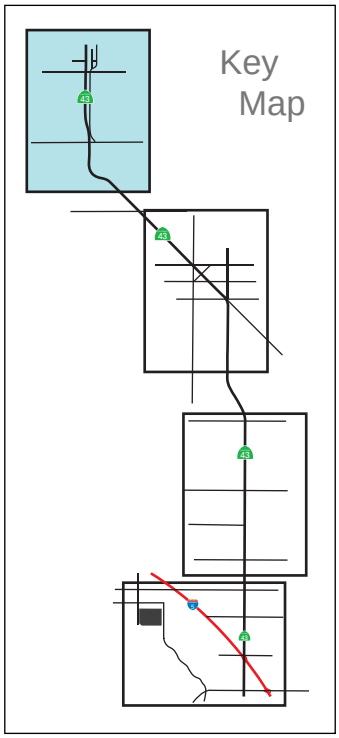

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EXISTING INTERSECTIONS GEOMETRICS

April 2012
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Kern County, California

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FIGURE 5.10-4b

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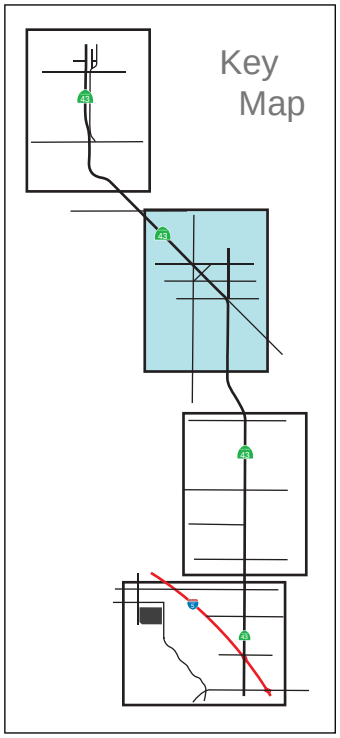

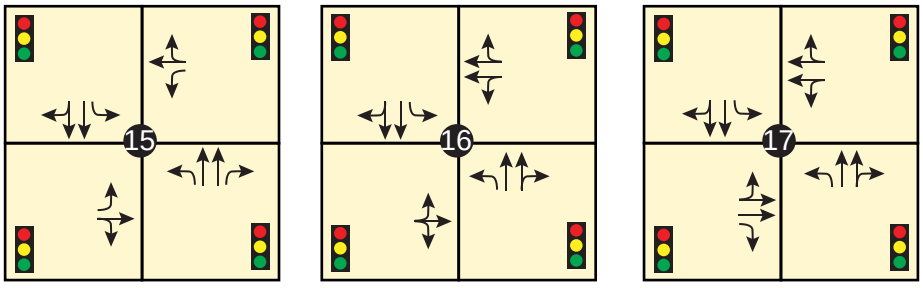

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EXISTING INTERSECTIONS GEOMETRICS

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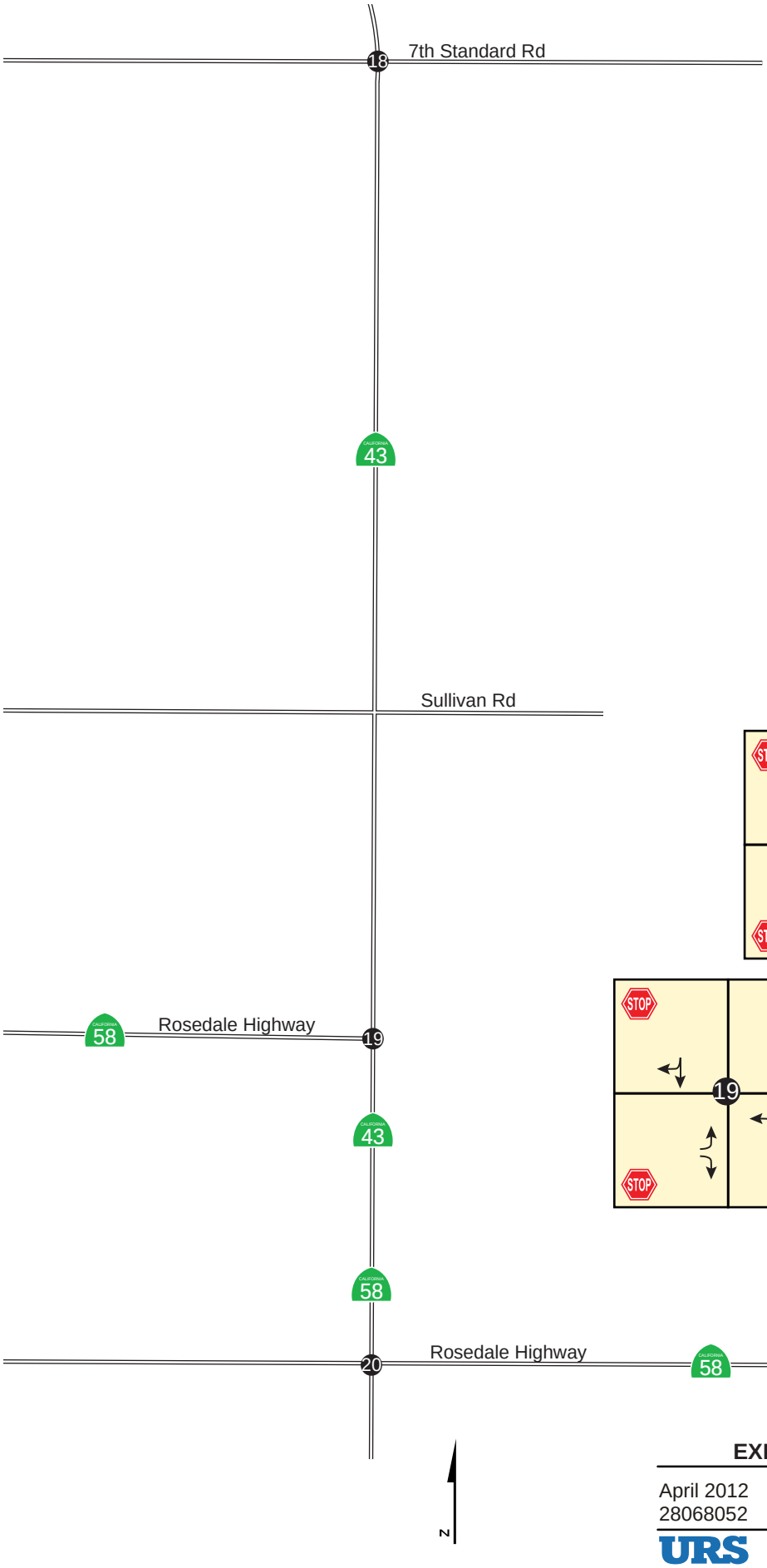
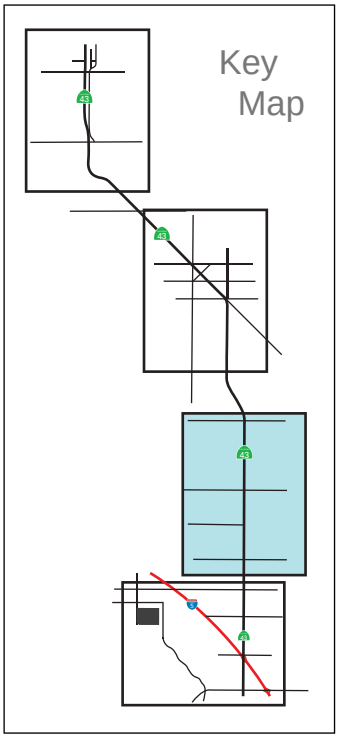
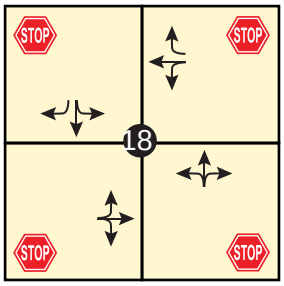
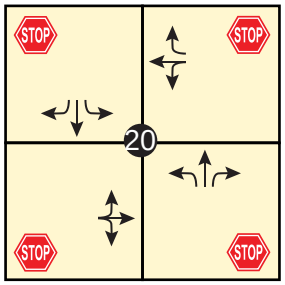
FIGURE 5.10-4c

4/26/12 vsa...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_4c.ai









EXISTING INTERSECTIONS GEOMETRICS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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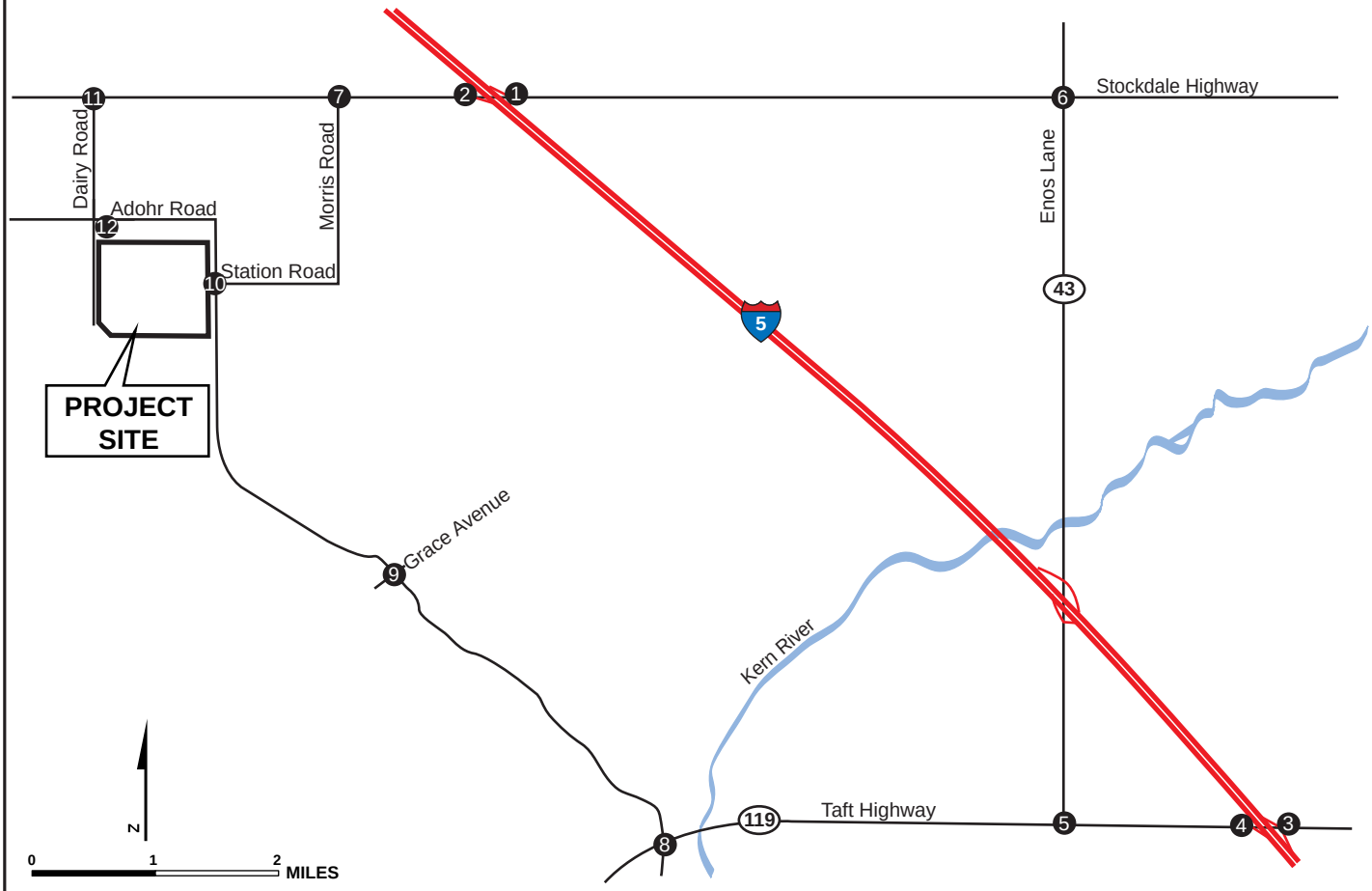
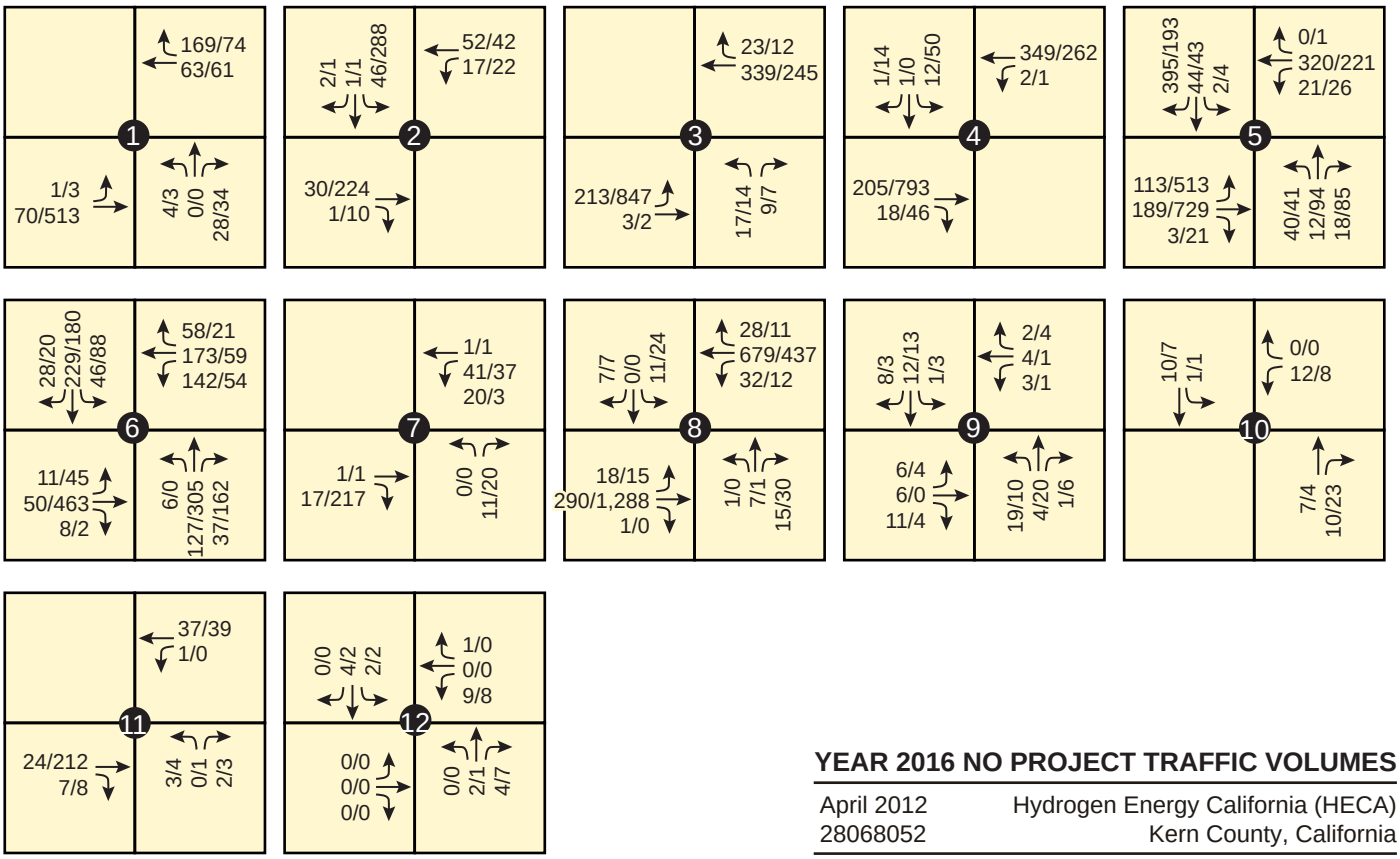
FIGURE 5.10-4d

4/26/12 vsa...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_4d.ai





YEAR 2016 NO PROJECT TRAFFIC VOLUMES

April 2012 — Hydrogen Energy California (HECA)
28068052 — Kern County, California

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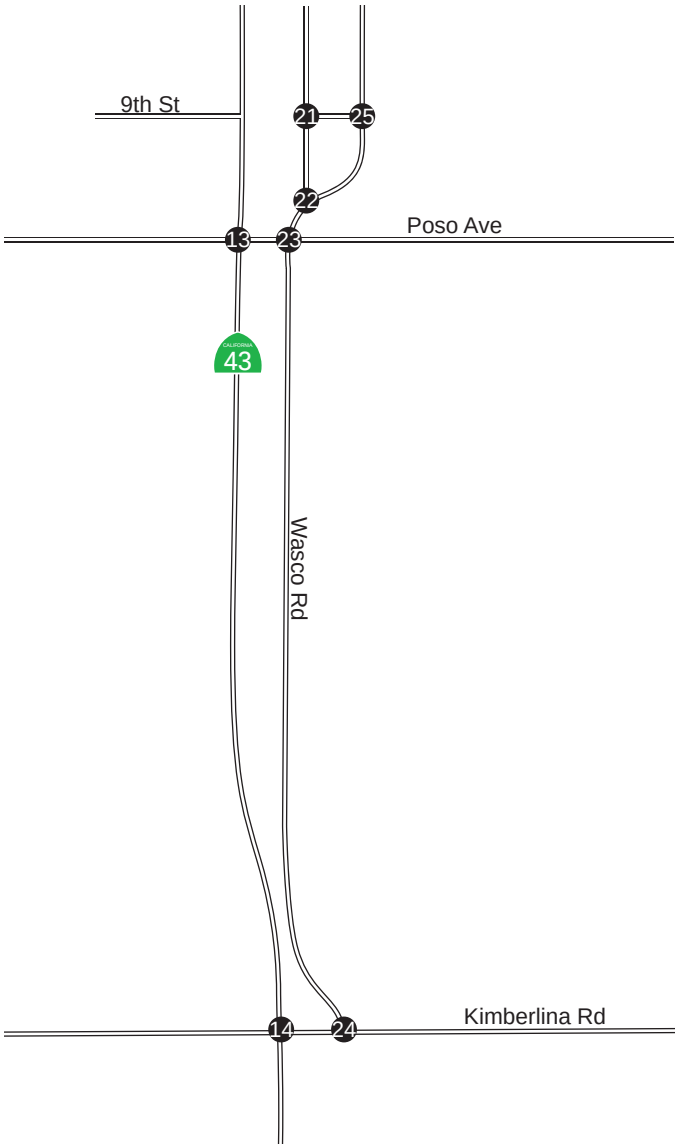
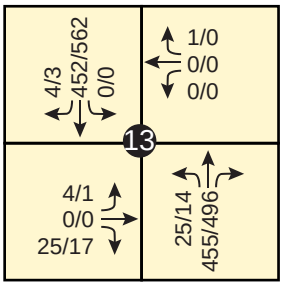
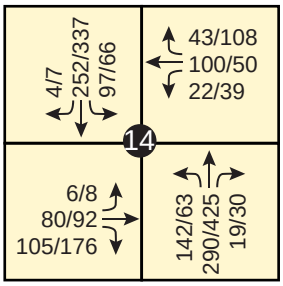
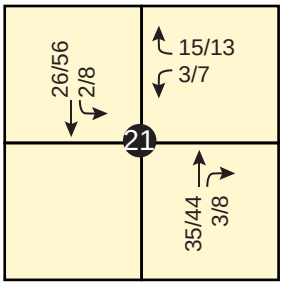
FIGURE 5.10-5a

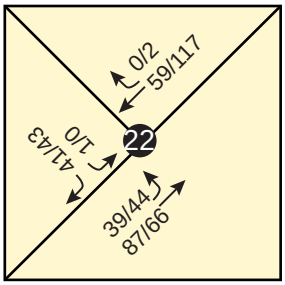
4/26/12 vsa/hk...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_5a_2016no.ai

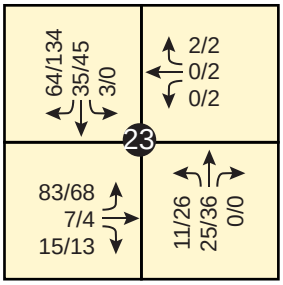


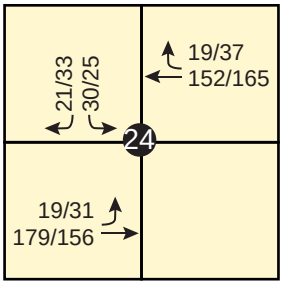


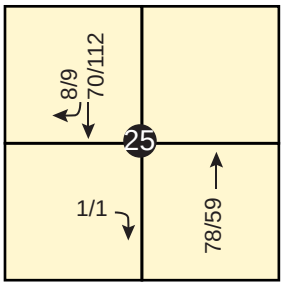


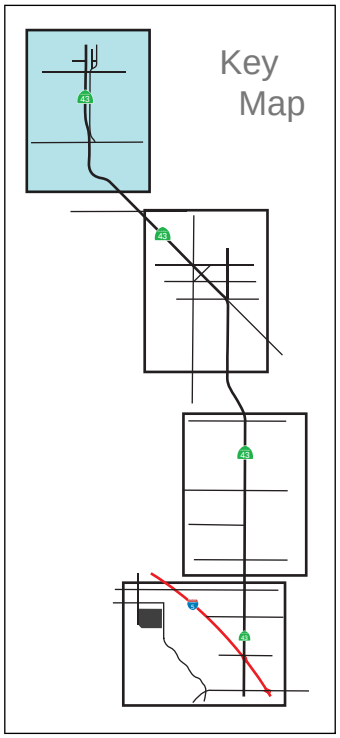












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YEAR 2016 NO PROJECT TRAFFIC VOLUMES

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28068052 — Kern County, California

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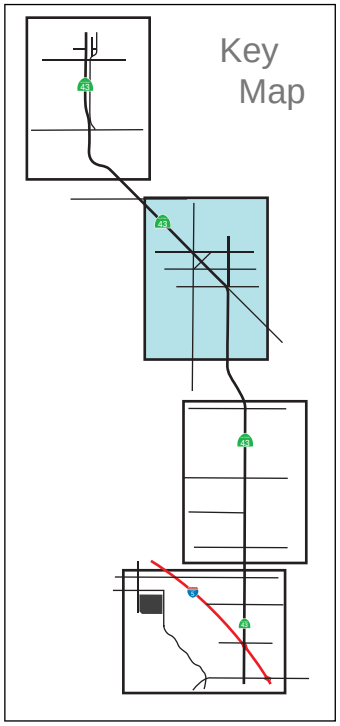
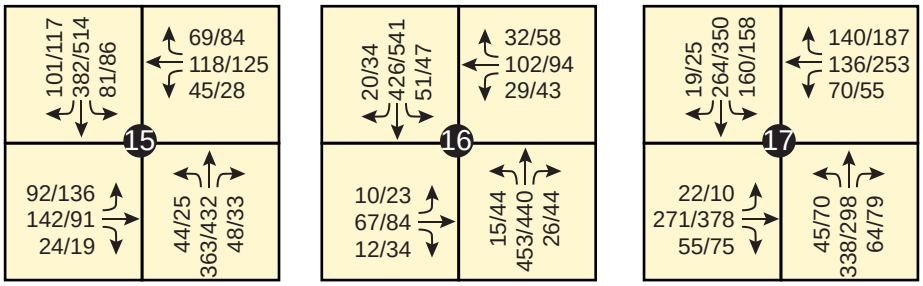
FIGURE 5.10-5b

4/26/12 vsa...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_5b.ai





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YEAR 2016 NO PROJECT TRAFFIC VOLUMES

April 2012 — Hydrogen Energy California (HECA)
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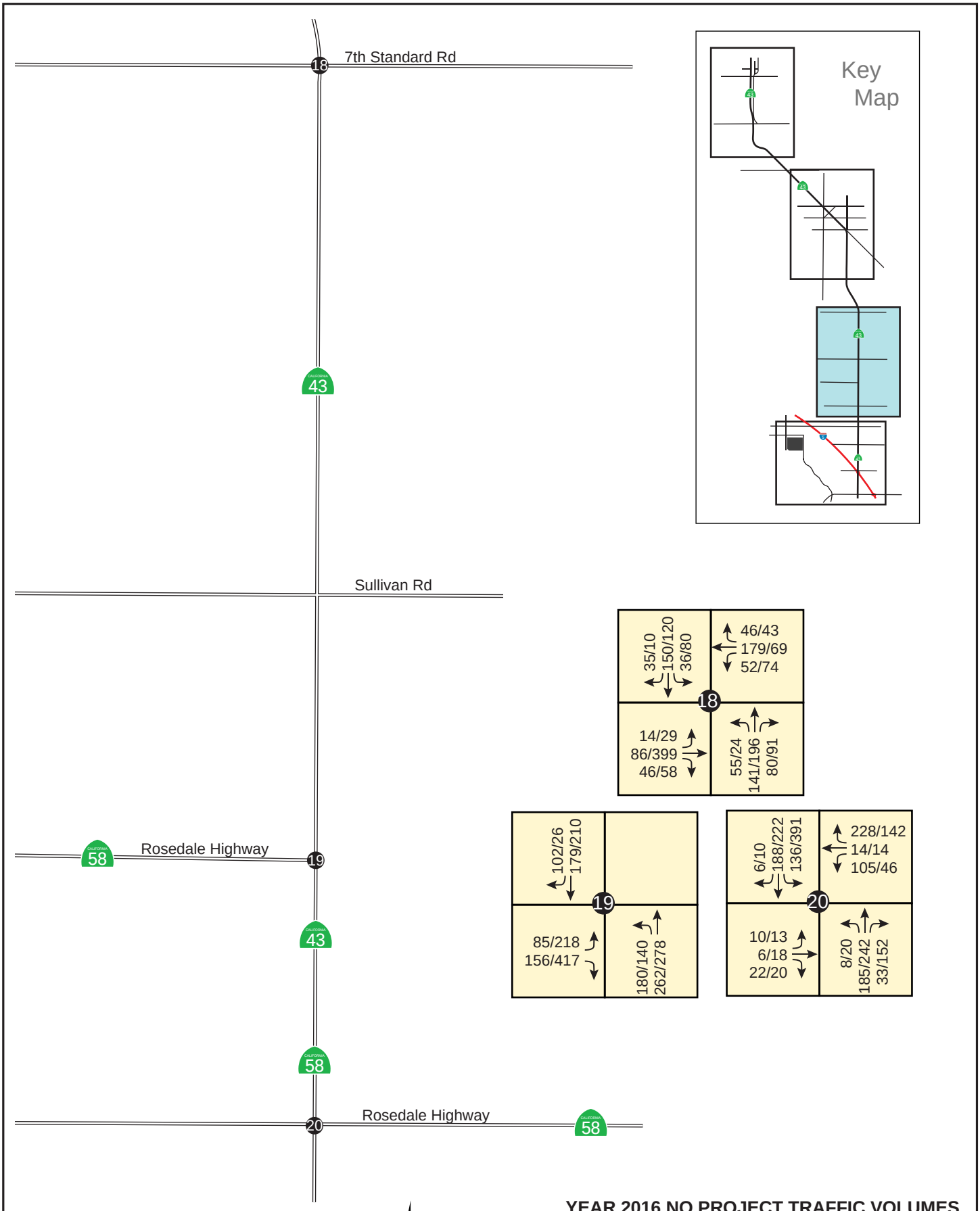
FIGURE 5.10-5c



YEAR 2016 NO PROJECT TRAFFIC VOLUMES

April 2012 — Hydrogen Energy California (HECA)
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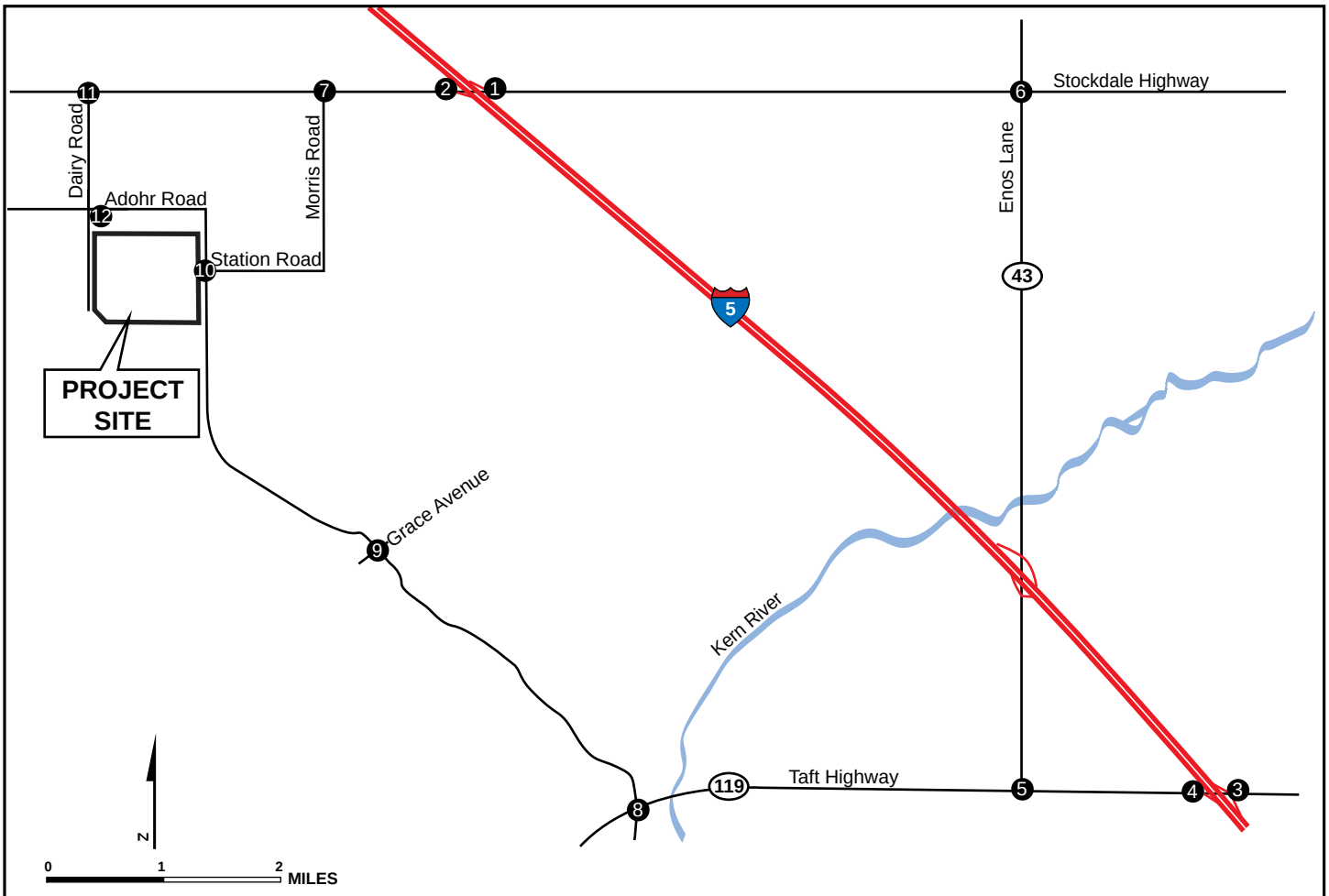
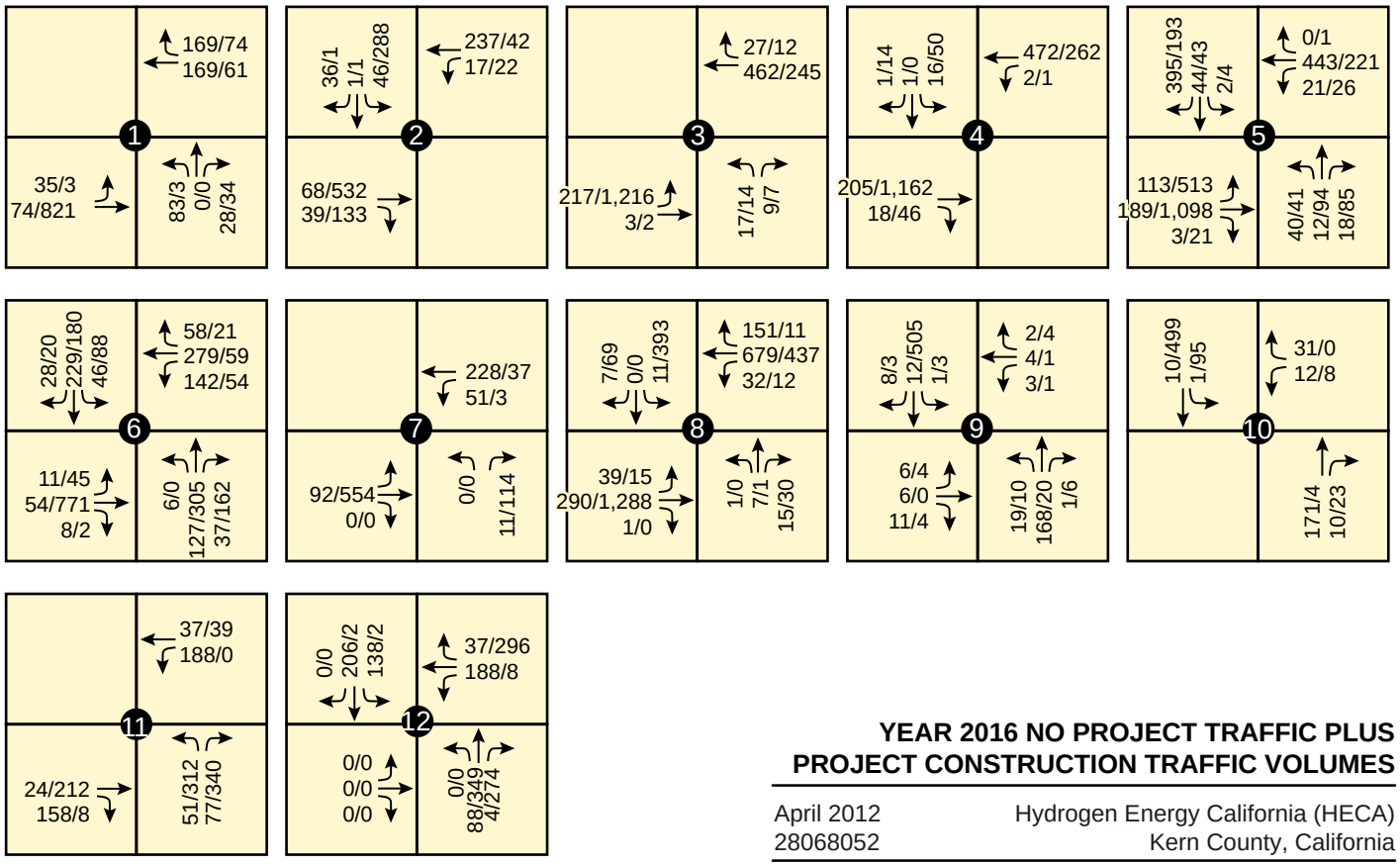
FIGURE 5.10-5d

4/26/12 vsa...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_5d.ai





YEAR 2016 NO PROJECT TRAFFIC PLUS PROJECT CONSTRUCTION TRAFFIC VOLUMES

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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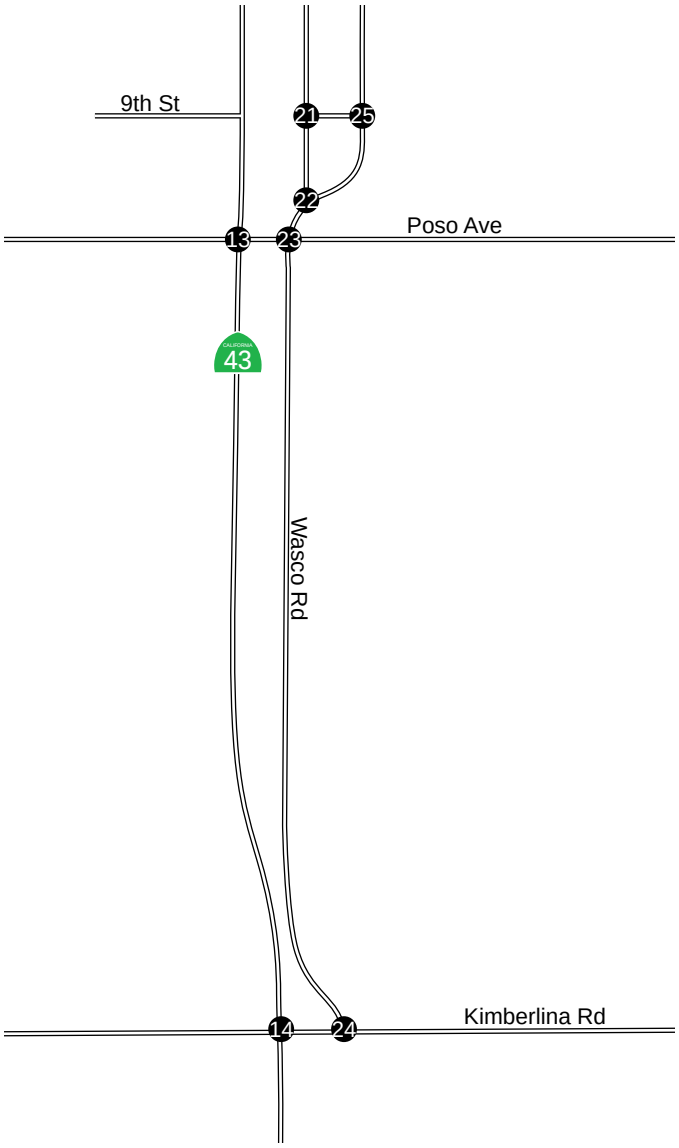
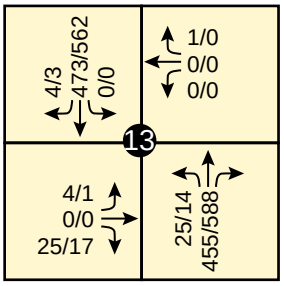
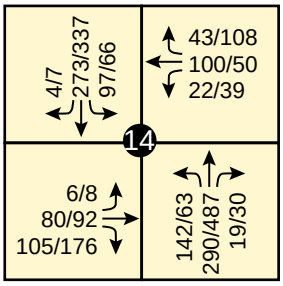
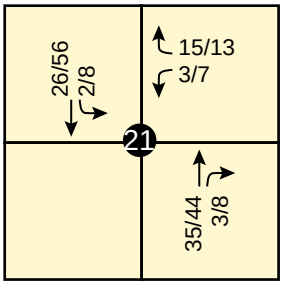
FIGURE 5.10-6a

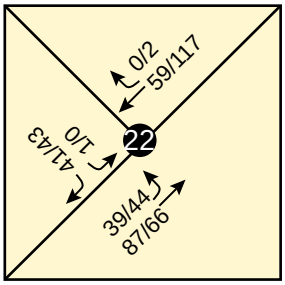
4/26/12 vsa/hk..T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_6a.ai

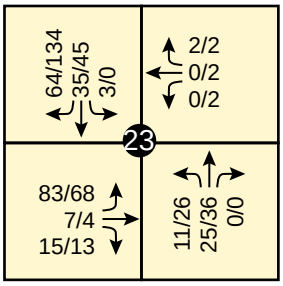


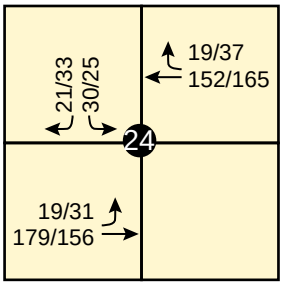


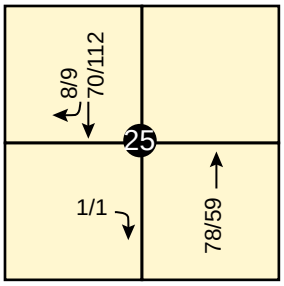


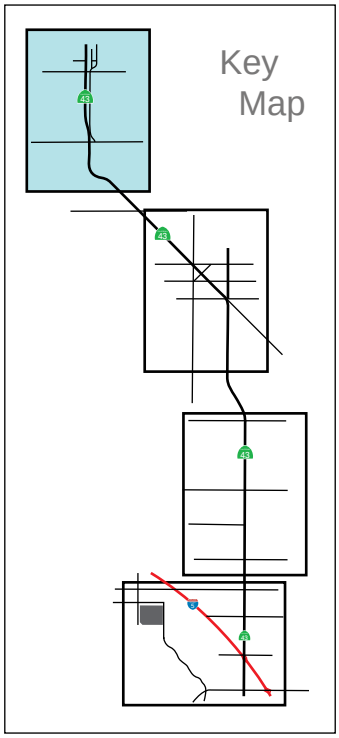












YEAR 2016 NO PROJECT TRAFFIC PLUS PROJECT CONSTRUCTION TRAFFIC VOLUMES

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Hydrogen Energy California (HECA)
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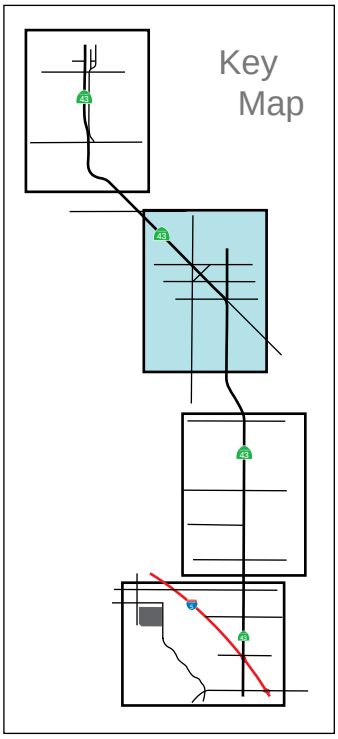
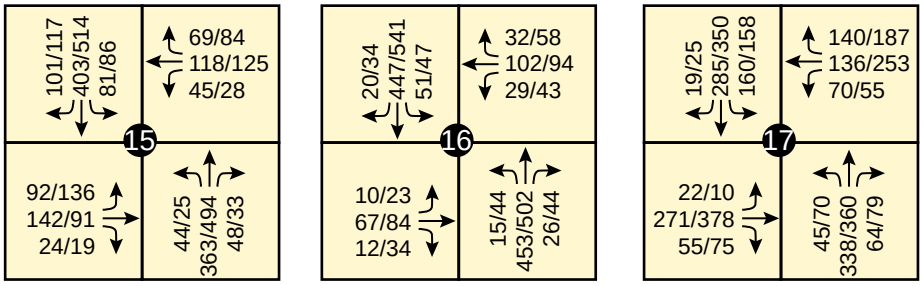
FIGURE 5.10-6b





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YEAR 2016 NO PROJECT TRAFFIC PLUS PROJECT CONSTRUCTION TRAFFIC VOLUMES

April 2012
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Hydrogen Energy California (HECA)
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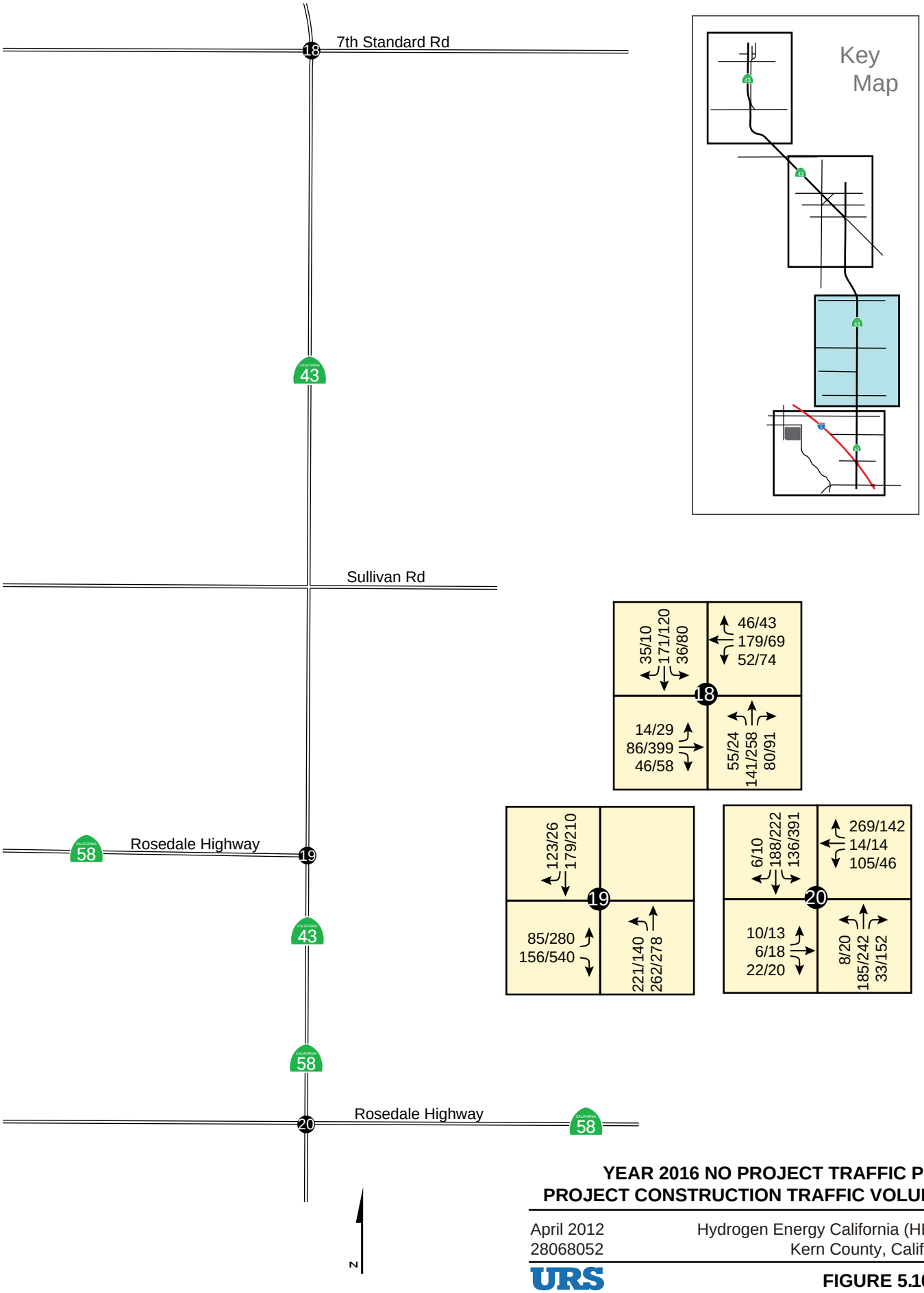
FIGURE 5.10-6c

4/26/12 vsa/hk..T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_6c.ai



YEAR 2016 NO PROJECT TRAFFIC PLUS PROJECT CONSTRUCTION TRAFFIC VOLUMES

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Hydrogen Energy California (HECA)
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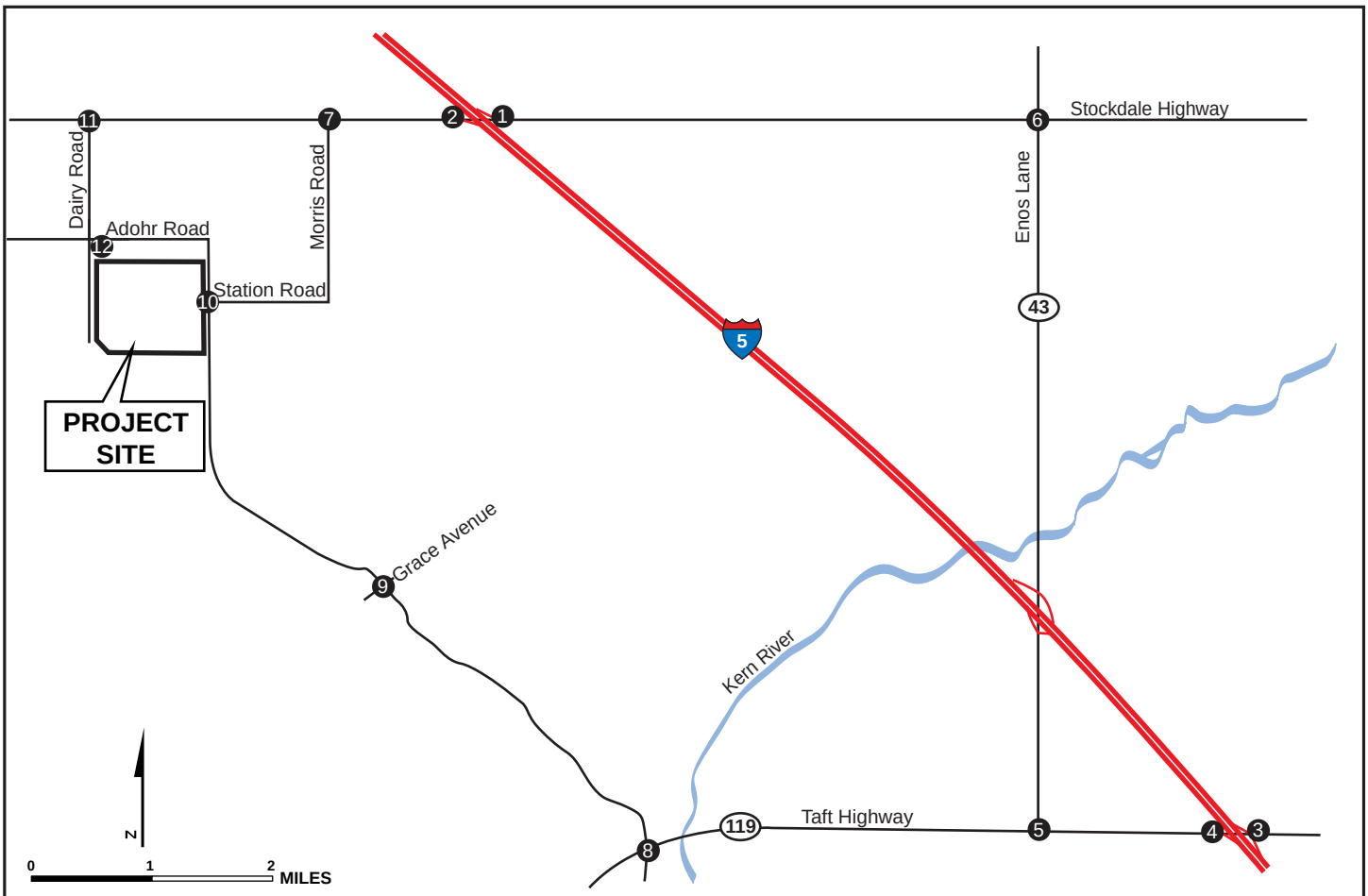
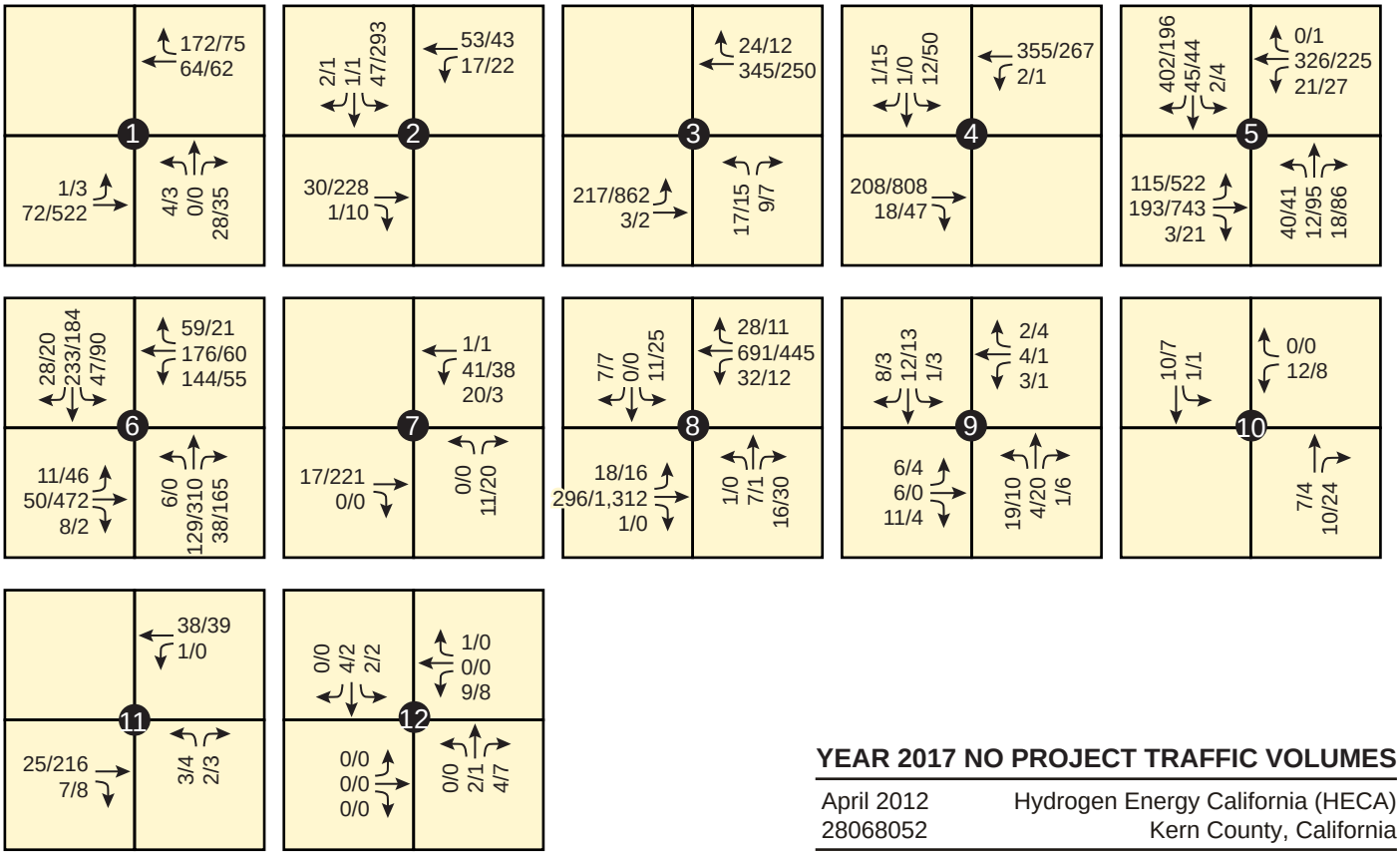
FIGURE 5.10-6d

4/26/12 vsa/hk...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_6d.ai





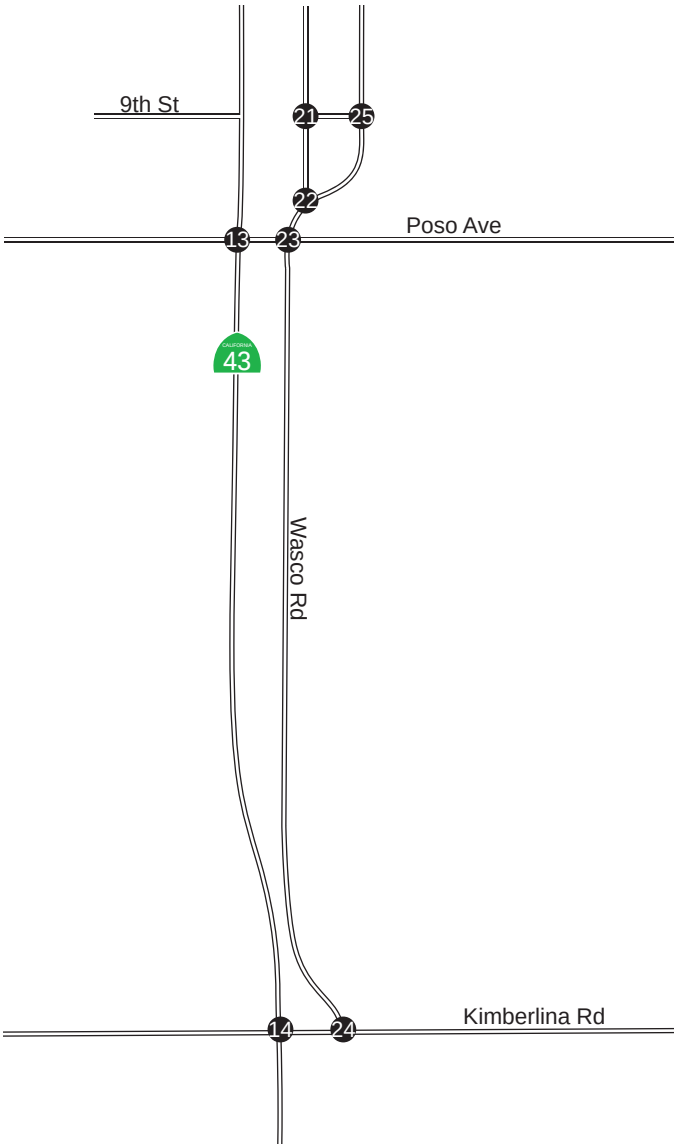
YEAR 2017 NO PROJECT TRAFFIC VOLUMES

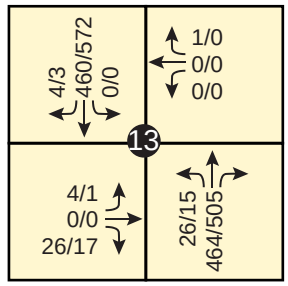
April 2012 — Hydrogen Energy California (HECA)
28068052 — Kern County, California

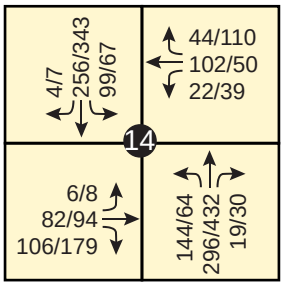
URS

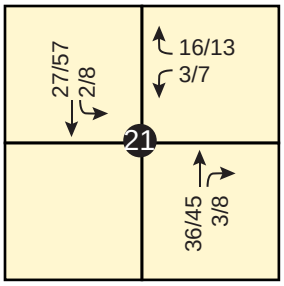
FIGURE 5.10-7a

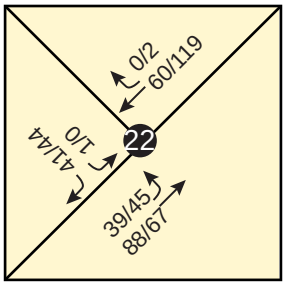
4/26/12 vsa/hk...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_7a_2017no.ai

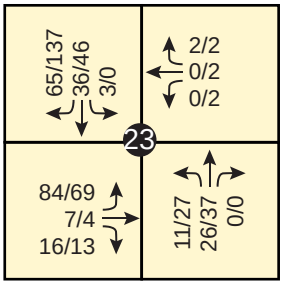


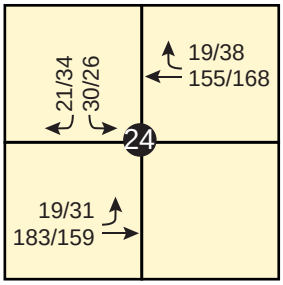


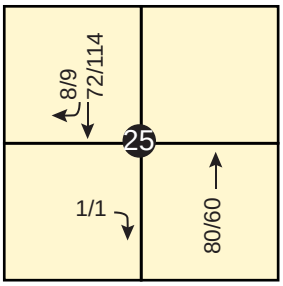


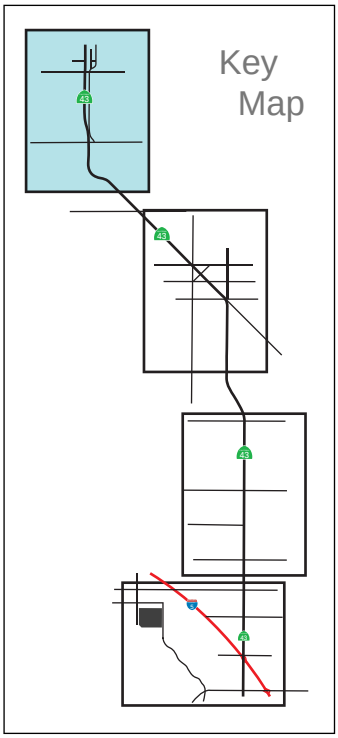












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YEAR 2017 NO PROJECT TRAFFIC VOLUMES

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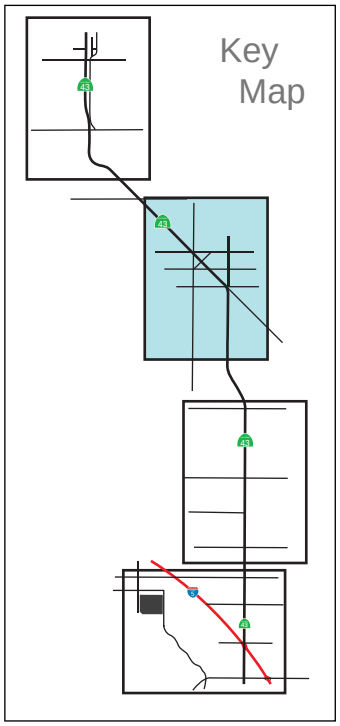
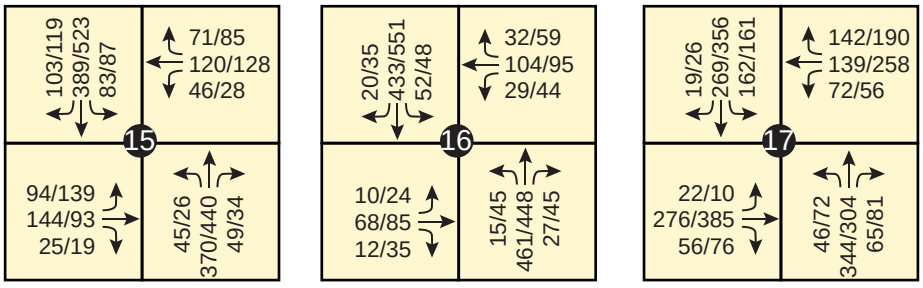
FIGURE 5.10-7b

4/26/12 vsa...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_7b.ai





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YEAR 2017 NO PROJECT TRAFFIC VOLUMES

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URS

FIGURE 5.10-7c

4/26/12 vsa...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_7c.ai

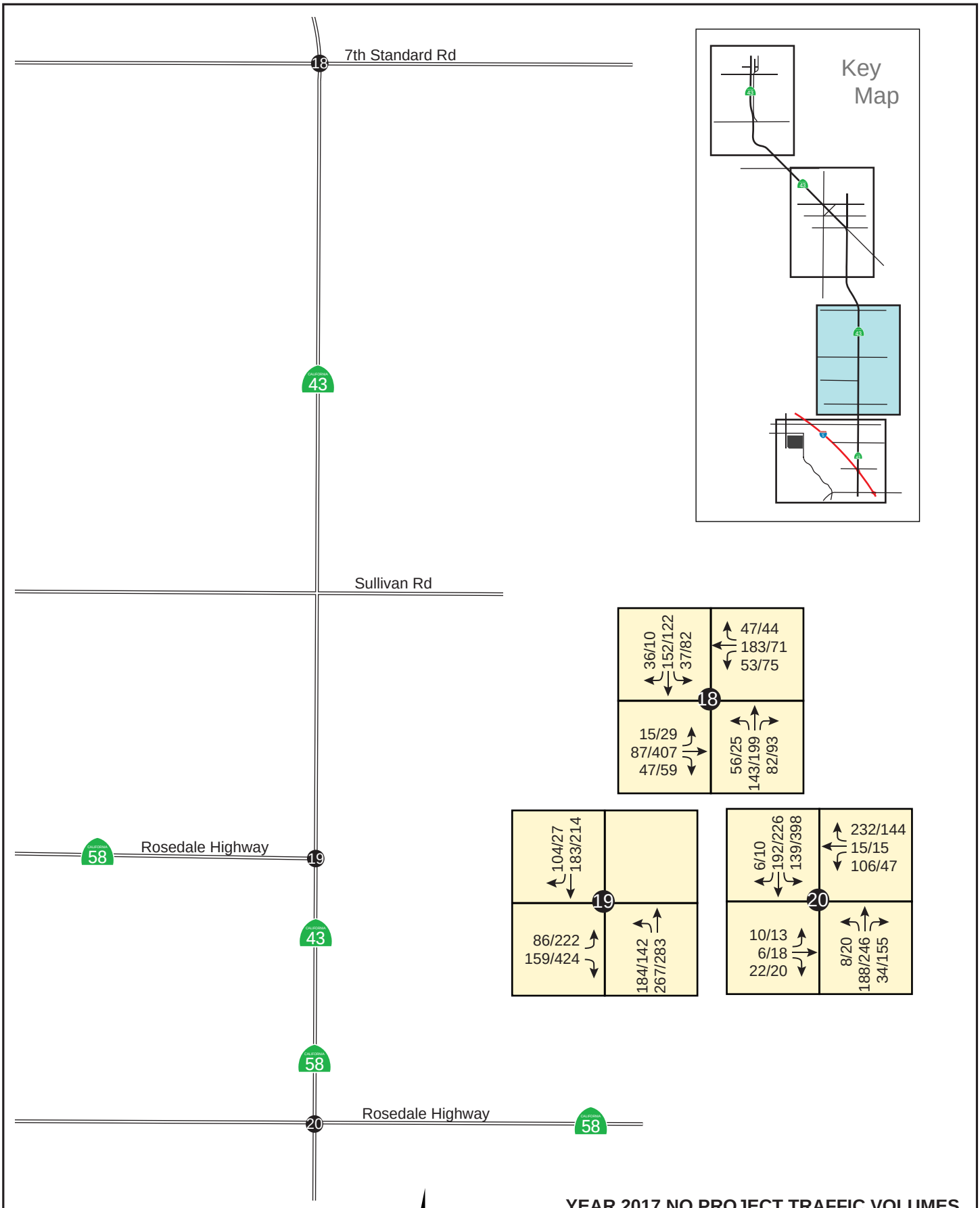

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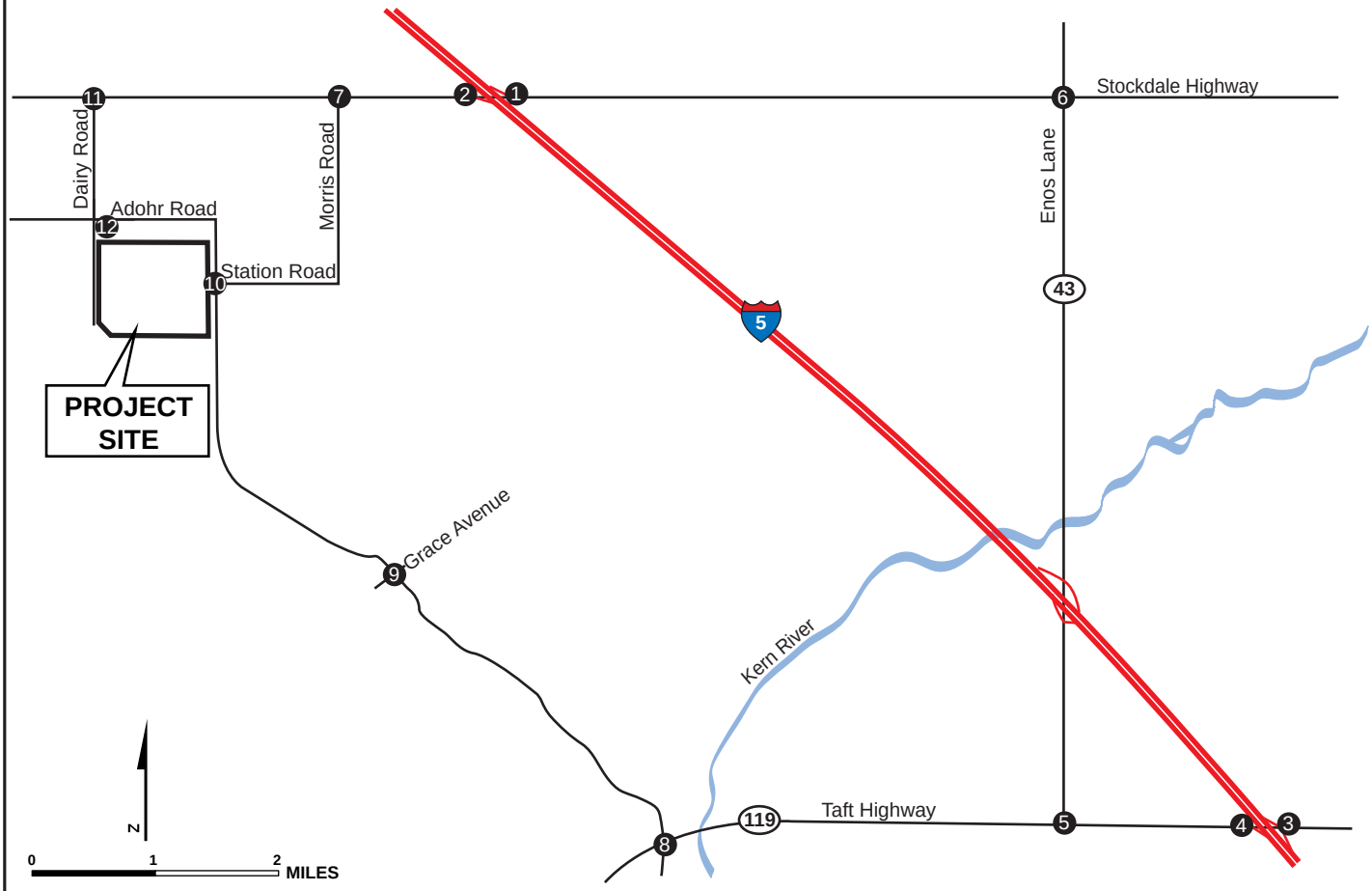
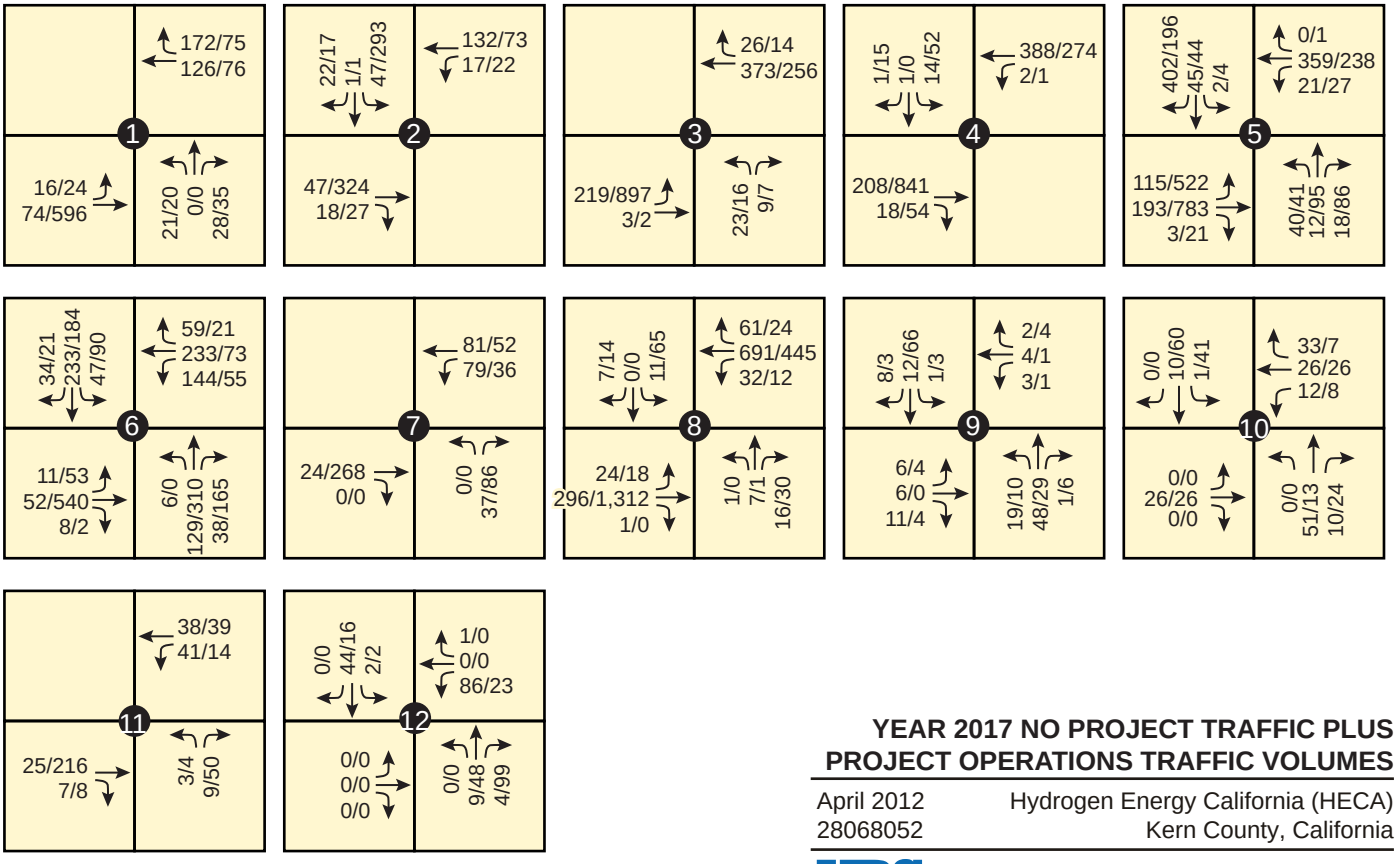
FIGURE 5.10-7d

4/26/12 vsa..T:\HECA-SCS 2012\GRAPHICS 20125.10_Traffic\Fig_5_10_7d.ai





YEAR 2017 NO PROJECT TRAFFIC PLUS PROJECT OPERATIONS TRAFFIC VOLUMES

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28068052 — Kern County, California

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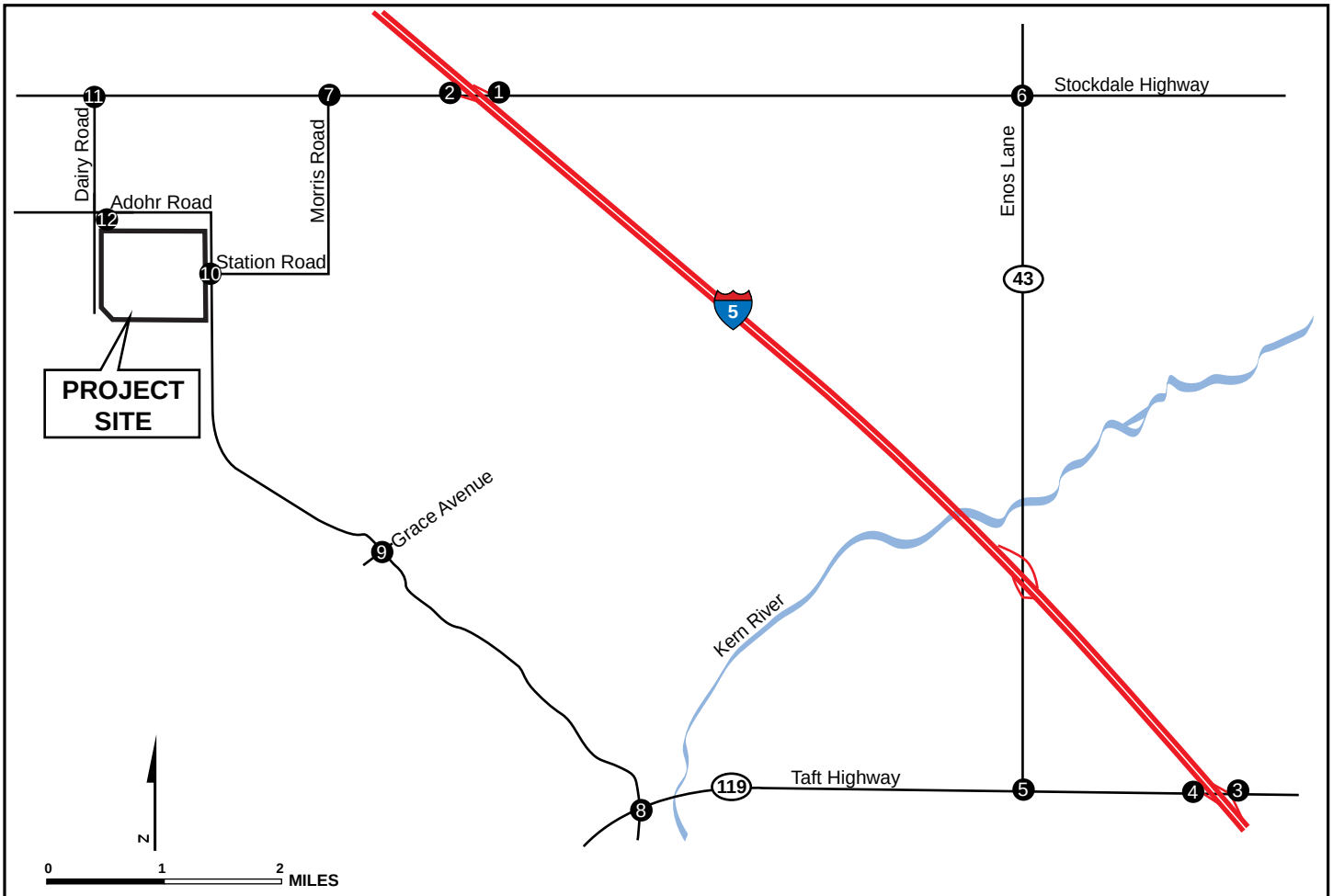
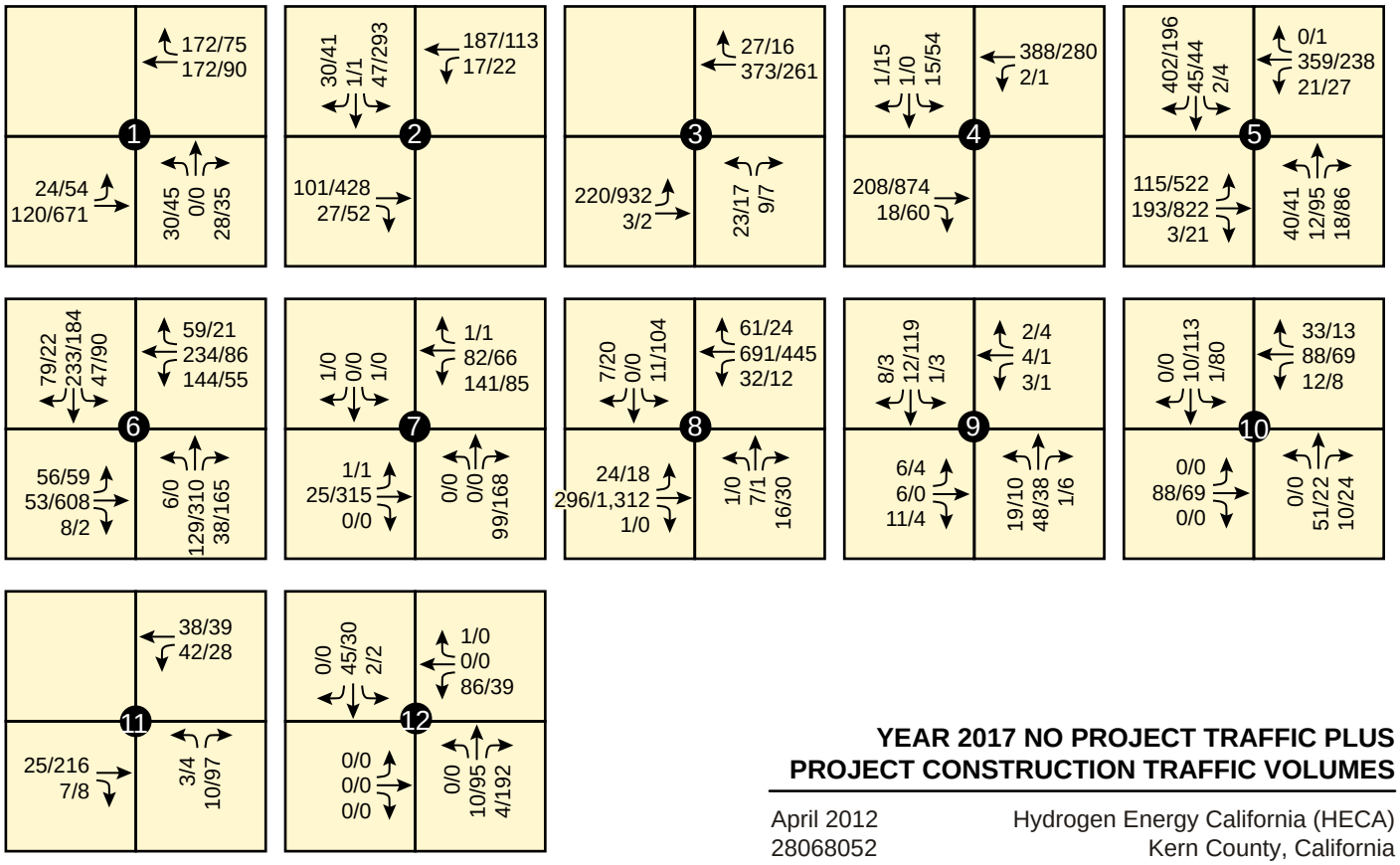
FIGURE 5.10-8

4/26/12 vsa/hk...T:\HECA-SCS 2012\GRAPHICS 2012\5.10_Traffic\Fig_5_10_8_2017no-plus.ai





YEAR 2017 NO PROJECT TRAFFIC PLUS PROJECT CONSTRUCTION TRAFFIC VOLUMES

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Hydrogen Energy California (HECA)
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FIGURE 5.10-9a

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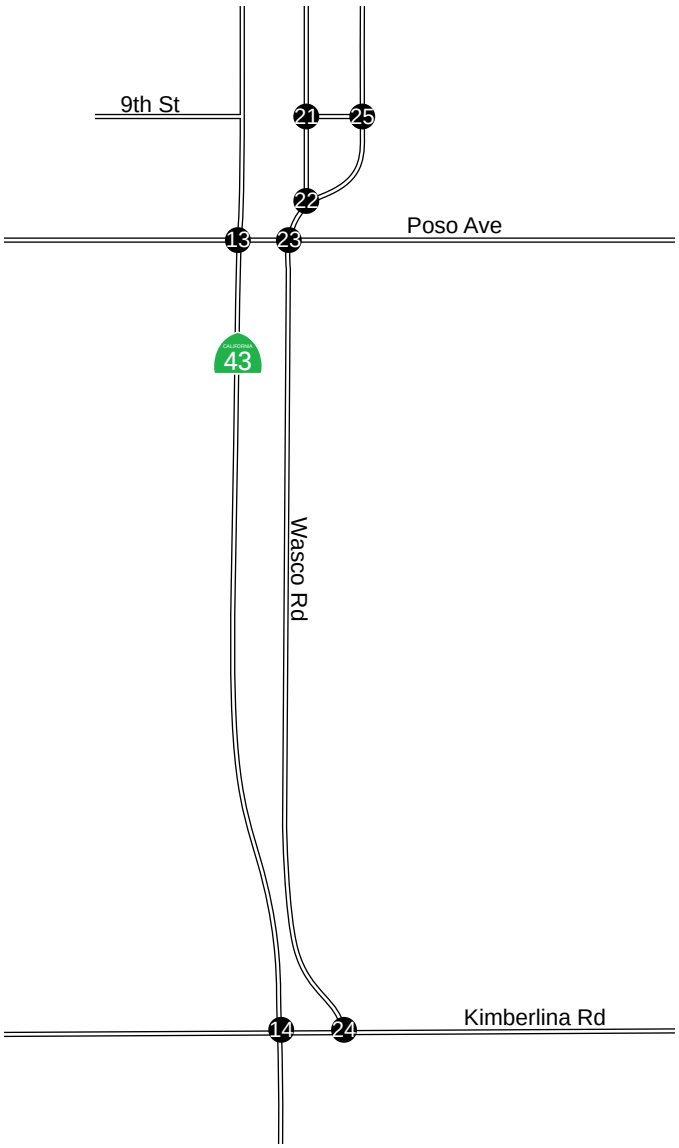

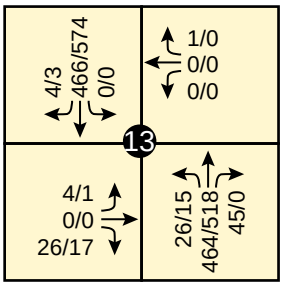

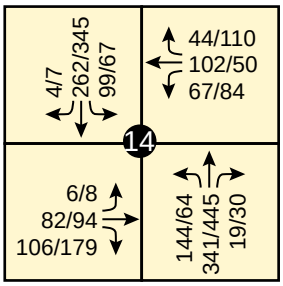

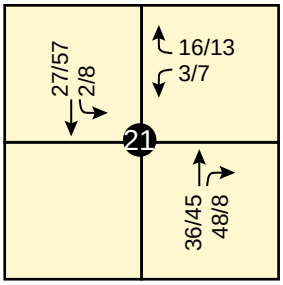

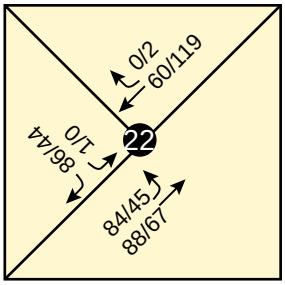

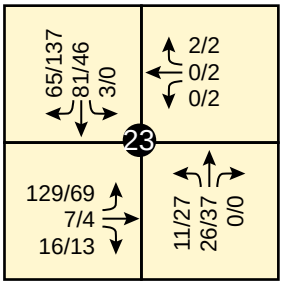

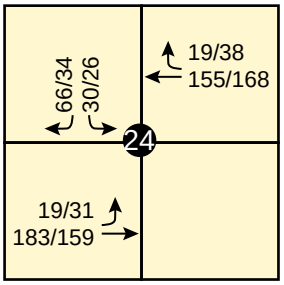

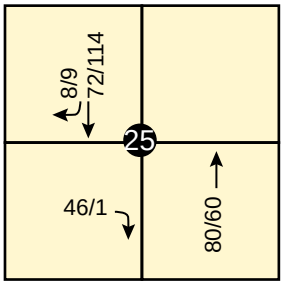

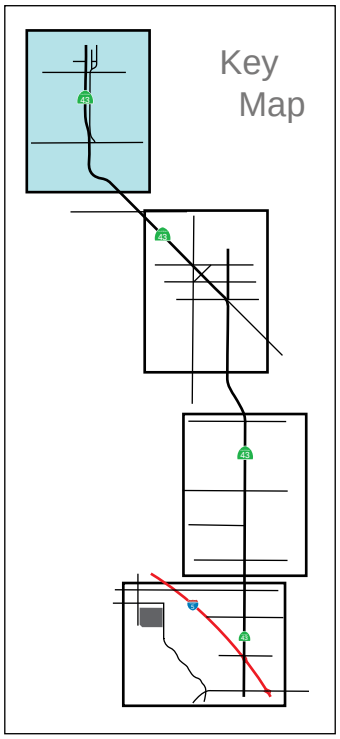

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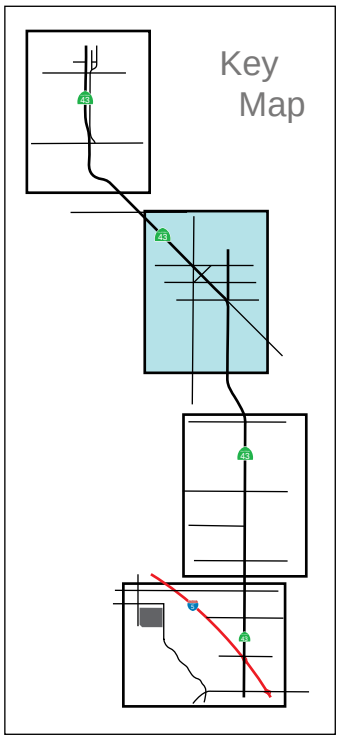

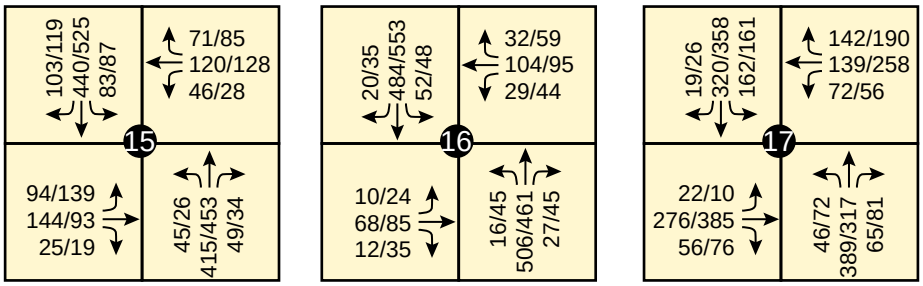

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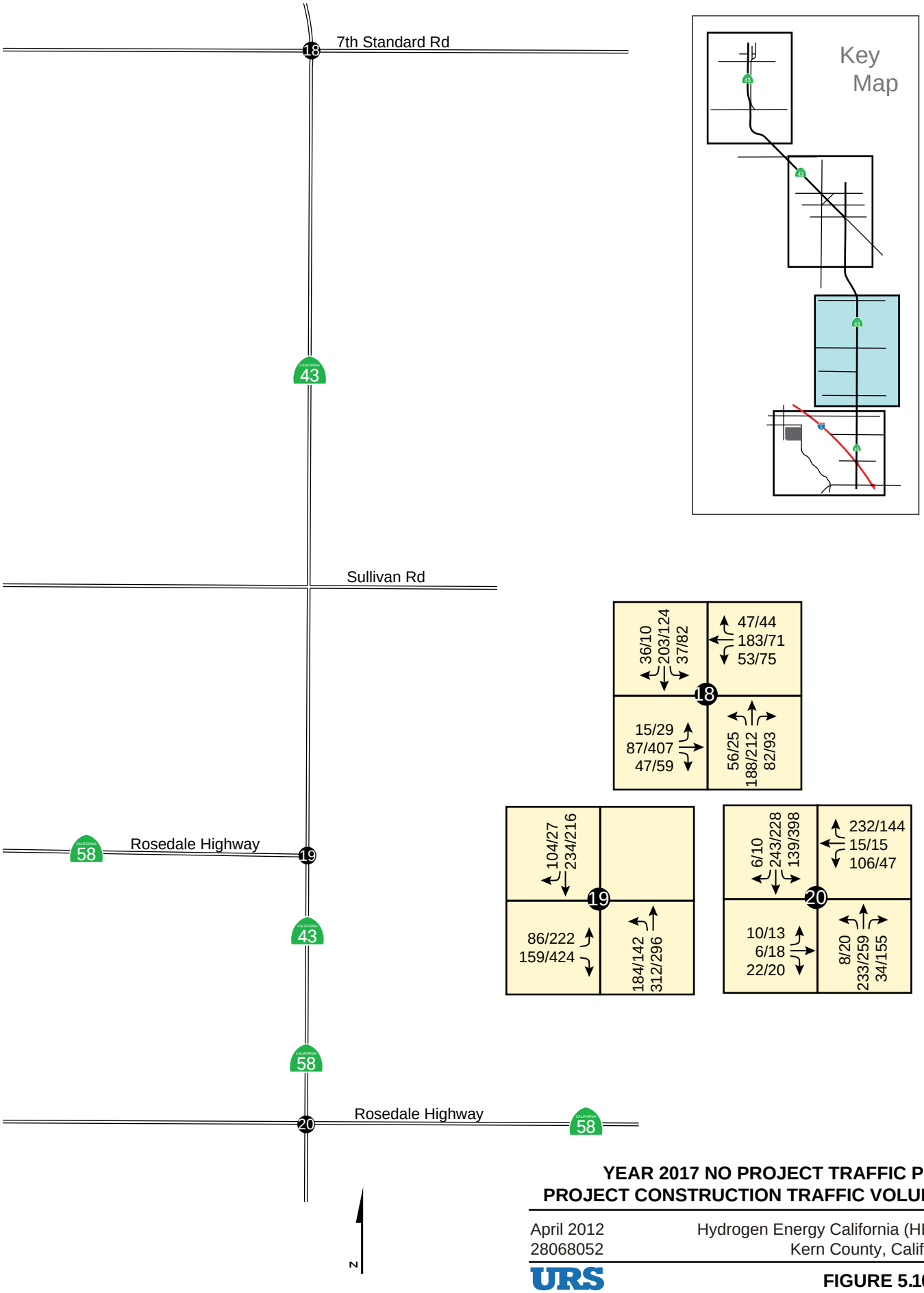

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5.11 VISUAL RESOURCES

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle (IGCC) polygeneration project (HECA or Project). The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR). CO_2 from HECA will be transported by pipeline for use in EOR in the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI). The EOR process results in sequestration (storage) of the CO_2.

Terms used throughout this section are defined as follows:

- **Project or HECA.** The HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes, including its linear facilities.

- **Project Site or HECA Project Site.** The 453-acre parcel of land on which the HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes (excluding off-site portions of linear facilities), will be located.

- **OEHI Project.** The use of CO_2 for EOR at the EHOF and resulting sequestration, including the CO_2 pipeline, EOR processing facility, and associated equipment.

- **OEHI Project Site.** The portion of land within the EHOF on which the OEHI Project will be located and where the CO_2 produced by HECA will be used for EOR and resulting sequestration**.**

- **Controlled Area.** The 653 acres of land adjacent to the Project Site over which HECA will control access and future land uses.

This introduction provides brief descriptions of both the Project and the OEHI Project. Additional HECA Project description details are provided in Section 2.0. Additional OEHI Project description details are provided in Appendix A of this Application for Certification (AFC) Amendment.

HECA Project Linear Facilities

The HECA Project includes the following linear facilities, which extend off the Project Site (see Figure 2-7, Project Location Map):

- **Electrical transmission line.** An approximately 2-mile-long electrical transmission line will interconnect the Project to a future Pacific Gas and Electric Company (PG&E) switching station east of the Project Site.

- **Natural gas supply pipeline.** An approximately 13-mile-long natural gas interconnection will be made with PG&E natural gas pipelines located north of the Project Site.

- **Water supply pipelines and wells.** An approximately 15-mile-long process water supply line and up to five new groundwater wells will be installed by the Buena Vista Water Storage District (BVWSD) to supply brackish groundwater from northwest of the Project Site. An approximately 1-mile-long water supply line from the West Kern Water District (WKWD) east of the Project Site will provide potable water.

- **Coal transportation.** HECA is considering two alternatives for transporting coal to the Project Site:

  — **Alternative 1, rail transportation.** An approximately 5-mile-long new industrial railroad spur that will connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market.

  — **Alternative 2, truck transportation.** An approximately 27-mile-long truck transport route via existing roads from an existing coal transloading facility northeast of the Project Site. This alternative was presented in the 2009 Revised AFC.

OEHI Project

OEHI will be installing the CO_2 pipeline from the Project Site to the EHOF, as well as installing the EOR Processing Facility, including any associated wells and pipelines needed in the EHOF for CO_2 EOR and sequestration. The following is a brief description of the OEHI Project, which is described in more detail in Appendix A of this AFC Amendment:

- **CO_2 EOR Processing Facility.** The CO_2 EOR Processing Facility and 13 satellites are expected to occupy approximately 136 acres within the EHOF. The facility will use 720 producing and injection wells: 570 existing wells and 150 new well installations. Approximately 652 miles of new pipeline will also be installed in the EHOF.

- **CO_2 pipeline.** An approximately 3-mile-long CO_2 pipeline will transfer the CO_2 from the HECA Project Site south to the OEHI CO_2 EOR Processing Facility.

This section discusses the potential for the construction, operation, and maintenance of the Project to cause significant impacts to aesthetic values within the Project vicinity. The section addresses the inventory of existing visual resources of the affected environment; the assessment of the environmental consequences of the Project on visual resources; and the laws, ordinances, regulations, and standards (LORS) pertaining to the aesthetic effects of the Project.

This visual resource analysis was conducted in conformance with California Energy Commission (CEC) guidelines for the inventory and assessment of visual impacts for an AFC. CEC guidelines, in turn, comply with the California Environmental Quality Act of 1970 (CEQA) documentation requirements (summarized in Section 5.11.2, Environmental Consequences). The study methods used, described in more detail in the inventory and impact assessment sections

that follow, were based on those established by the Bureau of Land Management (BLM) Visual Resource Management Inventory and Contrast Rating System (BLM, 1986), the Federal Highway Administration (FHWA) Visual Impact Assessment (DOT, FHWA, 1981), the *U.S. Forest Service (USFS) Visual Management System* (USFS, 1974 and 1995), and guidance provided by the CEC.

The analysis included in this section focuses on the HECA Project as well as the CO_2 pipeline associated with the OEHI Project. The analysis of the CO_2 EOR Processing Facility associated with the OEHI Project is included in Appendix A, Section 4.1, Aesthetics, of this AFC Amendment.

5.11.1 Affected Environment

This section contains an inventory of visual resources within the vicinity of the Project, a description of the regional landscape setting, the visual sphere of influence (VSOI) of the Project, and the inventory methods and results.

5.11.1.1 Regional Landscape Setting

Kern County has a large agricultural and industrial base. This region contains a number of large industrial operations, many with visible vapor plumes. Key agricultural commodities include grapes, almonds, milk, citrus, cotton, carrots, pistachios, hay, potatoes, and cattle. The county is also a significant producer of oil, natural gas, hydroelectric, wind-turbine, and geothermal power, and is host to numerous overhead electrical transmission lines. Kern County remains California's top oil-producing county, with over 85 percent of the State's 43,000 oil wells. The county accounts for one-tenth of overall U.S. oil production, and three of the five largest U.S. oil fields are in Kern County.

The Project Site lies within the southwestern portion of San Joaquin Valley, which stretches from the Sacramento-San Joaquin Delta in the north to the Tehachapi Mountains to the south. Various California coastal ranges line the valley to the west, including the Diablo and Santa Ynez, and the Sierra Nevada act as the eastern valley boundary. The climate is dry with hot summers and mild winters, and there is a persistent haze, generally characteristic of the air quality in the area that impairs the clarity of distant views.

The general area is characterized as relatively flat, with extensive current and previous soil disturbance associated with farming activities and ongoing oil field operations. The Project Site is generally flat, allowing for open, panoramic, and expansive views of the valley to the north, northwest and east. The closest notable topography is Hillcrest Point, over 5 miles away.

The Project Site is located in the Exclusive Agriculture (A) zone. Electrical Power Generating Plants are permitted in this zoning district with a conditional use permit. Land within 1 mile of the Project Site is used primarily for farming purposes, particularly the cultivation of cotton, alfalfa and onions. A former fertilizer manufacturing plant (Port Organics) was adjacent to the northwest of the Project Site. Small structures used for agricultural purposes are also located northwest of the Project Site. The structures associated with the organic fertilizer production facility, such as the large grain elevators and metal storage tanks, contribute to the landscape

character of the area. Character photos of the areas surrounding the Project Site (see Figures 5.11-3 through 5.11-8, which show neighboring land uses to help the reader better understand the landscape character and common land uses within the vicinity).

The western border of the Tule Elk State Natural Reserve is located approximately 1,700 feet to the east of the Project Site. The nearest single-family dwellings are located approximately 1,400 feet to the east; 3,300 feet to the southeast; and 4,000 feet to the north. The EHOF is located 1 mile south of the Project Site. Currently, there is a residence located approximately 370 feet to the northwest. The option to purchase this 5-acre parcel adjacent to the Project Site was acquired subsequent to the 2009 Revised AFC. This parcel will now be part of the Controlled Area.

Several semi-urban/urban areas surround the Project region, from 2 to 15 miles away from the Project Site. Those nearest include the community of McKittrick, the unincorporated communities of Tupman and Buttonwillow, and the City of Taft. Other than a few locations on the outskirts of the unincorporated community of Tupman, none of these areas has direct views to the Project Site. The nearest large incorporated city in the area is Bakersfield, which lies approximately 7 miles east of the Project area and contains the largest population in the nearby region, with an estimated 323,213 people in 2007 (CDOF, 2009).

Existing night lighting in the area is scattered and generally limited to residences. The few major sources of night lighting in the region include oil extraction operations in the Elk Hills which are visible and noticeable from the Project Site and surrounding area. Overall, the region is primarily dark with numerous light sources that, while visible, do not tend to light the night sky significantly.

The California Aqueduct runs in a northwest to southeast orientation approximately 1,900 feet south of the Project Site and is the dominant water feature in the Project area. Other water features in the region include the West Side and Outlet Canals approximately 500 feet to the south, the Kern River Flood Control Channel approximately 700 feet to the south, the East Side Canal approximately 1,300 feet to the east, and the Buena Vista Aquatic Recreation Area/Lake Webb located approximately 9 miles to the southeast.

The Tule Elk State Natural Reserve, an approximately 955-acre reserve area, is located approximately 1,700 feet east of the Project Site (closest point to the Project Site). Management of the Tule Elk State Natural Reserve is under the jurisdiction of the California Department of Parks and Recreation. The Tule Elk State Natural Reserve is a refuge to the tule elk, a rare species of elk that was once nearly hunted to the point of extinction. The reserve contains the Tule Elk Reserve State Park that includes a visitor center, a small park with shaded picnic tables, and a viewing platform/observation deck). The observation deck, approximately 3,900 feet from the Project area boundary, provides visitors views of the reserve area.

There are no existing recreational trails of local importance, nor are there plans for future trail routes or bike paths identified within the VSOI. The two closest areas considered recreational are the Elk Hills Elementary School playground, located approximately 2.3 miles southeast of the Project Site, within the unincorporated community of Tupman, and the Tule Elk State Natural Reserve.

5.11.1.2 Visual Sphere of Influence

The VSOI for the Project represents the area within which the Project could be seen and where impacts to visual resources could potentially occur (Figure 5.11-1). This area was determined using geographic information system (GIS)-based viewshed analyses conducted using 10-meter-grid cell resolution generated from the National Elevation Dataset (NED) from the U.S. Geological Survey [USGS] to map the viewshed boundaries of the Project, including the above-ground transmission line. USGS Digital Elevation Model (DEM) files were imported into an ArcMap-based GIS using the spatial analysis extension. Once in GIS, the DEMs were mosaicked. The combined DEM was used to run viewshed analyses in State Plane California, Zone V, Units U.S. Feet, North American Datum 83 (NAD 83). The Project's tallest structure, the coal feedstock dryer stack, measuring at a height of 305 feet, and transmission poles measuring 110 feet in height, were input into the viewshed model with a vertical observer offset of 6 feet. Other above-ground or at-grade linear Project components, such as the proposed railroad spur, and underground structures, such as CO_2 and natural gas lines, were not included in the viewshed model but were considered in the analysis. The resulting polygon represents the viewshed of the Project , assuming no vegetation shielding.

Overall, the Project Site is clearly visible from the west, north, and east with intermittent visibility from areas located to the south and southeast. The hills comprising the EHOF block the majority of views of the Project Site from the south/southwest.

The final VSOI was mapped to identify areas where the potential for significant impacts to views occur. Per CEC guidance, the review emphasized the identification of sensitive viewer areas within a 5-mile radius; however, potentially sensitive resources were reviewed within the framework of the following distance zones:

- **Foreground:** 0 to 0.5 mile from the observer's position. At this distance, the observer can view details of trees, shrubs, wildflowers, and animals.

- **Middleground:** 0.5 to 5 miles from the observer's position. At this distance, the observer can see forest stands, natural openings, masses of shrubs, and rock outcrops.

- **Background:** 5 miles to horizon from the observer's position. At this distance, the observer can view mountain peaks, ridgelines, and patterns of forest stands and openings.

5.11.1.3 Visual Study Inventory Components

The following sections detail the visual study inventory components used to provide the baseline for the assessment of potential impacts. The inventory included three primary components, discussed below: (1) scenic quality, (2) Existing Scenic Integrity Levels (ESILs), and (3) the identification of sensitive viewing areas.

Scenic Quality

Scenic quality is defined as the visual appeal of a tract of land (BLM, 1986), and includes both natural and man-made components. Scenic quality classes were established by evaluating the

distinctiveness and diversity of a particular landscape setting in relation to the following elements (BLM, 1986):

- Landform
- Vegetation
- Water
- Color
- Adjacent scenery
- Scarcity within the landscape
- Cultural modifications

Based on this assessment, landscapes were classified as follows:

- **Class A:** Areas have outstanding diversity or interest. Characteristic features of landform, water, and vegetation are distinctive or unique in relation to the surrounding region. These areas contain considerable variety in form, line, color, and texture.

- **Class B:** Areas have above-average diversity or interest, providing some variety in form, line, color, and texture. The natural features are not considered rare in the surrounding region but provide adequate visual diversity to be considered fairly unique.

- **Class C:** Areas have minimal diversity or interest where representative natural features have limited variation in form, line, color, or texture in the context of the surrounding region.

Scenic Attractiveness Classification Evaluation Forms (Figures 5.11-9 through 5.11-14) were developed for key view areas within the VSOI. The values highlighted in the scenic quality rating box on the forms indicate the assigned values (H – high, M – moderate, L – low) for each natural feature (e.g., landform, vegetation, water, etc.) or negative/positive cultural modification. The combined value of these elements is used to classify existing scenic quality.

Existing Scenic Integrity Levels

The Existing Scenic Integrity Level (ESIL) was defined as the extent to which natural features have been modified by human actions . An inventory of the ESILs within the VSOI was conducted. Varying cultural modifications included the unincorporated community of Tupman, cultivated farmlands, existing power/telephone transmission lines, oil field activities and associated structure (storage tanks, etc.), abandoned structures, miscellaneous industrial storage tanks, property fencing, and Tupman and Adohr Roads and other roadways. The following ESIL criteria were used to classify the degree of modification:

- **High:** Landscape character appears intact. Deviations are present but repeat form, line, color, texture, and patterns common to the landscape character so completely and at such a scale that they are not evident.

- **Moderate:** Landscape character appears slightly altered. Noticeable deviations remain visually subordinate to the landscape character being viewed.

- **Low:** Landscape character appears heavily altered. Deviations strongly dominate the landscape character. Deviations do not borrow from attributes such as size, shape, edge effects, vegetative type changes, or architectural styles within or outside the landscape being viewed.

Viewer Concern

Viewer concern is described as an observer's anticipated awareness and appreciation of the existing public view, including his or her interest in preserving that view (CEC, 2012 [Draft Appendix VR-1]). A viewer considers type of use, user attitude, volume of use, adjacent land use, visual quality, and whether the area is protected by existing laws, public regulations or policies, and/or planning documents.

Three levels of viewer sensitivity (high, moderate, and low) were used to describe the sensitivity of viewers within the study area. High-sensitivity viewpoints identified in the study area include existing residences and recreation areas. Moderate-sensitivity viewer areas identified in the study area consist of existing area roadways. Low-sensitivity viewer areas include industrial areas. These low-sensitivity areas were not evaluated in detail in this analysis because they are assumed to be a compatible use with the facility, and therefore not expected to result in significant visual impacts.

Sensitive Viewing Areas

Sensitive viewing areas within the VSOI were identified through review of existing land use data, agency contacts, and field observations. Additional input was received through discussions with the CEC's visual resources technical lead for the Project. It was determined that the majority of sensitive viewing areas within the VSOI were located within the middleground/ background distance zones. Sensitive viewing areas located within 5 miles of the Project include:

- Schools; parks; recreation areas; wildlife areas; visitor centers; and areas used for camping, picnicking, bicycling, or other recreational activities

- Residential areas, including the residences located closest to the Project Site and residences located closest to the transmission line route and switching station interconnection

- Travel routes, such as major roads or highways used primarily by origin/destination travelers

KOP Selection

Key Observation Points (KOPs) were selected to represent areas of high visual sensitivity located within the VSOI. KOPs were identified based on review of available land use data, field inspection, and discussion with CEC's visual resources technical lead. The inventory of KOPs included three components: (1) identification and photo-documentation of KOPs; (2) classification of viewer concern; and (3) description of Project Site visibility from KOPs, including the distance from the KOPs to the Project Site, the amount of screening, the number of viewers, and the duration of their view of the Project Site. Visibility determines how the Project

will be seen from a particular viewing area or KOP. It is expected that the ability of the viewer to perceive detail, such as form, line, color, and texture, diminishes with increasing distance.

Visual Impact Susceptibility on Sensitive Viewing Areas

The degree of impact to sensitive views was determined by analyzing the following components at each KOP:

- ESIL**:** The degree of existing disturbance within the natural setting
- Viewer Sensitivity**:** All residential and recreational viewers were considered high sensitivity viewers, while motorists were considered less sensitive
- Project Visibility**:** An assessment of the viewing angle, potential screening, lighting conditions, and time of day
- Viewer Exposure**:** An assessment of the distance from the Project, number of viewers, and duration of views

Inventory results for scenic integrity, viewer concern, and Project visibility were compiled to derive an overall value describing impact susceptibility, or the degree to which a sensitive viewpoint will be impacted by changes within its viewshed.

5.11.1.4 Inventory Results

This section presents the results of the inventory of existing conditions within the VSOI, including a description of sensitive viewing areas and KOPs. Impact susceptibility scores are presented in Table 5.11-1.

Scenic Quality

The VSOI for the Project area was characterized as having Class C scenic quality, as landscapes lack significant natural amenities and are heavily modified from their natural state due to existing agricultural production and industrial use. The landscape appeared to have minimal diversity or interest in form, line, color, or texture in the context of the surrounding region (see Figures 5.11-9 through 5.11-14).

Color created by existing vegetation, including cropland, is expected to vary based on seasonality and type of crop. Within the VSOI, views of mountainous areas added variety to background views. Predominantly flat topography provided for large expansive views of the valley. However, a persistent haze is characteristic of the air quality in the area and frequently impairs the clarity of distant views.

Existing Scenic Integrity Levels

Landscapes within the VSOI were classified as having low ESILs due to the presence of man-made development such as farming and related facilities, active and abandoned oil fields and

associated structures, telephone/transmission line systems, other industrial facilities, storage tanks, the Pacific Gas and Electric Company (PG&E) Midway Substation, residential development, fencing, and roadways.

Sensitive Viewing Areas

Per discussions with the CEC's visual resources technical lead for the Project, field observations, and review of surrounding land uses, it was determined that sensitive viewing areas within the VSOI consisted primarily of the following:

- Recreational viewers at the Elk Hills Elementary School playground, located approximately 2.3 miles southeast of the Project Site in the unincorporated community of Tupman;
- Residential viewers in houses and neighborhoods within the VSOI;
- Roadway travelers located on I-5, Stockdale Highway and Brite Road.

During field surveys conducted within the Project vicinity, it was determined that the picnic area within the Tule Elk State Natural Reserve, located approximately 1,700 feet east of the Project Site, is the closest recreational view to the Project Site (see Figure 5.11-3 [Figure 1 of 6]). Views from the reserve toward the Project Site, however, are partially screened by vegetation. Through discussion with the CEC staff, it was determined that no KOP was required at this location. The analysis of potential impacts to recreational viewers instead focused on the Elk Hills Elementary School. Due to the elevated position of the school and its playground, users within the school playground will have direct middleground views to the Project Site.

The nearest residential viewer is located approximately 1,400 feet to the east of the Project Site on Station Road. This residence will have immediate foreground views of the Project (Figure 5.11-15). Other residences represent middleground or greater views and are generally located to the north of the site or to the southeast in the unincorporated community of Tupman.

Stockdale Highway and Brite Road are not considered Designated Scenic Highways by federal (FHWA), state (California Department of Transportation [Caltrans]), or local standards. No travel routes within the VSOI are designated as federal, state, or county scenic highways or travel routes subject to aesthetic management goals or objectives. Although the current Kern County General Plan does not indicate any of the roadways and highways within this Project's vicinity as designated scenic routes, the Tupman Rural Community Specific Plan (dated October 1984) and the Buttonwillow Community Development Plan (dated April 1974) do indicate a proposed County Scenic Route 11 within the Project vicinity.

Travelers along the intersection of Stockdale Highway and I-5, located approximately 2 miles northeast of the site (at the closest point), will experience both indirect and direct views of the Project Site (see Figure 5.11-21). Topography and cultural modifications create visual screening, thereby limiting views of the Project Site. However, where views of the Project Site are not obstructed, travelers will have a clear, albeit distant, view of the larger on-site structures. Traffic flow/road counts along I-5 indicate that approximately 32,500 travelers/average daily trips (ADT) use the freeway near the Stockdale Highway/I-5 interchange.

Topography and cultural modifications create few obstructions within the largely panoramic view to the east (see Figure 5.11-14).

Key Observation Points

Six KOPs were identified to represent the range of views of the Project Site. KOPs are described as follows:

Key Observation Point No. 1

KOP 1 is located on Station Road, approximately 2,600 feet east of the middle of the Project Site. This KOP was selected to represent roadway travelers heading westbound, and residences located on the south side of the road. These residences represent the closest residences identified by the CEC staff with unobstructed and prolonged views of the Project Area (see Figure 5.11-15).

Topographic relief is generally flat terrain in the foreground, middleground, and hilly terrain in the distant background. There are no water sources within view from this KOP. The California Aqueduct is located in the background; however, as it is below surface grade, is not visible from this residence. A variety of cultural modifications, including cultivated farmlands, existing power/telephone transmission lines, oil field activities and associated structures, abandoned structures, miscellaneous industrial storage tanks, a fertilizer plant and associated structures, property fencing, and Station and Tupman Roads, are visible in middleground and distant range views.

The hills of the EHOF Unit are barely visible in the distant background and blend in with the mountainous terrain, providing a distant visual backdrop. What little color variation exists is created mainly from cultivated farmlands. The main visual interest and/or draw to this area results from the open expanses of land, geometric forms, and edges created by the cultivated cropland. While this landscape is mildly interesting within its setting, it is fairly common within the region. The ESIL from this area is characterized as low.

Key Observation Point No. 2

KOP 2 is located on the edge of the eastbound lane of the Stockdale Highway, approximately 1 mile north-northwest of the Project Site (see Figure 5.11-17 for this view and Figure 5.11-1 for the KOP location). Although the Stockdale Highway is not considered a Scenic Highway by federal (FHWA), state (Caltrans), or local standard, Stockdale Highway represents a major east–west connection in the area south of Buttonwillow and north of Tupman with connection to the I-5 corridor. Additionally, two south-facing residences are located on the north side of the road in this location and are representative of middleground residential viewers north of the Project Site.

Existing cultural modification, including existing power/telephone lines, miscellaneous industrial storage tanks, a fertilizer production plant, and roadways can be seen from KOP 2. Vegetation and color within the area is sparse (tan-grayish landscape with geometric cultivated fields of monotonous green). No water sources are visible within this area. Common viewer duration is

considered short and intermittent (i.e., from traveler views focusing on the road). The ESIL from this area is considered low.

Key Observation Point No. 3

KOP 3 is located at the Elk Hills Elementary School playground, approximately 2 miles southeast of the Project Site. This location represents the "worst-case" recreational view of the Project Site (see Figure 5.11-19 for this view and Figure 5.11-1 for the KOP location). The Elk Hills Elementary School playground was selected to represent views of the Project by individuals engaged in recreation activities. Topography in the area consists of a broad, horizontal composition varying from relatively flat terrain to rolling hills in the foreground, adding to the panoramic visual appeal of the form and line characteristics of the area. The only water source within view from this KOP is the California Aqueduct, which runs in a northwest to southeast orientation south of the Project Site, and is the dominant feature visible in the foreground of this view.

A variety of cultural modifications, including the California Aqueduct, existing power/telephone transmission lines, miscellaneous industrial storage tanks, property fencing, and Tupman Road, are visible in middleground and distant range views. The immediate area is characterized by little color variations (mainly from patches of sparse low-lying vegetation, and low contrast of generally mute tones. However, in the middleground to the north and northwest, cultivated farmlands add some monochromatic color to the middleground and background landscape. This landscape is mildly interesting within its setting, but fairly common within the region. The ESIL from this area can be characterized as low.

Key Observation Point No. 4

KOP 4 is located at the edge of the westbound lane of Stockdale Highway, near the I-5 interchange (see Figure 5.11-21 for the view and Figure 5.11-1 for the KOP location). This KOP represents public views of the Project area (including the transmission line) from a distance of approximately 2 miles northeast of the Project Site. Because this KOP is located at the directional signage leading to the Tule Elk State Natural Reserve, it is assumed to represent "gateway" views to the Tule Elk Reserve. This view is considered short-duration due to travel by viewers at speeds in excess of 45 miles per hour.

The relatively flat topography of the foreground and middleground gives way to more dramatic terrain in the background in this area, and allows for very open, panoramic views of the adjacent area. Topographic relief across the setting consists of a broad, horizontal composition varying from relatively flat terrain across the view to rolling terrain in the background, adding somewhat to the panoramic visual appeal of the form and line characteristics of the area.

A variety of cultural modifications, including industrial storage structures and numerous telephone/transmission lines, are visible in foreground, middleground, and background views. The area is characterized by little color variation with mostly natural sparse vegetation, and has low to moderate contrast of generally flat tones. Views from this KOP consist of large expanses of uncultivated, sparsely vegetated property. The most prominent visible features are numerous steel lattice transmission structures that cross the middleground of the view. This landscape is

mildly interesting within its setting, but fairly common within the region, and the scenic attractiveness of the view has been highly compromised by visible man-made alterations. The ESIL from this area can be characterized as low.

Key Observation Point No. 5

KOP 5 is located in the southbound lane of I-5, approximately 3 miles east of the Project Site and approximately 1.5 miles east of the transmission line interconnection (see Figure 5.11-23, KOP 5: View from Southbound I-15 Existing Conditions, and see Figure 5.11-1, VSOI Map for the KOP location). KOP 5 represents public views from the high-volume travel corridor of I-5. Viewer duration is considered short term due to travel speeds in excess of 65 miles per hour on I-5. The relatively flat topography of the foreground and middleground gives way to more dramatic terrain in the background of this area and allows for very open, panoramic views of the adjacent area. Topographic relief across the setting consists of a broad horizontal composition varying from relatively flat terrain across the view with rolling terrain in the distant background, adding somewhat to the visual appeal to form and line characteristics of the area. The background terrain is silhouetted by atmospheric conditions and the relative haze in the area.

A variety of cultural modifications, including industrial storage structures, fencing, and numerous telephone/transmission lines, are visible in foreground and middleground views. The area is characterized by little color variation with mostly natural sparse and striated vegetation, and has a low to moderate contrast of generally flat tones. Views from this KOP consist of large expanses of uncultivated, sparsely vegetated property. The most prominent visible features are numerous highly contrasting steel lattice transmission structures which cross the middleground of the view. This landscape is mildly interesting within its setting, but fairly common within the region, and the scenic attractiveness of the view has been highly compromised by visible man-made alterations. The ESIL from this area can be characterized as low.

Key Observation Point No. 6

KOP 6 is located at the eastbound lane of Brite Road, approximately 3.2 miles northwest of the Project Site. Both are middleground views (Figure 5.11-25, KOP 6: View from Eastbound Brite Road Existing Conditions, and Figure 5.11-1, VSOI Map for KOP location). This KOP represents residential and public views from the roadway. This view is considered short duration due to travel speeds up to 40 miles per hour. The relatively flat topography of the foreground and middleground gives way to more dramatic terrain in the background in this area and allows for very open, panoramic views of the adjacent area. Topographic relief across the setting consists of a broad horizontal composition varying from relatively flat terrain across the view to rolling terrain in the distant background (Elk Hills area), adding somewhat to the visual appeal to form and line characteristics of the area; however, the background terrain is only visible to the southeast and south of the KOP. Direct views down Brite Road are relatively flat in regard to terrain.

A variety of cultural modifications, including industrial storage structures, houses, fencing, and telephone/transmission lines, are visible in foreground and middleground views. The area is characterized by little color variation with mostly natural sparse and striated vegetation, and has a low to moderate contrast of generally flat tones. Views from this KOP consist of large

expanses of cultivated property, with the most prominent visible features being a house with a cluster of large trees in the middleground of the view.

There is an agricultural irrigation channel that runs south to southwest of the view and is visible from this KOP due to the earthen berms built along its edges. This landscape is mildly interesting within its setting, but common within the region, and the scenic attractiveness of the view has been highly compromised by visible man-made alterations. The ESIL from this area can be characterized as low.

5.11.1.5 Visual Impact Susceptibility of Sensitive Viewing Areas

Varying levels of Project visibility were identified. The greatest visibility exists from locations situated immediately adjacent to the Project Area, where views are permanent or stationary and not blocked by vegetation screening. Conversely, the lowest visibility exists, for example, when the viewer is located at greater distances from a project, when viewer duration is temporary or episodic (i.e., roadway travelers moving at high speeds), or in partially to fully-screened conditions. Other variables affecting visibility of a project include orientation of the viewer, duration of view, atmospheric conditions, lighting (daylight versus nighttime), and visual absorption capability (VAC). VAC is defined as the extent to which the complexity of the landscape can absorb new elements without changing the overall visual character of the area. Table 5.11-1 illustrates the level of visual impact susceptibility anticipated for each sensitive viewing area based on an evaluation of the previously stated factors.

5.11.2 Environmental Consequences

5.11.2.1 Project Components Analyzed

This section discusses the affected visual resources for the Project. A description of the potential impacts on scenic attractiveness and on sensitive viewers is provided. A detailed description of the Project is in Section 2.0, Project Description, and is summarized in Table 5.11-2. Due to height or size, the following Project elements are considered the most apparent of all Project features:

- Feedstock barn, conveyor area, and crusher station.
- Manufacturing Complex.
- Cooling towers.
- Water treatment plant, including the raw, treated, and firewater tanks.
- Air Separation Unit (ASU).
- Gasification structure.
- Flare stacks.
- Combustion turbine generator (CT);, a steam turbine generator (ST), and a heat recovery steam generator (HRSG).
- Coal dryer stack (with a height of 305 feet, the tallest Project Site structure).
- Gasification cooling towers.
- Security fence.
- 230 kV transmission line.

- Buildings, including a control room, a laboratory, an administration area, a warehouse and maintenance building, an emergency dispatch center, and a medical service facility.
- Temporary visible plumes.
- New access road to be constructed, extending north from the Project Site to Adohr Road.
- New railroad spur (for Alternative 1).

5.11.2.2 Impact Significance Criteria

The consideration of significant visual impacts was based on that defined in Appendix G of CEQA (California Code of Regulations, Title 14, § 1500 *et seq*.) and other relevant considerations. Using these thresholds, Project facilities will be considered to have significant aesthetic impacts if they do the following:

- Have a substantial adverse effect on scenic vistas or substantially degrade the existing visual character or quality of the project sites and their surroundings;

- Substantially degrade the existing visual character or quality of the site or its surroundings;

- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway; and

- Create a new source of substantial light or glare that will adversely affect day or nighttime views in the area.

Additionally, the CEC requires consideration of the following:

- Compliance with LORS
- Level of viewshed alteration and ground form manipulation
- Regional effects to visual resources
- Magnitude of impact related to light and glare
- Magnitude of back-light scatter during nighttime hours
- Level of sunlight reduction or increase in shadows in areas used by the public

5.11.2.3 Assessment Methodology

Levels of potential impact to sensitive viewing areas were established by analyzing the relationship between impact susceptibility and impact severity. Impact susceptibility, or the degree to which a sensitive viewpoint will be impacted by changes within its viewshed, was based on the relationship among existing scenic quality, viewer concern, Project visibility, and viewer exposure (see Table 5.11-1).

Impact severity is defined as the degree of change to the landscape created within a specific viewshed. The degree of change was assessed using photo simulations of the Project as seen from each KOP. The severity of the impact (high to low) on sensitive viewers was assigned a severity level based on the following factors:

- The degree of Project contrast (e.g., form, line, color, and texture)

- Scale and spatial dominance
- Extent of view blockage/screening (i.e., topographic and/or vegetative) and night lighting

Project Contrast

The BLM Contrast Rating procedure was used to determine visual contrast that may result from the construction and operation of the Project based on photo simulations depicting Project features. This method assumes that the extent to which the Project results in adverse effects to visual resources is a function of the visual contrast between the Project and the existing landscape character (BLM, 1986).

At each KOP, existing landforms, vegetation, and structures were described using the basic components of form, line, color, and texture. Project features were then evaluated using simulations, and were described using the same basic elements of form, line, color, and texture. The level of perceived contrast between the Project and the existing landscape was then classified using the following definitions:

- **None:** The element contrast is not visible nor perceived.

- **Weak:** The element contrast can be seen but does not attract attention.

- **Moderate:** The element contrast begins to attract attention and begins to dominate the characteristic landscape.

- **Strong:** The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

The level of contrast was assessed for all Project components used during the operation and maintenance phase. The level of visual contrast expected to result from construction or decommissioning-related activities was estimated based on a knowledge of the anticipated activities and equipment that will be present. No photo simulations of construction or decommissioning were developed.

Scale and Spatial Dominance

Spatial dominance is described as the proportionate size relationship between an object and the surroundings in which it is placed (BLM, 1986). Dominance was assessed by rating the following:

- The relative size of the Project to the existing landscape components (built and natural) and their surroundings

- The scale of the Project compared to the visible expanse of the landscape setting

- The scale of the Project relative to the total field-to-view accepted by the human eye or camera

View Blockage

View blockage is described as the extent to which a prominent landscape component within an existing public view will be obstructed by the Project. The extent of blockage is estimated at a range from low to high.

Visual Impact Significance

The relationship of impact severity and susceptibility to significance is described in Table 5.11-3, Visual Impact Significance Matrix – Sensitive Viewing Areas.

Visual Simulations

Visual simulations of Project components were used to evaluate potential impacts to aesthetic quality that may result from the Project. Views of the Project were simulated from KOP 1 through KOP 6, as shown in Figures 5.11-15 through 5.11-26, KOP 1 through KOP 6. The simulations served to provide a representative sample of the existing landscape settings contained within the VSOI, as well as an illustration of how the Project may look from specific key viewing locations. The general process used to develop these photographic simulations is described below.

Photographic/Three-Dimensional Model Composite Simulation

To ensure a high degree of visual accuracy in the simulations, computer-aided design (CAD) equipment and global positioning systems (GPS) were used to create life-sized, computer-generated models of the Project. This translates to using real-world scale and coordinates to locate facilities, other site data, and the actual camera locations corresponding to three-dimensional (3D) simulation viewpoints. The degree of accuracy of the CAD equipment is absolute; the accuracy for the GPS location data is to within approximately 1 meter, or 3.3 feet.

Microstation/AutoCad, 3D Computer-Aided Design, and GPS Data Integration

A DEM is used to provide a 3D representation of the earth's surface within the Project vicinity, and a CAD site map is imported as a background reference. CAD drawings of both existing and proposed facilities are placed on top of the site map to register and orient the correct locations of KOPs. The 3D massing models of both the existing structures and the proposed modifications are generated in real-world scale. The GPS camera positioning information is then referenced to the 3D data set.

Model View Professional/3D Studio Max/Adobe Photoshop

An electronic camera lens matches the camera lens that was actually used in the field. An 8-megapixel camera with a 50 millimeter lens was used consistently throughout the process. This lens selection allows for viewing of the computer-generated model in the same way that the Project would be viewed in the field.

Next, the digital photograph is transferred into the 3D database as an environment within which the view of the 3D model is generated. To generate the correct view relative to the actual photograph, the electronic camera is placed in the digital environment at a location corresponding to the real-world location from which the photograph was taken. This is provided by GPS records collected during field study. From here, the 3D wire-frame model is displayed on top of the existing structures, topography, or natural features to ensure proper alignment, scale, angle, and distance. When all lines of the wire-frame model exactly match the photograph, the camera target position is confirmed.

To complete this phase, the sun angle is set, materials and textures are applied, and the composite image is rendered through a computer imaging process known as ray tracing. Any additional filters required for appropriate atmospheric conditions (such as blur, focus, or haze) are applied at this time.

The photographic simulations developed for this Project have been designed to be viewed 10 inches from the viewer's eye when printed on 11×17-inch paper. This distance will portray the most realistic life-sized image from the location of the KOPs.

5.11.2.4 Visual Impact Assessment Results

Construction-Related Direct and Indirect Impacts

The temporary on-site construction area will include the construction laydown area, construction parking, offices, and warehouse. Construction access will be from Stockdale Highway north of the Project Site, then south along Dairy Road and east on Adohr Road. All construction laydown and parking areas will be located within the Project Site and the Controlled Area as shown on Figure 2-9, Preliminary Temporary Construction Facilities Plan.

Project Site preparation includes site grading to accommodate the Project on the existing landscape. Existing on-site soil will be used to build earthen berms at the north and east portions of the Project Site. Also see Section 2.0, Project Description, for more information relating to earthwork.

Project construction is forecasted to begin in June 2013.. Commissioning and startup are forecasted to begin in March 2016 with commercial operation to initiate in September 2017. Construction of the 230 kV transmission line route and interconnection is expected to take approximately 3 months within the Project construction period. Construction will most typically take place Monday through Friday beginning at 6:00 a.m.

Due to worker health and safety considerations associated with high daytime temperatures, early work hours (prior to daybreak) may be adopted. Additionally, certain critical construction activities may need to occur during nighttime hours to accelerate the Project schedule. The peak construction workforce will occur during Month 31 of construction and will involve approximately 2,500 workers and staff (see Table 2-28).

During the Project construction period, construction activities, construction materials, equipment, trucks, temporary structures, and vehicles will be visible to surrounding areas to the

north and east and some areas to the southeast due to the flat, open viewing conditions surrounding the Project Site. In addition, during construction of the transmission line and 100-foot-wide right-of-way, construction materials, equipment, and vehicles will be visible to adjacent areas. Refer to Section 2.6, Project Construction, for further detail regarding the schedule of the construction period.

While visual changes associated with construction activities at the Project Site and along the transmission line route will introduce activities and structures not currently occurring in the area, visual impacts are considered temporary and thus, less than significant. Indirect impacts associated with the construction of the Project and ancillary facilities may include impacts associated with fugitive dust, night lighting, and the presence of construction equipment. Construction activities will be conducted in a manner that minimizes (visible) dust emissions. Potential impacts are considered temporary and less than significant.

Operations-Related Direct and Indirect Impacts

The Project will be clearly visible from the west, north, and east with less contiguous visibility from areas located to the south and southeast. The transmission line, though visible, is expected to be subdominant to existing transmission lines and towers found along Stockdale Highway, Tupman Road, and other roads within the VSOI. The railroad spur (Alternative 1) will be sited on the ground plane, and consequently will not be detected by the majority of viewers located within the VSOI. Rail traffic will be visible from locations south of Buttonwillow; however, potential impacts will be intermittent and temporary. Underground linear structures are not expected to result in high contrast in form, line, color, or texture following restoration of construction and permanent right-of-way as the Project Area contains numerous roads.

Figures 5.11-9 through 5.11-14, Scenic Attractiveness Evaluation Form for Sensitive View Area and KOP 1 through KOP 6, depicting existing and simulated views from each of the seven selected KOPs, aided in verifying Project-related impacts and assessing visual impact significance. As stated, these six sensitive viewing areas were identified as representative of viewers who will be most susceptible to visual impacts within their viewshed as a result of the Project. The simulations served to present a representative sample of the existing landscape settings contained within the VSOI, as well as an illustration of how the Project may look from specific key viewing locations. Each of the six viewing areas and the resultant impacts are described below.

Key Observation Point No. 1

This KOP location represents the closest residential and travel way viewer of the Project. Residential viewers are assumed to have high levels of viewer concern. The KOP, located approximately 1,400 feet to the east, characterizes foreground views of the Project Site, and is consistent with a high degree of severity because of the proximity to the site and prolonged viewing duration (i.e., from residential views). The Project, in the absence of screening, will be highly visible because of the flat, open viewing conditions (see Figure 5.11-16).

Potential plume emissions from Project cooling towers will be clearly visible from this KOP; however, plumes are anticipated to occur only during seasonal clear weather conditions from

November to April. New lighting and flaring activities of the Project will potentially affect residential viewers associated with this KOP. Visual impact susceptibility from this location is characterized as high (see Table 5.11-1). Visual impact severity from this location is characterized as high (see Table 5.11-4). Aesthetic impact significance from this location is thereby classified as significant.

In order to address potentially significant visual impacts at KOP 1 and similar residential areas, specific mitigation measures are described in Section 5.11.4, Design Features and Mitigation Measures. With implementation of the mitigation measures, less-than-significant impacts from the construction, operation, maintenance, and long-term presence of the Project will be achieved.

Key Observation Point No. 2

This KOP location represents the closest public view to the Project Site, and includes views to the southeast toward the Project Area. KOP 2, located approximately 1 mile north-northwest of the Project Site, has middleground views to the site and is characterized by temporary, short-term viewing duration (i.e., from speeds in excess of 45 miles per hour). The Project will be visible because of the flat, open viewing conditions.

The Project will introduce visual contrast in form and line; however, the contrast in color and texture will be minimized due to adjacent industrial structures and the backdrop of the EHOF (see Figure 5.11-18). Potential plume emissions from Project cooling towers will be visible from this KOP; however, plumes are anticipated to occur largely only during seasonal clear weather conditions from November to April (see the discussion of visible plumes). New lighting and flaring activities of the Project are not considered to adversely affect the views from this location (see Lighting/Glare/Flare of the Project Site). Because the railroad spur will be constructed on the ground plane, this feature is not expected to result in visual contrast. Intermittent and temporary views of railcars will occur during periods of operation; however, the potential impacts will be intermittent and temporary.

The existing viewshed is modified by areas of cultivated farmland, existing power and telephone transmission lines, oil field activities and associated structures, abandoned structures, miscellaneous industrial storage tanks, and other cultural modifications in the immediate vicinity. Visual impact susceptibility from this location is characterized as moderate (see Table 5.11-1). Visual impact severity from this location is characterized as moderate (see Table 5.11-4). Therefore, aesthetic impact significance from this location is classified as less than significant.

Key Observation Point No. 3

This KOP location represents the closest recreational user view to the Project (see Figure 5.11-20). The Elk Hills Elementary School and playground, located approximately 2 miles to the southeast, has middleground views to the Project Site and is consistent with a low degree of severity because of the distance to the site and the smaller scale of the Project components relative to the surrounding panoramic landscape. In general, persons using recreational areas generally have an expectation of a high-quality visual environment. However,

as this KOP is an elementary school playground, the focus for recreational users is largely of playground activities, and use of the playground is generally for short durations.

Potential plume emissions from Project cooling towers will be visible from this KOP; however, plumes are anticipated to occur largely only during seasonal clear weather conditions from November to April (see the discussion on visible plumes in the subsection that follows). New lighting and flaring of the Project is not considered to adversely affect the Elk Hills Elementary School, which is primarily used during the day (see Lighting/Glare/Flare of the Project Site). Visual impact susceptibility from this location is characterized as low to moderate (see Table 5.11-1). Visual impact severity from this location is characterized as moderate (see Table 5.11-4). Aesthetic impact significance from this location is thereby classified as less than significant.

Key Observation Point No. 4

This KOP location represents the public view of a traveler along the Stockdale Highway northeast of the Project Site. KOP 4, located approximately 2 miles northeast of the Project, has middleground views to the Project and will have shorter viewing durations (i.e., from speeds in excess of 45 miles per hour). Middleground views from this KOP are highly impacted by views of numerous large existing power transmission lines. The addition of the Project to this viewshed is expected to be co-dominant with the man-made alterations already present to viewers at this location (see Figure 5.11-21).

Potential plume emissions from Project cooling towers will be visible from this KOP; however, plumes are anticipated to occur largely only during seasonal clear weather conditions from November to April. New lighting and flaring activities of the Project are not considered to adversely affect the views from this location (see Lighting/Glare/Flare of the Project Site). Visual impact susceptibility from this location is characterized as low (see Table 5.11-1). Visual impact severity from this location is also characterized as low (see Table 5.11-4,). Therefore, aesthetic impacts associated with the Project from this location are anticipated to be low and there is no impact.

Key Observation Point No. 5

This KOP location represents the public view of a traveler along I-5, a major travel route for the region, east of the Project Site. KOP 5, located approximately 3 miles east of the Project and 1 mile east of the transmission line interconnection, has middleground views to the Project and will have shorter viewing durations (i.e., from speeds in excess of 65 miles per hour). Middleground views from this KOP are highly impacted by views of numerous large existing power transmission lines that create a skylining effect.

The Project Site is visible from this KOP but is co-dominant with the existing transmission towers in this view (see Figure 5.11-24). Potential plume emissions from Project cooling towers will be visible from this KOP; however, plumes are anticipated to occur largely only during seasonal clear weather conditions from November to April. New lighting and flaring activities of the Project are not considered to adversely affect the views from this location (see Lighting/ Glare/Flare of the Project Site). Visual impact susceptibility from this location is characterized

as low (see Table 5.11-1). Visual impact severity from this location is characterized as low (see Table 5.11-4). Therefore, aesthetic impacts associated with the Project from this location are anticipated to be low and there is no impact.

Key Observation Point No. 6

This KOP location represents the residential and public views of residences and travelers along Brite Road directly northwest of the Project. KOP 6 is located approximately 3.2 miles northwest of the Project Site, which has middleground views with long and short viewing durations (i.e., from stationary residences and traveling at speeds in excess of 45 miles per hour). Middleground views from this KOP are moderately impacted by views of numerous existing power/telephone line structures (see Figure 5.11-26). Visual impact susceptibility from this location is characterized as low (see Table 5.11-1). Visual impact severity from this location is characterized as moderate (see Table 5.11-4). Therefore, aesthetic impacts associated with the Project from this location are anticipated to be low to moderate and less than significant.

Visual Impact Severity

Results of the visual impact severity analysis are described in Table 5.11-4.

Lighting/Glare/Flare of the Project

Lighting will be required for safe and efficient operation of the Project, for example, in the following typical areas:

- Building interior, office, control, and maintenance areas
- Building exterior entrances
- Outdoor equipment platforms and walkways
- Transformer and switchyard areas
- Entrance gate

The lighting system is intended to provide personnel with illumination for Project operation under normal conditions, means of egress under emergency conditions, and emergency lighting to perform manual operations during a power outage of the normal power source. The lighting system will be designed and installed to meet Occupational Safety and Health Administration (OSHA) minimum standards, and to offer maximum illumination of operating work areas while minimizing off-site illumination.

Lighting will be directed downward to avoid backscatter, and shielded from public view to the extent practicable. Lighting not required continuously during nighttime hours will be controlled with sensors or switches operated such that lighting will be on only when needed. Lighting design for the Project will be consistent with applicable lighting LORS. See Section 2.9.2.3, Specific Project Emergency Systems, in the Project Description for further description of lighting fixtures. Additionally, the Kern County Planning Department reiterates the use of "normal mitigations such as shielded fixtures and motion sensor security lighting" for the Project, described in Section 5.11.4, VIS-2 Lighting (Oviatt, 2009).

Currently, little nighttime lighting is produced within the VSOI, and consists mainly of street lighting on larger roadways and external lighting of industrial facilities, farming operations, and residences in the area. While the Project may contribute to existing lighting, the Project will not significantly increase the existing night lighting in the Project area due to the design features of the Project lighting as described in VIS-2 Lighting (Section 5.11.4.1, Project Design Features) that reduce backscatter, glare, and unnecessary light. In addition, structures and transmission towers will be treated to reduce sun reflectivity and potential glint/glare.

Overall, the addition of the Project is not anticipated to create significant glint/glare or night lighting impacts from backscatter light and night lighting that the average viewer may experience when looking toward the Project Site, due to the design of Project lighting. The residential viewers in close proximity of the Project may have significant impacts from night lighting resulting from the Project. Therefore, the Project will develop a lighting plan and equipment surface treatment plan, as described in Section 5.11.4, Design Features and Mitigation Measures, to ensure that potential glint/glare impacts are reduced and maintained to less-than-significant levels.

Under certain conditions during construction-related activities, slightly higher amounts of backscatter lighting may be apparent to the casual observer. This condition provides safety for construction workers during this phase of the Project. Upon completion of construction, night lighting at the Project Site will be substantially reduced and less noticeable to the casual observer. Therefore, visual impacts related to construction activities will be temporary and are considered less than significant. The Project will be consistent with Section 1.10.7, Light and Glare of the *Kern County General Plan* (Kern County, 2009).

Lighting Related to Airfield Operations

Federal Aviation Administration Advisory Circular 70/7460-1K requires that all airspace obstructions over 200 feet high or in close proximity to an airfield have obstruction lighting (FAA, 2000). The tallest structure on-site (coal dryer stack) is 305 feet high. There is one airport within the identified VSOI (see Figure 5.11-1). The Elk Hills–Buttonwillow Airport is located approximately 5 miles northwest of the Project Site. This airport covers approximately 216 acres, has one runway, and generally supports small private planes.

The Elk Hills–Buttonwillow Airport is located outside the VSOI 5-mile radius of the transmission line, and the transmission poles are well below the 200-feet limit at approximately 110 feet high; therefore, no obstruction lighting is required for Project transmission poles. However, Project facilities over 200 feet high on the Project Site may require obstruction lighting by the FAA. With proper installation of obstruction lighting on structures, no impacts to aircraft operation are expected with construction, operation, and maintenance of the Project. Obstruction lighting is designed primarily to be visible to aviation and does not produce significant down lighting or backscatter, and is not anticipated to adversely or significantly add to the night lighting levels, or adversely affect any of the six identified KOPs.

Flare/Flaring Activities

The Project includes flares for burning excess gas — for example, during start-up or emergency or upset conditions — including a gasification flare and a Sulfur Recovery Unit (SRU) flare. These flares can create additional lighting impact if operated at night. These flares are not as luminous as typical refinery flares. The operation of flares at night may potentially result in adverse impacts for KOP 1 and 2; however, these flares will be operated infrequently.

Because these flares are operated infrequently, and because the effect of lighting from flaring will decrease with distance, it is not anticipated that these flares will result in adverse impacts to KOP 3, 4, or 5; therefore, impacts from flaring activities to all six KOPs are anticipated to be less than significant due to infrequent use and/or distance.

Visible Plumes

The potential exists for vapor plumes (water vapor condensation) to be visible from the following sources at the Project Site: plumes from the 213-foot-high CTG/HRSG stack and the 305-foot-high coal dryer stack, and plumes from the 55-foot-high wet cooling towers (4-celled ASU cooling tower, 13-celled process cooling tower, and 12-celled power block cooling towers).

A visible plume analysis was performed for the Project and presented in the 2009 Revised AFC that showed visible plumes were infrequent. New visible plume analyses were not conducted, as the ambient conditions at the site have not changed to make it more conducive for plume development and as exhaust parameters have not changed significantly. Discussion of predicted plumes in the remainder of this section derives from the analysis presented in the Revised AFC.

Table 5.11-6 summarizes the CTG/HRSG exhaust temperatures, exhaust flow rates, and exhaust moisture contents for cold weather, average annual and hot weather temperature conditions.

Power block cooling tower heat rejection and exhaust air flow totals are provided in Table 5.11-7, along with the exhaust air temperature. The exhaust air leaves the cooling tower at essentially 100 percent relative humidity. Cooling tower fans are shut off at lower ambient temperatures to control the minimum cooling water supply temperature and the steam turbine exhaust pressure. Data have been provided across the ambient temperature range.

The process cooling tower exhaust air flows and temperatures and heat rejection loads are included in Table 5.11-8. These conditions were calculated for a constant heat rejection across the ambient temperature range, which closely approximates the expected operating profile.

The ASU cooling tower exhaust air flows and temperatures and heat rejection loads are included in Table 5.11-9. These conditions were calculated for a constant heat rejection across the ambient temperature range, which approximates constant oxygen production.

Table 5.11-10 provides representative cooling tower manufacturers and model numbers for each of the cooling towers in the HECA Project. Final cooling towers selected will be the same or similar. Fogging frequency curves are not available at this time.

The cooling tower design specifications will incorporate a range of key operating parameters, including ambient conditions, heat rejection loads, prevailing wind direction, noise emission requirements, and drift limits. The supplier will apply design margins as appropriate to ensure cooling tower performance guarantees are met.

The frequency, persistence, and size of visible condensate plumes depends primarily on the design and type of combustion turbine generator/HRSG and/or cooling tower, as well as meteorological conditions of temperature and humidity. Specifically, visible plume formation depends on local ambient temperature, humidity conditions, and wind patterns. A location with higher temperature and lower humidity, the general climate in Kern County, will have fewer extended visible plumes compared to operation of the same Project at a cooler, more humid location. Visible plume formation is more frequent during the cooler seasons, when ambient conditions are more conducive. It should be noted that the same ambient conditions that result in plume formation from Project cooling towers will often cause natural weather conditions such as fog, haze, and precipitation to occur, which generally reduce visibility and would obscure any plumes.

Visible plume formation is expected to be more frequent during the cooler seasons (i.e., winter) when ambient conditions are more favorable to plume formation.

Plumes generated from Project operations will be visible from residences and travelers within the VSOI. When plumes are formed over the Project Site, they will be above and extend downwind of the Project structures.

Plumes from the cooling towers and HRSG stack are expected to be visually subordinate from distant viewpoints, and subordinate to co-dominant from middleground to foreground viewpoints, depending upon specific viewing locations and conditions. Currently, there are few to no visible plumes within the existing viewshed. Although the addition of plumes to the Project area will create a change to existing conditions, most viewers will be at such distances that impacts from visible plumes are considered to be less than significant. The area of highest concern for visible plumes is for the nearest resident within the VSOI, represented by KOP 1.

For KOP 1, reasonable worst-case visible plumes generated from Project operations will create a co-dominant effect related to the Project structures. However, typical plumes generated from Project operations will be expected to be much smaller in length, height, and width than the reasonable worst-case plumes, and the typical plumes are what KOP 1 and other viewers within the VSOI will see more often.

Project operations will largely be in peak operation during the summer months (outside of the November to April seasonal hours), at which time the temperature at the Project Site is generally too high for long plumes to occur. Both size and frequency of typical Project cooling tower and HRSG plumes (occurring outside of the winter/no fog and seasonal daylight clear period) are expected to be visually subordinate and will be less than significant. Project cooling tower and HRSG plumes during the reasonable worst-case conditions (within the winter/no fog and seasonal daylight clear period) conditions will be visually co-dominant to dominant; however, plumes of this size will occur for less than 10 percent of the winter/no fog and seasonal daylight clear period, and were thus considered to be less than significant.

As plume formation depends on highly variable atmospheric conditions, peak operation of the Project will be during hot, summer months not conducive to plume formation, and most viewers will be at such distances that any potential plumes will be remotely visible. Less than significant impacts related to plume generation at the Project Site are anticipated.

Nighttime plumes could present a potential visual impact under two possible circumstances. If bright, upwardly directed night lighting were to illuminate the plumes, they could become visually dominant and obtrusive. However, no such light exists in the immediate Project vicinity and on-site lighting will be shielded and directed downward. Thus, no significant impacts from illuminated plumes are anticipated.

Visual Impact Significance

Landscapes within the VSOI were classified as having low ESILs. The Project Site is located within areas characterized by low distinctive or diverse natural amenities or lacking substantial positive cultural modifications. There are a number of existing cultural modifications (e.g., cultivated farmlands, industrial facilities, existing power transmission lines, a former fertilizer manufacturing plant (Port Organics) adjacent to the Project Site, and oil field activities and associated structures/storage tanks, etc.) within the VSOI. While the Project is expected to change the existing character of the site, significant impacts to the scenic attractiveness of the VSOI as a whole are not anticipated due to existing industrial and agricultural activities. Therefore, less-than-significant impacts on visual resources and aesthetics are expected to occur. Table 5.11-1, Visual Impact Susceptibility – Sensitive Viewing Areas, Table 5.11-4, Visual Impact Severity – Sensitive Viewing Areas, and Table 5.11-5, Visual Impact Significance – Sensitive Viewing Areas, summarize visual impact susceptibility, visual impact severity, and resultant visual impact significance on sensitive viewing areas, respectively.

OEHI Project

An analysis of the potential visual impacts of the OEHI Project is included in Appendix A, Section 4.1, Aesthetics, of this AFC Amendment. Appendix A concludes that with implementation of recommended mitigation measures, the OEHI Project will not have significant adverse impacts to aesthetics.

5.11.3 Cumulative Impact Analyses

Under certain circumstances, CEQA requires consideration of a project's cumulative impacts. (CEQA Guidelines Section 15130). A "cumulative impact" consists of an impact which is created as a result of the combination of the project under review together with other projects causing related impacts (CEQA Guidelines Section 15355). CEQA requires a discussion of the cumulative impacts of a project when the project's incremental effect is cumulatively considerable (CEQA Guidelines Section 15130[a]). "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines Section 15065 [a][3]).

When the combined cumulative impact associated with a project's incremental effect and the effects of other projects is not significant, further discussion of the cumulative impact is not necessary (CEQA Guidelines Section 15130[a]). It is also possible that a project's contribution to a significant cumulative impact is less than cumulatively considerable and thus not significant (CEQA Guidelines Section 15130[a]).

The discussion of cumulative impacts should reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great a level of detail as is provided for the effects attributable to the project under consideration (CEQA Guidelines Section 15130[b]) The discussion should be guided by standards of practicality and reasonableness (CEQA Guidelines Section 15130[b]).

A cumulative impact analysis starts with a list of past, present, and probable future projects within a defined geographical scope with the potential to produce related or cumulative impacts (CEQA Guidelines Section 15130[b]). Factors to consider when determining whether to include a related project include the nature of the environmental resource being examined, the location of the project, and its type (CEQA Guidelines Section 15130[b]). For purposes of this AFC Amendment, Kern County was contacted to obtain a list of related projects, which is contained in Appendix I. Depending on its location and type, not every project on this list is necessarily relevant to the cumulative impact analysis for each environmental topic.

The Project and other projects in the vicinity are not expected to result in significant cumulative impacts to visual resources during the construction or operation phases. The areas within the VSOI are generally characterized by agricultural activities, oil extraction and other industrial facilities, as well as desert terrain supported by small towns and other sparsely populated communities. All proposed projects within the VSOI can be characterized primarily as zone changes, lot line/property line adjustments, roadway improvements, home remodeling, agricultural supply services, or activities related to agriculture, or to oil and mining operations. No new residential or recreational uses are proposed that may generate additional sensitive visual receptors. A new dairy operation is planned on the north side of Adohr Road at Dairy Road. The dairy facilities will be subordinate to the Project, and the adjacency of the two projects is expected to result in less-than-significant impacts for viewers in the area.

The addition of the Project will alter the existing landscape and visual setting at the Project Site. However, the addition of any of the other listed projects, when considered in combination with the Project, will not cumulatively create significant impacts to the visual setting within the VSOI. Thus, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the Project and other projects in the area.

An analysis of the potential of the OEHI Project to impact aesthetics is included in Appendix A, Section 4.1, Aesthetics, of this AFC Amendment. Appendix A concludes that with implementation of recommended mitigation measures, the OEHI Project will not have significant adverse cumulative impacts to aesthetics.

5.11.4 Design Features and Mitigation Measures

Project design inherently includes mitigation measures. For example, the Project Site location was chosen because of its proximity to other existing industrial land uses (industrial oil producing area within Kern County). In addition, Project features have been designed to help minimize visual impacts.

5.11.4.1 Project Design Features

VIS- 1 Project Structures

- Structures, stacks, buildings, and storage tanks will be painted in accordance with CEC guidelines, and colors will be selected to blend in with the existing visual conditions.
- The colors will provide subtle variations and contrast. The selected color will help the Project to blend more naturally with the natural setting.
- Reflectivity of surfaces will be reduced by using nonreflective elements where practical.

VIS-2 Lighting

- Lighting on the Project Site will be limited to areas required for safety, will be directed on site to avoid backscatter, and will be shielded from public view to the extent practical.
- All lighting that is not required to be on during nighttime hours will be controlled with sensors or switches operated so that the lighting will be on only when needed.
- High-pressure sodium vapor fixtures will be used. These lights typically produce low-intensity amber light, which will reduce visual contrast with the night sky.
- Stacks and other tall Project elements will be lit in accordance with FAA guidelines.

VIS-3 Natural Gas and CO_2 Pipelines

After construction, areas where pavement or vegetation has been removed will be restored to be consistent with the surrounding area. Pipeline routes may also follow road rights-of-way and therefore will be placed under pavement or prepared dirt surfaces.

While the Project includes features that reduce visual impacts from the construction or operation, potentially significant impacts have been identified for the nearest residential viewer to the Project Site identified by CEC staff at the location identified as KOP 1. Visual impacts from the construction or operation of the Project will significantly affect the nearest residential viewer. Suggested visual resources mitigation measures (VRMMs) are provided to ensure that all potential impacts are reduced to levels considered to be less than significant..

5.11.4.2 Mitigation Measures

According to Kern County Ordinance 19.12.120 Landscaping: Exclusive Agriculture (A) District, no landscaping is required in the A district, except where the proposed use is subject to a plot plan review pursuant to Chapter 19.80. However, to reduce significant impacts to the nearby residential viewers, visual mitigation measures are proposed to include landscaping.

VRMM-1: Prepare Conceptual Landscaping Plan for screening purposes. The plan will include information on the plant species proposed; their size, quantity, and spacing at planting; their expected heights at 5 years and at maturity; and their expected growth rates.

5.11.5 Laws, Ordinances, Regulations, and Standards

The applicable LORS related to visual resources are summarized in Table 5.11-11, Summary of LORS – Visual Resources.

5.11.5.1 Federal and State

The Project is located on privately-owned land under the jurisdiction of Kern County. There are a few patches of BLM lands within the area that have views to the Project Site. However, no federal lands considered to be sensitive are located within the VSOI. BLM VRM guidelines were considered for this Project because VRM methodology is an effective assessment tool that categorizes impacts based upon changes to scenic quality, sensitivity levels, and distance zones. These are all discussed in detail in Section 5.11.1, Affected Environment. The Project is consistent with all federal aesthetic LORS.

State-designated scenic highways or highways eligible for designation were not identified within the VSOI. Furthermore, no other area managed by the State was identified that will require the Project to adhere to State aesthetic LORS. However, CEQA methodology is described in Section 5.11.2.1, Significance Criteria and Assessment Methodology, and was used as part of the assessment methodology.

5.11.5.2 Local

The Project Site is located on privately-owned land under the jurisdiction of Kern County. The unincorporated community of Tupman, located 1.5 miles to the southeast of the Project Site, will have middle and distant views to the Project Site. The unincorporated community of Buttonwillow is located approximately 4 miles to the north of the Project Site. The city of Taft is the closest city to the Project Site and is more than 15 miles away. This city will have no views to the Project Site, and therefore local LORS were only considered for Kern County and the unincorporated communities of Tupman and Buttonwillow.

The property is zoned A (Exclusive Agriculture) in Kern County. See Section 5.4, Land Use, for more information. The *Kern County General Plan* (Kern County, 2009), Buttonwillow *Community Development Plan* (Buttonwillow, 1974), and Tupman's *Rural Community Specific Plan* (Tupman, 1984) contain several goals and policies relating specifically to aesthetics and minimizing impacts to visual resources. The Buttonwillow *Community Development Plan* and

Tupman *Community Specific Plan* were prepared in conjunction with Kern County; therefore, the majority of Tupman's and Buttonwillow's goals/policies related to aesthetic and visual resources are very similar if not the same as the goals/policies identified in the Kern County General Plan. Table 5.11-1, Summary of LORS – Visual Resources, summarizes each of these local LORS and the Project's conformance to these LORS.

The Project Site is located north of the EHOF. The land surrounding the Project Site is used primarily for farmland, industrial, other similar land uses, and for oil extraction to the south of the Project vicinity. Proper light/glare shielding during both construction and operation of the Project Site is included as part of Project design. While the Project Site will add to existing area lighting, the Project will not significantly increase the existing night lighting, backscatter light, or glare in the Project area due to its adjacency with similar existing industrial land uses. The Project will not create a significant visual change to existing area conditions.

In addition, Project design elements have been incorporated into the Project description that will be effective in minimizing visual impacts (see Section 2.0, Project Description). The Project will conform to all applicable local LORS related to the preservation of areas identified as retaining high scenic value. Based on the inventory of scenic attractiveness and ESILs, areas retaining high scenic value were not identified within the VSOI. Therefore, compliance with local aesthetic LORS will be maintained.

5.11.6 Involved Agencies and Agency Contacts

The local agency for the Project is the Kern County Environmental Health Services Department shown in Table 5.11-12, Agency Contact List for LORS.

5.11.7 Permits Required and Permit Schedule

No permits are required pertaining to visual resources.

5.11.8 References

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Oviatt, L., 2009. Email to Kathy Rushmore on April 15, 2009, from Lorelei Oviatt at Kern County Planning).

Tupman, 1984. *Rural Community Specific Plan.* Scenic Highways. October 29, 1984.

URS (URS Corporation), 2006. Application for Certification (AFC) for Panoche Energy Center Power Plant Project, 06-AFC-5. 2006.

USFS (U.S. Forest Service), 1995. U.S. Forest Service Visual Management System.

Table 5.11-1
Visual Impact Susceptibility – Sensitive Viewing Areas

Viewing Areas*	Existing Scenic Integrity Level	Viewer Concern	Project Visibility	Viewer Exposure	Visual Impact Susceptibility
Sensitive Viewing Area and KOP 1 (Figure 5.11-15) – Traveler view and unobstructed residential view along Station Road to the east of the Project.	Low	High	High	High	High
Sensitive Viewing Area and KOP 2 (Figure 5.11-17) – From largely unobstructed view along Stockdale Highway to the north-northwest of the Project and west of the railroad spur.	Low	High	Moderate	Moderate	Moderate
Sensitive Viewing Area and KOP 3 (Figure 5.11-19) – Elk Hills Elementary School playground view to the southeast of the Project.	Low	High	Low	Moderate	Moderate/ Low
Sensitive Viewing Area and KOP 4 (Figure 5.11-21) – Traveler view from Stockdale Highway adjacent to the I-5 interchange northeast of the Project.	Low	Moderate	Low	Low	Low
Sensitive Viewing Area and KOP 5 (Figure 5.11-23) – Traveler view from southbound I-5 east of the Project and transmission line.	Low	Moderate	Low	Low	Low
Sensitive Viewing Area and KOP 6 (Figure 5.11-25) – Traveler view from eastbound Brite Road west of the railroad spur and northwest of the Project.	Low	Moderate	Low	Moderate	Low

Source: HECA, 2012.

Note: KOP = Key Observation Point
* Also, see Figure 5.11-1 for KOP locations

Table 5.11-2
Major Component Design Characteristics

Component	Height (feet)	Diameter (feet)	Color/Materials[1]
Gasification Structure/ Feedstock Dryer/Crusher	305	270 × 125	Steel; Flint Gray SW 4019
CO_2 Vent	260	4	Steel; Flint Gray SW 4019
Gasification Flare	250	10	Steel; Flint Gray SW 4019
Rectisol® Flare	250	2	Steel; Flint Gray SW 4019
SRU Flare	250	2	Steel; Flint Gray SW 4019
AGR Methanol Wash Column	235	20	Steel; Flint Gray SW 4019
HRSG Stack/HRSG	213/90	20	Steel; Flint Gray SW 4019
Air Separation Column Can ASU Column (Cold Box)	200 205	110 × 40 30	Steel; Torque Tan SW 4015
Gasification Flare Structure	200	65 × 65	Steel; Flint Gray SW 4019
Slurry Preparation Building	165	140 × 40	Steel; Flint Gray SW 4019
Tail Gas Thermal Oxidizer	165	3	Steel; Flint Gray SW 4019
Feedstock Barn	160	250 × 650	Steel; Slate Gray SW 4026
Sour Water Stripper	150	8	Steel; Flint Gray SW 4019
Nitric Acid Absorber Vent	145	4	Steel; Flint Gray SW 4019
Additional AGR Columns	75 – 140	12 – 18	Steel; Flint Gray SW 4019
Feedstock Barn	160	250 × 650	Steel; Slate Gray SW 4026
Urea Plant Absorbers (HP/LP)	130/50	26/30	Steel; Torque Tan SW 4015
Urea Transfer Towers (5)	100	28 × 30	Steel; Torque Tan SW 4015
Wastewater ZLD Evaporator A	100	12	Steel; Flint Gray SW 4019
Wastewater ZLD Evaporator B	100	12	Steel; Flint Gray SW 4019
Feedstock Transfer Tower/Tower B/Crusher Vent	100	35 × 45	Steel; Torque Tan SW 4015
Heat Recovery Steam Generator Structure	90	122 × 115	Steel; Slate Gray SW 4026
LOX Storage Tank	90	42	Steel; Flint Gray SW 4019
Process Wastewater ZLD Evaporator	80	5	Steel; Flint Gray SW 4019
Auxiliary Boiler Stack/Auxiliary Boiler	80/80	6	Steel; Flint Gray SW 4019
Ammonia Unit Startup Heater	80	21 × 81	Steel; Flint Gray SW 4019
Ammonia Storage Tanks (2)	70	90	Pillar White SW 4029

Table 5.11-2
Major Component Design Characteristics (Continued)

Component	Height (feet)	Diameter (feet)	Color/Materials[1]
Fine Slag Handling Enclosure	70	172 × 52	Steel; Flint Gray SW 4019
Urea Reclaim Loadout Building	70	135 × 20	Steel; Slate Gray SW 4026
Urea Storage (4 Domes)	70	162	Steel; Torque Tan SW 4015
Tail Gas Treating Unit Columns	60 – 70	4 – 6	Steel; Flint Gray SW 4019
Feedstock Truck Unloading Vent	60	5	Steel; Torque Tan SW 4015
Power Block/Process Cooling Towers	55	850 × 120	Steel; Flint Gray SW 4019
ASU Cooling Tower	55	205 × 120	Steel; Flint Gray SW 4019
Combustion Turbine Generator Structure	50	12	Steel; Flint Gray SW 4019
CO_2 Compressor Enclosure	50	110 × 110	Steel; Flint Gray SW 4019
CTG Air Filter	50	–	Steel; Flint Gray SW 4019
Sour Shift/Low Temp Gas Cooling Unit	50	235 × 40	Steel; Flint Gray SW 4019
Urea Plant LP Absorber	50	??	Steel; Torque Tan SW 4015
Urea Pastillation Vent	50	??	Steel; Torque Tan SW 4015
Urea Bucket Elevator	50	20 × 20	Steel; Slate Gray SW 4026
230-kilovolt Switchyard	–	–	Steel; Flint Gray SW 4019
Wastewater ZLD Feed Tank A	48	120	Steel; Flint Gray SW 4019
Wastewater ZLD Feed Tank B	48	120	Steel; Flint Gray SW 4019
UAN Storage (3 Tanks)	48	120	Steel; Torque Tan SW 4015
Firewater Storage Tank	48	110	Steel; Flint Gray SW 4019
Water Treatment Plant Tanks (Raw, Treated, Purified, Backwash, Utility, Demineralized)	32 – 48	50 – 100	Steel; Flint Gray SW 4019
Feedstock Truck Unloading Building	44	82 × 36	Steel; Flint Gray SW 4019
Methanol Storage Tank	40	40	Steel; Torque Tan SW 4015
ASU Main Air Compressor Enclosure	40	46 × 119	Steel; Flint Gray SW 4019
AGR Refrigeration Compressor Structure	40	180 × 80	Steel; Flint Gray SW 4019
Process Wastewater Treatment Feed Tank	40	60	Steel; Torque Tan SW 4015
Flare K.O. Drums (3) Gasification Settler	35 35	 85	 Steel; Flint Gray SW 4019
Power Distribution Centers	25	120 × 15	Steel; Torque Tan SW 4015
230-kV Transmission Line	110	2.1 miles	Steel; Gray
Railroad Spur	Raised Bed	5.3 miles	Steel; Gray

Table 5.11-2
Major Component Design Characteristics (Continued)

Component	Height (feet)	Diameter (feet)	Color/Materials[1]
CO_2 Line	Buried	3.4 miles	NA
Natural Gas Line	Buried	13 miles	NA
Process Water Line	Buried	14.4 miles	NA
Potable Water Line	Buried	1.2 miles	NA

Source: HECA Project.
Notes:
[1] Steel will be treated to minimize glare
AGR = acid gas removal
ASU = Air Separation Unit
CO_2 = carbon dioxide
CTG = combustion turbine generator
HP = high pressure
HRSG = heat recovery steam generator
K.O. = Knock Out
kV = kilovolt
LP = low pressure
LOX = Liquid Oxygen
SRU = sulfur recovery unit
UAN = Urea Ammonium Nitrate
ZLD = zero liquid discharge

Table 5.11-3
Visual Impact Significance Matrix – Sensitive Viewing Areas

Visual Impact Severity	High Visual Sensitivity	Moderate Visual Sensitivity	Low Visual Sensitivity
High Visual Change	Significant	Less Than Significant	Less Than Significant
Moderate Visual Change	Less Than Significant	Less Than Significant	Less Than Significant
Low Visual Change	Less Than Significant	Less Than Significant	No Impact

Table 5.11-4
Visual Impact Severity – Sensitive Viewing Areas

KOP*	Form Contrast	Line Contrast	Color Contrast	Texture Contrast	Scale Dominance	Spatial Dominance	View Blockage Night Lighting	Visual Impact Severity
KOP 1 (Figure 5.11-15) – Unobstructed traveler and residential viewers along Station Road to the east of the Project.	High	High	Moderate/ High	Moderate	High	Moderate/ High	Moderate/ High	High
KOP 2 (Figure 5.11-17) – From largely unobstructed view along Stockdale Highway to the north-northwest of the Project.	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate
KOP 3 (Figure 5.11-19) – Elk Hills Elementary School playground view to the southeast of the Project.	Moderate/ Low	Moderate/ Low	Moderate/ Low	Low	Moderate	Moderate	Moderate/ Low	Moderate
KOP 4 (Figure 5.11-21) – Traveler view from Stockdale Highway adjacent to the I-5 interchange northeast of the Project.	Low	Low	Low	Low	Low	Low	Low	Low
KOP 5 (Figure 5.11-23) – Traveler view from southbound I-5 east of the Project and transmission line.	Low	Low	Low	Low	Low	Low	Low	Low
KOP 6 (Figure 5.11-25) – Traveler view from eastbound Brite Road northwest of the Project.	Moderate/ Low	Moderate/ Low	Moderate/ Low	Low	Moderate	Moderate	Moderate	Moderate

Source: HECA Project.

Note:
KOP = key observation point
*Also see Figure 5.11-1 for KOP locations

Table 5.11-5
Visual Impact Significance – Sensitive Viewing Areas

Viewing Areas*	Visual Impact Susceptibility	Visual Impact Severity	Visual Impact Significance
KOP 1 (Figures 5.11-14 and 5.11-15) – Unobstructed residential view to the east of the Project Site on Station Road.	High	Moderate/ High	Significant (Less than Significant with visual mitigation described in VRMM-1)
KOP 2 (Figures 5.11-16 and 5.11-17) – Unobstructed view along Stockdale Highway to the north-northwest of the Project Site.	Moderate	Moderate	Less than Significant
KOP 3 (Figures 5.11-18 and 5.11-19) – Elk Hills Elementary School playground view to the southeast of the Project.	Moderate/ Low	Low	Less than Significant
KOP 4 (Figures 5.11-020 and 5.11-21) – Traveler view from Stockdale Highway adjacent to I-5 interchange.	Low	Low	No Impact
KOP 5 (Figures 5.11-22 and 5.11-23) – Traveler views from Southbound I-5.	Low	Low	No Impact
KOP 6 (Figures 5.11-25 and 5.11-26) – Residential and traveler views from eastbound Brite Road.	Low	Low	Less than Significant

Notes:
KOP = key observation point
VRMM = visual resource mitigation measure
*Also see Figure 5.11-1 for KOP locations

Table 5.11-6
Summary of CTG/HRSG Exhaust Conditions

Parameter			CTG/HRSG Exhaust			
Stack Height			65 meters (213 feet)			
Stack Diameter			7.0 meters (23 feet)			
Ambient Temperature			39°F	65°F	97°F	
	HRSG Stack					
	On Peak	Off Peak	On Peak	Off Peak	On Peak	Off Peak
Full Load Exhaust Temperature (°F)	200	200	200	200	200	200
Full Load Exhaust Flow Rate (kpph)	4,876	3,956	4,712	3,747	4,575	3,496
Full Load Exhaust Moisture Content (wt%)	7.2	6.4	7.8	7.0	8.3	7.5
	Coal Drying Stack					
	On Peak	Off Peak	On Peak	Off Peak	On Peak	Off Peak
Full Load Exhaust Temperature (°F)	200	200	200	200	200	200
Full Load Exhaust Flow Rate (kpph)	800	800	800	800	800	800
Full Load Exhaust Moisture Content (wt%)	10.8	10.8	10.8	10.8	10.8	10.8

Notes:

The 20°F ambient temperature is an extreme minimum, while 39°F ambient is more representative of minimum monthly average winter conditions.

CTG = combustion turbine generator
°F = degrees Fahrenheit
HRSG = heat recovery steam generator
kpph = kilopascals per hour
wt% = percent weight

Table 5.11-7
Power Block Cooling Tower Heat Rejection and Exhaust Air Flow Totals

Parameter	Power Block Cooling Tower Exhausts					
Number of Cells	12 cells (1 by 12)					
Cell Height	16.76 meters (55 feet)					
Cell Diameter	9.14 meters (30 feet)					
Tower Housing Length	183 meters (600 feet)					
Tower Housing Width	18.29 meters (60 feet)					
Ambient Dry Bulb Temperature	39°F		65°F		97°F	
Ambient Wet Bulb Temperature	36.8°F		55.5°F		67.6°F	
Ambient Relative Humidity	82%		55%		20%	
Fuel Type	**H_2-Rich Fuel Gas**					
	On Peak	**Off Peak**	**On Peak**	**Off Peak**	**On Peak**	**Off Peak**
Number of Cells in Operation	12	12	12	12	12	12
Heat Rejection (MWth)	269.5	248.1	271.1	253.8	271.8	260.9
Exhaust Air Dry Bulb Temperature (°F)	82.8	80.3	84.1	82.6	90.8	90.0
Exhaust Air Wet Bulb Temperature (°F)	82.8	80.3	84.1	82.6	90.8	90.0
Exhaust Air Flow Rate (MMlb/hr)	28.8	29.0	38.7	38.8	38.1	38.1
Air Flow/Heat Rejection (kg/s per MWth)	13.5	14.7	18.0	19.3	17.7	18.4
Fuel Type	**Natural Gas**					
Load					**80%**	**40%**
Number of Cells in Operation					12	12
Heat Rejection (MWth)					195.3	149.0
Exhaust Air Dry Bulb Temperature (°F)					85.1	81.4
Exhaust Air Wet Bulb Temperature (°F)					85.1	81.4
Exhaust Air Flow Rate (MMlb/hr)					38.6	38.9
Air Flow/Heat Rejection (kg/s per MWth)					24.9	32.9

Notes:
°F = degrees Fahrenheit
H_2 = hydrogen
HRSG = heat recovery steam generator
kg/s = kilograms per second
MMlb/hr = million pounds per hour
MWth = megawatt, thermal
% = percent

Table 5.11-8
Process Cooling Tower Exhaust Air Flows and Temperatures and Heat Rejection Loads

Parameter	Process Cooling Tower Exhausts		
Number of Cells	13 cells (1 by 13)		
Cell Height	16.76 meters (55 feet)		
Cell Diameter	9.14 meters (30 feet)		
Tower Housing Length	198 meters (650 feet)		
Tower Housing Width	18.29 meters (60 feet)		
Ambient Dry Bulb Temperature	39°F	65°F	97°F
Ambient Wet Bulb Temperature	36.8°F	55.5°F	67.6°F
Ambient Relative Humidity	82%	55%	20%
Number of Cells in Operation	13	13	13
Heat Rejection (MWth)	292.0	293.7	294.5
Exhaust Air Dry Bulb Temp (°F)	82.8	84.1	90.8
Exhaust Air Wet Bulb Temp (°F)	82.8	84.1	90.8
Exhaust Air Flow Rate (MMlb/hr)	31.2	41.9	41.3
Air Flow/Heat Rejection (kg/s per MWth)	13.5	18.0	17.7

Notes:
°F = degrees Fahrenheit
kg/s = kilograms per second
MMlb/hr = million pounds per hour
MWth = megawatt, thermal
% = percent

Table 5.11-9
Air Separation Unit Cooling Tower Exhaust Air Flows and Temperatures and Heat Rejection Loads

Parameter	Air Separation Unit Cooling Tower Exhausts		
Number of Cells	4 cells (1 by 4)		
Cell Height	16.76 meters (55 feet)		
Cell Diameter	9.14 meters (30 feet)		
Tower Housing Length	60.70 meters (200 feet)		
Tower Housing Width	18.29 meters (60 feet)		
Ambient Dry Bulb Temperature	39°F	65°F	97°F
Ambient Wet Bulb Temperature	36.8°F	55.5°F	67.6°F
Ambient Relative Humidity	82%	55%	20%
Number of Cells in Operation	4	4	4
Heat Rejection (MWth)	89.8	90.4	90.6
Exhaust Air Dry Bulb Temp (°F)	82.8	84.1	90.8
Exhaust Air Wet Bulb Temp (°F)	82.8	84.1	90.8
Exhaust Air Flow Rate (MMlb/hr)	9.6	12.9	12.7
Air Flow/Heat Rejection (kg/s per MWth)	13.5	18.0	17.7

Notes:

°F = degrees Fahrenheit
kg/s = kilograms per second
MMlb/hr = million pounds per hour
MWth = megawatt, thermal
% = percent

Table 5.11-10
Representative Cooling Tower Manufacturer and Model Information

Cooling Tower Service	Manufacturer	Model Number
Power Block	SPX Cooling Technologies Inc.	F489-6.0-13
Process	SPX Cooling Technologies Inc.	F489-6.0-4
Air Separation Unit	SPX Cooling Technologies Inc.	F489-6.0-4

Table 5.11-11
Summary of LORS – Visual Resources

LORS	Requirements	Conformance to Requirements	Administering Agency	Agency Contact
Federal Jurisdiction				
There are no applicable federal LORS.				
State Jurisdiction				
Application for Certification Requirements	Rules of Practice and Procedure and Power Plant Site Certification Regulations, Appendix B.	See Section 5.11	California Energy Commission (CEC)	1
State Scenic Highway Requirements	Requirements are applicable to state designated scenic highways.	The portions of roads and highways within the Project vicinity are not designated official State Scenic Highways.	California Department of Transportation (Caltrans)	2 & 4
Local Jurisdiction				
Kern County General Plan, 1.8 Industrial – Policy 6	Encourage upgrading the visual character of existing industrial areas through the use of landscaping, screening, or buffering.	According to Kern County Ordinance 19.12.120 Landscaping: Exclusive Agriculture (A) District, No landscaping is required in the A district, except where the proposed use is subject to a plot plan review pursuant to Chapter 19.80. Therefore, compliance with this regulation is inapplicable.	Kern County	3
Kern County General Plan, 1.8 Industrial – Policy 7	Require that industrial uses provide design features such as screen walls, landscaping, increased height and/or setbacks, and lighting restrictions between the boundaries of residential land use designation so as to reduce impacts on residences due to light, noise, sound, and vibration.	Proper light/glare shielding is included as part of Project design.	Kern County	3

Table 5.11-11
Summary of LORS – Visual Resources

LORS	Requirements	Conformance to Requirements	Administering Agency	Agency Contact
Kern County General Plan, 1.8 Industrial – Implementation Measure VI	Design, layout, and visual appearance coordinated with existing adjacent industrial uses.	The Project design and layout are in conformance with the existing industrial land uses within the area.	Kern County	3
Kern County General Plan, 1.8 Industrial – Map Provisions Service Industrial (Map Code 7.2)	Industrial properties/activities that involve outdoor storage/use of heavy equipment. Such uses produce significant air or noise pollution and are visually obtrusive.	The Project area is located north and directly south of existing industrial structures and storage tanks. The design of the Project elements results in a co-dominant visual effect with the adjacent fertilizer plant.	Kern County	3
Kern County General Plan, 1.10.8 Smart Growth Policy 49g	Aesthetically pleasing and unifying design features that promote a visually pleasing environment.	The Project design and visual aesthetics are similar to the existing industrial land uses with in the area.	Kern County	3
Kern County General Plan, 1.10.7 Light and Glare Policy 47	Ensure that light and glare from discretionary new development projects are minimized in rural as well as urban areas.	Proper light/glare shielding is included as part of Project design.	Kern County	3
Kern County General Plan, 1.10.7 Light and Glare Policy 48	Encourage the use of low-glare lighting to minimize the nighttime glare effects on neighboring properties	Proper light/glare shielding is included as part of Project design.	Kern County	3
Kern County General Plan, Zoning Ordinance Code Chapter 19.86	Requires public notification and review of any project that might adversely impact visual resources.	Given that the zoning of the Project property is A; a Landscape Plan is not required.	Kern County	3
Kern County General Plan Circulation Element – 2.3.9 Scenic Route Corridors	Requirements are applicable to state designated scenic highways. The California Scenic Highways Master Plan designates three state highways in Kern County "Eligible State Scenic Highway," including portions of State Routes 14, 58, and 41, and of State Highway 395.	The portions of roads and highways within the Project vicinity are not designated official State Scenic Highways.	Kern County	4

Table 5.11-11
Summary of LORS – Visual Resources

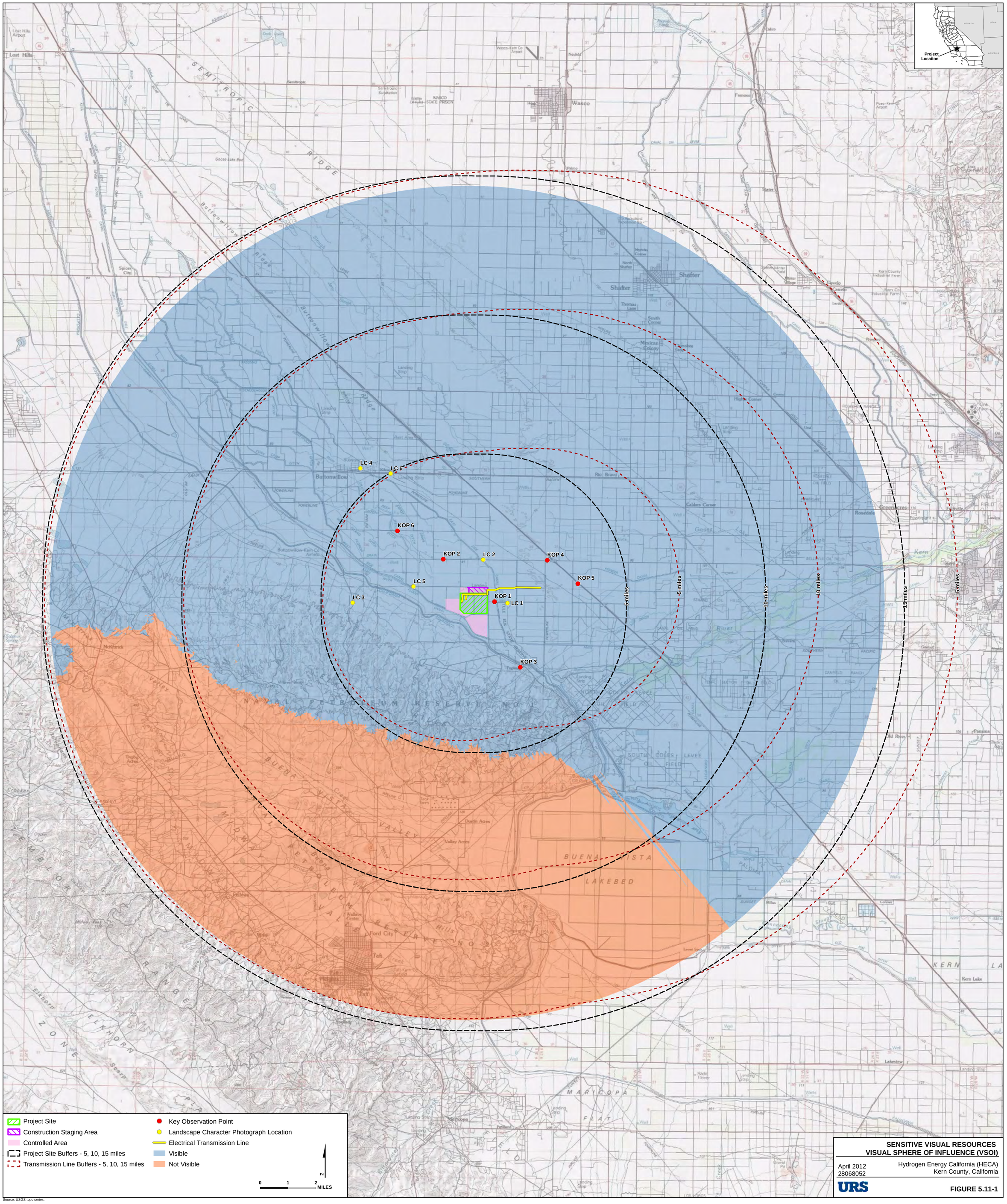
LORS	Requirements	Conformance to Requirements	Administering Agency	Agency Contact
Kern County River Plan Element, Chapter III - 3.2.3 Policies (3)	Building heights and setbacks shall not significantly obstruct river views, and they shall be regulated in accordance with potential to obstruct river views from existing or planned roads or trails.	There are no river views within the Project vicinity; therefore this requirement is not applicable to the Project.	Kern County	3
Tupman Rural Community Specific Plan, Scenic Highways Implementation 2	All proposed existing and or expanding land uses adjacent to the Tupman Road route shall seek approval of the Planning Agency prior to issuance of permits so as to provide for the screening of unsightly uses.	From a conversation with Shawn Beyeler, Planner 2 (Kern County Planning Department) on 30 May 2008 it was determined that Tupman Road is not designated as a scenic route and there are to date no scenic routes designated throughout Kern County	Kern County	4
Buttonwillow Community Development Plan, Open Space	Encourages continuing dual use of transmission line easements as open space or possible greenbelt areas.	Some portions of the Project's proposed transmission route follow existing transmission lines and poles	Kern County	3
Buttonwillow Community Development Plan, Scenic Lands	Encourage continuing implementation of the County Scenic Highway Programs	Currently there are no designated County Scenic Highways within the Project vicinity.	Kern County	4

Notes:
BLM = Bureau of Land Management
LORS = laws, ordinances, regulations, and standards

Table 5.11-12
Agency Contact List for LORS

	Agency	Contact Information
State Jurisdiction		
1	California Energy Commission Energy Facilities Siting Division Community Resources Unit	Mark Hamblin, Senior Planner/Supervisor 1516 Ninth Street, Sacramento, CA 95814 916-654-5107
2	California Department of Transportation (Caltrans) Guidelines for the Official Designation of Scenic Highways Office of Landscape	Ken Murray, L.A. #4345 Senior Landscape Architect 2800 Gateway Oaks Drive, Suite 100 Sacramento, CA 95833 916-274-6138
Local Jurisdiction		
3	Kern County	Scott Denney, Supervising Planner 2700 "M" Street, Suite 100 Bakersfield, CA 93301-2323 661-862-8631
4	Kern County	Shawn Beyeler, Planner 2 2700 "M" Street, Suite 100 Bakersfield, CA 93301-2323 661-862-8641

Note:
LORS = laws, ordinances, regulations, and standards



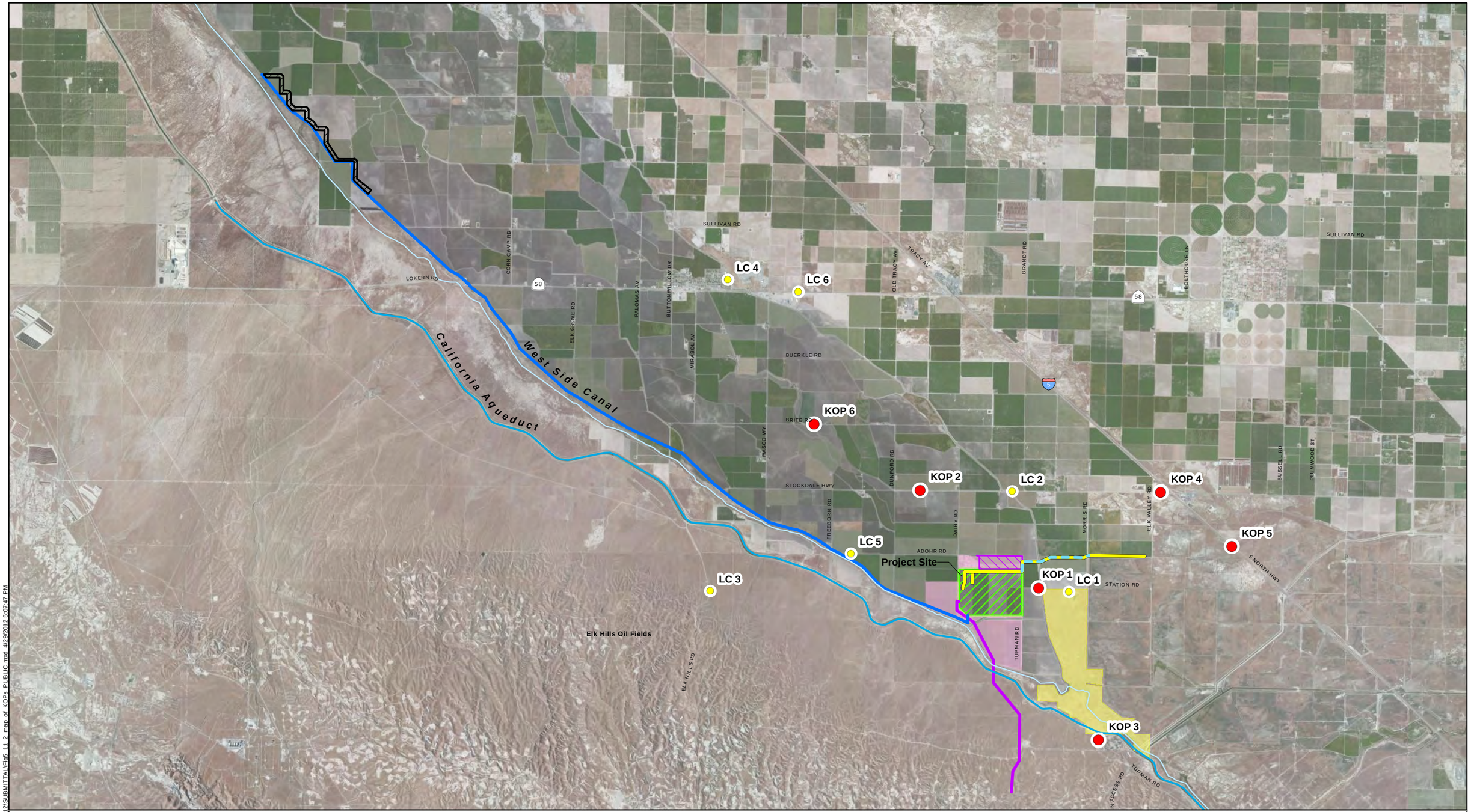
SENSITIVE VISUAL RESOURCES
VISUAL SPHERE OF INFLUENCE (VSOI)

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.11-1



Note:
1. Feature temporarily designated as confidential

Source: Aerial Imagery, Bing Maps, 2009.

MAP OF KOPS

April 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.11-2

FIGURE 5.11-3
SCENIC ATTRACTIVENESS EVALUATION FORM FOR LANDSCAPE CHARACTER PHOTO NO. 1

Landform	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Vegetation	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Adjacent Scenery	H (5)	H/M (4)	**M (3)**	M/L (2)	L (1)
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	**M (0)**	M/L (-2)	L (-4)
Scenic Attractiveness: Class C (11)					

Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2).

Narrative Landscape Description and Photograph: Landscape Character Photo No. 1 (see Figure 5.11-1 for photograph location) was taken from the picnic area of the Tule Elk State Natural Reserve and represents a recreational public view of the project area, approximately 0.75 mile east of the Project area. The relatively flat topography of the foreground and middleground gives way to more dramatic terrain in the background in this area and allows for very open, panoramic views of the adjacent area. Topographic relief across the setting consists of a broad, horizontal composition varying from relatively flat terrain across the view to rolling terrain in the distant background, adding somewhat to the visual appeal of the form and line characteristics of the area. There are no natural water features in the Project area. A variety of cultural modifications (including industrial storage structures, telephone/transmission lines, and residential housing) are visible in foreground and middleground views. The area is characterized by little color variation, with thick undulating grasses, and low to moderate contrast of generally flat tones. Views from this KOP consist of large expanses of naturally vegetated property, and the most prominent visible features are the heavy steel fencing structures that cross the foreground, as well as the large trees that screen most of view toward the Project Site. This landscape is mildly interesting within its setting, and uncommon within the region due to habitat restoration/preservation for the Tule Elk.

FIGURE 5.11-4
SCENIC ATTRACTIVENESS EVALUATION FORM FOR LANDSCAPE CHARACTER PHOTO NO. 2

Landform	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Vegetation	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Adjacent Scenery	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	M (0)	**M/L (-2)**	L (-4)
Scenic Attractiveness: Class C (5)					

Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2).

Narrative Landscape Description and Photograph: Landscape Character Photo No. 2 (see Figure 5.11-1 for photograph location) was taken from a residence along Stockdale Highway and represents a public view of the Project area, approximately 1.0 mile north of the Project area. The relatively flat topography of the foreground and middleground gives way to more dramatic terrain in the background in this area and allows for very open, panoramic views of the adjacent area. Topographic relief across the area consists of a broad horizontal composition varying from relatively flat terrain across the view to the mountainous terrain of the Elk Hills in the distant background, adding somewhat to the visual appeal of the form and line characteristics of the area. There are no natural water features in the Project area. A variety of cultural modifications (including industrial storage structures, telephone/transmission lines, irrigation canals, and residential housing) are visible in foreground and middleground views. The water in the canal is below grade, and thus not visible in this area. The area is characterized by little color variation, with scattered trees usually associated with residences and cultivated farmland, and low to moderate contrast of generally flat tones. Views from this photo consist of large expanses of cultivated crops, with the most prominent visible features being the fertilizer operation in the middleground, as well as the large trees in the foreground that partially screen the view toward the project site. This landscape is mildly interesting within its setting, and common within the region due to the agricultural heritage.

FIGURE 5.11-5
SCENIC ATTRACTIVENESS EVALUATION FORM FOR LANDSCAPE CHARACTER PHOTO NO. 3

Landform	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Vegetation	H (5)	H/M (4)	**M (3)**	M/L (2)	L (1)
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Adjacent Scenery	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Scarcity	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Modifications*	H (2)	H/M (1)	M (0)	**M/L (-2)**	L (-4)
Scenic Attractiveness: Class C (9)					

Scenic Quality Classifications:

A = 19 or more

B = 12 to 18

C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2)

Narrative Landscape Description and Photograph: Landscape Character Photo No. 3 (see Figure 5.11-1 for photograph location) was taken from Elk Hills Road and represents a public view of the Project area, approximately 3.8 mile west of the Project area. The superior view looks across the relatively flat topography of the foreground, middleground, and background, which rises slightly as the viewer approaches Elk Hills. The vantage points allows for very open, panoramic views of the adjacent area. Topographic relief across the area consists of a broad, horizontal composition varying from relatively flat terrain across the view with the mountainous terrain of the Elk Hills rising up toward the viewpoint, adding somewhat to the visual appeal of the form and line characteristics of the area. There are no natural water features in the Project area. The California Aqueduct is in the middleground, but is not visible because it is below grade. A variety of cultural modifications (including industrial operation/storage structures, telephone/transmission lines, and residential housing) are visible in foreground and middleground views. The area is characterized by various color variations associated with the natural grasses along the foothills and cultivated farmland in the middleground and background, and has low to moderate contrast of generally flat tones. Views from this photo consist of large expanses of cultivated crops, and the most prominent visible features are the two large transmission lines that cross the middleground. This landscape is mildly interesting within its setting, and common within the regional area.

FIGURE 5.11-6
SCENIC ATTRACTIVENESS EVALUATION FORM FOR LANDSCAPE CHARACTER PHOTO NO. 4

Landform	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Vegetation	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Adjacent Scenery	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	M (0)	M/L (-2)	**L (-4)**
Scenic Attractiveness: Class C (2)					

Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2)

Narrative Landscape Description and Photograph: Landscape Character Photo No. 4 (see Figure 5.11-1 for photograph location) was taken from Buttonwillow Park and represents a public view of the project substation interconnection, approximately 0.4 mile west of the interconnection point. The view looks across the relatively flat topography of the foreground, middleground, and background, which is heavily modified by industrial elements in the foreground and middleground. The view allows for a shielded view of the adjacent area, detracting from the visual appeal of possible form and line characteristics in the area. There are no natural water features in the area. A variety of cultural modifications (including industrial operation/storage structures, telephone/transmission lines, fencing, irrigation canals, and substation elements) is visible in foreground and middleground views. The water in the canal itself is below grade, and thus is not visible from this viewpoint. The area is characterized by few color variations associated with the natural grasses/bushes along the canal, and has low to moderate contrast of generally flat tones. Views from this photo consist of large industrial elements that dominate the viewshed.

FIGURE 5.11-7
SCENIC ATTRACTIVENESS EVALUATION FORM FOR LANDSCAPE CHARACTER PHOTO NO. 5

Landform	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Vegetation	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Adjacent Scenery	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	M (0)	**M/L (-2)**	L (-4)
Scenic Attractiveness: Class C (4)					

Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2)

Narrative Landscape Description and Photograph: Landscape Character Photo No. 5 (see Figure 5.11-1 for photograph location) was taken from the eastbound lane of Adohr Road approximately 1.7 miles west of the Project Site, and 0.1 mile from closest transmission alternative. The view looks across the relatively flat topography of the foreground, middleground, and background, which is modified crop production. The view allows for an open and panoramic view of the adjacent area, with industrial elements in the middleground that detract from the visual appeal of possible form and line characteristics in the area. There are no natural water features in the area. The area is characterized by few color variations, which are associated with the agricultural plantings flanking the view and creating divergent lines toward the Project Site, which has low to moderate contrast of generally flat tones. Views from this photo consist of agricultural and industrial elements that create a viewshed common throughout this region.

FIGURE 5.11-8
SCENIC ATTRACTIVENESS EVALUATION FORM FOR LANDSCAPE CHARACTER PHOTO NO. 6

Landform	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Vegetation	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Adjacent Scenery	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	M (0)	M/L (-2)	**L (-4)**
Scenic Attractiveness: Class C (2)					

Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2)

Narrative Landscape Description and Photograph: Landscape Character Photo No. 6 (see Figure 5.11-1 for photograph location) was taken from the eastbound lane of State Highway 58, and represents a public view of the project transmission line crossing, approximately 0.3 mile east of the crossing point. The view looks across the relatively flat topography of the foreground, middleground, and background, which is heavily modified by industrial elements in the foreground and middleground. The view allows for an open view of the adjacent areas, which are heavily modified by industrial elements, detracting from visual appeal of possible form and line characteristics in the area. There are no natural water features in the area. A variety of cultural modifications (including industrial operation/storage structures, telephone/transmission lines, pipeline markers, fencing, and the railroad) are visible in foreground and middleground views. The area is characterized by little variation in color associated with the sparse low-lying vegetation, and has low to moderate contrast of generally flat tones. Views from this photo consist of large industrial elements that dominate the viewshed.

FIGURE 5.11-9
SCENIC ATTRACTIVENESS EVALUATION FORM FOR SENSITIVE VIEW AREA AND KOP NO. 1

Landform	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Vegetation	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Adjacent Scenery	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	**M (0)**	M/L (-2)	L (-4)
Scenic Attractiveness: Class C (8)					

Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2)

Narrative Landscape Description and Photograph: Sensitive Viewing Area and KOP No. 1 (Figure 5.11-14; see also Figure 5.11-1 for KOP location) was taken along Station Road adjacent to two residences and is just west of the Tule Elk Reserve, approximately 0.25 mile east of the Project Site. The relative flatness of the foreground and middleground in this area allows for more open, expansive views of the adjacent area. Topographic relief across the setting consists of a broad, horizontal composition varying from relatively flat terrain to more dramatic distant terrain, adding to the panoramic visual appeal of the form and line characteristics of the area (although background topography is partially concealed by haze). There are no natural water features in the Project area. A variety of cultural modifications (including industrial storage tank/structures, telephone/transmission lines along Station and Tupman roads, and crop cultivation) are visible in foreground and middleground views. The area is characterized by few color variations (mainly from the monochromatic crop coloration), with low contrast of generally flat tones. Views from this KOP consist of large expanses of farmlands. This landscape is mildly interesting within its setting, but fairly common within the region.

FIGURE 5.11-10
SCENIC ATTRACTIVENESS EVALUATION FORM FOR SENSITIVE VIEW AREA AND KOP NO. 2

Landform	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Vegetation	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Adjacent Scenery	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	M (0)	**M/L (-2)**	L (-4)
Scenic Attractiveness: Class C (6)					

Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2)

Narrative Landscape Description and Photograph: Sensitive Viewing Area and KOP No. 2 (Figure 5.11-16; see also Figure 5.11-1 for KOP location) was taken from the eastbound lane of Stockdale Highway and represents a public view of the Project area, approximately 1.2 miles north-northwest of the Project Site. The relative flatness of the foreground and middleground in this area allows for more open, expansive views of the adjacent area. Topographic relief across the setting consists of a broad, horizontal composition varying from relatively flat terrain to distant rolling terrain, adding somewhat to the panoramic visual appeal of the form and line characteristics of the area. There are no natural water features in the Project area. The only water source within view from this KOP is the California Aqueduct, which runs south of the Project site and is not visible from this KOP. A variety of cultural modifications (including industrial storage tank/structures, telephone/transmission lines along Dairy Road, and crop cultivation) are visible in foreground, middleground, and background views. The area is characterized by few color variations (mainly from the monochromatic crop coloration), and has low contrast of generally flat tones. Views from this KOP consist of large expanses of farmlands. This landscape is mildly interesting within its setting, but fairly common within the region.

FIGURE 5.11-11
SCENIC ATTRACTIVENESS EVALUATION FORM FOR SENSITIVE VIEW AREA AND KOP NO. 3

Landform	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Vegetation	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Water	H (5)	H/M (4)	**M (3)**	M/L (2)	L (1)
Color	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Adjacent Scenery	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	M (0)	**M/L (-2)**	L (-4)
Scenic Attractiveness: Class C (10)					

Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2).

Narrative Landscape Description and Photograph: Sensitive Viewing Area and KOP No. 3 (Figure 5.11-18; see also Figure 5.11-1 for KOP location) was taken from the Elk Hills Elementary School's playground and represents public recreational views of the Project area, approximately 2.25 miles south-southeast of the Project Site. The rolling topography of the foreground gives way to the flatness of the middleground and background in this area, allowing for very open, expansive views of the adjacent area. Topographic relief across the setting consists of a broad, horizontal composition varying from relatively flat terrain across the view to the rolling terrain in the foreground, adding to the panoramic visual appeal of the form and line characteristics of the area, and giving this KOP a superior viewpoint of the Project Site. There are minimal natural water features in the Project area, with none present in this view. One manmade water feature within view from this KOP is the California Aqueduct, which runs southeast across the middleground of this KOP and is a major focal point of the view. A variety of cultural modifications (including industrial storage tank/structures, telephone/transmission lines along Tupman Road, and crop cultivation) are visible in foreground, middleground, and background views. The area is characterized by some color variation (mainly from the contrast between the monochromatic crop coloration and the natural desert vegetation), and has low to moderate contrast of generally flat tones. Views from this KOP consist of large expanses of farmlands. This landscape is mildly interesting within its setting, but fairly common within the region.

FIGURE 5.11-12
SCENIC ATTRACTIVENESS EVALUATION FORM FOR SENSITIVE VIEW AREA AND KOP NO. 4

Landform	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Vegetation	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Adjacent Scenery	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	M (0)	**M/L (-2)**	L (-4)
Scenic Attractiveness: Class C (5)					

Scenic Quality Classifications:

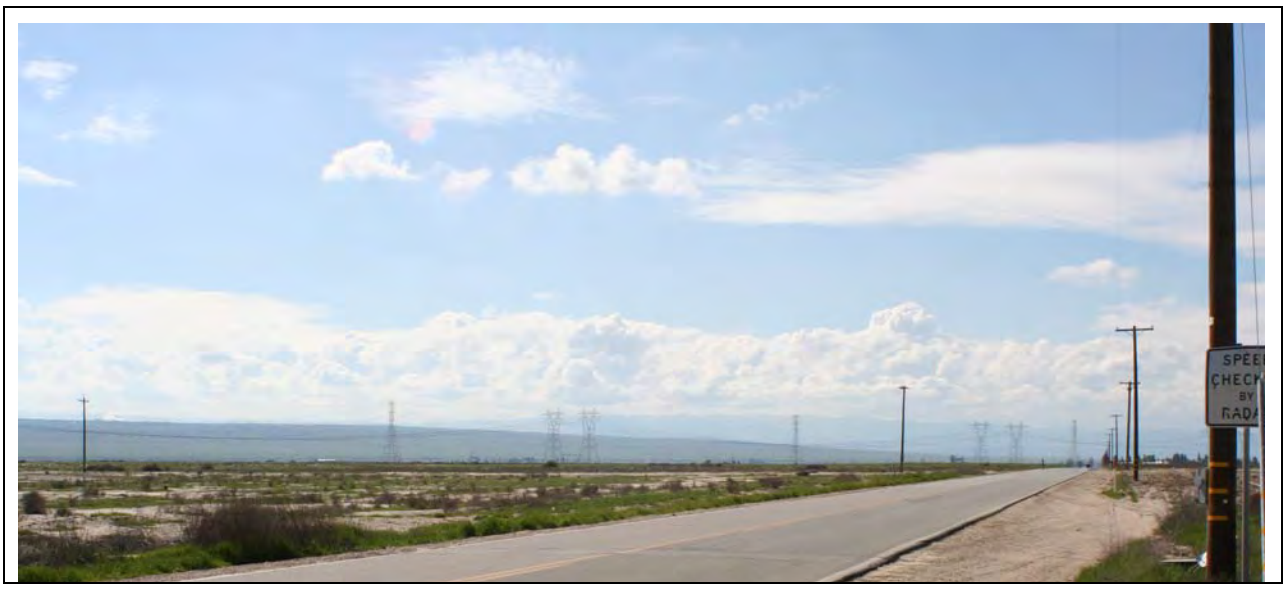
A = 19 or more

B = 12 to 18

C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2)



Narrative Landscape Description and Photograph: Sensitive Viewing Area and KOP No. 4 (Figure 5.11-20; see also Figure 5.11-1 for KOP location) was taken from the westbound lane of Stockton Boulevard near the I-5 interchange and represents public views of the Project area, approximately 2.4 miles northeast of the Project Site. The relatively flat topography of the foreground and middleground gives way to more dramatic terrain in the background in this area, and allows for very open, panoramic views of the adjacent area. Topographic relief across the setting consists of a broad, horizontal composition varying from relatively flat terrain across the view with rolling terrain in the background, adding somewhat to the panoramic visual appeal of the form and line characteristics of the area. There are no natural water features in the Project area. A variety of cultural modifications (including industrial storage structures and numerous telephone/transmission lines) are visible in foreground, middleground, and background views. The area is characterized by few color variations, with mostly natural sparse vegetation, and has low to moderate contrast of generally flat tones. Views from this KOP consist of large expanses of uncultivated, sparsely vegetated property, with the most prominent visible features being the numerous highly contrasting steel lattice transmission structures that cross the middleground of the view and create a skylining effect. This landscape is mildly interesting within its setting, but fairly common within the region, and the scenic attractiveness of the view has been highly compromised by visible manmade alterations.

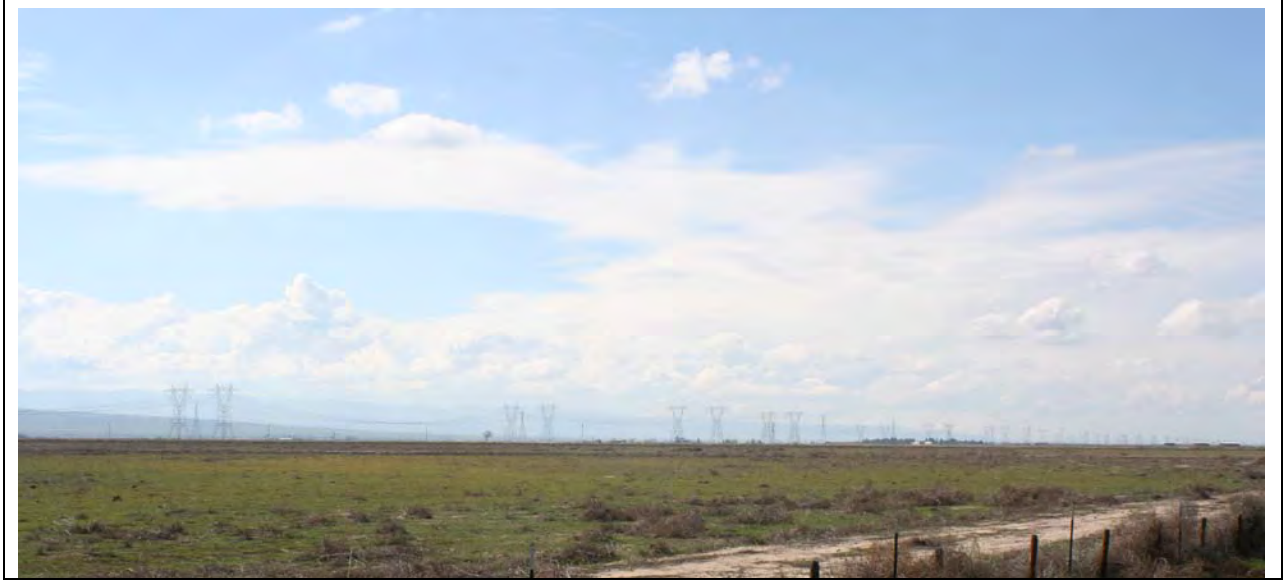
FIGURE 5.11-13
SCENIC ATTRACTIVENESS EVALUATION FORM FOR SENSITIVE VIEW AREA AND KOP NO. 5

Landform	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Vegetation	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Adjacent Scenery	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	M (0)	**M/L (-2)**	L (-4)
Scenic Attractiveness: Class C (5)					

Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2)



Narrative Landscape Description and Photograph: Sensitive Viewing Area and KOP No. 5 (Figure 5.11-22; see also Figure 5.11-1 for KOP location) was taken from the southbound lane of I-5 and represents the public view of the Project area, approximately 3.3 miles east of the Project Site. The relatively flat topography of the foreground and middleground gives way to more dramatic terrain in the background in this area, and allows for very open, panoramic views of the adjacent area. Topographic relief across the setting consists of a broad, horizontal composition varying from relatively flat terrain across the view to rolling terrain in the distant background, adding somewhat to the visual appeal of the form and line characteristics of the area. There are no natural water features in the Project area. A variety of cultural modifications (including industrial storage structures and numerous telephone/transmission lines) are visible in foreground and middleground views. The area is characterized by few color variations, with mostly natural sparse and striated vegetation, and low to moderate contrast of generally flat tones. Views from this KOP consist of large expanses of uncultivated, sparsely vegetated property, and the most prominent visible features are the numerous highly contrasting steel lattice transmission structures that cross the middleground of the view and create a skylining effect. This landscape is mildly interesting within its setting, but fairly common within the region, and the scenic attractiveness of the view has been highly compromised by visible manmade alterations.

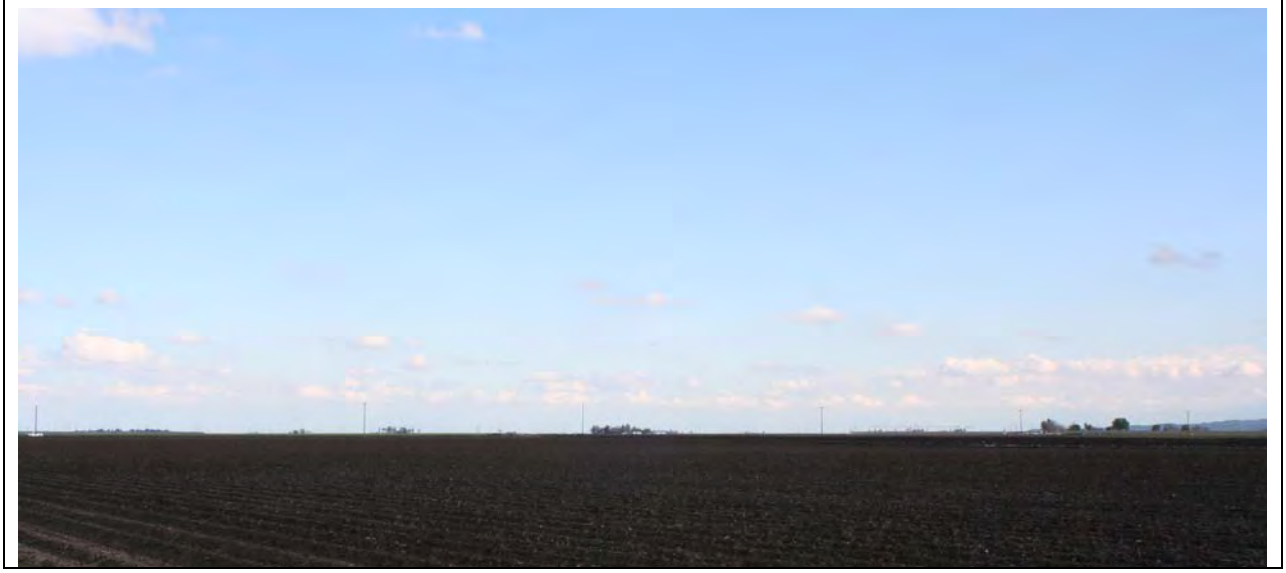
FIGURE 5.11-14
SCENIC ATTRACTIVENESS EVALUATION FORM FOR SENSITIVE VIEW AREA AND KOP NO. 6

Landform	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Vegetation	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Water	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Color	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Adjacent Scenery	H (5)	H/M (4)	M (3)	**M/L (2)**	L (1)
Scarcity	H (5)	H/M (4)	M (3)	M/L (2)	**L (1)**
Modifications*	H (2)	H/M (1)	M (0)	**M/L (-2)**	L (-4)
Scenic Attractiveness: Class C (6)					

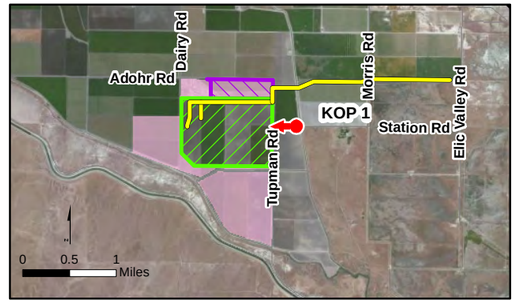
Scenic Quality Classifications:
A = 19 or more
B = 12 to 18
C = 11 or less

Note: Evaluation score is **bold**; H = High; M = Moderate; and L = Low

* Explains cultural modifications present in the landscape, ranging from negative intrusions (-4) to those that complement the scenic quality and promote visual harmony (2).



Narrative Landscape Description and Photograph: Sensitive Viewing Area and KOP No. 6 (Figure 5.11-14; see also Figure 5.11-1 for KOP location) was taken from the eastbound lane of Brite Road and represents a public view of the transmission line crossing, approximately 0.3 mile east of this KOP location. The relative flatness of the foreground and middleground in this area allows for more open, expansive views of the adjacent area. Topographic relief across the setting consists of a broad, horizontal composition varying from relatively flat terrain to distant rolling terrain, adding a bit to the panoramic visual appeal of the form and line characteristics of the area. There are no natural water features in the area adjacent to this KOP. The only water source within view from this KOP is an agricultural irrigation channel that runs south to southwest of the view, and is only visible from this KOP because of the earthen berms built along its edges. A variety of cultural modifications (including houses, industrial storage tanks/structures, telephone/transmission lines along Brite Road, and crop cultivation) are visible in foreground, middleground, and background views. The area is characterized by few color variations (mainly from the monochromatic crop coloration and bare cultivated lands not growing crops), and has low contrast from generally flat tones. Views from this KOP consist of large expanses of farmlands. This landscape is mildly interesting within its setting, but fairly common within the region.



Key Observation Point
Transmission
Project Site
Construction Staging Area
Controlled Area

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	12:14 PM
Date of photograph:	March 5, 2009
Distance to project:	.71 miles
Weather condition:	Partly Cloudy
Viewing direction:	West
Latitude:	35°19'58.83"N
Longitude:	119°22'20.44"W

KOP 1: VIEW FROM STATION ROAD
EXISTING CONDITIONS

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FIGURE 5.11-15

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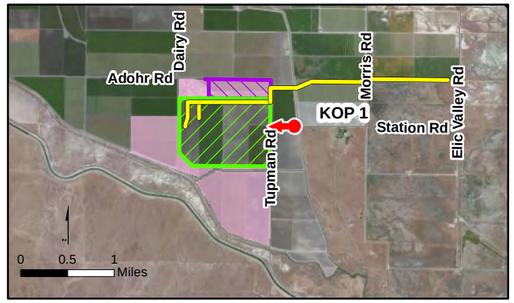

Key Observation Point
Transmission
Project Site
Construction Staging Area
Controlled Area

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	12:14 PM
Date of photograph:	March 5, 2009
Distance to project:	.71 miles
Weather condition:	Partly Cloudy
Viewing direction:	West
Latitude:	35°19'58.83"N
Longitude:	119°22'20.44"W

KOP 1: VIEW FROM STATION ROAD
SIMULATED CONDITIONS

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FIGURE 5.11-16

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Key Observation Point

Transmission

Project Site

Construction Staging Area

Controlled Area

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	1:14 PM
Date of photograph:	March 5, 2009
Distance to project:	1.98 miles
Weather condition:	Partly Cloudy
Viewing direction:	Southeast
Latitude:	35°21'16.82"N
Longitude:	119°24'18.91"W

KOP 2: VIEW FROM STOCKDALE HIGHWAY EXISTING CONDITIONS

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FIGURE 5.11-17

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Key Observation Point
Transmission
Project Site
Construction Staging Area
Controlled Area

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	1:14 PM
Date of photograph:	March 5, 2009
Distance to project:	1.98 miles
Weather condition:	Partly Cloudy
Viewing direction:	Southeast
Latitude:	35°21'16.82"N
Longitude:	119°24'18.91"W

KOP 2: VIEW FROM STOCKDALE HIGHWAY
SIMULATED CONDITIONS

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FIGURE 5.11-18

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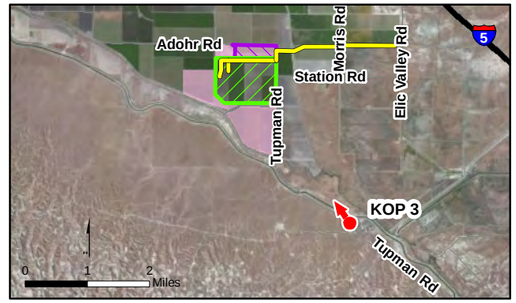

Key Observation Point

Transmission

Project Site

Construction Staging Area

Controlled Area

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Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	12:52 PM
Date of photograph:	March 5, 2009
Distance to project:	2.79 miles
Weather condition:	Partly Cloudy
Viewing direction:	Northwest
Latitude:	35°17'56.21"N
Longitude:	119°21'19.91"W

KOP 3: VIEW FROM ELK HILLS ELEMENTARY SCHOOL EXISTING CONDITIONS

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Kern County, California

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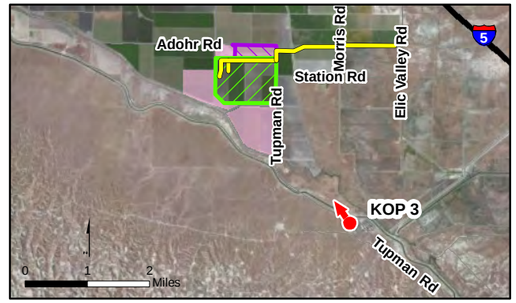
FIGURE 5.11-19



Key Observation Point

Transmission

Project Site

Construction Staging Area

Controlled Area

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Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	12:52 PM
Date of photograph:	March 5, 2009
Distance to project:	2.79 miles
Weather condition:	Partly Cloudy
Viewing direction:	Northwest
Latitude:	35°17'56.21"N
Longitude:	119°21'19.91"W

KOP 3: VIEW FROM ELK HILLS ELEMENTARY SCHOOL SIMULATED CONDITIONS

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Kern County, California

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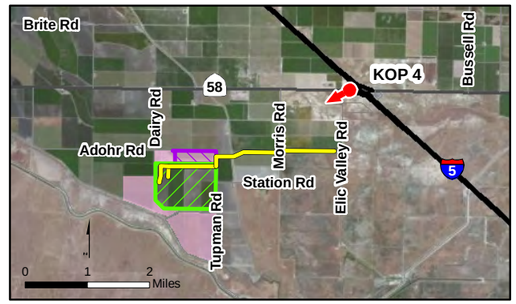
FIGURE 5.11-20



Key Observation Point

Transmission

Project Site

Construction Staging Area

Controlled Area

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Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	3:09 PM
Date of photograph:	March 5, 2009
Distance to project:	3.03 miles
Weather condition:	Partly Cloudy
Viewing direction:	Southwest
Latitude:	35°21'17.81"N
Longitude:	119°20'20.91"W

KOP 4: VIEW FROM STOCKDALE HIGHWAY AND I-5 EXISTING CONDITIONS

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Kern County, California

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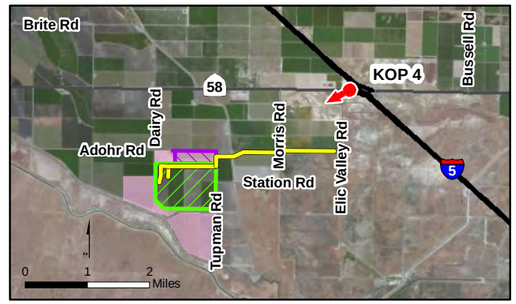
FIGURE 5.11-21



Key Observation Point

Transmission

Project Site

Construction Staging Area

Controlled Area

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Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	3:09 PM
Date of photograph:	March 5, 2009
Distance to project:	3.03 miles
Weather condition:	Partly Cloudy
Viewing direction:	Southwest
Latitude:	35°21'17.81"N
Longitude:	119°20'20.91"W

KOP 4: VIEW FROM STOCKDALE HIGHWAY AND I-5 SIMULATED CONDITIONS

April 2012
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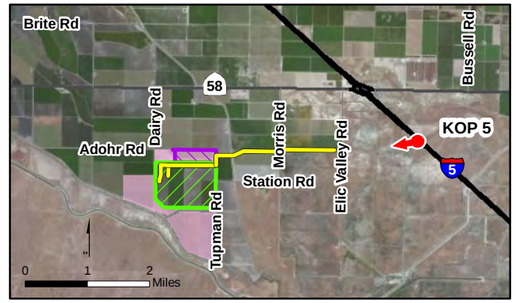
Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.11-22



Key Observation Point

Transmission

Project Site

Construction Staging Area

Controlled Area

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Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	3:13 PM
Date of photograph:	March 5, 2009
Distance to project:	3.77 miles
Weather condition:	Partly Cloudy
Viewing direction:	Southwest
Latitude:	35°20'34.70"N
Longitude:	119°19'10.12"W

KOP 5: VIEW FROM SOUTHBOUND I-5
EXISTING CONDITIONS

April 2012
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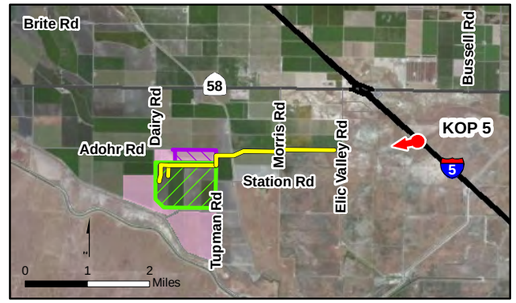
Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.11-23



Key Observation Point

Transmission

Project Site

Construction Staging Area

Controlled Area

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Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Photograph Information

Time of photograph:	3:13 PM
Date of photograph:	March 5, 2009
Distance to project:	3.77 miles
Weather condition:	Partly Cloudy
Viewing direction:	Southwest
Latitude:	35°20'34.70"N
Longitude:	119°19'10.12"W

KOP 5: VIEW FROM SOUTHBOUND I-5
SIMULATED CONDITIONS

April 2012
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Kern County, California

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FIGURE 5.11-24