3.6 Public Utilities and Energy

3.6.1 Introduction

This section describes the regulatory setting, affected environment, potential impacts, and mitigation measures for public utilities and energy within the area potentially affected by the Fresno to Bakersfield Section of the California High-Speed Train (HST) System. The *Final Program Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System* (Statewide Program EIR/EIS) (Authority and FRA 2005) concluded that the HST System alternatives would not be expected to result in a significant effect on utilities and utility services when viewed on a systemwide basis.

The 2005 Statewide Program EIR/EIS also concluded that the systemwide energy demand would be potentially significant under the California Environmental Quality Act (CEQA). Project design elements that reduce effects include an elevated guideway that avoids utilities, construction phasing to avoid interruptions to utility service, and identification of conflicts with utilities. Project features that reduce energy consumption include designing the HST System with regenerative braking and implementing energy-saving measures during construction. More information regarding public utilities and energy is provided in Section 3.2, Transportation (Sections 3.2.5 and 3.2.8); Section 3.5, Electromagnetic Fields and Electromagnetic Interference (Sections 3.5.1 and 3.5.5); Section 3.8, Hydrology and Water Resources (Section 3.10, Hazardous Materials and Wastes (Section 3.10.4); Section 3.13, Station Planning, Land Use, and Development (Section 3.13.5); and Section 3.14, Agricultural Lands (Section 3.14.5).

As discussed in Section 3.1.5 and the Executive Summary, the analysis in this chapter includes revisions based on design refinements and analytical refinements. Gray shading is used as a guide to help the reader navigate the revisions.

3.6.2 Laws, Regulations, and Orders

The following sections discuss federal, state, and local laws; regulations; and agency jurisdiction and management guidance that are relevant to this resource.

3.6.2.1 Federal

Section 403(b) of the Power Plant and Industrial Fuel Use Act [Executive Order 12185, 44 F.R. Section 75093; Public Law 95-620]

This section of the Power Plant and Industrial Fuel Use Act and of the Executive Order encourages additional conservation of petroleum and natural gas by recipients of federal financial assistance.

Norman Y. Mineta and Special Programs Improvement Act [Public Law 108-426]

This act, established by the United States Department of Transportation, Pipeline, and Hazardous Materials Safety Administration, regulates safe movement of hazardous materials to industry and consumers by all modes of transportation, including pipelines. The regulations require pipeline owners and operators to meet specific standards and qualifications, including participating in public safety programs that "notify an operator of proposed demolition, excavation, tunneling, or construction near or affecting a pipeline." This includes identifying pipelines that may be affected by such activities and identifying any hazards that may affect a pipeline. In California, pipeline safety is administered by the Office of the Fire Marshal.

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of natural gas, oil, and electricity. FERC also regulates natural gas and hydropower projects. As part of that responsibility, FERC regulates the transmission and sale of natural gas for resale in interstate commerce, the transmission of oil by pipeline in interstate commerce, and the transmission and wholesale sales of electricity in interstate commerce. FERC also licenses and inspects private, municipal, and state hydroelectric projects; approves the siting and abandonment of interstate natural gas facilities, including pipelines, storage, and liquefied natural gas; oversees environmental matters related to natural gas and hydroelectricity projects and major electricity policy initiatives; and administers accounting and financial reporting regulations and conduct of regulated companies.

Corporate Average Fuel Economy

Corporate Average Fuel Economy (CAFE) standards are federal regulations that are set to reduce energy consumed by on-road motor vehicles. The National Highway Traffic Safety Administration regulates the standards, and the U.S. Environmental Protection Agency (USEPA) measures vehicle fuel efficiency. The standards specify minimum fuel consumption efficiency standards for new automobiles sold in the United States. The current standard is 27.5 miles per gallon (mpg) for passenger cars and 20.7 mpg for light-duty trucks. On May 19, 2009, President Obama issued a Presidential Memorandum proposing a new national fuel economy program that adopts uniform federal standards to regulate both fuel economy and greenhouse gas emissions. The program covers model year 2012 to model year 2016 and ultimately requires an average fuel economy standard of 35.5 mpg in 2016 (39 mpg for cars and 30 mpg for trucks). In response to the Presidential Memorandum, an October 2010 Regulatory Announcement developed with support from industry, the State of California, and environmental stakeholders was issued by the USEPA and the U.S. Department of Transportation (DOT).

Resource Conservation and Recovery Act (42 U.S.C. §6901 et seq.)

The federal Resource Conservation and Recovery Act (RCRA) enacted in 1976 to ensure that solid and hazardous wastes are properly managed, from their generation, to ultimate disposal or destruction. Implementation of RCRA has largely been delegated to federally-approved state waste management programs and under Subtitle D, further promulgated to local governments for management of planning, regulation, and implementation of nonhazardous solid waste disposal. The USEPA retains oversight of state actions under 40 C.F.R. 239-259. Where facilities are found to be inadequate, Section 256.42 requires that necessary facilities and practices be developed by the responsible state and local agencies, or by the private sector. In California, that responsibility was created under the California Integrated Waste Management Act of 1989 and Assembly Bill (AB) 939.

3.6.2.2 State

Public Utilities Code Section 1001–1013 [California Public Utilities Commission General Order 131-D]

The California Public Utilities Commission (CPUC) regulates public electric utilities in California. Section 1001-1013 of the Public Utilities Code requires that railroad companies operating railroads primarily powered by electric energy or electric companies operating power lines shall not begin construction of electric railroads or power lines without first obtaining a certificate from the CPUC specifying that such construction is required for the public's convenience and necessity. General Order 131-D establishes CPUC rules for implementing Public Utilities Code Section 1001-1013 relating to the planning and construction of electrical generation, transmission, power, and distribution line facilities, and substations located in California. A Permit to Construct (PTC) must be obtained from the CPUC for facilities between 50 kilovolts (kV) to 200 kV. A Certificate of Public Convenience and Necessity (CPCN) must be obtained from the CPUC for facilities 200 kV and above.

California Code of Regulations, Title 24, Part 6, Energy Efficiency Standards

Title 24, Part 6 of the California Code of Regulations, Energy Efficiency Standards, promotes efficient energy use in new buildings constructed in California. The standards regulate energy consumed for heating, cooling, ventilation, water heating, and lighting. The standards are enforced through the local building permit process.

Renewable Portfolio Standard Program [Senate Bill 1078]

Requires retail sellers of electricity to increase their purchases of electricity generated by renewable sources and establishes a goal of having 20% of California's electricity generated by renewable sources by 2017. In 2010, the California Air Resources Board (CARB) extended this target for renewable energy resource use to 33% of total use by 2020 (CARB 2010). Increasing California's renewable supplies will diminish the state's heavy dependence on natural gas as a fuel for electric power generation.

Integrated Waste Management Act (AB 939)

In response to RCRA, the California Integrated Waste Management Act of 1989 was created under AB 939. AB 939 requires cities and counties to prepare an Integrated Waste Management Plan, including a Countywide Siting Element (CSE), for each jurisdiction. Per Public Resources Code Sections 41700-41721.5, the CSE provides an estimate of the total permitted disposal capacity needed for a 15-year period, or whenever additional capacity is necessary. CSEs in California must be updated by each operator and permitted by Department of Resources Recycling and Recovery (CalRecycle), which is within the Natural Resources Agency every 5 years. AB 939 mandated that local jurisdictions meet solid waste diversion goals of 50 percent by 2000.

Local Government Construction and Demolition (C&D) Guide [Senate Bill 1374]

Seeks to assist jurisdictions with diverting their C&D material, with a primary focus on the CalRecycle, by developing and adopting a model C&D diversion ordinance for voluntary use by California jurisdictions.

Protection of Underground Infrastructure [California Government Code, Section 4216]

Requires that an excavator must contact a regional notification center (i.e., Underground Service Alert [USA]) at least 2 days before excavation of any subsurface installations. An Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the excavation. Representatives of the utilities are required to mark the specific location of their facilities within the work area prior to the start of excavation. The construction contractor is required to probe and expose the underground facilities by hand prior to using power equipment.

Pavley Rule [AB 1493]

In California, the Pavley regulations for automobile efficiency (AB 1493) are expected to reduce greenhouse gas emissions from California passenger vehicles by about 22% in 2012 and about 30% in 2016, all while improving fuel efficiency and reducing motorists' costs.

CPUC General Order No. 95

The CPUC General Order, Rule for Overhead Electric Line Construction, formulates uniform requirements for overhead electrical line construction, including overhead catenary construction, the application of which will insure adequate service and secure safety to persons engaged in the construction, maintenance, operation or use of overhead electrical lines and to the public in general.

Water Conservation Act of 2009 (Senate Bill X7-7)

The Water Conservation Act of 2009 (Senate Bill X7-7) enacted in November 2009 (Chapter 4, Statutes of 2009 Seventh Extraordinary Session) requires urban and agricultural water suppliers to increase water use efficiency. The urban water use goal within the state is to achieve a 20% reduction in per capita water use by December 31, 2020. Agricultural water suppliers will prepare and adopt agricultural water management plans by December 31, 2012, and update those plans by December 31, 2015, and every 5 years thereafter. Effective 2013, agricultural water suppliers who do not meet the water management planning requirements established by this bill are not eligible for state water grants or loans.

Rules for Overhead 25-kV AC Railroad Electrification Systems

The purpose of these proposed rules is to establish uniform safety requirements governing the design, construction, operation and maintenance of 25 kV AC (alternating current) Railroad Electrification Overhead Contact Systems (OCS). When the CPUC completes these rulemaking proceedings, there will be a new CPUC General Order that will apply to the HSR project.

The rulemaking is for 25-kV Electrification System, which includes new safety rules only for construction and operation of high-speed train Overhead Contact System (OCS). The Traction Power System (TPS) which includes all power substations and required interconnections with utilities will be constructed per existing safety rules (General Orders or GOs) and is not part of these proceedings. This rulemaking process is not related to relocation of utilities that enable construction of HSR infrastructure. All this work will be performed based on bilateral agreements with utilities and in accordance with existing regulations and design criteria.

3.6.2.3 Regional and Local

The Fresno to Bakersfield Section of the California HST System traverses several local government jurisdictions, including Fresno, Kings, Tulare, and Kern counties and the cities of Fresno, Hanford, Corcoran, Wasco, Shafter, and Bakersfield.

Local jurisdictions (counties and cities) have implemented policies and ordinances to regulate public utilities and energy. The general plans for Fresno, Kings, Tulare, and Kern counties contain goals and policies associated with the development, availability, and adequate service of public facilities (County of Fresno 2000, 4-1 to 4-16, 4-21, 4-22; Kings County Planning Department 2010a, LU-9, LU 42–46; Kings County Planning Department 2010b, RC-39, 40, 49, 50; Tulare County 2012; Kern County Planning Department 2009, 214–215; Kern County Planning Department 2007b, 16–27). The facility and service standards called for in these goals and policies are typically achieved and maintained through the use of equitable development funding methods. The general plans and municipal codes for the cities of Fresno, Hanford, Corcoran, Wasco, Shafter, and Bakersfield provide policies and regulations to ensure the development and funding of adequate water services, sewer services, storm drainage services, and solid waste disposal services (City of Fresno Planning and Development Department 2002b, 147–148; City of Fresno Planning and Development Department 2002a, 86–91, 97; City of Fresno 2008a, 2008b, 2009a, 2009b; City of Hanford 2002, PF-3, PF-9 to PF-15; City of Hanford 2006; City of Corcoran

2007, 8-2 to 8-3; City of Corcoran 2010; City of Wasco 2010; City of Shafter 2005, 4-1 to 4-3, 4-7, 4-8; City of Bakersfield and Kern County 2007, X-1 to X-20).

The counties crossed by the Fresno to Bakersfield Section of the HST System have developed and implemented integrated waste management plans in coordination with the cities in each county. These plans include the following components: waste characterization, source reduction, recycling, composting, solid waste facility capacity, education and public information, funding, special waste (e.g., asbestos, sewage sludge), and household hazardous waste.

In the Resource Conservation Element of the *2025 Fresno General Plan,* the City of Fresno provides goals and policies aimed at reducing the consumption of nonrenewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources (City of Fresno Planning and Development Department 2002b). The Energy Element of the *Kern County General Plan* defines the critical energy-related issues facing the county and sets forth goals, policies, and implementation measures to protect the energy resources of the county, to encourage orderly energy development, and to afford the maximum protection for the public's health and safety, and for the environment (Kern County Planning Department 2009).

Table 3.6-1 is a list of county and city policies, plans, and codes that were identified and considered in the preparation of this analysis. Regional plans for the management of utilities or energy have not been prepared.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Fresno County	
Fresno County General Plan, "Public Facilities and Services Element," Goals PF-A through PF-F, Policies PF-A.1 through PF-F.11, Goal PF-J, Policies PF-J.1 through PF-J.4 (County of Fresno 2000, 4-1 to 4-16, 4-21, 4-22)	The "Public Facilities and Services Element" of the *Fresno County General Plan* outlines goals and policies associated with the development, availability, and adequate service of public facilities. Goals in this element ensure the timely development of public facilities, maintenance of an adequate level of service, and the availability of such facilities to serve new development; that facility and service standards are achieved and maintained through the use of equitable development funding methods; the availability of an adequate and safe water supply, including groundwater storage, recharge, supply evaluation, and promotion of surface water use over groundwater; adequate wastewater collection and treatment systems; adequate storm drainage and flood control facilities; an adequate system for disposal or recycling of solid waste; and the development of efficient and cost-effective utilities that serve the existing and future needs of people in the unincorporated areas of the county.
Fresno County Code of Ordinances, Title 8 and Title 14	To promote the general health, safety, and welfare of Fresno County citizens, bans the disposal of construction and demolition debris at the American Avenue and Coalinga landfills. Sets well construction, pump installation, and well destruction standards; and requires permits for groundwater transfer. Establishes regulations governing the discharge of wastewater into wastewater treatment facilities operated by the county. Prohibits the commencement, conduct, or continuance of illicit discharges to the storm drain system within the county.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
City of Fresno	
2025 Fresno General Plan, "Public Facilities Element," Objective E-18, E-20 to E-23, and E-30; Policies E-18-a through E-18-e, E-20-a through E-23-i, and E-30-a through E-30-e (City of Fresno Planning and Development Department 2002a, 86–91, 97, 147–148)	The "Public Facilities Element" of the City of Fresno *2025 General Plan* provides goals and policies for sewer service, wastewater treatment, water supply and related facilities, stormwater, and solid waste. Objective E-18 is associated with the provision of adequate trunk sewer and collector main capacities to serve both existing and planned urban development. Objective E-20 deals with the provision of adequate sewage treatment and disposal. Objective E-21 promotes the reduction in wastewater flows and the development of facilities for the reuse of reclaimed water and biosolids. Objective E-22 ensures the management and development of city water facilities to ensure a safe, economical, and reliable water supply for existing and planned urban development. Objective E-23 ensures adequate facilities for stormwater runoff. Objective E-30 ensures adequate solid waste facilities and services for collection, transfer, recycling, and disposal of refuse.
2025 Fresno General Plan, "Resource Conservation Element," Objective G-9 and Policies G-9-a through G-9-c (City of Fresno Planning and Development Department 2002b)	The "Resource Conservation Element" of the City of Fresno *2025 General Plan* provides goals and policies associated with energy conservation. Objective G-9 and Policy G-9-c are aimed at reducing the consumption of nonrenewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.
Fresno Code of Ordinances, Chapter 6, "Municipal Services and Utilities"; and Chapter 10, Article 4, "Solid Waste and Recycling Facilities Ordinance"	These sections of the *Municipal Code of the City of Fresno* provide regulations for municipal services and utilities and cover solid waste collection and disposal, sewage and water disposal, wells and water regulations, urban stormwater quality management and discharge control, and cross-connection control.
City of Fresno Urban Water Management Plan (City of Fresno 2012)	The *City of Fresno 2012 Urban Water Management* Plan addresses current and projected future water supply availability and reliability, and provides a comparison with current and projected future water demands through 2035.
City of Fresno Sewer System Management Plan (City of Fresno 2009c)	The *City of Fresno Sewer System Management* Plan provides a mechanism to properly manage, operate, and maintain all parts of the sanitary sewer system, with the ultimate goal of reducing and preventing sanitary sewer overflows and mitigating any sanitary sewer overflows that do occur.
City of Fresno: Zero Waste Strategic Action Plan (City of Fresno 2008b)	The City of Fresno has adopted a *Zero Waste Strategic Plan* to achieve 75% diversion from landfills by 2012 and zero waste by 2025. The plan promotes policies that foster the reduction and gradual elimination of problem waste for individuals, businesses, and governments.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Kings County	
2035 Kings County General Plan, "Land Use Element," Goal D1, Objective D1.6, Policies D1.6.1 through D1.6.8 (Kings County Planning Department 2010a, LU 40, LU 43–44)	The "Land Use Element" of the *2035 Kings County General Plan* provides regulations that ensure funding from public facility impact fees, directs new urban growth to community districts where municipal services can be provided, promotes the orderly extension of services, and enhances the planning of urban growth through coordinated County and City General Plan Development policies and infrastructure improvement standards.
2035 Kings County General Plan, "Resource Conservation Element," RC Goal A1, Objectives A1.1 through A1.2, and Policies A1.1.1 through A1.2.6, RC Goal G1, RC Objective G1.2, RC Policy G1.2.1 to G1.2.7 (Kings County Planning Department 2010b, RC-39, 40, 49, 50)	The "Resource Conservation Element" of the *2035 Kings County General Plan* provides regulation for the use, conservation, and protection of water supplies, including groundwater supply (quality and quantity) and recharge, while encouraging development of sustainable and renewable energy sources.
Kings County Code of Ordinances, Chapter 13, Article II, "Waste Management Regulations" and Chapter 14A	These sections of the code establish standards for the storage, collection, and transportation of solid waste; and for well construction, repair, and deconstruction to ensure groundwater will not be polluted or contaminated.
Kings County Countrywide Integrated Waste Management Plan (Kings County 1995)	Policies pertaining to solid waste, source reduction, and recycling are identified in the "Source Reduction and Recycling Element" and the "Household Hazardous Waste Element" of the *Kings County Integrated Waste Management Plan*, and are incorporated in the County of Kings 2035 General Plan Land Use Element by reference.
County of Kings Improvement Standards (Kings County Public Works 2003)	This document sets standards for the design of stormwater and other drainage systems and connections to water supply and sanitary sewerage systems.
City of Hanford	
City of Hanford General Plan Update 2002, "Public Facilities and Services Element," Objective PF 1 to PF 11, Policies PF 1.1 to PF 11.2 (City of Hanford 2002, PF-8 to PF-15)	The "Public Facilities and Services Element" of the *City of Hanford General Plan* provides goals and policies for the development of facilities and services in relation to planned development, collection of development impact fees, maintenance of existing public facilities and services, water supply and infrastructure; including a groundwater management program and participation in groundwater recharge and replenishment, provision of sufficient wastewater collection and treatment facilities, provision and maintenance of stormwater drainage systems, and provision of adequate solid waste disposal capacity.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Hanford Municipal Code, Title 13, Chapter 13.04, "Water Service System"; Chapter 13.08, "Sewer Service System"; Chapter 13.10, "Storm Water Quality Management and Discharge Control"; and Chapter 13.12, "Solid Waste Collection and Disposal"	This section of the code describes regulations regarding the water service system, sewer service system, stormwater quality management and discharge control, and solid waste collection and disposal.
2010 Urban Water Management Plan (City of Hanford 2006)	The City of Hanford *2010 Urban Water Management Plan* provides a plan for maintaining efficient use of urban water supplies, promoting conservation programs and policies, continuing to promote conservation programs and policies, ensuring that sufficient water supplies are available for future beneficial use, and providing a mechanism for response during drought conditions. The plan summarizes existing and potential water sources, (including groundwater), use, and demand.
City of Corcoran	
Corcoran General Plan 2025 Policies Statement, "Public Services and Facilities Element," Public Facilities Improvement Objectives A through C, Local Government Facilities and Services Objective A, Policies 8.1 through 8.16 (City of Corcoran 2007)	The "Public Services and Facilities Element" of the *Corcoran General Plan* provides objectives and policies associated with the development of adequate public facilities to meet the demands of future growth and development, including enhancement of groundwater recharge.
Corcoran City Code, Title 8, Chapter 1, "Water Use and Service"; and Chapter 2, "Wastewater System"	The Water Use and Service regulations provide measures to minimize outdoor water use and to control unnecessary consumption of the available potable water supply of the city. The Wastewater System regulations set uniform requirements for the use of the city's sanitary sewer, regulates use and construction of the wastewater collection system, regulates the quality and quantity of the wastewater discharged to the system, and regulates the issuance of permits prior to connection to the system.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Tulare County	
Tulare County General Plan 2030 Update, Public Facilities and Services, Goals PFS-2 through PFS-5, Policies PFS-2.1 through PFS-5.9, Goal PFS-9, Policies PSF-9.1 through PSF-9.4 and Goal WR-1 through WR-3, Policies WR-1 through 3.13 (Tulare County 2012, [Part I] 14-6 to 14-9, 14-13 to 14-14)	The *Tulare County General Plan* provides regulations for public facilities in the plan's infrastructure component. This plan component outlines principles and policies for provision of adequate water supply, including improvement of groundwater recharge; provision of adequate wastewater collection, treatment and disposal; provision of adequate storm drainage facilities and management of storm water; provision of safe and efficient disposal and recycling of solid and hazardous waste; and provision of gas and electric services throughout the county. The plan also provides for current and long-term water needs, protects the quality and quantity of water resources, and assures that new development is consistent with water resources.
Tulare County Code, Part IV, Chapter 3, Article 10, "Recycling and Diversion of Construction and Demolition Debris"	The Construction and Demolition Ordinance establishes regulations for the recycling and diversion of construction and demolition debris in the unincorporated area of the County. This ordinance assists Tulare County in reaching the 50% waste diversion mandate required by the California Integrated Waste Management Board.
Tulare County Code, Part IV, Chapter 3, "Management of Solid Waste"; Chapter 13, "Wells"; Part VIII, Chapter 1, "Sewer Service"; Chapter 3, "Sewer Service"; Chapter 5, "Water Service"; and Chapter 7, "Water Conservation Program"	These sections of the *Tulare County Code* include regulations for solid waste, wells for protection of groundwater quality, and provisions for water and sewer service in county service areas and water conservation programs in county service areas.
Kern County	
Kern County General Plan, "Land Use, Open Space and Conservation Element," Public Facilities and Services Goals 1 through 13, Policies 1 through 17, and Implementation Measures A through II; General Provisions Goal 1, Policies 9–17, and Implementation Measures D and E (Kern County Planning Department 2009, 19, 21–27, 61, 63–64)	The *Kern County General Plan* "Land Use, Open Space and Conservation Element" provides goals and policies associated with the development of public service infrastructure; the distribution of facility costs for new development; the collection, treatment, and disposal of sewage and refuse; the maintenance of water supply and quality; and the provision of adequate landfill capacity, and effective groundwater resource management.
Kern County Municipal Code, Title 14, Utilities	This section of the *Kern County Municipal Code* provides regulations for water supply and sewer systems including wells, private sewer disposal and drainage systems, and stormwater.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
Kern County Planning Department, "Energy Element," in *Kern County General Plan,* 214–215 (Kern County Planning Department 2009)	The "Energy Element" of the *Kern County General Plan* contains policies relating to development of energy resources (e.g., petroleum products, electricity generation (including renewable sources).
Kern County and Incorporated Cities Integrated Waste Management Plan (Kern County Planning Department 2007a)	The Kern County and Incorporated Cities Integrated Waste Management Plan addresses issues pertaining to nonhazardous waste disposal and other waste facilities.
City of Wasco	
City of Wasco General Plan, "Conservation and Open Space Element," "Safety Element (City of Wasco 2010)	The *City of Wasco General Plan* sets policies and standards relating to stormwater control, water conservation, and protection of natural resources such as groundwater, sewer systems, storm drainage facilities, and water supply systems.
Wasco Municipal Code, Title 12, Chapter 12.16, "Excavations"	Chapter 12.16 of the *Wasco Municipal Code* outlines the permitting process for excavations and provides regulations for the relocation and protection of utilities during excavation.
Wasco Municipal Code, Title 13, Public Services	Title 13 of the *Wasco Municipal Code* regulates water service, water rates, water system impact fees, water conservation measures, sewer system service, sewer service charges, sewer connection charges, underground utility districts, and sanitation impact fees.
City of Shafter	
City of Shafter General Plan, Public Services and Facilities Program, Water Facilities Policies 1 through 6, Sewer Facilities Policies 1 through 8, Solid Waste Policies 1 through 5, Drainage and Flooding Policies 1 through 4, Public Services and Facilities Policies 1 through 6 (City of Shafter 2005, 4-1 to 4-3, 4-7, 4-8)	The Public Services and Facilities Program of the *City of Shafter General Plan* establishes objectives and policies associated with the provision of a water system with adequate capacity; the timely development of infrastructure to meet the demands of new development; the provision of an adequate wastewater collection, treatment, and disposal system; the provision of sewer systems with adequate capacity, (including protection of groundwater supplies); the encouragement of water conservation and solid waste reduction; the provision of stormwater detention, retention, and conveyance facilities; and funding for the expansion of public facilities in areas of new development.
Shafter Code of Ordinances, Title 13, Public Services	This section of the *City of Shafter Code of Ordinances* provides regulations for water and sewer services.

Table 3.6-1
Local Plans and Policies

Policy Title	Summary
City of Bakersfield	
Metropolitan Bakersfield General Plan, "Public Services and Facilities Element," General Utility Services Goals 1 through 4, Policies 1 through 6; Water Distribution Goal 1, Policies 1 through 3; Sewer Service Goals 1 through 3, Policies 1 through 3; Storm Drainage Goals 1 and 2, Policies 1 through 3; Solid Waste Goals 1 and 2, Policies 1 and 2 (City of Bakersfield and Kern County 2007, X-1 to X-14, X-18 to X-20)	The "Public Services and Facilities Element" of the *Metropolitan Bakersfield General Plan* provides goals and policies associated with funding new services and facilities in areas of new development; the provision of adequate water service, sewer service, trunk sewer availability, storm drainage facilities, and solid waste disposal services; and the development of resource recovery and recycling systems.
Bakersfield Municipal Code, Title 14, Water and Sewers	This section of the *Bakersfield Municipal Code* provides regulations for water and sewer services.

3.6.3 Methods of Evaluation of Impacts

3.6.3.1 Public Utilities and Energy Data Collection and Analysis

Utilities

Data provided by local utilities service providers within the study area describe the type, size, and location of existing and proposed utility infrastructure. Field survey information gathered in 2009 and 2010 augments the information provided by utility service providers. The locations of aboveground and underground utilities (e.g., natural gas lines, petroleum pipelines, fiber optic cables, and telecommunication infrastructure) were verified or corrected based on field observations and were mapped by recording the GIS coordinates of their aboveground signage.

The impact evaluation considers all utilities but focuses on major utilities. For the purpose of this analysis, major utilities include the following:

- High-voltage electrical lines (50 kV or greater).
- High-pressure natural gas lines.
- Petroleum and fuel lines.
- Water, wastewater, irrigation and stormwater canals, conduits, and pipes (outside diameter of 6 inches or larger).
- Fiber optic lines and communication infrastructure (i.e., towers and antennas).

This analysis considers high-voltage, underground and aboveground electrical lines, underground high-pressure natural gas lines, and petroleum lines and facilities "high-risk" utilities (Caltrans 1997). In addition, this analysis considers electrical substations to be high risk. The remaining utilities, such as water and wastewater lines, have a lower safety risk.

Estimates for water demand, wastewater, stormwater, and waste removal services for HST stations are based on typical rates, such as gallons per minute, acre-feet per acre per year, or ridership and employment projections. The analysis compares these estimated quantities with anticipated supply and capacity, as reported by the service providers in the Fresno to Bakersfield Section of the HST corridor.

Water demand estimates are presented in in Appendix 3.6-B, Technical Memorandum: Water Usage Analysis for CHST Fresno to Bakersfield Section. Water demand estimates for construction are based on an estimated 5-year time period in which earthmoving and construction activities requiring water use would occur. Annual operational water use estimates are based on full build-out of the project in 2035. Estimates of existing water use were generated by applying region-specific water use rates for the known land uses in the project footprint (see Section 3.13, Station Planning, Land Use, and Development). Wastewater generation would be approximately 50% of total water demand during operation. For additional detail regarding water supply, stormwater, and hydrology, see Section 3.8, Hydrology and Water Resources.

Waste generated by HST construction and demolition activities is based on estimates by project engineers using the existing character of the study area and the requirements of various project attributes. Operational waste generation is based on the anticipated ridership and number of employees, taking into account the estimates of waste generation and recycling in California.

Energy

The proposed HST System would obtain electricity from the statewide grid. Any potential impacts on electrical production that may result from the proposed HST System would affect statewide electricity reserves and, to a lesser degree, transmission capacity. To identify the projected energy demand of the Fresno to Bakersfield Section of the HST System, estimated energy impact for the entire HST System was prorated based on the proportion of the length of HST guideway within the Fresno to Bakersfield Section study area.

Energy is commonly measured in terms of British thermal units (Btu). A Btu is defined as the amount of heat required to raise the temperature of one pound of water by 1°Fahrenheit. For transportation projects, energy usage is predominantly influenced by the amount of fuel used. The average Btu content of fuels is the heat value (or energy content) per quantity of fuel as determined from tests of fuel samples. A gallon of gasoline produces approximately 114,000 Btu (USEPA 2010); however, the Btu value of gasoline varies from season to season and from batch to batch. The Btu is the unit of measure used to quantify the overall energy effects expected to result from construction and operation of the HST.

Transportation energy is generally discussed in terms of direct and indirect energy. Direct energy involves all energy consumed by vehicle propulsion (i.e., automobiles and airplanes). This energy is a function of traffic characteristics such as volume, speed, distance traveled, vehicle mix, and thermal value of the fuel being used. This energy also includes the electrical power requirements of the HST Project, including recoverable energy during HST train braking, as well as aircraft fuel. Indirect energy consumption involves the nonrecoverable, one-time energy expenditure involved in constructing the physical infrastructure associated with the project, typically through the irreversible burning of hydrocarbons for operating equipment and vehicles in which energy is lost to the environment.

Energy impacts caused by the project might include the additional consumption of electricity required to power the HSTs (direct use) and consumption of resources to construct the proposed HST facilities (indirect use). Energy used for vehicle propulsion is a function of traffic characteristics and the thermal value of the fuel used. Petroleum consumption rates for vehicle travel were derived from the travel demand forecast for the HST and growth projections performed by the California Energy Commission (CEC). These consumption rates were used to determine the amount of petroleum used for transportation under the No Project Alternative and HST alternatives. Current electricity consumption rates from the CEC are compared with the projected energy consumption of the HST System.

The entire HST System would be approximately 800 miles long. The length of the Fresno to Bakersfield Section alignment alternatives is approximately 114 miles or less, depending on the design options selected. This is approximately 14% of the length of the entire HST System.

Indirect energy consumption involves the nonrecoverable, one-time energy expenditure required to construct the physical infrastructure associated with the project. Indirect energy impacts are evaluated quantitatively. This analysis uses construction energy data from other sources or existing HST systems. Construction energy information for comparable HST systems is not readily available. Therefore, construction energy consumption factors identified for the proposed HST system are derived from data gathered for typical heavy-rail systems and the San Francisco Bay Area Rapid Transit District (BART) heavy-rail commuter system. These data were used to estimate the projected construction energy consumption for the HST alternatives in the Fresno to Bakersfield Section, including the proposed station and heavy maintenance facility (HMF), and are presented in Table 3.6-2.

Actual energy consumption may differ from these estimates, depending on the final design. The estimated energy consumed to construct an elevated or below-grade guideway is approximately 300% more than for an at-grade guideway. The BNSF Alternative and each of the eight alternative bypass and alignment options represent different lengths and ratios of at-grade and elevated guideway. To compare the HST alternatives, Table 3.6-2 shows the estimated construction energy consumption in billions of Btu for the BNSF Alternative and for each of the other alternatives based on the length of their anticipated at-grade or elevated/below-grade construction elements.

Specific rail profile data are not available for all of the HMF site alternatives. The Fresno HMF site would require the greatest length of total guideway at approximately 3.5 miles. The remaining four HMF sites would each require between 1.5 and 2.5 miles of guideway. Because these HMF sites would only require a limited length of elevated track, energy consumption is calculated using the at-grade factor for preliminary estimates. Analysis for this limited length would not be substantially different even if an elevated factor is used.

The construction energy payback period is the number of years required to pay back the energy used in construction with operational energy consumption savings of the HST alternative prorated to statewide energy savings. The payback period is calculated for the Fresno to Bakersfield Section by dividing the estimated HST System construction energy by the amount of energy that would later be saved by the full operation of the HST System (based on the prorated statewide value). The calculations assume that the amount of energy saved in the study year (2035) would remain constant throughout the payback period.

Table 3.6-2
Construction Energy Consumption Assumptions for the Fresno to Bakersfield Section

HST Alignment Alternative	At-Grade Design (guideway miles)[b]	Elevated/Below-Grade Design (guideway miles)[b]	HST Stations	HMF (guideway miles)[b]	Btu (billion)
Energy Consumption Factor[a]	**19.11 billion Btu/one-way guideway miles**	**55.63 billion Btu/one-way guideway miles**	**78 billion Btu/station**	**19.11 billion Btu/one-way guideway miles**	**--**
BNSF Alternative	117	41	3	8	7,930
Optional Bypass and Other Alternative Alignments Compared to BNSF Alternative					
Hanford West Bypass 1	+3	-5	0	0	-442
Hanford West Bypass 1 Modified	+2	-4	0	0	-369
Hanford West Bypass 2	+2	-4	0	0	-369
Hanford West Bypass 2 Modified	0	-2	0	0	-223
Corcoran Elevated	-4	+4	0	0	+292
Corcoran Bypass	+1	-1	0	0	-73
Allensworth Bypass	0	0	0	0	0
Wasco-Shafter Bypass	+6	-7	0	0	-550
Bakersfield South	0	0	0	0	0
Bakersfield Hybrid	0	0	0	0	0

Notes:
Assumed HMF Guideway Miles: Fresno HMF site, assume 4 guideway miles; Hanford HMF site, Wasco HMF site, and Shafter East and Shafter West HMF sites, assume 2 guideway miles each.
[a] Factors for energy consumption for BART system construction (as surrogate for HST construction through urban areas) and a freight terminal (as a surrogate for a passenger train station), as identified in Table 3.5-2 of the *Final Bay Area to Central Valley High-Speed Train (HST) Program Environmental Impact Report/ Environmental Impact Statement (EIR/EIS)* (Authority and FRA [2008] 2011).
[b] Data for number of guideway miles and stations based on estimates by URS Corporation. The values for "guideway miles" for each alternative accounts for a "one-way" guideway. The estimated energy consumption for stations is based on the construction of three HST stations, and one of four HMF alternatives that would require additional HST guideway.
Acronyms:
Btu = British thermal unit
HMF = heavy maintenance facility
HST = high-speed train

3.6.3.2 Methods for Evaluating Effects under NEPA

Pursuant to NEPA regulations (40 Code of Federal Regulations [C.F.R.] 1500–1508), project effects are evaluated based on the criteria of context and intensity. Context means the affected environment in which a proposed project occurs. Intensity refers to the severity of the effect, which is examined in terms of the type, quality, and sensitivity of the resource involved, location and extent of the effect, duration of the effect (short or long term), and other considerations. Beneficial effects are identified and described. When there is no measurable effect, an impact is found not to occur. The intensity of adverse effects is the degree or magnitude of a potential adverse effect, described as negligible, moderate, or substantial. Context and intensity are considered together when determining whether an impact is significant under NEPA. Thus, it is possible that a significant adverse effect may still exist when the intensity of the impact is negligible or even beneficial.

For public utilities and energy, the terms are defined as follows:

A public utilities impact with *negligible* intensity would result in a slight measurable increased use of utilities and service systems, but the increase is very close to the existing conditions. A negligible intensity would also result when the conflict (physical contact with utility infrastructure within the HST footprint) or timing of a conflict is not noticeable. An impact with *moderate* intensity is defined as a measureable change from existing conditions in the use of these resources, but the change does not contribute to a violation of regulatory standards or conflict with or exceed the capacity of existing facilities (e.g., wastewater treatment plants [WWTPs] or landfills). A moderate intensity would also result when a utility service interruption would be noticed, but not cause substantial inconvenience or loss of revenue from commercial or industrial operations or cause substantial inconvenience to residents. An impact with *substantial* intensity within the regional context of the Fresno, Tulare, Kings, and Kern counties would contribute to a violation of regulatory standards, or conflict with or exceed the capacity of existing facilities. A substantial intensity would also result from an interruption of commercial or industrial operations that lead to a substantial loss of revenue, and an inordinate measure of inconvenience or jeopardy to users or customers.

An energy impact with *negligible* intensity would result in a slight, measurable increased use of energy but is very close to the existing conditions. An energy impact of *moderate* intensity is defined as measurable changes in energy consumption that can be met through existing generating facilities or new power plant facilities already approved by state and federal regulatory agencies and scheduled to be built and operational by 2035. An energy impact of *substantial* intensity would deplete existing energy resource to such a degree that it would require construction and operation of new electrical generating facilities.

3.6.3.3 CEQA Significance Criteria

<u>Public Utilities</u>

According to CEQA Statute §21068, a "significant effect on the environment" means a substantial, or potentially substantial, adverse change in the environment. For this project, the following criteria are used in determining whether the project would result in a significant impact on public utilities service and systems:

- Construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- New or expanded entitlements to supply water to the project.
- A determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the projected project demand in addition to its existing commitments.
- Construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Insufficient permitted capacity at the landfill serving the project to accommodate solid waste disposal needs.

- Noncompliance with federal, state, and local statutes and regulations related to solid waste.
- Conflict with a fixed facility such as an electrical substation or wastewater treatment plant (WWTP).

Energy

According to Appendix F of the CEQA Guidelines, EIRs must discuss the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. Wise and efficient use of energy may include decreasing overall per-capita energy consumption; decreasing reliance on fossil fuels such as coal, natural gas and oil; and increasing reliance on renewable energy sources. The criteria discussed herein are used to determine whether the HST would have a potentially significant effect on energy use, including energy conservation.

Significant long-term operational or direct energy impacts would occur if the HST would place a substantial demand on regional energy supply or require significant additional capacity, or significantly increase peak and base period electricity demand.

3.6.3.4 Study Area

This section considers two study areas in the analysis of public utility and energy resources. The study area for evaluating conflicts with public utilities is the construction footprint (see Section 3.1, Introduction) and includes surface, subsurface, and overhead utilities, as well as aquifers underlying the construction footprint. As described below, the affected environment for public utilities is thus defined as the Fresno, Kings, Tulare, and Kern County project area.

The affected environment studied to determine the potential impacts of the HST System on electricity generation and transmission includes the entire state of California (and western states that produce energy that is exported to California) because the HST System would obtain electricity from the statewide grid. Therefore, this analysis cannot apportion to a particular regional study area the use of any particular generation facilities.

3.6.4 Affected Environment

This section describes the current conditions for public utilities and infrastructure as well as energy demand. There are no applicable regional plans or policies pertaining to public utilities and energy within the Fresno to Bakersfield Section study area.

3.6.4.1 Public Utilities

Major public utilities within the study area include facilities for electricity, natural gas and petroleum distribution; telecommunications; potable and irrigable water delivery; and stormwater, wastewater, and solid waste disposal. As summarized in Table 3.6-3 and discussed further in the following analysis, various service providers own or maintain utilities and associated easements within the study area.

Table 3.6-3
Study Area Utility and Energy Providers

Utility Type		Provider	County/City
Electrical		Pacific Gas and Electric Company (PG&E)	Fresno County, Kings County, Tulare County and western Kern County
		Southern California Edison	Northeast Fresno County, Kings County (Hanford), SE Tulare County; East Kern County
Natural Gas		PG&E	Fresno County (Fresno); SW Kings County; and western Kern County
		Sempra	Fresno County, Kings County (Hanford, Corcoran), Tulare County, Kern County (Wasco, Shafter, Bakersfield)
		Shell Oil Company	Kern County (Bakersfield)
Petroleum and Fuel Pipelines		ConocoPhillips	Kern County (Bakersfield)
		ExxonMobil Corporation	Kern County (Bakersfield)
		Shell Oil Company	Kern County (Bakersfield)
		British Petroleum	Kern County (Bakersfield)
		Chevron Corporation	Kern County (Bakersfield)
		Kinder Morgan, Inc.	Fresno County (Fresno), Tulare County and Kern County (Bakersfield)
		ConocoPhillips	Kern County (Bakersfield)
Communications	Telephone	AT&T	Fresno County, Kings County, Tulare County, and Kern County
	Cable/ Internet	Various	Fresno County, Kings County, Tulare County, and Kern County
Water Supply		Kaweah Delta WCD	Kings County and Tulare County
		Fresno ID	Fresno County
		Last Chance Water Ditch Company	Kings County
		Peoples Ditch Company	Kings County
		Semitropic WSD	Kern County
		Consolidated ID	Fresno County and northern Kings County
		Kings County WD	Kings County
		Arvin-Edison WSD	Kern County
		Lower Tule River Irrigation District	Tulare County
		City of Fresno Service Area	City of Fresno
		North Kern WSD	Kern County
		Pond Poso Improvement District	Kern County
		Pixley ID	Tulare County
		Kern County Water Agency Improvement District No. 4	Kern County

Table 3.6-3
Study Area Utility and Energy Providers

Utility Type	Provider	County/City
Water Supply (continued)	Southern San Joaquin MUD	Kern County
	Corcoran ID	Kings County (Corcoran)
	Melga Canal Company	Kings County
	Rosedale–Rio Bravo WSD	Kern County
	Shafter-Wasco ID	Kern County (Shafter, Wasco)
	Laguna ID	Fresno County and Kings County
	Angiola WD	Kings County
	Lakeside Irrigation WD	Kings County
	California Water Service Company	Kern County (Bakersfield)
	Liberty WD	Fresno County
	Vaughn Water Company Service Area	Kern County
	Alpaugh ID	Tulare County
	Rosedale Ranch Improvement District	Kern County
	City of Hanford WSA	Kings (Hanford)
	Atwell Island WD	Kings County and Tulare County
	City of Corcoran WSA	Kings County (Corcoran)
	City of Wasco WSA	Kern County (Wasco)
Sewer/Wastewater	Fresno/Clovis Regional Wastewater Reclamation Facility	Fresno-Clovis Metropolitan Area
	City of Hanford	City of Hanford
	City of Corcoran	City of Corcoran
	City of Shafter; North of River Sanitary District (NORSD)	City of Shafter
	City of Bakersfield	City of Bakersfield
Stormwater	City of Fresno/Fresno Metropolitan Flood Control District	City of Fresno
	City of Hanford/Peoples Ditch Company	City of Hanford
	City of Corcoran	City of Corcoran
	City of Wasco	City of Wasco
	City of Shafter	City of Fresno
	City of Bakersfield	City of Bakersfield

Table 3.6-3
Study Area Utility and Energy Providers

Utility Type	Provider	County/City
Solid Waste Collection	American Avenue Disposal and Coalinga Disposal Sites	Fresno County
	Chemical Waste Management Landfill	Kings County
	Visalia Disposal Site, Woodville Disposal Site (Tulare), and Teapot Dome Disposal Site (Porterville)	Tulare County
	Bena, Boron, Mojave-Rosamond, Ridgecrest, Shafter-Wasco, Taft, and Tehachapi Landfills	Kern County

Acronyms and Abbreviations:
CVP = Central Valley Project
ID = Irrigation District
MUD = Municipal Utility District
SWP = State Water Project
WCD = Water Conservation District
WD = Water District
WSA = Water Service Areas
WSD = Water Supply District

Electrical Transmission Lines

PG&E provides electricity to much of Northern California, from approximately Bakersfield to the Oregon border. The company's generation portfolio includes hydroelectric facilities, a nuclear power plant, and a natural-gas-fired power plant. PG&E provides electrical service to approximately 15 million people throughout a 70,000-square-mile service area in northern and central California (PG&E 2009). Within the study area, PG&E provides electricity to the majority of Fresno County, with the exception of the northeastern corner of the county; the majority of Kings County, with the exception of areas within and immediately surrounding the city of Hanford; the northern and southwestern areas of Tulare County; and western Kern County. Southern California Edison (SCE) provides electricity to those areas not served by PG&E. SCE serves more than 14 million people in a 50,000-square-mile area of central, coastal, and Southern California (SCE 2009).

Forty-nine transmission and power lines owned by PG&E cross the BNSF Alternative corridor. Four transmission lines occur within proposed HST stations, one at the Kings/Tulare Regional Station–East Alternative and three at the Bakersfield Station. No transmission or power lines cross any of the sites considered for the HMF alternatives. There are three substations in the study area, all in Kings County. One substation owned by Southern California Edison is approximately 900 feet north of Front Street on the west side of 13th Avenue adjacent to the Kings/Tulare Regional Station–West Alternative. A second substation, owned by PG&E, is at the northwestern corner of the intersection of Kent Avenue and South 11th Avenue, south of the city of Hanford, and adjacent to the Hanford West Bypass 1 alternatives and proposed overcrossing at Kent Avenue. The third substation, Southern California Edison's Mascot electrical substation completed in 2013, is located at the southwest corner of Grangeville Boulevard and 7½ Avenue, east of the city of Hanford.

High-Pressure Natural Gas Pipelines

PG&E, Sempra, Occidental Petroleum Corporation, Shell, and Kinder Morgan provide natural gas service and are responsible for maintaining the infrastructure for natural gas distribution in the study area. Twenty-two potentially affected high-pressure natural-gas transmission pipelines are of varying sizes and age.

Petroleum and Fuel Pipelines

California is the third-largest oil-producing state in the United States, and many of the onshore oilfields are in the San Joaquin Valley between Fresno and the Tehachapi Mountains. All oil produced is processed into fuels and other petroleum products at refineries in the San Francisco Bay Area and Southern California. As a result, crude oil pipelines run throughout the study area; these pipelines are owned and operated by ConocoPhillips, ExxonMobil Corporation, Shell Oil Company, British Petroleum, Occidental Petroleum, and Chevron Corporation.

Kinder Morgan is the largest independent transporter of refined petroleum products in the United States. Kinder Morgan owns and operates many miles of fuel pipelines in California. Occidental Petroleum operates substantial pumping equipment for deep wells and an oil collection tank facility east of Wasco from which the product is transferred via pipeline to refineries.

Communication Facilities

Communication facilities in the study area are owned and operated by AT&T, Verizon Telecom, Sprint, Quest, Comcast Cable, and Charter Communication Cable companies. Other communication service providers may also own or lease cellular service or microwave towers and antennas, or telecommunication cable or overhead distribution lines. Underground or above-ground components of this infrastructure are located within the study area.

Water Supply Infrastructure

Surface water and groundwater are the basic sources of drinking water and irrigation in the region. Municipal service providers typically use groundwater sources; however, surface water sources may also supplement supplies. Many residents in rural and unincorporated areas rely on private groundwater wells for drinking water. Agricultural water users augment their groundwater supplies with surface water that is conveyed through a network of natural and constructed channels. Irrigation of agricultural land is the primary water use in the San Joaquin River region (DWR 2009). Numerous large- and small-scale districts provide municipal and irrigation water service to the communities in the study area. The predominant domestic water source in unincorporated portions of the study area is individual private well systems. Some 30 water companies and districts are located within the study area. The largest is the Kaweah Delta Water Conservation District, which serves 340,000 acres (about 285,000 acres involve agricultural activities and about 55,000 acres are urban or undeveloped lands). The smallest are the water service areas for the cities of Wasco and Corcoran, each of which serves about 5,000 acres. Table 3.6-4 lists the water source and uses, among other key features, of the water supply companies and districts potentially affected by the BNSF Alternative and the other HST alignment alternatives. Figure 3.6-1 shows the locations of these water supply companies and districts.

Table 3.6-4
Water Suppliers in the Fresno to Bakersfield Study Area

Water District	Water Sources*	Predominant Uses	Total Area (acres)	Approx. Area Irrigated (acres)	Data Sources
Kaweah Delta WCD	Conserves and stores water from Kaweah River	Groundwater recharge	340,000	330,000	(1)
Fresno ID	Kings River, CVP	Agricultural; municipal; groundwater recharge; environmental	245,000	150,000	(2)
Semitropic WSD	SWP and Poso Creek	Agricultural	224,000	140,000	(3)
Consolidated ID	Kings River	Agricultural; municipal; groundwater recharge	161,000	144,000	(4)
Kings County WD	Imports reservoir water; irrigation water from Kings and Kaweah rivers; and CVP and SWP water	Agricultural; groundwater recharge	143,000	135,000	(5)
Arvin-Edison WSD	Kern River; CVP; groundwater	Agricultural; groundwater recharge; other water agencies.	133,000	100,000	(6)
Lower Tule River Irrigation District	CVP water; Tule River water stored behind Success Dam	Agricultural; groundwater recharge	103,000	85,000	(7)
City of Fresno Service Area	Groundwater (88%); surface water (12%)	Municipal	90,000	0	(8)
North Kern WSD	Kern River and Poso Creek, CVP, and SWP	Agricultural	83,000	70,000	(9)
Pond Poso Improvement District**	Kern County Water Agency	Agricultural	—	—	(10)
Pixley ID	CVP	Agricultural	70,000	48,300	(11)

Table 3.6-4
Water Suppliers in the Fresno to Bakersfield Study Area

Water District	Water Sources*	Predominant Uses	Total Area (acres)	Approx. Area Irrigated (acres)	Data Sources
Kern County Water Agency Improvement District No. 4	Kern River; SWP	Municipal; groundwater recharge	66,000	3,000	(12)
Southern San Joaquin MUD	CVP	Agricultural	62,000	50,000	(13)
Corcoran ID	CVP via Kings River	Agricultural	48,000	45,000	(14)
Rosedale–Rio Bravo WSD	Kern River; CVP; SWP	Agricultural; groundwater recharge	44,000	33,400	(15)
Shafter-Wasco ID	CVP	Agricultural	39,000	31,000	(16)
Laguna ID	Kings River	Agricultural	35,000	20,700	(17)
Angiola WD	SWP from Tulare Lake Basin WSD	Agricultural	33,000	33,000	(18)
Lakeside Irrigation WD	Kaweah River, CVP	Agricultural; surface water supplies	32,000	27,000	(19)
California Water Service Company	Kern River, groundwater	Municipal	31,000	0	(20)
Liberty WD	Kings River	Agricultural	21,000	21,000	(21)
Vaughn Water Company Service Area	Groundwater	Municipal (Rosedale area of Bakersfield)	18,000	3,000	(22)
Alpaugh ID	Purchases CVP water from County of Tulare	Agricultural	11,000	6,000	(23)
Rosedale Ranch Improvement District	Kern River	Agricultural	9,000	9,000	(24)
City of Hanford WSA	Groundwater; surface water (groundwater recharge)	Municipal	8,000	0	(25)
Atwell Island WD	Purchases CVP water from County of Tulare	Agricultural; environmental: land retirement / habitat restoration	7,000	4,000	(26)
City of Corcoran WSA	Groundwater	Municipal	5,000	0	(27)

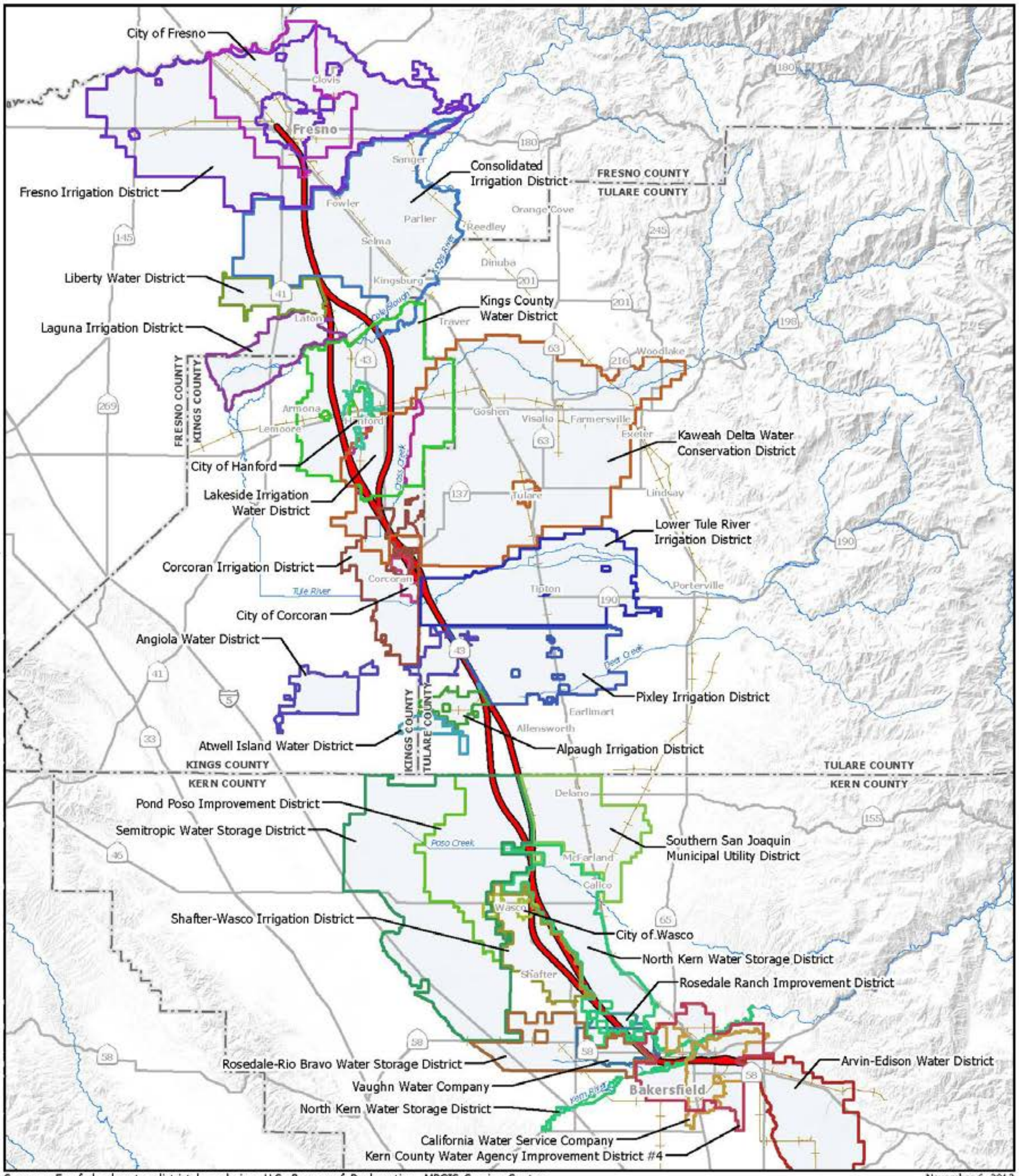
Table 3.6-4
Water Suppliers in the Fresno to Bakersfield Study Area

Water District	Water Sources*	Predominant Uses	Total Area (acres)	Approx. Area Irrigated (acres)	Data Sources
City of Wasco WSA	Groundwater	Municipal	5,000	0	(28)
Peoples Ditch Co	Surface Water	Kings River	n/a	n/a	(29)
Last Chance Ditch Company	Surface Water	Kings River	n/a	n/a	(29)
Melga Canal Company	Surface Water	Kings River	n/a	n/a	(29)

* Although groundwater may not be listed as a major water source distributed by the districts, private groundwater wells are a major water supply source for the region.
** Part of Semitropic Water Storage District.

Sources:
1. City of Fresno 2007, 2010.
2. Fresno Irrigation District 2009.
3. USBR 2004b, 2007.
4. USBR 2007.
5. KRCD and KRWA 2009.
6. USBR 2007.
7. City of Hanford 2006; City of Hanford Public Works Department 2010b.
8. USBR 2007.
9. USBR 2007; Nidever 2010; Becky Madruga, Treasurer/Assessor/Tax Collector/Office Manager, Lakeside Irrigation Water District, Hanford, CA. July 2, 2010. Personal communication.
10. Jason Gianquinto, Deputy General Manager, Semitropic Water Storage District, Wasco, CA. February 7, 2012. Personal communication.
11. USBR 2004a.
12. Lower Tule River Irrigation District 2009; USBR 2009c.
13. MWH 2003.
14. USBR 2000a.
15. USBR 2009c.
16. Center for Irrigation Technology 2005.
17. USBR 2004a.
18. USBR 2007; Semitropic Water Storage District 2004; Wilmar Boschman, General Manager, Semitropic Water Storage District. Wasco, CA. July 7, 2010. Personal communication.
19. USBR 2000b.
20. USBR 2007; Fernando Rizo, Administrative Services Manager, North Kern Water Storage District, Bakersfield, CA. July 7, 2010. Personal communication.
21. USBR 2000a.
22. Allen 2011, personal communication.
23. USBR 2007; Rizo 2010, personal communication.
24. Vaughn Water Company 2009, 2010.
25. USBR 2007, 2009b.
26. USBR 2007; Kern County Water Agency 2010; Kern County Water Agency n.d.
27. California Water Service Company 2010.
28. USBR 2009a.
29. USEPA 2007.

Acronyms and Abbreviations:
CVP = Central Valley Project
ID = Irrigation District
MUD = Municipal Utility District
n/a = not applicable
SWP = State Water Project
WCD = Water Conservation District
WD = Water District
WSA = Water Service Areas
WSD = Water Supply District



Sources: For federal water district boundaries, U.S. Bureau of Reclamation, MPGIS Service Center, (February 24, 2009); for state water district boundaries, U.S. Bureau of Reclamation, MPGIS Service Center in coordination with the CDWR, (March 2003); for private water district boundaries, U.S. Bureau of Reclamation, MPGIS Service Center in coordination with the CDWR, (October 2003); URS/HMM/Arup JV, 2013.

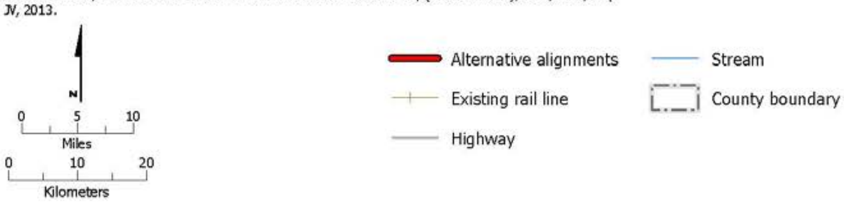


Figure 3.6-1
Boundaries of agricultural water districts and community water service areas

Wastewater Infrastructure

Generally, onsite sewage systems (e.g., septic tanks) treat rural and low-density areas of the study area. Table 3.6-5 summarizes municipal wastewater systems for the urban areas of each county, which are discussed further in the following subsections.

Table 3.6-5
Wastewater Treatment Plant Existing Average Flow and Capacity Summary for Proposed HST Station and Maintenance Facility Locations in the Fresno to Bakersfield Section

Jurisdiction	Agency	WWTP Name	WWTP Address	Average / Capacity Flow (mgd)
Fresno-Clovis Metropolitan Area	City of Fresno	Fresno/Clovis Regional Wastewater Treatment and Reclamation Facility	5607 W. Jensen Street	68/80
City of Hanford	City of Hanford Public Works	City of Hanford Wastewater Treatment Facility	10555 Houston Avenue	5.5/8.0
City of Corcoran	City of Corcoran Wastewater Division	City of Corcoran Wastewater Treatment Plant	Pueblo and King avenues	1.5/2.0
City of Shafter	City of Shafter Public Works Department and North of River Sanitary District	7th Standard Road Wastewater Treatment Facility	28970 7th Standard Road	5.32/7.50
City of Bakersfield	City of Bakersfield Public Works	City of Bakersfield Wastewater Treatment Facility #2	Mt. Vernon Avenue and White Lane	16.5/25.0
Kern County	Kern Waste Management Department	Kern Sanitation Authority Wastewater Treatment Plan	4101 Kimber Avenue	4.0/6.0

Acronyms:
HST high-speed train
mgd million gallons per day
WWTP wastewater treatment plant

Fresno County

City of Fresno

Wastewater in the city of Fresno is treated at the Fresno/Clovis Regional Wastewater Treatment and Reclamation Facility. The City of Fresno operates this facility, which is situated at Jensen and Cornelia streets in southwest Fresno. The facility provides wastewater treatment services for the greater Fresno-Clovis Metropolitan Area. On an average day, the facility receives 68 million gallons of wastewater; the facility has the capacity to treat 80 million gallons per day (mgd) (City of Fresno 2009a).

The City of Fresno is the designated regional sewer agency for the Fresno-Clovis Metropolitan Area of Fresno County. A joint powers agreement between the City of Fresno and Fresno County provides sewer services to most areas within the county. Since 1968, the City of Fresno has enforced a mandatory sewer ordinance that requires an end to the use of onsite sewage systems. Developments must connect to the regional sewer system as connections become available within the city limits. Due to the area's level terrain, a sewer lift station may be required to raise sewage to a higher elevation to allow for further gravity flow.

The Fresno-Clovis Regional Wastewater Treatment and Reclamation Facility provides trunk sewer lines and treatment services for the cities of Clovis and Fresno. Operation, maintenance, and long-term planning for the treatment facility are the responsibility of the City of Fresno. The treatment capacity is approximately 80 mgd for an average flow, including equipment redundancy for maintenance and equipment failures. The facility provides primary and secondary treatment processes, and a treatment process for solids removed at the facility (City of Fresno 2011).

The City of Fresno owns major sewer lines that cross the study area in Fresno north of West Bullard Avenue and north of West Shaw Avenue. The study area does not include any WWTPs or sewer lift stations in the city of Fresno.

Kings County

Incorporated and unincorporated communities in Kings County provide wastewater services to their services areas. The incorporated areas potentially affected by the proposed HST facilities are in the cities of Hanford and Corcoran, which have their own wastewater services, as described in the paragraphs below.

City of Hanford

The City of Hanford treats wastewater at a city-operated facility at 10555 Houston Avenue. The facility is permitted, and designed to treat 8 mgd (City of Hanford Public Works Department 2010a). The plant currently treats approximately 5.5 mgd of wastewater.

City of Corcoran

The City of Corcoran operates a wastewater treatment plant at the corner of Pueblo Avenue and King Avenue. The facility has a capacity of 2 mgd; the average treatment rate is 1.2 to 1.5 mgd (City of Corcoran 2010). The effluent from this plant is disposed of on 338 acres to the south of the corner of Plymouth and King avenues.

Tulare County

The Tulare County Resource Management Agency, Sewer and Water District, operates small-scale wastewater treatment plants, specifically the Terra Bella sewer wastewater treatment plant at 9832 Road 238 in Terra Bella, California; the Traver sewer wastewater treatment plants at 36550 Road 44 in Traver, California; and the Tooleville sewer wastewater treatment plant at 2285 Morgan Avenue in Exeter, California. The Fresno to Bakersfield Section of the proposed HST System would not require the use of wastewater services in Tulare County.

Kern County

The Kern County Waste Management Department provides management of wastewater at the Kern Sanitation Authority Sewer Plant, the Taft Wastewater Treatment Plant, the treatment plant at the Kern County Sheriff Office's Lerdo Detention Facility, the plant at the Buena Vista Aquatic Recreation Area, and the Reeder Sewer Plant. The Kern Sanitation Authority Sewer Plant treats an average of 4 mgd of industrial, commercial, and domestic wastewater from East Bakersfield and has a capacity to treat up to 6 mgd. All of the plant effluent is used to irrigate 2 square miles of adjacent farmland owned by the Kern Sanitation Authority. The City of Taft and Kern County jointly own the Taft Wastewater Treatment Plant. The Lerdo plant treats approximately 350,000 gallons per day of wastewater generated by the inmates and offices at the Lerdo Detention Facility. The plant at the Buena Vista Aquatic Recreation Area treats a maximum of 200,000 gallons per day of wastewater generated by the visitors and staff of the recreation area. The Reeder Sewer Plant treats a maximum of 40,000 gallons per day of domestic wastewater from the Reeder Tract area adjacent to Lake Isabella; the Reeder Tract area consists specifically of residential communities between Lake Isabella and Bodfish (Kern County Waste Management Department 2006).

City of Shafter

The City of Shafter Department of Public Works is responsible for the operation and maintenance of the city's public sewer system. Wastewater is treated at a plant in Shafter at 28970 7th Standard Road; the City of Shafter and the North of River Sanitation District (NORSD) jointly own the plant; NORSD owns two-thirds of the plant and the city owns one-third. The plant has a permitted treatment capacity of 7.5 mgd, of which the city is allowed to treat up to 2mgd and the NORSD is allowed to treat 5.5 mgd (LaMar 2010, personal communication). Currently, the City of Shafter treats an average of 1.20 mgd, and the NORSD treats an average of 4.12 mgd. The service area boundary for the two entities is along 7th Standard Road.

City of Bakersfield

The City of Bakersfield Department of Public Works, Water Treatment Division, operates Plant 2, which serves the area east of SR 99 and would support either HST station alternative, and Plant 3, which serves the area west of SR 99. The treated wastewater is used for restricted agricultural purposes. On average, Plant 2 processes approximately 16.5 mgd; it has a design capacity of 25 mgd. Plant 3 processes approximately 14 mgd; it is currently designed to treat 32 mgd per day (City of Bakersfield Public Works Department 2011a, 2011b).

Storm Drains

Storm drain systems are more prominent in developed urban areas. In the rural areas, roadside ditches, irrigation canals, and natural drainages convey stormwater runoff. The storm drainage systems for the counties and cities in the vicinity of the alternative alignments for the Fresno to Bakersfield Section reflect the limited annual rainfall and relatively flat topography of the region. The systems typically transport stormwater runoff to retention or detention basins, typically for groundwater recharge.

The Fresno Metropolitan Flood Control District (FMFCD) is responsible for planning and managing flood control areas. The FMFCD prepared a stormwater drainage and flood control master plan (FMFCD 2004) to coordinate the activities of the FMFCD, Fresno County, and individual cities. Runoff is routed to detention basins throughout the Fresno-Clovis Metropolitan Area and eventually recharges the groundwater basin, the primary source of potable water for the metropolitan area. The system captures an average of 90% of all urban runoff (FMFCD n.d.). The city of Hanford discharges a limited amount of stormwater into the central branch canal of the Peoples Ditch Company. Table 3.6-6 identifies the number of conflicts with existing drainage infrastructure within the study area for the BNSF Alternative and HMFs, every other alternative alignment, and proposed HST stations. One drainage system is proposed by the FMFCD, and is considered in the analysis, because it is likely to be present within the project footprint by 2035.

Table 3.6-6
Number of Storm Drain Facility Conflicts within Study Area[1]

Utility Type	Owner Name	Alternative Alignments											Station Areas				
		BNSF	Hanford West Bypass 1	Hanford West Bypass 2	Hanford West Bypass 1 Modified	Hanford West Bypass 2 Modified	Corcoran Elevated	Corcoran Bypass	Allens-worth Bypass	Wasco-Shafter Bypass	Bakers-field South	Bakers-field Hybrid	Fresno	Kings/ Tulare West	Kings/ Tulare East	Bakers-field	Bakers-field Hybrid
Storm pipes	Fresno Metropolitan Flood Control District	61	----	----			----	----	----	----	----	----	36	----	----	----	----
Storm pipes	City of Corcoran	3	----	----	----	----	----	-3	----	----	----	----	----	----	----	----	----
Storm pipes	City of Hanford	0	+4	+4	+4	+4	----	----	----	----	----	----	----	----	----	----	----
Retention ponds	City of Hanford	0	+2	+2	+2	+2	----	----	----	----	----	----	----	----	----	----	----
Storm drain manhole	Fresno Metropolitan Flood Control District	16	----	----	----	----	----	----	----	----	----	----	11	----	----	----	----
Storm drain manhole	Other than Fresno Metropolitan Flood Control District	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----

Table 3.6-6
Number of Storm Drain Facility Conflicts within Study Area[1]

Utility Type	Owner Name	Alternative Alignments											Station Areas				
		BNSF	Hanford West Bypass 1	Hanford West Bypass 2	Hanford West Bypass 1 Modified	Hanford West Bypass 2 Modified	Corcoran Elevated	Corcoran Bypass	Allens-worth Bypass	Wasco-Shafter Bypass	Bakers-field South	Bakers-field Hybrid	Fresno	Kings/ Tulare West	Kings/ Tulare East	Bakers-field	Bakers-field Hybrid
Storm drain manhole	City of Corcoran	1	----	----	----	----	----	-1	----	----	----	----	----	----	----	----	----
Storm drain manhole	City of Wasco	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Storm drains	City of Wasco	3	----	----	----	----	----	----	----	-3	----	----	----	----	----	----	----
Infiltration pond	Fresno Metropolitan Flood Control District	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Future storm pipes	Fresno Metropolitan Flood Control District	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Storm pipes	City of Bakersfield Public Works Department	7	----	----	----	----	----	----	----	----	+1	+2				3	3

CALIFORNIA High-Speed Rail Authority
U.S. Department of Transportation Federal Railroad Administration

Table 3.6-6
Number of Storm Drain Facility Conflicts within Study Area[1]

Utility Type	Owner Name	Alternative Alignments											Station Areas				
		BNSF	Hanford West Bypass 1	Hanford West Bypass 2	Hanford West Bypass 1 Modified	Hanford West Bypass 2 Modified	Corcoran Elevated	Corcoran Bypass	Allens-worth Bypass	Wasco-Shafter Bypass	Bakers-field South	Bakers-field Hybrid	Fresno	Kings/ Tulare West	Kings/ Tulare East	Bakers-field	Bakers-field Hybrid
Storm pipes	County of Kern Engineering, Surveying and Permit Services Department	0	----	----	----	----	----	----	----	----	0	0				0	0
Total conflicts (net)		89	+6	+6	+6	+6	0	-4	0	-3	+1	+2	48	0	0	3	3

[1] The plus and minus shown in the table is the difference between the BNSF Alternative and the alternative under consideration.

Solid Waste Facilities

Under RCRA and AB 939, affected county or municipal solid waste disposal facilities are required to plan for non-hazardous solid waste facility expansions, or addition from all anticipated sources. Following reuse or recycling, anticipated HST solid waste disposal volumes destined for county and municipal facilities would be considered in the mandated 5-year Countywide Siting Element (CSE) review process, along with all other prospective sources, and eventually included in the affected Integrated Water Management Plan documentation.

The following sections discuss solid waste facilities that may serve the project. The project would not directly affect active solid waste disposal facilities (i.e., landfills) or recycling facilities.

Fresno County

Fresno County operates two active solid waste disposal facilities/landfills: the American Avenue Landfill and the Coalinga Landfill. These landfills have a service area of 6,000 square miles. Parts of the unincorporated areas of the county also use the Clovis Landfill and until recently the Orange Avenue Landfill. Only a small part of the unincorporated county's solid waste is taken to these facilities because the Clovis Landfill serves mainly the city of Clovis, and the Orange Avenue Landfill serves mainly the city of Fresno. Table 3.6-7 lists the permitted daily disposal capacities of these Fresno County facilities, their remaining capacity, and their estimated closure dates.

Table 3.6-7
Landfill Facility Summary for Fresno County

Facility Name	Activity	Location	Permitted Daily Disposal Capacity (tons/day)	Remaining Capacity (million cubic yards)	Permitted Disposal Area (acres)	Estimated Closure Date	Actual Daily Disposal Volume (tons/day)
American Avenue Disposal Site	Solid waste landfill	18950 W. American Ave., Kerman, CA	2,200	21.55	32.70	2031	1,171[a]
Coalinga Disposal Site	Solid waste landfill	30825 Lost Hills Road, Coalinga, CA 93210	200	2.29	52	2029	No longer accepting waste
City of Clovis Landfill[1]	Solid waste landfill	15679 Auberry Road, Fresno CA	600	2.12	77	2047	160-180[b]
Orange Avenue Disposal Inc.	Solid waste landfill	3280 South Orange Ave., Fresno, CA	Permitted	Inactive	—	—	No longer accepting waste

Sources: CalRecycle 2010b; Zetz 2012, personal communication.
Notes:
[a] Average volume disposed in the month of March.
[b] Private municipal landfill and does not allow private haulers or self-hauls

Kings County

The solid waste landfills serving Kings County in the vicinity of the Fresno to Bakersfield Section have been closed since the late 1990s. The Kings Waste Recycling Authority transports solid waste from the Hanford area to its materials recovery facility (MRF) at 7803 Hanford-Armona Road in Hanford and then to the Chemical Waste Management Landfill in Kettleman Hills, approximately 45 miles west of the MRF. The Kings Waste Recycling Authority MRF has a maximum capacity of 800 tons/day. The Chemical Waste Management Landfill in Kettleman Hills has a disposal capacity of 8,000 tons/day and a maximum capacity of 10.7 million cubic yards.

Tulare County

Tulare County generates approximately 300,000 tons of waste per year in three landfills. All of these landfills are to the east of the study area in the vicinity of Visalia (Visalia Disposal Site), Tulare (Woodville Disposal Site), and Porterville (Teapot Dome Disposal Site). Table 3.6-8 lists the permitted daily disposal capacities of these facilities, their remaining capacities, and their estimated closure dates.

Table 3.6-8
Landfill Facility Summary for Tulare County

Facility Name	Activity	Location	Permitted Daily Disposal Capacity (tons/day)	Remaining Capacity (million cubic yards)	Permitted Disposal Area (acres)	Estimated Closure Date	Actual Daily Disposal Volume (tons/day)
Visalia Disposal Site	Solid waste landfill	Road 80 at Avenue 332, Visalia, CA	2,000	16.14	247	2024	280
Woodville Disposal Site	Solid waste landfill	Road 152 at Avenue 198, 10 miles SE of Tulare, CA	1,078	6.97	152	2038	320
Teapot Dome Disposal Site	Solid waste landfill	Avenue 128 and Road 208, Porterville, CA	600	1.14	71	2012*	280

*The Teapot Dome Disposal Site continues to operate past its estimated closure date under a reduced schedule (http://tularecounty.ca.gov/county/index.cfm/county-news/teapot-dome-landfill-to-operate-with-reduced-hours-starting-this-week/, accessed December 20, 2013.)Sources: CalRecycle 2010b; Jahnke 2012, personal communication.

Kern County

The Kern County Waste Management Department operates landfills in Bena, Boron, Mojave-Rosamond, Ridgecrest, Shafter-Wasco, Taft, and Tehachapi (Kern County Waste Management Department 2005). Table 3.6-9 lists the permitted daily disposal capacities, remaining capacities, and estimated closure dates for the Kern County landfills in the project vicinity.

The Shafter/Wasco Landfill is the City of Shafter's primary landfill, although the Bena Landfill accepts some refuse from industrial uses in the city.

All City of Bakersfield solid waste is disposed of in county-operated landfills: primarily, the Bena Landfill.

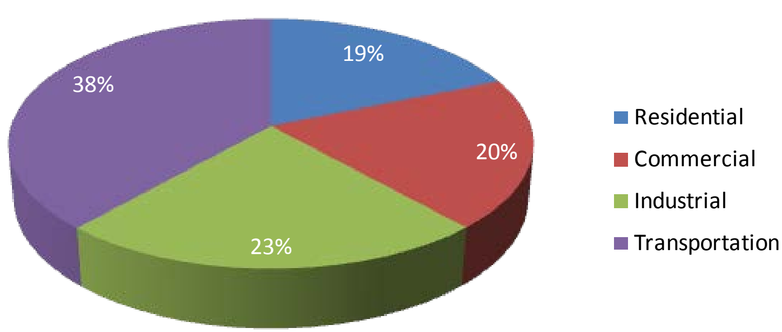
Table 3.6-9
Landfill Facility Summary for Kern County

Facility Name	Activity	Location	Permitted Daily Disposal Capacity (tons/day)	Remaining Capacity (million cubic yards)	Permitted Disposal Area (acres)	Estimated Closure Date	Actual Daily Disposal Volume (tons/ day)
Shafter-Wasco Sanitary Landfill	Solid waste landfill	17621 Scofield Avenue, Shafter, CA	888	7.90	135	2027	321[a]
Bakersfield Metropolitan (Bena) Sanitary Landfill	Solid waste landfill	2951 Neumarkel Road, Caliente, CA	4,500	34.99	229	2038	1,137[a]

Sources: CalRecycle 2010b; O'Rullian 2012, personal communication.
Note:
[a.] Daily disposal volumes are obtained from average of 1st Quarter (Months of January, February, and March)

3.6.4.2 ENERGY

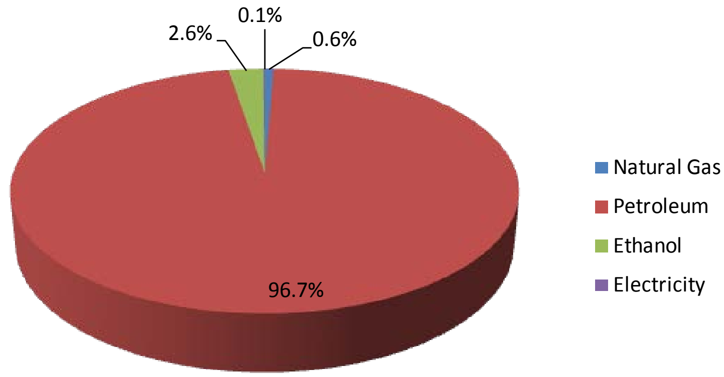
California is the tenth largest energy consumer in the world, just behind the entire country of France. The transportation sector consumes 38% of California's energy, the industrial sector consumes 23%, the residential sector consumes 22%, and the commercial sector consumes 19% (U.S. Energy Information Administration 2008). Figure 3.6-2 illustrates California's energy consumption by sector in 2008.



Source: U.S. Energy Information Administration 2008.

Figure 3.6-2
California energy consumption by sector, 2008

In California, electricity and natural gas are nearly synonymous with stationary energy usage, and petroleum is similarly synonymous with transportation energy (CEC 2000). Figure 3.6-3 depicts the sources of energy used for transportation in California in 2008.



Source: U.S. Energy Information Administration 2008.

Figure 3.6-3
California transportation energy consumption by source, 2008

Energy Resources

Electricity

Demand

There are two ways to measure electricity demand: consumption and peak demand. Electricity consumption is the amount of electricity used by consumers in the state. According to the CEC, total statewide electricity consumption grew from 166,979 GWh in 1980 to 272,000 GWh in 2005 (CEC 2010a). Electricity consumption growth rates fell from an estimated rate of 3.2% in the 1980s to a rate of 0.9% between 1990 and 1998. This reduction in consumption is attributed to the economic recession in the early part of the decade (Authority and FRA 2005). Table 3.6-10 summarizes electricity consumption in Fresno, Kings, Tulare, and Kern counties in 2009.

The highest electric power requirement during a specified period, known as peak demand, is measured as the amount of electricity consumed at any given moment, usually integrated over a 1-hour period. Because electricity must be generated at the instant it is consumed, this measurement specifies the greatest generating capacity that must be available during periods of peak demand. Peak demand is important in evaluating system reliability, identifying congestion points on the electrical grid, and designing required system upgrades. California's peak demand typically occurs in August, between 3 p.m. and 5 p.m. In the San Joaquin Valley, high air-conditioning loads and irrigation pumping contribute to this summer peak demand.

Table 3.6-10
2009 Electricity Consumption in Fresno, Kings, Tulare, and Kern Counties

County	2009 Usage (million kilowatt hours)
Fresno	7,222.12
Kings	14,308.64
Tulare	1,573.65
Kern	3,879.54
Source: CEC 2010a.	

Generation

The electric power sector is the fastest-growing share of the energy economy in California (U.S. Department of Energy 2008). The projected net power supply within the grid controlled by the California Independent System Operator for summer 2009 was 58,098 megawatts (MW) (ISO 2009). Table 3.6-11 summarizes fuel sources for electric power in California for 2005.

Table 3.6-11
Fuel Sources for Electric Power in California in 2005

Fuel Source	Quantity Used (trillion Btu)	Percentage of Fuel Mix
Coal	20.7	1
Petroleum	49.4	3
Nuclear	376.8	19
Hydroelectric	396.2	20
Renewable	398.3	20
Natural Gas	709.3	36
Source: U.S. Department of Energy 2008.		

In-state electricity generation accounted for 73% of the total electricity supply for California in 2008.

Electricity Demand and Generation Capacity Outlook

Statewide, the projected average summer power supply in 2010 was forecast at 76,968 MW. Assuming 1-in-2 summer temperatures,[1] demand was approximately 57,253 MW. The result is an average planning reserve margin[2] of 36% (CEC 2010b). California's population is projected to

[1] 1-in-2 forecast temperatures are temperatures with a 50% chance of not being exceeded.

exceed 49 million by 2025 and more than 53 million by 2030, requiring an additional 92,000 MW of peak summer capacity in 2030[3] to meet demand and have an adequate reserve margin (Electric Power Group 2004).

Projections of in-state generation capacity for 2035 are not possible because generation infrastructure decisions typically are not made more than 2 to 3 years in advance of construction. The Western Electricity Coordinating Council (WECC) 2008 power supply assessment projects system deficits within the period forecast in the assessment (2017). These values factor in the loss of generating capacity from decommissioned sources, and the addition of programmed capacity. Most of the planned generating resources are renewable (e.g., wind, gas, hydroelectric, and solar) (WECC 2008).

Projected deficits indicate the need for additional generation capacity. Historically, new generation has been in step with demand. Where supply insufficiencies have occurred, they have been the result of a number of interrelated factors, including faulty market design and regulatory issues (Weare 2003).

California's Renewables Portfolio Standard (RPS), established in 2002 and expanded in 2011 under Senate Bill 2, requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33% of total procurement by 2020. The CPUC and the California Energy Commission jointly implement the RPS program.

Transmission

California's electricity transmission system comprises more than 31,000 miles of bulk electric transmission lines rated at 69 kV or more, towers, and substations (Authority and FRA [2008] 2011). The system links generation to distribution in a complex electrical network that balances supply and demand on a nearly instantaneous basis. The California Independent System Operator, a nonprofit entity responsible for the system's reliability and nondiscriminatory transmission of energy, operates California's transmission system.

In addition to the in-state transmission connections, there is a system of transmission interconnections that connect California's electricity grid with out-of-state electricity utilities. The Western Interconnection connects California to electricity generation facilities in 10 other western states, western Canada, and northwestern Mexico. With a total importing capacity of 18,170 MW, these interconnections serve a critical role in satisfying California's electricity consumption (Authority and FRA [2008] 2011). As electricity consumption grows, the addition of transmission capacity may facilitate energy transfers from subregions where there is surplus generating capacity to subregions that require additional energy. However, when the overall energy market is in a deficit, additional transmission capacity alone cannot relieve the subregional deficits and additional energy generation is required.

Natural Gas

California is the second largest consumer of natural gas in the nation, with consumption at 71,567 million cubic feet (MMcf) per day in 2007. Natural gas is the most used fuel for electricity generation in California, and approximately 44% of the 2006 daily consumption of natural gas was for electricity generation (CEC 2007). In 2007, California produced 12.9% of the natural gas consumed in the state. Most of the natural gas consumed comes from the southwestern United States (40.8%), the Rocky Mountain area (24.2%), and Canada (22.1%) (CEC 2007).

The CEC predicts that overall natural gas demand will grow slightly more than 1% annually through 2017, with demand volumes of 89,720 MMcf daily by 2017 (CEC 2007). Within the contiguous United States, the projected natural gas reserves recoverable with today's technology are expected to permit current levels of production for the next 50 years (U.S. Energy Information Administration 2014). Natural gas supplies are not considered to limit California's projected demand.

Petroleum

Automobile travel is the predominant mode of passenger transportation within the study area. Historically, demand for transportation services (and petroleum consumption) in California has mirrored the growth of the state's population and economic output. The *Base Case Forecast of California Transportation Energy Demand* (CEC 2001) indicates that vehicle miles traveled (VMT) are currently growing at an average rate of 1.8% annually, which is greater than the population growth rate. The report projects that between 2000 and 2020, on-road gasoline demand will increase an average of 1.6% annually, and diesel demand will increase by an average of 2.4% annually.

Automobiles are most efficient when operating at steady speeds of 35 to 45 mph with no stops (U.S. Department of Energy 2006). Fuel consumption by conventional automobile engines increases by approximately 30% when average speeds drop from 30 to 20 mph; a drop from 30 to 10 mph results in a 100% increase in fuel consumption. Fuel consumption increases at speeds above 45 mph since the power to overcome air resistance increases roughly with the cube of the speed, and the energy required per unit distance is roughly proportional to the square of speed. For this reason, driving at 45 rather than 65 mph requires about one-third the power to overcome wind resistance, or about one-half the energy per unit distance.

3.6.5 Environmental Consequences

This section provides the impact analysis relating to public utilities and energy for the project. The Statewide Program EIR/EIS addressed consultation with each utility provider and owner to avoid or reduce potential impacts on existing and planned utilities.

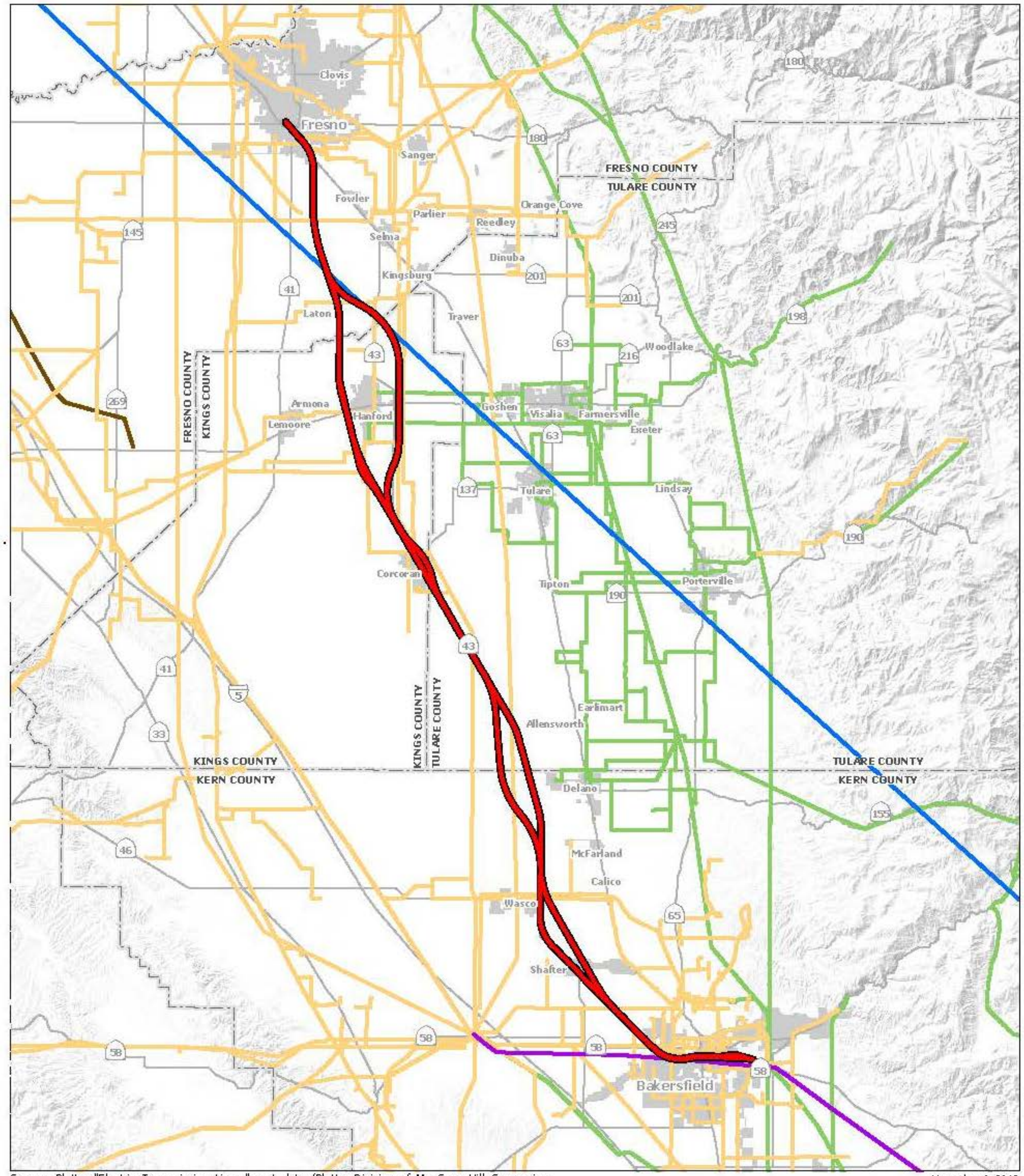
3.6.5.1 Overview

Utilities

Constructing the Fresno to Bakersfield Section of the California HST System could result in scheduled and accidental interruptions of utility services, and it would generate construction and demolition material. Notices by phone, email, mail, newspaper, or other means would inform utility customers of scheduled outages. Probing for existing underground utilities prior to the start of construction would reduce the risk of accidental service interruptions. Where feasible, C&D material would be recycled or repurposed to divert it from landfills.

The permanent project footprint in some places would be located where current utility lines exist (i.e., a potential "utility conflict"). At some locations, current utility infrastructure will be upgraded and/or extended to serve the HST System. Utilities within the permanent project footprint would be either relocated outside the restricted access areas of the HST right-of-way, or they would be modified (i.e., encased in a pipe sturdy enough to withstand the weight of HST System elements and allow for maintenance access from outside the HST right-of-way) to avoid the conflict. It would be standard practice that agreements related to utility relocation or encasement require utility owners and operators to notify the Authority in advance of monitoring or maintenance of their facilities that remain in the HST right-of-way after construction of the guideway.

The following sections analyze utility conflicts by alternative for high-risk utilities and low-risk utilities, respectively. Figures 3.6-4 through 3.6-7 identify various utility conflicts along the Fresno to Bakersfield Section. The Hanford West Bypass 1 alternatives would affect power distribution lines adjacent and connected to an existing substation.



Source: Platts, "Electric Transmission Lines," metadata (Platts, Division of MacGraw-Hill Companies, Inc., 2009), http://www.platts.com/ (accessed August 9, 2010); URS/HMM/Arup JV, 2013.

November 6, 2013

N

0 5 10 Miles

0 10 20 Kilometers

Electric transmission line ownership

- AEP Texas Central Company
- Imperial Irrigation District
- Pacific Gas & Electric Company
- San Diego Gas & Electric Company
- Southern California Edison Company
- Alternative alignments
- Highway
- County boundary
- Urban area

Figure 3.6-4
Electric transmission lines

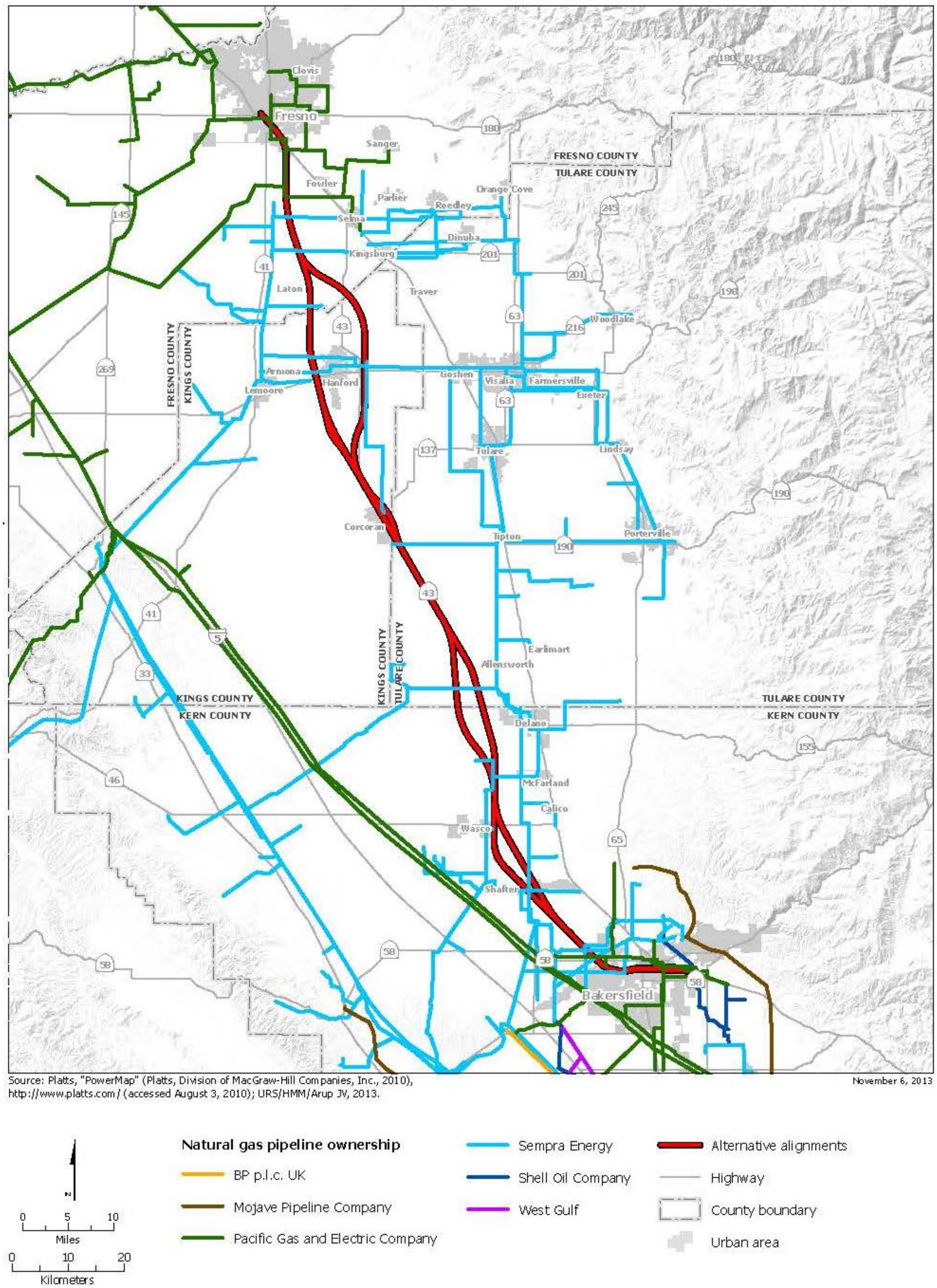
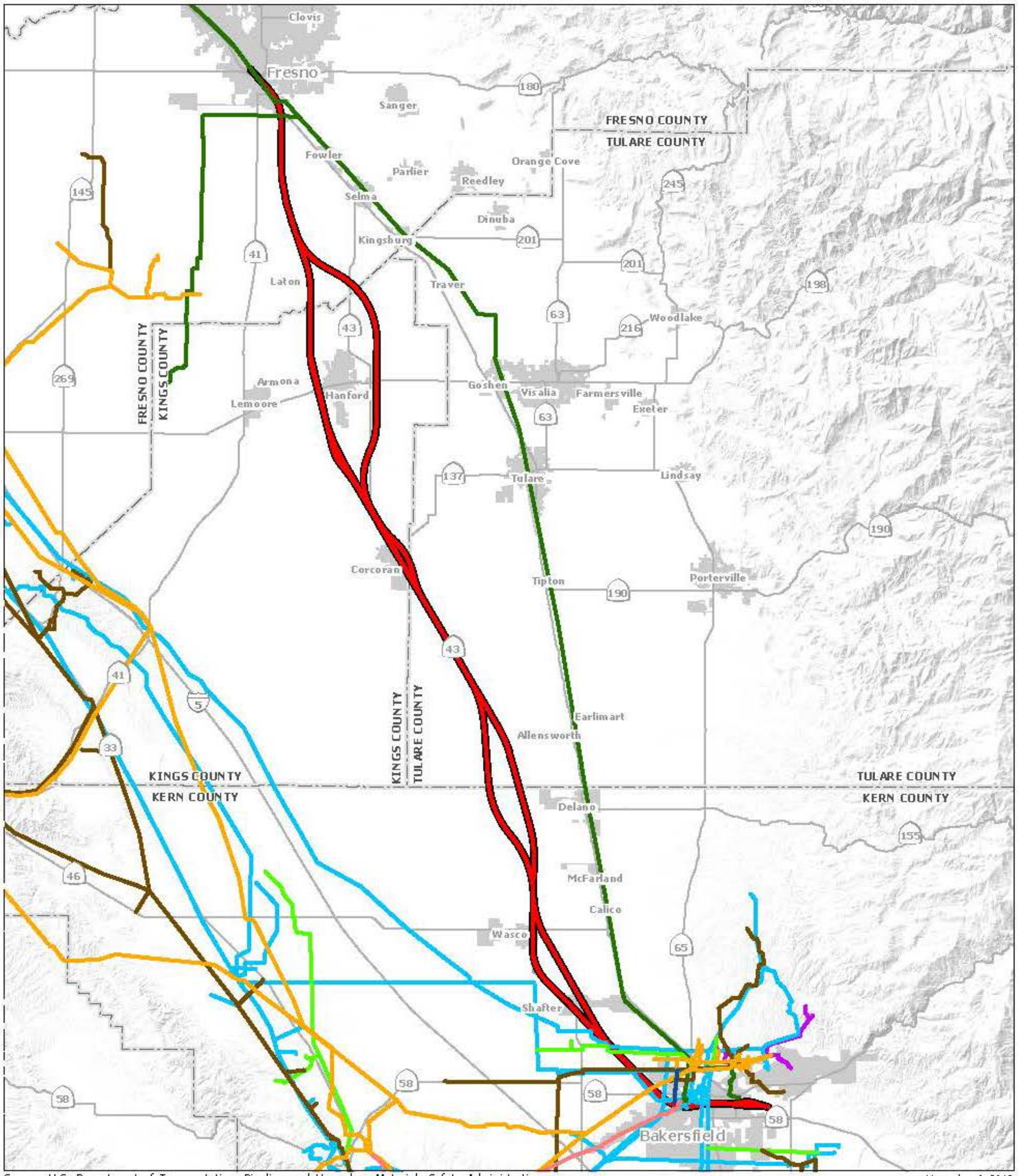


Figure 3.6-5
Natural gas pipelines



Source: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, "National Pipeline Mapping System," metadata (Washington, D.C.: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, January 28, 2004), https://www.npms.phmsa.dot.gov/ (accessed August 2010); URS/HMM/Arup JV, 2013.

November 6, 2013

Petroleum and fuel pipeline ownership

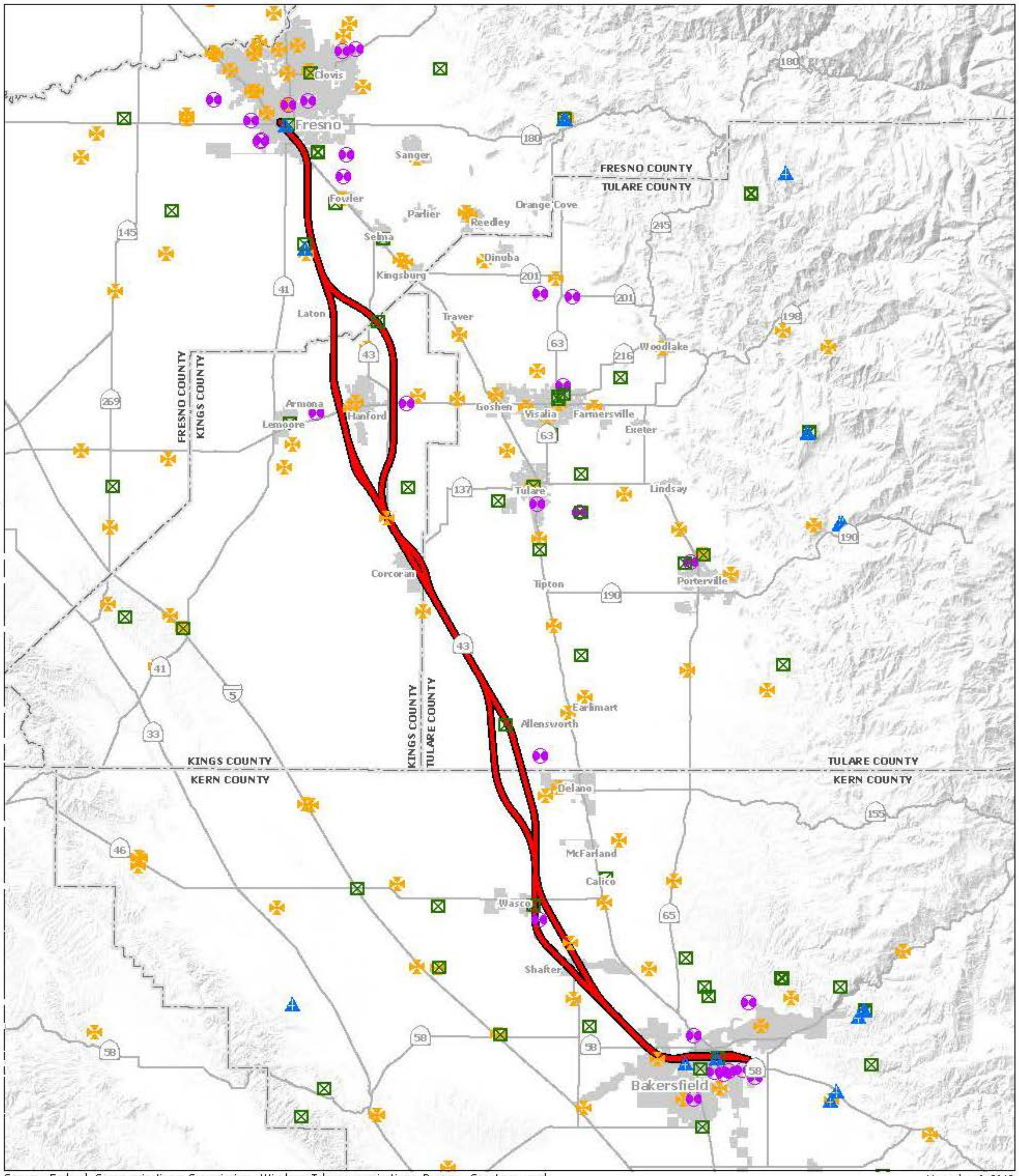
- BP p.l.c. UK
- Chevron Corporation
- ConocoPhillips
- Exxon Mobil Corporation
- Kinder Morgan Inc.
- Shell Oil Company
- Sunland Refining Corporation
- Tricor Refining LLC
- Alternative alignments
- Highway
- County boundary
- Urban area

N

0 5 10 Miles

0 10 20 Kilometers

Figure 3.6-6
Petroleum and fuel pipelines



Source: Federal Communications Commission, Wireless Telecommunications Bureau, Spectrum and Competition Policy Division, "Antenna Structure Registration" (Washington, D.C.: Federal Communications Commission, last updated April 5, 2010), http://wireless.fcc.gov/geographic/index.htm (accessed August 13, 2010); URS/HMM/Arup JV, 2013.

Miles 0 5 10
Kilometers 0 10 20

Cellular service site
AM radio broadcast facility
FM radio broadcast facility
Television broadcast facility
Alternative alignments
Highway
County boundary
Urban area

Figure 3.6-7
Communication facilities and sites

As discussed below, project-related demand on existing utility facilities such as water and wastewater treatment, and stormwater drainage would not require expansion of existing facilities or the construction of new facilities or entitlements. Based on anticipated reuse, recycling, and waste diversion to be implemented by the HST System to reduce solid waste, existing landfill capacity is adequate to meet project demands. The potential effect on these facilities and services would have negligible intensity under NEPA, and a less-than-significant impact under CEQA. Project design features would help reduce, avoid, or minimize adverse impacts resulting from the project.

The analysis provided in this EIR/EIS includes impacts of the relocation of high-risk utilities such as power and gas transmission lines. Relocation of many low-risk utilities such as water distribution lines and irrigation canals would take place within the temporary and permanent project footprints evaluated in this EIR/EIS. For these reasons, the impacts of most utility relocations associated with the project are included in the impact assessments provided in this document. In the event that additional utility relocations are identified during final engineering design, and those relocations are outside of the project footprint evaluated in this EIR/EIS, additional CEQA and NEPA review would be conducted for those relocations, as necessary.

Energy

Per CEQA requirements, an EIR must include a description of the existing physical environmental conditions in the vicinity of the project. Those conditions, in turn, "will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant" (CEQA Guidelines Section 15125[a]). NEPA requires a succinct description of the environment for areas to be affected by the alternatives under consideration. The description shall be no longer than is necessary to understand the effects of the alternatives, and to provide the context for assessing the significance of impacts. Data and analyses shall be commensurate with the importance of the impact, with less-important material summarized, consolidated, or simply referenced (40 C.F.R. 1502.15).

For a project such as the HST project that would not commence operation for almost 10 years and would not reach full operation for almost 25 years, use of only existing conditions as a baseline for energy impacts would not be useful for comparison. It is more likely that existing background traffic volumes (and, thus the intensity of energy use) would change due to planned traffic improvement projects) between today and 2020/2035 than it is that existing traffic conditions would remain unchanged over the next 10 to 25 years. For example, Regional Transportation Plans (RTP) included funded transportation projects that are programmed to be constructed by 2035. To ignore that these projects would be in place before the HST project reaches maturity (i.e., the point/year at which HST-related transportation generation reaches its maximum), and to evaluate the HST project's energy impacts while ignoring that these improvements would change the underlying background conditions to which HST project effects would be added, would present a hypothetical comparison that would not be an accurate prediction of expected conditions.

Therefore, the energy analysis uses a dual baseline approach. That is, the HST project's energy impacts are evaluated both against existing conditions and against background (i.e., No Project) conditions as they are expected to be in 2035. Results for both baselines are presented in this section. The results comparing the project with the future expected baseline are presented in detail in this document. The results comparing the project with existing conditions are summarized in this document and details are presented in Appendix 3.6-A, Existing plus Project Conditions Energy Analysis. This approach complies with CEQA (see *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* [2013], 57 Cal.4th 439), by informing the public of potential project impacts under both baselines, but focuses the analysis on the baseline analysis more likely to portray a more accurate comparison for environmental purposes. Court decisions indicate that a projected future baseline is an appropriate means to analyze environmental effects of a long-term infrastructure project, when that future baseline is supported by substantial evidence.

Electrical Requirements of the HST

The electrical demand for the propulsion of the trains and for the operation of the trains at terminal stations and in storage depots and maintenance facilities has been conservatively estimated by the project's engineers to be 12.66 GWh per day for the 50% fare scenario and 8.44 GWh per day for the 83% fare scenario. Transmission losses, the percentage of energy lost due to transmission from the power plant to the project, have been estimated to be approximately 4%. Applying this factor to the electrical requirement of the HST System, the total electrical requirement at the power plant would be approximately 13.17 GWh, or 44,900 million Btu (MMBtu), per day for the 50% fare scenario, and 8.78 GWh, or 30,000 MMBtu, for the 83% fare scenario. This change in electrical demand is predicted to occur under the existing conditions plus project scenario and the 2035 build scenario.

Table 3.6-12 summarizes the energy changes that would result from the HST System. The analysis conducted for this project estimated the changes in energy use anticipated throughout the state with and without the HST System. The analysis estimated the energy changes from reduced on-road VMT, reduced intrastate airplane travel, and increased electrical demand. Although the HST System would result in an increase in electricity demand, it would reduce the energy demands from automobile and airplane travel, resulting in an overall beneficial effect on statewide energy use.

Table 3.6-12
2035 Estimated Change in Energy Consumption due to the HST System (50% to 83% Fare Scenario)

Projected Outcomes of the HST System	Change in Energy Usage due to HST versus Future Conditions (MMBtu/day)	Change in Energy Usage due to HST versus Current Conditions (MMBtu/day)
Reduced VMT	-92,550 to -62,283	-105,474 to -70,240
Reduced Airplane Travel	-47,105 to -31,561	-27,321 to -18,305
Increased Electricity Consumption	44,900 to 30,000	44,900 to 30,000
Net Change in Energy Use	-94,755 to -63,844	-87,895 to -58,546
Acronyms and Abbreviations: HST high-speed train MMBtu million British thermal units VMT vehicle miles travelled		

The entire HST System would be approximately 800 miles long. The length of the Fresno to Bakersfield Section alternatives is approximately 114 miles or less, depending on the design options selected, or approximately 14% of the length of the entire HST System. The Fresno to Bakersfield Section of the HST System would contribute approximately 14% to the statewide estimates of HST energy demand and savings, as compared with the energy use of conventional means of transportation. The anticipated electricity use would be approximately 14% of the total HST System power use, or 1.84 to 1.23 gigawatt-hours (GWh) per day, depending upon the fare scenario. The payback period for energy used during HST construction would be approximately 2 to 4 years.

3.6.5.2 No Project Alternative

The population in Fresno, Kings, Tulare, and Kern counties is projected to grow, as discussed in Chapter 1, Project Purpose, Need, and Objectives, and in Section 3.18, Regional Growth. An increase in population would increase the demand for utility services. Section 3.19, Cumulative Impacts, discusses foreseeable future projects, which include shopping centers, industrial parks, road network improvements, and residential developments between the cities of Fresno and Bakersfield. These projects are planned or approved to accommodate the growth projections in the area. As discussed in Section 3.6.4, Affected Environment, local utilities have capital improvement plans to accommodate the anticipated population growth. These improvements include the expansion of the wastewater treatment plants and infrastructure additions and upgrades to provide services to growing populations.

Demand for energy would also increase at a level commensurate with population growth. The region would increase peak and base period electricity demand and would require additional generation and transmission capacity.

Under the No Project Alternative, the daily VMT in Fresno, Kings, Tulare, and Kern counties would increase by 2035, as described in Section 3.2, Transportation. This increase would require an estimated 0.75-million gallons of additional petroleum in the Fresno to Bakersfield region alone (Bureau of Transportation Statistics 2010).[2] Potential increases in petroleum demand could be a concern under the No Project Alternative.

3.6.5.3 High-Speed Train Alternatives

The project design incorporates elements that minimize electricity consumption (e.g., using regenerative breaking and energy-saving equipment and facilities). The project will be constructed and operated in an energy-efficient manner. For example, the stations will qualify for Leadership in Energy and Environmental Design (LEED) certification, and renewable energy will power the HSTs, to the extent feasible.

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, guides Federal agencies on compensation for impacts on property owners and tenants who must relocate if they are displaced by a federally sponsored project. This act applies to all real property, including the acquisition of land for relocation of utilities. The Authority would positively locate public utilities within the potential impact area (by probing, potholing, electronic detection, as-built designs, or through other means) prior to construction, in compliance with state law (i.e., California Government Code 4216). Where it is not possible to avoid utilities, they would be improved (e.g., steel pipe encasement) so that there is no damage or impairment to the operation of these utilities from the HST project.

Utilities

Construction Period Impacts—Common Utilities Impacts

The construction of any of the project alternatives and the HMF could result in planned temporary interruption of utility service, accidental disruption of services, increased water use, and an increase in waste generation.

[2] Based on the 2007 national average fuel economy for passenger and other two-axle, four-tire vehicles.

Impact PU&E#1 – Temporary Interruption of Utility Service

Construction could require the temporary shutdown of utility lines, such as water, sewer, electricity, or gas, to safely move or extend these lines. Shutdown could interrupt utility services to industrial, commercial, agricultural, and residential customers.

Where necessary, project design and phasing of construction activities would minimize interruptions, including for upgrades of existing power lines to connect the HST System to existing PG&E substations. Prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification would specify the estimated duration of the planned outage and would be published no fewer than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users. Because of the short duration of the planned interruptions and the interruption notification procedures it is unlikely that these interruptions would be noticeable to residents and businesses, this would be an impact of negligible intensity under NEPA. Under CEQA, this impact would be less than significant.

Impact PU&E#2 – Accidents and Disruption of Services

During construction, the potential for accidental disruption of utility systems, including overhead utility lines (e.g., telephone and cable television) and buried utility lines (e.g., water, wastewater, and natural gas lines) is low due to the established practices of utility identification and notification. In addition, California Government Code Section 4216 establishes required procedures for identifying buried utilities prior to initiating excavation. Given the standard precautions that will be instituted during construction, this would be a local impact with negligible intensity under NEPA. Under CEQA, the impact would be less than significant.

Impact PU&E#3 – Effects from Water Demand during Construction

Construction activities would use water to prepare concrete, increase the water content of soil to optimize compaction for control dust, and to re-seed disturbed areas. Table 3.6-13 shows the estimated water use among various alternative alignments and facilities.

Table 3.6-13
Construction Water Use Summary

Facility	Item	Total Volume (MG)	Total Volume (acre-feet)	Annualized Water Use[a,b] (ac-ft/yr)
BNSF Alternative				
117 miles	Concrete Work	184	564	113
	Earthwork	30	92	18
	Dust Control (tracks)	713	2,190	438
	Irrigation (tracks)	161	495	99
	Total	1,088	3,340	**668**

Table 3.6-13
Construction Water Use Summary

Facility	Item	Total Volume (MG)	Total Volume (acre-feet)	Annualized Water Use[a,b] (ac-ft/yr)
Hanford West Bypass 1				
	Concrete Work	26	80	16
	Earthwork	9	28	6
28 miles	Dust Control (tracks)	170	521	104
	Irrigation (tracks)	38	118	24
	Total	243	747	**149 (169)**
Hanford West Bypass 1 Modified				
	Concrete Work	34	105	21
	Earthwork	8	26	5
28 miles	Dust Control (tracks)	170	520	104
	Irrigation (tracks)	38	118	24
	Total	250	769	**154 (169)**
Hanford West Bypass 2				
	Concrete Work	29	90	18
	Earthwork	9	27	5
28 miles	Dust Control (tracks	169	520	104
	Irrigation (tracks)	38	118	24
	Total	246	755	**151 (169)**
Hanford West Bypass 2 Modified				
	Concrete Work	37	114	23
	Earthwork	8	25	5
28 miles	Dust Control (tracks)	169	520	104
	Irrigation (tracks)	38	118	24
	Total	253	777	**155 (169)**
Corcoran Elevated				
	Concrete Work	32	98	20
	Earthwork	0.6	2	0.4
10 miles	Dust Control (tracks)	61	188	38
	Irrigation (tracks)	14	43	9
	Total	107	331	**66 (59)**
Corcoran Bypass				
	Concrete Work	13	40	8
	Earthwork	3	9	2
10 miles	Dust Control (tracks)	62	191	38
	Irrigation (tracks)	14	43	9
	Total	92	283	**56 (59)**

Table 3.6-13
Construction Water Use Summary

Facility	Item	Total Volume (MG)	Total Volume (acre-feet)	Annualized Water Use[a,b] (ac-ft/yr)
Allensworth Bypass				
21 miles	Concrete Work	19	57	11
	Earthwork	7	22	4
	Dust Control (tracks)	130	398	80
	Irrigation (tracks)	29	90	18
	Total	185	567	**113 (112)**
Wasco-Shafter Bypass				
21 miles	Concrete Work	22	68	14
	Earthwork	7	20	4
	Dust Control (tracks)	127	389	78
	Irrigation (tracks)	29	88	18
	Total	185	565	**113 (130)**
Bakersfield South				
12 miles	Concrete Work	39	119	24
	Earthwork	0.9	3	0.6
	Dust Control (tracks)	73	223	45
	Irrigation (tracks)	17	50	10
	Total	129	395	**79 (79)**
Bakersfield Hybrid				
12 miles	Concrete Work	39	119	24
	Earthwork	0.9	3	0.6
	Dust Control (tracks)	73	224	45
	Irrigation (tracks)	17	51	10
	Total	129	397	**79 (79)**
Heavy Maintenance Facility				
150 acres	Concrete Work	14	44	9
	Dust Control	168	516	103
	Irrigation	6	19	4
	Total	188	578	**116**
Fresno Station				
20.5 acres	Concrete Work[c]	6	18	4
	Dust Control	23	70	14
	Irrigation	0.2	0.5	0.1
	Total	29	89	**18**

Table 3.6-13
Construction Water Use Summary

Facility	Item	Total Volume (MG)	Total Volume (acre-feet)	Annualized Water Use[a,b] (ac-ft/yr)
Kings/Tulare Station – East Alternative				
25.25 acres	Concrete Work[c]	6	18	4
	Dust Control	28	87	17
	Irrigation	0.5	2	0.3
	Total	35	106	**21**
Kings/Tulare Station – West Alternative, at-grade				
48.3 acres	Concrete Work[c]	6	18	4
	Dust Control	54	166	33
	Irrigation	6	17	3
	Total	65	201	**40**
Kings/Tulare Station – West Alternative, below-grade				
48.3 acres	Concrete Work[c]	6	18	4
	Dust Control	54	166	33
	Irrigation	6	17	3
	Total	66	201	**40**
Bakersfield Station – North Alternative				
19 acres	Concrete Work[c]	6	18	4
	Dust Control	21	65	13
	Irrigation	0.3	1	0.2
	Total	27	84	**17**
Bakersfield Station – South Alternative				
20 acres	Concrete Work[c]	7	20	4
	Dust Control	22	69	14
	Irrigation	0.6	2	0.4
	Total	30	91	**18**
Bakersfield Station – Hybrid Alternative				
24 acres	Concrete Work[c]	6	18	4
	Dust Control	27	82	16
	Irrigation	0.4	1	0.2
	Total	33	102	**20**
Maximum Use Total*				**868**

Notes:
[a] Annualized water use is for a 5-year construction period.
[b] Equivalent numbers for the corresponding segments of the BNSF Alternative are presented in parentheses.
[c] Concrete volume for stations was estimated by structure footprints and building characteristics.
*The Maximum Use Total is the sum of the greatest water use estimates for each of the track alignments, stations and HMF alternatives considered.
Acronyms and Abbreviations:
ac-ft/yr = acre-feet per year
MG = million gallons

The difference in water demand between the alignment alternatives is a function of the total guideway length; however, the guideway lengths vary only slightly between the BNSF Alternative and each of the 10 other alternative alignments for the Fresno to Bakersfield Section. A variety of existing sources would provide water, depending on the alternative constructed. Information regarding existing water use and anticipated project water demand is summarized in Appendix 3.6-B, Technical Memorandum: Water Usage Analysis for CHST Fresno to Bakersfield Section.

Existing water use within the project footprint, primarily for agriculture, is estimated to be 13,750 acre-feet/year for the BNSF Alternative and varies between 40 ac-ft/yr (Bakersfield South) and 880 ac-ft/yr (Hanford West Bypass 2) for the other alternative alignments, depending on which of the 10 other alignment alternatives are selected. The HMF site alternatives are in areas currently in agricultural use, and existing water use varies from 1,600 (Fresno Works – Fresno HMF Site) to almost 1,880 acre-feet/year (Kern Council of Governments–Shafter West HMF Site). Finally, existing water use at each proposed station site in acre-feet/year is as follows: Fresno Station: 39; Kings/Tulare Regional Station–West: 147; Kings/Tulare Regional Station–East: 80; Bakersfield Station–North: 38; Bakersfield Station–South: 38; and Bakersfield Hybrid Station: 48. The average annual water use over the construction period would not be greater than 868 ac-ft/yr, which is less than the over 14,000 ac-ft/yr of existing demand due to the elimination of water use for existing agricultural purposes within the HST construction footprint. Water for construction of the proposed project could be supplied from existing surface or groundwater supply systems. HST construction would require neither construction nor expansion of a water treatment facility and would also not require new or expanded entitlements. This would result in a local impact of negligible intensity under NEPA, and in a less-than-significant impact under CEQA.

Impact PU&E#4 – Effects from Waste Generation during Construction

Clearing of vegetation, removal of existing asphalt and gravel, and demolition of existing structures during construction would generate solid waste. Construction of any of the HST alternatives would generate an estimated 2.6 million cubic yards of solid waste. The HMFs alone would each generate 750,000 to 1,000,000 cubic yards of solid waste during construction.

As standard construction practice, the contractor would divert construction and demolition waste from landfills by reusing or recycling to aid with implementing the Local Government Construction and Demolition (C&D) Guide [Senate Bill 1374] and to meet solid waste diversion goals to the extent practicable. The contractor would either segregate and recycle the waste at a certified recycling facility or contract with an authorized agent to collect mixed (not segregated) waste and dispose of it at a certified recycling facility.

The 2010 Green Building Standards Code requires every city and county in California to develop a waste management plan and divert at least 50% of the construction materials generated (CalRecycle 2012). The Authority’s 2013 sustainability policy specifies all (100%) steel and concrete will be recycled, and a minimum of 75% construction waste will be diverted from landfills (Authority 2013). The landfills to which C&D material from the project would be sent have not been identified. Each landfill has specific requirements regarding the acceptance of hazardous wastes and C&D material that may influence the selection of disposal sites. Although there are three active landfills that accept C&D material, other regional facilities, such as those that serve the city of Fresno, may be used for waste disposal. It is estimated that the total volume of C&D material would be a maximum of 3 million cubic yards before recycling (approximately 8.1% of the total remaining capacity of the three active landfills that accept C&D material, which were previously identified in Table 3.6-7). After diversion of C&D materials, about 4% of the remaining capacity at active landfills would be sent to existing landfills. Existing landfills serving counties within which the proposed HST project would occur have adequate estimated capacities through 2038 or longer. Under RCRA and AB 939, affected county or municipal solid waste disposal facilities are required to plan for non-hazardous solid waste facility expansions or additions from all anticipated sources. Following reuse or recycling, anticipated HST solid waste disposal volumes destined for county and municipal facilities would be considered in the mandated 5-year Countywide Siting Element (CSE) review process, along with all other prospective sources, and eventually included in the affected Integrated Water Management Plan documentation. The project would comply with federal, state, and local statutes and regulations related to solid waste, and there exists sufficient permitted capacity at the landfills serving the project to accommodate solid waste disposal needs. Therefore, the effects of the Fresno to Bakersfield HST on regional landfills would have negligible intensity under NEPA. Under CEQA, the impact on permitted landfills that would serve the project would be less than significant.

As discussed in Section 3.10, Hazardous Materials and Wastes, construction would generate hazardous waste consisting of welding materials, fuel and lubricant containers, paint and solvent containers, and cement products containing strong basic or acidic chemicals. Demolition of older buildings could also generate hazardous waste, such as asbestos-containing materials and lead-based paint. The Authority would handle, store, and dispose of all hazardous waste in accordance with applicable requirements, including the Resource Conservation and Recovery Act (see Section 3.10, Hazardous Materials and Wastes). A certified hazardous waste collection company would deliver the waste to an authorized hazardous waste management facility for recycling or disposal. Some in-state landfills, such as the Chemical Waste Management Kettleman Hills Landfill in Kings County and permitted landfills in southern California, accept hazardous wastes (DTSC 2007). Kettleman Hills Landfill is a chemical waste disposal and treatment facility with a capacity of 5.7 million cubic yards. The 1,600-acre site accepts waste from all over the western U.S., although it primarily serves California. The anticipated implementation of the B-20 landfill addition within the Kettleman Hills Landfill site is expected to provide permitted capacity for the disposal of hazardous and designated waste through 2042. Because hazardous waste could be disposed of at permitted landfills that have sufficient capacity through the HST construction period, potential effects would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Project Impacts—Common Utility Impacts

The operation and maintenance for each of the project alternatives and HMFs could result in permanent relocation and extensions of utilities; reduced access to existing utilities in the project footprint; and increased demand for water, wastewater, and waste disposal services. None of the project alternatives would physically encroach on the footprint of water or wastewater treatment facilities, water pump stations, or power plants.

Impact PU&E#5 – Conflicts with Existing Utilities

Many utilities are within or cross the study area for the proposed HST and associated facilities, as listed in Tables 3.6-14 and 3.6-15 for high-risk and low-risk utilities, respectively. The proposed project would avoid, protect, or relocate potentially affected existing utility infrastructure. Pursuant to utility agreements negotiated between the Authority and the utility owners, the Authority would work with utility owners during final engineering design and construction of the project to relocate utilities or protect them in place. Where overhead distribution lines cross the HST alignment, the Authority and the utility owner may determine that it is best to place the line underground. In this case, the distribution line would be placed in a conduit. Where existing underground utilities, such as gas, petroleum, and water pipelines, cross the HST alignment, these affected utilities would be placed in a protective casing. The project construction contractor would coordinate schedules for utility relocations and protection-in-place with the utility owner to ensure the project would not result in prolonged disruption of services. If utilities cannot be relocated or modified within the construction footprint defined in Chapter 2, Alternatives, additional environmental analysis would be conducted, if necessary. In compliance with state law (California Government Code Section 4216), the construction contractor would use a utility locator service and manually probe for buried utilities within the construction footprint prior to initiating ground disturbing activities. This would avoid accidental disruption of utility services. Transmission lines between the transmission power supply stations and the existing substations would be improved or constructed aboveground to industry standards and would not substantially conflict with services provided using existing infrastructure. For these reasons, utility relocations to avoid conflicts with HST facilities would not noticeably affect residential and commercial utility customers. Therefore, the effect of the project on utility providers and their customers would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Table 3.6-14
Alternative Alignment Impacts: High-Risk Utilities

Design Option	Electrical Lines	Natural Gas Distribution Lines	Petroleum and Fuel Pipelines	Electrical Substations
BNSF Alternative	51	52	25	1
Impacts for Other Alternative Alignments[a]				
Hanford West Bypass 1	-3	-1	0	1
Hanford West Bypass 1 Modified	-3	0	0	2
Hanford West Bypass 2	-3	-1	0	0
Hanford West Bypass 2 Modified	-3	0	0	1
Corcoran Elevated	0	0	0	0
Corcoran Bypass	+3	-5	0	0
Allensworth Bypass	0	-1	0	0
Wasco-Shafter Bypass	+2	+2	+4	0
Bakersfield South	+8	+2	+1	0
Bakersfield Hybrid	+8	+2	+2	0
Range of Impacts[b]	**48–64**	**45–56**	**25-31**	**0-3**
Station Area				
Fresno Station	0	1	1	0
Kings/Tulare Regional Station–East	1	2	0	0
Kings/Tulare Regional Station–West	0	2	0	1
Bakersfield Station - North	3	1	1	0
Bakersfield Station - South	3	1	1	0
Bakersfield Station - Hybrid	3	1	1	0
Range of Impacts for Station Areas[c]	**3–4**	**2–4**	**2**	**0-1**
HMF Site Alternatives				
Fresno Works–Fresno	0	1	0	0
Kings County–Hanford	1	0	0	0
Kern Council of Governments–Wasco	0	0	0	0

Table 3.6-14
Alternative Alignment Impacts: High-Risk Utilities

Design Option	Electrical Lines	Natural Gas Distribution Lines	Petroleum and Fuel Pipelines	Electrical Substations
Kern Council of Governments–Shafter East	1	0	1	0
Kern Council of Governments–Shafter West	0	0	0	0
Total Impacts for HMF Sites	**2**	**1**	**1**	**0**

[a] The number of impacts for each of the other alternative alignments is expressed in terms of additional (+) or fewer (-) impacts compared with the BNSF Alternative.

[b] The total range of impacts for each utility was calculated by adding the number of impacts for the overall alignment option with the lowest and highest number of impacts respectively.

[c] The lower range of impacts for station areas was calculated by adding the number of impacts for the Fresno and Bakersfield stations; the higher range was calculated by adding the number of impacts for all three stations.

Table 3.6-15
Alternative Alignment Impacts: Low-Risk Utilities

Design Option	Communi-cations Facilities	Irrigation Canals	Water Lines	Sewers	Stormwater Retention Ponds	Stormwater Pipelines
BNSF Alternative	0	13	137	68	2	87
Impacts for Other Alternative Alignments[a]						
Hanford West Bypass 1	0	+2	+7	+1	+2	+4
Hanford West Bypass 1 Modified	0	+2	+7	+1	+2	+4
Hanford West Bypass 2	0	+2	+7	+1	+2	+4
Hanford West Bypass 2 Modified	0	+2	+7	+1	+2	+4
Corcoran Elevated	+1	0	0	0	0	0
Corcoran Bypass	0	0	-15	-4	0	-4
Allensworth Bypass	0	0	0	0	0	0
Wasco-Shafter Bypass	0	+1	-6	-1	0	-3
Bakersfield South	0	0	+12	+6	0	0
Bakersfield Hybrid	0	0	-44	+5	0	0
Range of Impacts[b]	**0–1**	**13–16**	**100–156**	**63–75**	**2–4**	**80–84**

Table 3.6-15
Alternative Alignment Impacts: Low-Risk Utilities

Design Option	Communi-cations Facilities	Irrigation Canals	Water Lines	Sewers	Stormwater Retention Ponds	Stormwater Pipelines
Station Areas						
Fresno Station	0	0	24	19	0	48
Kings/Tulare Regional Station–East	0	0	0	0	0	0
Kings/Tulare Regional Station–West	0	0	2	2	0	0
Bakersfield Station - North	0	0	0	16	0	0
Bakersfield Station - South	0	0	0	16	0	0
Bakersfield Station - Hybrid	0	0	0	16	0	0
Range of Impacts for Station Areas[c]	**0**	**0**	**24**	**35**	**0**	**48**
HMF Site Alternatives						
Fresno Works–Fresno	0	0	3	0	0	1
Kings County–Hanford	0	0	0	0	0	0
Kern Council of Governments–Wasco	0	1	1	0	0	0
Kern Council of Governments–Shafter East	0	0	0	0	0	0
Kern Council of Governments–Shafter West	0	0	0	0	0	0
Total Impacts for HMF Sites	**0**	**1**	**4**	**0**	**0**	**1**

[a] The number of impacts for each of the other alternative alignments is expressed in terms of additional (+) or fewer (-) impacts compared with the BNSF Alternative.
[b] The total range of impacts for each utility was calculated by adding the number of impacts for the overall alignment options with the lowest and highest number of impacts, respectively.
[c] The lower range of impacts for station areas was calculated by adding the number of impacts for the Fresno and Bakersfield stations; the higher range was calculated by adding the number of impacts for all three stations.
Acronym:
HMF = heavy maintenance facility

The HST may conflict with existing stormwater retention ponds and basins; without taking the appropriate measures to reduce these conflicts, this is potentially an impact with moderate intensity under NEPA, and a significant impact under CEQA. However, the Authority will replace any stormwater basin capacity lost through HST construction. Preliminary engineering has established the feasibility of either avoiding impacts on existing stormwater basins, or relocating the stormwater basins within the HST construction footprint. If, during third-party negotiations and final design, it is determined that stormwater basin capacity cannot be relocated or modified within the construction footprint defined in Chapter 2, Alternatives, additional environmental analysis would be conducted, if necessary. Because any loss in capacity at the existing retention ponds would be restored within the existing utility footprint, as feasible, or the HST alignment would be modified to avoid impacts, the impact would be reduced to a level of negligible intensity for the local context under NEPA, and to a less-than-significant impact under CEQA.

The proposed HST construction footprint would not overlap with or displace the three substations in the study area owned by Southern California Edison and PG&E. Adjacent lines leading into the substations are within the HST construction footprint and may result in an indirect conflict with each substation. Where the alignments would conflict with an existing electrical substation's ancillary infrastructure, and without taking the appropriate measures to reduce these conflicts, there is a potential for an impact with substantial intensity under NEPA, and for a significant impact under CEQA.

It is anticipated that utilities can be relocated and modified within the construction footprint defined in Chapter 2, Alternatives.

Impact PU&E#6 – Reduced Access to Existing Utilities in the HST Right-of-Way

The HST right-of-way would be fenced and secured after construction. Any underground utilities that conflict with the HST right-of-way would be relocated or reinforced underneath the HST right-of-way inside a casing pipe that is strong enough to carry the HST System facilities and allow for utility maintenance access from outside the HST right-of-way. Underground wet utilities, such as water, sewer, storm drains, gas, and petroleum lines, are conveyed inside a pipeline material with a service life typically of 50 years or more. Dry utilities, such as electrical, fiber optics, and telephone lines, are encased in a durable pipeline—for example, one made of steel—that protects the dry utilities from deterioration and also has a service life of 50 years or more. If the utility conveyance pipeline were in need of repair or replacement, the casing pipe would stay in place so that HST operations could continue. It is common practice that utility districts coordinate and schedule in advance any field visits to their facilities with the owner of the property within which their facilities lie. With implementation of these standard engineering and utility access practices, in addition to the casing and maintenance access requirements of utilities located underneath HST right-of-way, reduced access to existing utility lines would result in an impact with negligible intensity under NEPA. Under CEQA, the impact would be less than significant.

Impact PU&E#7 – Effects from Upgrade or Construction of Power Lines

The HST System would use an electrified line with traction power for electric vehicles. Electricity would be supplied and distributed by a 2 x 25-kV autotransformer power supply system and an overhead contact system (Authority 2009). The HST System would connect to existing substations (see Chapter 2, Alternatives). Establishing connections to existing substations may require the upgrade of the substations, the upgrade of existing transmission lines, or construction of new overhead lines. The details of the specific equipment and location of these additional utility actions have not been designed. When electrification of the system is engineered, PG&E would assess the need to alter the existing transmission lines. The Authority would assist utility providers in complying with CPUC General Order 131-D, including the need for follow-on design and environmental review for transmission line upgrades or construction as part of the CPUC permit application and prior to construction.

High-Speed Train Alternatives Analysis

The BNSF Alternative and each alignment and bypass alternative are analyzed, along with proposed HST station and HMF site alternatives, for potential conflicts with existing utility infrastructure, such as utility transmission and service corridors or substations. Table 3.6-14 shows the number of high-risk utilities that could be affected by each alternative; similarly, Table 3.6-15 shows the number of low-risk utilities that could be affected. Further discussion of these impacts by each type of utility is also provided below for each alternative.

Impact PU&E#8 – Potential Conflicts with Electrical Facilities

BNSF Alternative. Table 3.6-14 identifies the number of high-risk potential conflicts between existing utility facilities and the BNSF Alternative and its associated station areas and HMF site alternatives. The BNSF Alternative would affect 51 transmission lines, 50 of which are owned by PG&E, and 1 of which is owned by SCE. The Authority would work with PG&E and SCE during final engineering design and construction of the HST to relocate these transmission lines or protect them in place. Where electrical distribution lines cross the HST alignment, the Authority and the utility owner may determine that it is best to place the line underground. In this case, the line would be placed in a conduit so that future maintenance of the line could be accomplished outside of the HST right-of-way.

In the event that an electrical distribution line must be relocated, the relocation would be done in coordination and cooperation with the utility owner, so that the relocation would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. Electrical lines between the transmission power substations and the existing substations would be constructed aboveground and to industry standards, and would not conflict with existing infrastructure. For this reason, the effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 1 and Bypass 1 Modified Alternatives. The Hanford West Bypass 1 alternatives would reduce the number of transmission line conflicts by three, but would conflict with ancillary components adjacent to an electrical substation. The ancillary components of the substation potentially affected, at the minimum, are roadside utility poles and local distribution lines leading to the substation, which could require relocation. The substation would not be altered or displaced. Relocation of ancillary components would be done in coordination with the utility owners to minimize disruption of service. The effect of relocating ancillary components connected to a substation would have moderate intensity under NEPA, and a potentially significant impact under CEQA.

Hanford West Bypass 2 and Bypass 2 Modified Alternatives. The Hanford West Bypass 2 alternatives would reduce the number of transmission line conflicts by three, and would not conflict with any electrical substation. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Elevated Alternative. The Corcoran Elevated Alternative would have the same impact on electrical transmission lines as the corresponding section of the BNSF Alternative. The local effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Bypass Alternative. The Corcoran Bypass Alternative would cross three more PG&E transmission lines than the corresponding section of the BNSF Alternative. The number and type of transmission line conflicts under this alternative would not result in a noticeable change from existing conditions. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Allensworth Bypass Alternative. The Allensworth Bypass Alternative would have the same impact on electrical transmission lines and facilities as would the corresponding section of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Wasco-Shafter Bypass Alternative. The Wasco-Shafter Bypass Alternative would have two more impacts on transmission lines and facilities than would the corresponding section of the BNSF Alternative. The number and type of transmission line conflicts under this alternative are not result in a noticeable change from existing conditions. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield South Alternative. The Bakersfield South Alternative would have eight more impacts on transmission lines and facilities than would the corresponding section of the BNSF Alternative. The number and type of transmission line conflicts under this alternative would not result in a noticeable change from existing local conditions. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield Hybrid Alternative. The Bakersfield Hybrid Alternative would have eight more impacts on transmission lines and facilities than would the corresponding section of the BNSF Alternative. The number and type of transmission line conflicts under this alternative would not result in a noticeable change from existing local conditions. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

HST Station Facilities. Three high-risk PG&E power transmission lines would be displaced due to any the proposed Bakersfield Station alternatives. Construction of the Kings/Tulare Regional Station–West Alternative would not increase the number of conflicts with a PG&E transmission line. One PG&E power transmission line would be displaced as a result of the Kings/Tulare Regional Station–East Alternative. The number and type of transmission line conflicts under this alternative would result in a noticeable change from existing conditions. No power plants or power substations would be directly affected by the proposed HST station alternatives. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Heavy Maintenance Facility Site Alternatives. None of the HMF alternatives in the Fresno to Bakersfield Section would conflict with existing electrical transmission lines and facilities; therefore, no impact would result.

Impact PU&E#9 – Potential Conflicts with Natural Gas Lines (High Pressure)

BNSF Alternative. Table 3.6-14 identifies the number of high-risk potential conflicts between existing natural gas lines and the BNSF Alternative and associated station areas. As shown in the table, the BNSF Alternative would conflict with 52 natural gas lines. No fixed facilities or structures would be affected. The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility pipes. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 1 and Bypass 1 Modified Alternatives. The Hanford West Bypass 1 would conflict with one fewer natural gas line than would the corresponding section of the BNSF Alternative. However, the Hanford Bypass 1 Modified Alternative would have the same number of conflicts with natural gas lines as the BNSF Alternative. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to public natural-gas utilities. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 2 and Bypass 2 Modified Alternatives. The Hanford West Bypass 2 would conflict with one fewer natural gas line than would the corresponding section of the BNSF Alternative. The Hanford West Bypass 2 Modified Alternative would have the same number of conflicts with natural gas lines as the BNSF Alternative. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to public natural-gas utilities. The effect would have negligible intensity under NEPA, and the impact would be less than significant under CEQA.

Corcoran Elevated Alternative. The Corcoran Elevated Alternative would not conflict with any natural gas lines; therefore, no impact would result.

Corcoran Bypass Alternative. The Corcoran Bypass Alternative would conflict with five fewer natural gas lines than would the corresponding section of the BNSF Alternative. The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public natural-gas utilities. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Allensworth Bypass Alternative. The Allensworth Bypass Alternative would have one fewer impact on natural gas pipelines than would the corresponding section of the BNSF Alternative. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public natural-gas utilities. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Wasco-Shafter Bypass Alternative. The Wasco-Shafter Bypass Alternative would affect two more natural gas pipelines than would the corresponding section of the BNSF Alternative. The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield South Alternative. The Bakersfield South Alternative would affect two more natural gas pipelines than would the BNSF Alternative. The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield Hybrid Alternative. The Bakersfield Hybrid Alternative would affect two more natural gas pipelines than the corresponding section of the BNSF Alternative. The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to public natural-gas utilities. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

HST Station Facilities. One potential conflict with a local PG&E high-pressure natural gas distribution line would occur as a result of the proposed Fresno Station Alternative. Conflict with one local natural gas distribution line would occur as a result of the Kings/Tulare Regional Station–West Alternative. Conflict with two local Sempra natural gas distribution lines would occur as a result of the Kings/Tulare Regional Station–East Alternative. One conflict with a PG&E interstate natural gas line would occur at all of the Bakersfield Station alternatives.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Heavy Maintenance Facility Site Alternatives. None of the HMF alternatives in the Fresno to Bakersfield Section would conflict with existing electrical transmission lines; therefore, no impact would result.

Impact PU&E#10 – Potential Conflicts with Petroleum and Fuel Pipelines

BNSF Alternative. Table 3.6-14 identifies the number of high-risk potential conflicts between existing petroleum and fuel pipelines and the BNSF Alternative and associated station areas. The BNSF Alternative would conflict with 25 petroleum and fuel pipelines. The Fresno and Bakersfield stations would also conflict with Kinder Morgan refined oil pipelines. However, no fixed petroleum and fuel facilities or structures would be affected. The Authority would work with pipeline owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 1 and Bypass 1 Modified Alternatives. The Hanford West Bypass 1 alternatives would have the same impact on petroleum and fuel pipelines as would the corresponding section of the BNSF Alternative. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to petroleum and fuel pipelines. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 2 and Bypass 2 Modified Alternatives. The Hanford West Bypass 2 alternatives would have the same impact on petroleum and fuel pipelines as would the corresponding section of the BNSF Alternative. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to petroleum and fuel pipelines. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Elevated Alternative. The Corcoran Elevated Alternative would have the same impact on petroleum and fuel pipelines as would the corresponding section of the BNSF Alternative. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to petroleum and fuel pipelines. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Bypass Alternative. The Corcoran Bypass Alternative would have the same impact on petroleum and fuel pipelines as would the corresponding section of the BNSF Alternative. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to petroleum and fuel pipelines. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Allensworth Bypass Alternative. The Allensworth Bypass Alternative would have the same impact on petroleum and fuel pipelines as would the corresponding section of the BNSF Alternative. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to petroleum and fuel pipelines. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Wasco-Shafter Bypass Alternative. The Wasco-Shafter Bypass Alternative would conflict with four more petroleum and fuel pipelines than would the corresponding section of the BNSF Alternative. The Wasco-Shafter Bypass would avoid an oil storage tank facility. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield South Alternative. The Bakersfield South Alternative would conflict with one more petroleum and fuel pipeline than the corresponding section of the BNSF Alternative. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to petroleum and fuel pipelines. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield Hybrid Alternative. The Bakersfield Hybrid Alternative would conflict with two more petroleum and fuel pipelines than the corresponding section of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

HST Station Facilities. One potential conflict with a Kinder Morgan refined oil pipeline would occur due to the proposed Fresno Station Alternative. No conflict would occur due to the proposed Kings/Tulare Regional Station–West or the Kings/Tulare Regional Station–East Alternative. One conflict would occur with a Kinder Morgan refined oil line at all of the proposed Bakersfield Station alternatives.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Heavy Maintenance Facility Site Alternatives.

An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing petroleum and fuel pipelines; therefore, no impact would result.

Impact PU&E#11 – Potential Conflicts with Water Facilities

BNSF Alternative. Table 3.6-15 identifies the number of low-risk potential conflicts between the BNSF Alternative and associated station areas and existing water facilities. The BNSF Alternative would cross at least 137 water lines, valves, pumps/hydrants, irrigation pipelines, and 13 canals. The majority of these crossings would be in the city of Fresno and other urban areas where the HST would be on an elevated guideway. Because the guideway would be elevated in these areas, it is likely that disturbance to these water facilities would be avoided during final engineering design for the specific placement of columns. However, there may be some locations where it would be necessary to relocate these water facilities. The Authority would work with the appropriate city public works department to relocate affected lines and water facilities away from HST support columns. Therefore, the project would not result in prolonged disruption of services, or the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

In the rural portion of the Fresno to Bakersfield Section, the project would cross irrigation pipelines and canals. The Authority would work with irrigation districts and landowners to protect these irrigation systems and where relocating an irrigation facility is necessary, the Authority shall ensure that where feasible the new facility is operational prior to disconnecting the original facility to help alleviate the potential for service interruptions. Canals may be bridged or placed in pipelines beneath the HST right-of-way. Irrigation pipelines crossing the alignment would be buried to an appropriate depth to sustain the weight of the HST, and would be placed in protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The BNSF Alternative would not result in prolonged disruption of services because of the need for relocation of or improvements to irrigation systems. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 1 and Bypass 1 Modified Alternative. The Hanford West Bypass 1 alternatives would conflict with seven more water lines than would the BNSF Alternative. The project under this alternative would not result in prolonged disruption of services, or the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 2 and Bypass 2 Modified Alternatives. The Hanford West Bypass 2 alternatives would conflict with seven more water lines than would the BNSF Alternative. The project under this alternative would not result in prolonged disruption of services, or the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Elevated Alternative. The Corcoran Elevated Alternative would conflict with the same number of water lines as would the BNSF Alternative. The project under this alternative would not result in prolonged disruption of services, or in the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Bypass Alternative. The Corcoran Bypass Alternative would conflict with 15 fewer City of Corcoran water lines than would the BNSF Alternative. The Authority would work with the City of Corcoran Public Works Department to relocate affected lines and water facilities away from HST support columns where these facilities cannot be avoided. The project would not result in prolonged disruption of services, and would not result in the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Allensworth Bypass Alternative. The Allensworth Bypass Alternative would not conflict with known water facilities; therefore, no impact would result.

Wasco-Shafter Bypass Alternative. The Wasco-Shafter Bypass Alternative would have six fewer conflicts with the City of Wasco water system but would conflict with one more irrigation pipeline (owned by the Shafter-Wasco Irrigation District) than would the BNSF Alternative. The Authority would work with the Shafter-Wasco Irrigation District, as well as any other irrigation districts affected by the project, to protect irrigation systems. Canals may be bridged or placed in pipelines beneath the HST right-of-way. Irrigation pipelines crossing the alignment would be buried within protective casing so they could be accessed from outside of the HST. Therefore, the Wasco-Shafter Bypass Alternative would not result in prolonged disruption of services because of the need for relocation of or improvements to irrigation systems. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield South Alternative. The Bakersfield South Alternative would have 12 more impacts on water facilities than would the BNSF Alternative. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public water utilities. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield Hybrid Alternative. The Bakersfield Hybrid Alternative would have 44 fewer impacts on water facilities than would the BNSF Alternative. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public water utilities. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

HST Station Facilities. Twenty-four potential conflicts with local City of Fresno water distribution lines would occur due to the proposed Fresno Station alternative. No conflicts with water facilities or infrastructure would occur due to either of the proposed Kings/Tulare Regional Station alternatives or the proposed Bakersfield Station alternatives.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Operational Supply Demand

The estimated existing water use based on land use and anticipated project water demand are presented in Table 3.6-16 for each area proposed for a HST station. The proposed Fresno and Bakersfield station alternatives are currently supplied with treated municipal water from the City of Fresno Water Division and the California Water Service Company, respectively. For the proposed Kings/Tulare Regional Station–East Alternative location, the majority of the affected area (99.9%) is within agricultural use and served by agricultural water districts. For the Kings/Tulare Regional Station–West Alternative location, the majority of the area is undeveloped and served by the City of Hanford.

To estimate the existing water use at the proposed Fresno and Bakersfield station locations, land use for each parcel was identified. The proposed station footprint on these parcels was overlain to identify affected land use classifications. Water use factors for each affected land use classification were applied to estimate current water usage for each station location, based on water use factors summarized in Appendix 3.6-B, Technical Memorandum: Water Usage Analysis for the California HST Fresno to Bakersfield Section.

The Fresno Station, the Kings/Tulare Regional Station-West, and Bakersfield Station alternatives would use water from the municipal systems of Fresno, Hanford, and Bakersfield, respectively. The Kings/Tulare Regional Station–West Alternative is partially within the City of Hanford city limits and is within the City of Hanford's sphere of influence. The Kings/Tulare Regional Station–East Alternative is immediately outside of Hanford's sphere of influence. The Authority would seek to connect the Kings/Tulare Regional Station-West to the Hanford water system as part of this project. Based on the current water supply capacity and distribution system for Hanford, the water for the Kings-Tulare Regional Station-East would be provided by a groundwater well at the station site.

Table 3.6-16
Estimated Existing Water Use and Anticipated Project Water Demand at Proposed High-Speed Train Stations for the Fresno to Bakersfield Section

Proposed Station	Existing Water Use (gpd)	Project Water Demand (gpd)*
Fresno Station	35,000	42,000
Kings/Tulare Regional Station West	131,000	16,500
Kings/Tulare Regional Station East	71,000	16,500
Bakersfield**	42,000	46,000

gpd = gallons per day

*Water demand estimated based on a per capita use for each station alternative (see Appendix 3.6-B, Technical Memorandum: Water Usage Analysis for California HST Fresno to Bakersfield Section).

**The most conservative method used to estimate water demand is for the Bakersfield Station alternatives (see Appendix 3.6-B, Technical Memorandum: Water Usage Analysis for California HST Fresno to Bakersfield Section).

The water supplies for the cities of Fresno, Hanford, and Bakersfield are adequate to meet projected demand during normal water years through 2030 (City of Fresno 2008a; City of Hanford 2006; City of Bakersfield 2007). Like many communities throughout California, increased conservation measures are encouraged by local agencies and service providers in Fresno and Bakersfield to reduce water demand, particularly during multiple drought years. Because Hanford uses only groundwater for its supply, the community does not project supply deficiencies through 2030, even in drought years (City of Hanford 2006). In addition, local water-use efficiency goals mandated statewide under SB x7-7, the Water Conservation Act, would partially offset the additional water demand expected from the HST station operation. As indicated in Table 3.6-16, the proposed Fresno and Bakersfield stations would demand more water than existing water uses; the Kings/Tulare Regional Station alternatives would result in less water demand. The Fresno and Bakersfield Station areas would be served by each of their respective municipal water supply agencies. The Fresno station location is within the study area of the 2010 Fresno Urban Water Management Plan (FUWMP). This plan projects that total water supply for the City of Fresno from all sources will be 252,700 ac-ft/yr by 2015 and 308,700 ac-ft/yr by 2035. By comparison, the proposed Fresno Station would require an estimated 39 ac-ft/yr. Similarly, the Bakersfield District 2010 Urban Water Management Plan has a supply of 85,257 ac-ft/yr during a normal season to meet water demand within the City of Bakersfield study area. By comparison, the proposed Bakersfield Station would require an estimated 38 ac-ft/yr. Because the water demand increase that would be used relative to available supply, the proposed HST stations would not require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

The Kings/Tulare Regional Station–East Alternative is immediately outside of Hanford's primary sphere of influence (SOI) and within a secondary SOI defined in the adopted Kings County General Plan (Kings County 2010a). It is also outside the City of Hanford's 2010 Urban Water Management Plan (UWMP) Ultimate Growth Boundary. Since existing 12-inch-diameter water pipelines do not support sustained flows adequate for firefighting in eastern portions of the city of Hanford, a well would be installed within the proposed HST project footprint to supply the station. As indicated in Table 3.6-16, the proposed Kings/Tulare Regional Station alternatives would result in less water demand than existing conditions, and the increase in water demand for the Fresno and Bakersfield stations over existing conditions would be less than 0.05% of the available supply. For these reasons, new or expanded entitlements to water would not be needed to supply the project. As discussed in Impact HWR#7 in Section 3.8.5.3, a well at the Kings-Tulare Regional Station-East would drawdown the groundwater table less than 6 inches at a distance of 100 feet from the pumping well. This would not affect water production from groundwater wells on properties outside of the station site. Overall, the effect on water supply would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Heavy Maintenance Facility Site Alternatives. An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing water facilities, pipelines, and related infrastructure. The Authority would work with irrigation districts and landowners to protect pipelines, ditches, and related irrigation systems. Where relocating irrigation infrastructure is necessary, the Authority shall ensure that where feasible the new system is operational prior to disconnecting the original system to help alleviate the potential for service interruptions. Canals may be bridged or placed in pipelines beneath the HST right-of-way. Irrigation pipelines crossing the HST would be either re-routed or buried and placed in protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The BNSF Alternative would not result in prolonged disruption of services because of the need for relocation of or improvements to irrigation systems. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Operational Water Supply Demand

The water demand estimate for an HMF is based on water use data from a comparable facility operated by BART in Hayward, California, and considers water used for industrial operations, landscaping, and train washing. Wash water is assumed to be reused at a rate of approximately 60% with the implementation of an onsite recycling system. Daily water use is estimated at 30 gallons per employee. Assuming that an HMF employs 1,500 individuals, the annual water demand of the facility would be approximately 17 million gallons, or 52 acre-feet.

The HMF alternative sites are largely agricultural properties served by local water irrigation districts. A summary of existing water use and known sources is described below and discussed further in Appendix 3.6-B, Technical Memorandum: Water Usage Analysis for CHST Fresno to Bakersfield Section.

The Fresno Works–Fresno HMF site is located in Fresno County. The site is mainly agricultural (51%), with substantial areas of industrial (21%) and institutional (12%) land uses. Single-family residential, commercial, roadways/right-of-way/no data, and unknown land uses each comprise less than 10% of the HMF site area. The City of Fresno provides water to only two land parcels totaling around 10 acres. The remaining agricultural properties in the potentially affected 586-acre area are served by the Fresno Irrigation District.

Over 98% of the 511-acre area potentially affected by the Kings County–Hanford HMF Site is used for agriculture. Industrial uses, roadways and other rights-of-way comprise the balance of the study area. Surface water for agricultural uses is largely provided by the Lakeside Irrigation Water District. Kings County Water District also provides water to numerous private ditch companies, which then distribute water to connected landowners. These surface water sources are augmented by agricultural landowners by the use of unmetered groundwater withdrawals.

Nearly 98% of the prospective 415-acre Kern Council of Governments–Wasco HMF site is used for agriculture. The northern portion of the potentially affected area is within the Wasco-Shafter Irrigation District, and the southern portion is within the North Kern Water Storage District (NKWSD). Groundwater is also used by agricultural users to supplement these surface water suppliers. A small portion of the potentially affected HMF site area is served by the City of Wasco municipal water supply.

Over 97% of the prospective 495-acre Kern Council of Governments–Shafter East HMF site is used for agriculture, almost entirely as almond tree orchards. Approximately 4 acre-feet/acre/year of water is used for almond orchards in this area; thus, total annual water use for the potentially affected HMF site after considering all land use categories is approximately 1,955 acre-feet/year. Surface water supplied by the NKWSD and SWID is used for approximately one-quarter of the overall agricultural demand; the remainder is supplied by groundwater wells.

Over 97% of the prospective 476-acre Kern Council of Governments–Shafter West HMF Site is in agricultural use, also almost entirely as almond tree orchards. Approximately 4 acre-feet/acre/year of water is used for almond orchards in this area; thus, total annual water use for the potentially affected HMF site after considering all land use categories is approximately 1,883 acre-feet/year. Surface water supplied by the NKWSD and SWID is used for approximately one-quarter of the overall agricultural demand; the remainder is supplied by groundwater wells.

The projected water demand of 52 acre-feet per year would amount to a reduced water demand at all of the HMF sites, resulting in a reduced rate of drawdown within affected aquifers. To the extent that 52 acre-feet per year is an increase in groundwater pumping compared to current levels, additional aquifer drawdown could occur. However, as discussed in Section 3.8, Hydrology and Water Resources, drawdown effects would be negligible. No entitlements are necessary to pump groundwater. The effect of operation of the HMF on water supply would have negligible intensity under NEPA. The impact would be less than significant under CEQA.

Based on the capacity and existing use of water in each of the areas proposed for HMFs, operation of these facilities would result in a negligible impact on water supply in the study area. The effect would have negligible intensity under NEPA. The impact would be less than significant under CEQA.

Impact PU&E#12 –Effects to Wastewater Facilities

HST System operations would generate wastewater at the HST stations and the HMF. The following sections describe impacts on existing water treatment facilities and infrastructure. Overall, these effects would have negligible intensity under NEPA. The impact would be less than significant under CEQA because no additional wastewater treatment facility is needed.

BNSF Alternative. Table 3.6-15 identifies the number of low-risk potential wastewater pipeline conflicts (approximately 68) that would occur with the BNSF Alternative and project stations. These conflicts would be in the cities of Fresno, Corcoran, Wasco, and Bakersfield where portions of the HST would be on both an elevated guideway and at-grade. In areas where the HST route would be elevated, it is likely that disturbance to these pipelines would be avoided during final engineering design for the specific placement of columns. However, there may be some locations where it would be necessary to relocate wastewater pipelines. As part of the project design, the Authority would work with the appropriate city public works department to relocate affected lines away from HST support columns and schedule relocations to minimize service disruptions. Therefore, the project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility pipes. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 1 and Bypass 1 Modified Alternatives. The Hanford West Bypass 1 alternatives would conflict with one more wastewater/sewer line than would the BNSF Alternative. The project would not result in prolonged disruption of wastewater services and would not result in the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 2 and Bypass 2 Modified Alternatives. The Hanford West Bypass 2 alternatives would conflict with one more wastewater/sewer line than would the BNSF Alternative. The project would not result in prolonged disruption of wastewater services, and would not result in the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Elevated Alternative. The Corcoran Elevated Alternative would conflict with the same number of existing wastewater/sewer lines as would the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The project would not result in prolonged disruption of wastewater services, and would not result in the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Bypass Alternative. The Corcoran Bypass Alternative would conflict with four fewer wastewater/sewer lines than would the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The project would not result in prolonged disruption of wastewater services, and would not result in the loss of or reduced access to public utility pipes. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Allensworth Bypass Alternative. The Allensworth Bypass Alternative would conflict with the same number of existing wastewater/sewer lines as would the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The project would not result in prolonged disruption of wastewater services, and would not result in the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Wasco-Shafter Bypass Alternative. The Wasco-Shafter Bypass Alternative would conflict with fewer existing wastewater/sewer line than would the BNSF Alternative. The impacts of this alternative alignment would be similar to or less than those of the BNSF Alternative. The project would not result in prolonged disruption of wastewater services, and would not result in the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield South Alternative. The Bakersfield South Alternative would affect six more wastewater/sewer lines than would the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield Hybrid Alternative. The Bakersfield Hybrid Alternative would affect five more wastewater/sewer lines than would the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The project would not result in prolonged disruption of wastewater services, and would not result in the loss of or reduced access to public utility pipes. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

HST Station Facilities. Nineteen potential low-risk conflicts with local City of Fresno sewer collection lines would occur due to the proposed Fresno Station. Sixteen potential low-risk conflicts with local City of Bakersfield sewer collection lines would occur due to the proposed

Bakersfield Station. Two potential conflicts with wastewater/sewer infrastructure would occur with the Kings/Tulare Regional Station–West Alternative. No conflicts with wastewater/sewer facilities or infrastructure would occur with the proposed Kings/Tulare Regional Station–East Alternative.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Operational Wastewater Service Demand

Wastewater generated at each HST station is estimated in Table 3.6-17. These estimates are based on station uses defined for domestic water consumption (i.e., a mix of concourse, office, parking structure, outdoor car park, and platform). Sewage generation is assumed to be 50% of the domestic water demand generated by the number of estimated station users in occupied areas, such as the concourse, offices, parking structure, outdoor car parking, and HST platform.

Table 3.6-17
Estimated Project Wastewater (Sewage) Generated for Each High-Speed Train Station

Station Alternatives	Estimated Sewage Generation (gallons/day)
Fresno Station	23,100
Kings/Tulare Regional Station–East	9,100
Kings/Tulare Regional Station–West	9,100
Bakersfield Station Alternatives (including Bakersfield Hybrid Station)	25,300

As indicated in Table 3.6-5, wastewater treatment capacity in Fresno, Hanford, and Bakersfield exceeds the average daily volume of wastewater that is treated at each respective facility by the following amount:

- Fresno: 12 mgd.
- Hanford: 2.5 mgd.
- Bakersfield: 10.5 mgd.

HST System operations would generate wastewater at the HST stations and the HMF. The volume of wastewater produced by the proposed HST stations represents 0.2% of the current excess capacity of the Fresno and Bakersfield treatment facilities, and between 0.1% and 1% of the Hanford treatment capacity. The population in these communities is projected to grow over the next 20 years, and treatment capacity will need to be expanded to meet the demand of that growing population. However, the volume of wastewater generated at the proposed HST stations would not result in inadequate capacity to serve the project's anticipated demand in addition to the existing sewer service demand. The Kings/Tulare Regional Station–East Alternative is immediately outside of Hanford's primary SOI. The proposed route for wastewater utility lines would extend from the Kings/Tulare Regional-East station south along the proposed HST right-of-way to Lacey Boulevard and then west on Lacey Boulevard to existing sewer infrastructure. Construction of the infrastructure would occur within the existing right-of-way and require a temporary right-of-way acquisition along Lacey Boulevard. Following an expansion of the city's SOI, the proposed Kings/Tulare Regional Station-East site would be annexed by the city for the purpose of extending wastewater service. The Authority would coordinate with the City of Hanford for the construction of adequate wastewater infrastructure and pay its fair share of the impact fee for any improvements to the city's sewer system (including the new trunk line in 9th Avenue and a lift station). Effects on existing water treatment facilities would have negligible intensity under NEPA, and impacts would be less than significant under CEQA because there is sufficient capacity.

Heavy Maintenance Facility Site Alternatives. An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing wastewater infrastructure.

Where regional or municipal wastewater services are unavailable, the HMF would be served by an onsite wastewater treatment package plant for treatment of project-related wastewater. Treated wastewater from the package plant would be used for onsite irrigation. Sludge generated by the process would be removed onsite using aerobic digestion, a bacterial process occurring in the presence of oxygen. Under aerobic conditions, bacteria rapidly consume organic matter and convert it into carbon dioxide. These facilities are commonly used in rural regions of California to dispose of wastewater without causing impacts to surface water resources. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

The HMF would produce approximately 5.7 million gallons of wastewater annually (or approximately 15,600 gallons per day) requiring treatment. This volume represents less than 1% of the capacity of any of the wastewater treatment facilities in Atwater, Chowchilla, and Madera. Therefore, wastewater generated by the HMF is within the capacity of the regional wastewater treatment facilities. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Impact PU&E#13 – Effects on Storm Drain Facilities

As discussed in Section 3.8, Hydrology and Water Resources, the project would result in increases in stormwater runoff. The project design addresses stormwater volumes and flow requirements. During final design, an evaluation of each receiving stormwater system's capacity to accommodate project runoff would be conducted. As necessary, onsite stormwater management measures, such as detention or selected upgrades to the receiving system, would be included in the design to provide adequate capacity. Project stormwater pipelines and ditches would be sized to convey runoff from the 25-year storm in rural areas and the 50-year storm in urban areas (Authority 2011). Measures such as onsite retention, infiltration basins, and detention ponds would be used to maintain offsite stormwater discharge in compliance with the General Construction Stormwater Permit issued by the State Water Resources Control Board. Where a local agency requires a higher level of stormwater runoff control, the more stringent requirement would be applied to the project. In addition, stormwater best management practices (BMPs) would be applied to treat stormwater from pollutant-generating surfaces such as project parking lots, access roads, and public roads relocated due to the project (runoff from the at-grade tracks and elevated guideways would have minimal pollutants and would not need treatment). BMPs could include bioretention swales, grass filter strips, and infiltration and water quality ponds. More information on stormwater measures can be found in Section 3.8, Hydrology and Water Resources. The following sections describe impacts on existing storm drain facilities and infrastructure. Overall, the effects would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

BNSF Alternative. The BNSF Alternative would affect 87 storm drains, two infiltration or retention ponds, and one future storm pipe site in the Fresno Metropolitan Flood Control District. Where necessary, the Authority would work with utility owners to place affected storm drain lines underground in a protective casing so that they could be accessed without disturbance to the HST right-of-way. The BNSF Alternative would not affect their capacity or reliability. The BNSF Alternative would not result in prolonged disruption of stormwater conveyance networks or in the permanent loss of public storm drain infrastructure. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 1 and Bypass 1 Modified Alternatives. The Hanford West Bypass 1 alternatives would affect four more storm drain facilities than would the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 2 and Bypass 2 Modified Alternatives. The Hanford West Bypass 2 alternatives would affect four more storm drain facilities than would the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Elevated Alternative. The Corcoran Elevated Alternative would affect the same number of storm drain facilities as the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Bypass Alternative. The Corcoran Bypass Alternative would affect four fewer storm drain facilities than the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Allensworth Bypass Alternative. The Allensworth Bypass Alternative would not affect any additional storm drain facilities beyond those described in the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Wasco-Shafter Bypass Alternative. The Wasco-Shafter Bypass Alternative would affect three fewer storm drain facilities than the BNSF Alternative. The impacts of this alternative alignment would be similar to those of the BNSF Alternative. The effect would be of negligible intensity under NEPA. Impacts would be less than significant under CEQA.

Bakersfield South Alternative. The Bakersfield South Alternative would not affect any additional storm drain facilities beyond those described in the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield Hybrid Alternative. The Bakersfield Hybrid Alternative would not affect any additional storm drain facilities beyond those described in the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

HST Station Facilities. Table 3.6-6 identifies the number of storm drain facility conflicts within the study area along the alternative alignments and station areas. Forty-seven potential low-risk conflicts with Fresno Metropolitan Flood Control District storm pipes and manholes lines, and one manhole managed by another entity, would occur due to the proposed Fresno HST station. No conflicts with drainage facilities or infrastructure would occur due to the proposed Kings/Tulare Regional or the Bakersfield HST stations.

The Authority would work with utility owners to place affected lines underground in a protective casing so that future maintenance of the line could be accomplished outside of the HST right-of-way. The project would not result in prolonged disruption of services and would not result in the loss of or reduced access to public utility lines or pipes. The effect would have negligible intensity under NEPA; impacts would be less than significant under CEQA.

Heavy Maintenance Facility Site Alternatives. An HMF at any of the potential sites in the Fresno to Bakersfield Section would not conflict with existing stormwater infrastructure.

In summary, and as discussed in Section 3.8, Hydrology and Water Resources, stormwater runoff could increase and collect as a result of the project. The project design addresses stormwater volumes and flow requirements. During final design, engineering elements, such as project stormwater conveyance features and detention ponds, would be adequately sized and designed to meet the regulatory requirements, such as the General Construction Stormwater Permit issued by the State Water Resources Control Board, outlined in Section 3.8, Hydrology and Water Resources. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Impact PU&E#14 –Effects from Waste Generation during Operation

Project operation activities that would generate solid waste include passenger refuse disposal at stations and materials used for HST maintenance. Maintenance of the HST guideway would generate small amounts of wastes, which are included in the discussion of waste generation at the HMF. Under RCRA and AB 939, affected county or municipal solid waste disposal facilities are required to plan for non-hazardous solid waste facility expansions, or addition from all anticipated sources. The anticipated disposal of non-hazardous solid wastes to landfills due to HST operation would not alone trigger the need for new or expanded facilities beyond dates that disposal capacities affected facilities are currently projected to be reached.

The following sections describe impacts on existing solid waste facilities and infrastructure. Overall, effects on solid waste facilities would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

BNSF Alternative. The BNSF Alternative would not conflict with existing solid waste disposal facilities. No existing or proposed expansion areas for solid waste disposal would be affected by this alternative alignment. Solid waste would be generated by the operation and use of each of the HST stations in the Fresno to Bakersfield Section. As shown in Table 3.6-7, each of the affected counties have at least one existing solid waste disposal facility with adequate capacity beyond the date the project commences operation. The estimated closure dates for these facilities occur during the service life of the proposed California HST System. Under the California Integrated Waste Management Act of 1989 and AB 939, local jurisdictions are required to prepare annual plans for new or expanded solid waste disposal services before the estimated closure dates of the existing facilities. However, the need for new or expanded landfill capacity beyond currently projected closure dates would not occur solely due to operation of the Fresno to Bakersfield Section of the HST System. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 1 and Bypass 1 Modified Alternatives. The Hanford West Bypass 1 alternatives would have the same level of solid waste generated as the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Hanford West Bypass 2 and Bypass 2 Modified Alternatives. The Hanford West Bypass 2 alternatives would have the same level of solid waste generated as the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Elevated Alternative. The Corcoran Elevated Alternative would have the same level of solid waste generated as that anticipated under the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Corcoran Bypass Alternative. The Corcoran Bypass Alternative would have the same level of solid waste generated as that anticipated under the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Allensworth Bypass Alternative. The Allensworth Bypass Alternative would have the same level of solid waste generated as that anticipated under the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Wasco-Shafter Bypass Alternative. The Wasco-Shafter Bypass Alternative would have the same level of solid waste generated as that anticipated under the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would be of negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield South Alternative. The Bakersfield South Alternative would have the same level of solid waste generated as that anticipated under the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Bakersfield Hybrid Alternative. The Bakersfield Hybrid Alternative would have the same level of solid waste generated as that anticipated under the BNSF Alternative. The impacts of this alternative alignment would be the same as those of the BNSF Alternative. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

HST Station Facilities. Non-hazardous solid waste from the HST System in Fresno County would be disposed of (after recycling collection and diversion) at either of two operating solid waste disposal landfills: the American Avenue Landfill or the Coalinga Landfill. The estimated closure dates for these two landfills are 2031 and 2029, respectively. The American Avenue Landfill provides 2,200 tons per day disposal capacity, with 21.55 million cubic yards of remaining storage capacity in large permitted disposal areas to receive the estimated 1.13 tons per day from the proposed Fresno Station. The State CalRecycle program requires counties and municipalities to plan for and provide adequate solid waste disposal, along with meeting diversion goals (AB 939). However, if capacity is not expanded for use after these dates, the City of Clovis Landfill and landfills outside the county would be available. The estimated closure date for the City of Clovis Landfill is 2047.

The anticipated amount of nonhazardous solid waste for each HST Station is 0.48 ton per day (Kings/Tulare Regional Station–East and Kings/Tulare Regional Station–West), 1.13 tons per day (Fresno Station), and 1.30 tons per day (Bakersfield Stations, including the Bakersfield Hybrid Station alternative). These amounts are based on the anticipated station ridership per day, the average daily per capita residential disposal rate in California (factored by 0.2) (CalRecycle 2010b), and a recycling diversion rate of 65% for Californians in 2009 (CalRecycle 2010a). The recycling diversion factor estimates that 65% of waste is recycled and 35% is sent to the landfill after processing.

The Kings Waste Recycling Authority would transport the solid waste from the HST System in the Hanford area about 45 miles from its materials recovery facility (MRF) to the Kettleman Hills Landfill. The MRF has a maximum capacity of 800 tons per day, a capacity sufficient to serve the solid waste needs of the proposed Kings/Tulare Regional Station–West and the proposed Kings/Tulare regional Station–East alternatives. Similarly, delivery of 0.48 ton per day to the Chemical Waste Management Landfill, which is permitted to receive a maximum of 2,000 tons of municipal solid waste per day, and typically receives an average of only about 1,350 tons per day, would be adequate to serve the anticipated non-hazardous solid waste requirements of the proposed station during the life of the project. The estimated closure dates for the two operating landfills serving Tulare County are 2024 for the Visalia Landfill and 2026 for the Woodville Landfill. Approval is pending for the Woodville Landfill to be expanded to a “full solid waste” capacity, and for the closure date to be extended for this major facility.

For Kern County, all non-hazardous solid waste generated in the area of the proposed Bakersfield Station would be disposed of in landfills operated by Kern County, primarily the Bena Sanitary Landfill or the Shafter-Wasco Sanitary Landfill. The combined permitted daily disposal capacity of these two landfills is 5,388 tons/day. Bena Sanitary Landfill alone has a maximum permitted daily throughput of4,500 tons per day and a remaining capacity of 33,000 cubic yards; this capacity is considered adequate to support the 1.3 tons per day (worst-case) from any of the Bakersfield Station alternatives. The estimated closure date for the Bena Sanitary Landfill is 2038. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Heavy Maintenance Facility Site Alternatives. Activities at the HMF, including administrative (office) work, packaging of materials and equipment used for maintenance of the HST, and incidental waste from HMF employees, would generate solid waste, such as paper, cardboard, plastics, and other materials similar to household waste. Non-air-travel-related transportation businesses dispose of approximately 1.3 tons of waste per year (CalRecycle 2010a). Estimates indicate that the HMF, with up to 1,500 employees, would dispose of approximately 41,000 cubic yards of waste annually, representing less than 0.2% of estimated remaining landfill capacity provided in Tables 3.6-7, 3.6-8, and 3.6-9 for landfills in the area. Existing landfill capacity will either be adequate or sufficiently added to during the life of the project. The effect would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Impact PU&E#15 – Effects from Hazardous Waste Generation

As discussed in Chapter 3.10, Hazardous Materials and Wastes, routine maintenance of the HST Station and HMF facilities would produce small quantities of hazardous waste. Operation of the HMF would involve the use, storage, and disposal of hazardous materials and petroleum products associated with maintenance of HST equipment. Hazardous waste may consist of welding materials, fuel and lubricant containers, batteries, and paint and solvent residues and containers. All hazardous wastes would be handled, stored, and disposed of in accordance with applicable requirements, such as the Resource Conservation and Recovery Act (see Section 3.10, Hazardous Materials and Wastes). A certified hazardous waste collection company would deliver the waste to an authorized hazardous waste management facility for recycling or disposal. Landfills, such as Clean Harbors Westmorland Landfill in Imperial County, the Chemical Waste Management Kettleman Hills Landfill in Kings County, and permitted out-of-state landfills accept hazardous wastes. Because hazardous wastes could be disposed of at permitted landfills that have sufficient capacity, potential effects would have negligible intensity under NEPA, and impacts would be less than significant under CEQA.

Impact PU&E#16 – Energy Construction Period Impacts—Common Energy Impacts

During project construction, energy would be consumed to produce and transport construction materials. Operating and maintaining construction equipment would also consume energy resources. Energy used for the construction of track work, guideways, maintenance yards, stations, support facilities, and other structures would be a one-time, non-recoverable energy cost.

Energy consumption during construction of the Fresno to Bakersfield portion of the HST System depends on the characteristics of the alternative, particularly the length of elevated and at-grade guideway work. The energy consumption estimate for constructing the Fresno to Bakersfield Section is 7,930 billion Btu for the BNSF Alternative. Construction of the various other alternatives would range from approximately 550 billion Btu (7%) less, to 292 billion Btu (3.7%) greater, than the BNSF Alternative. Because the Fresno to Bakersfield Section would contribute approximately 14% to the HST energy demand and to the annual energy savings (i.e., approximately 5,278,000 to 7,910,000 MMBtu/day, depending upon the fare scenario), the payback period for energy consumed during construction would be approximately 2 to 4 years of full project operations (i.e., because the project will remove more energy-inefficient cars and planes from the system).

Although measurable, the energy used for project construction would not require significant additional capacity nor significantly increase peak- or base-period demands for electricity and other forms of energy. Energy efficiency is assumed for the offsite production of construction materials (Authority and FRA 2005). This assumption is based on the cost of nonrenewable resources and the economic incentive for efficiency. Standard best management practices would be implemented onsite so that nonrenewable energy would not be consumed in a wasteful, inefficient, or unnecessary manner. The effect of indirect use of energy for construction of the Fresno to Bakersfield Section of the HST System would have moderate intensity under NEPA, and impacts would be less than significant under CEQA.

Impact PU&E#17 – Project Impacts—Common Energy Impacts

The electric vehicles of the HST System would use an electrified line with traction power connected to existing PG&E substations (see Chapter 2, Alternatives). For determining HST energy consumption, the analysis assumed use of a Siemens ICE-3 Velaro vehicle operating as two 8-car trainsets and traveling 43.1 million annual train miles by 2035. As shown in Table 3.6-18, the analysis conservatively includes the use of regenerative braking as well as transmission losses. Electrical demand for the propulsion of the HST and for the operation of the HST at terminal stations, storage depots, and maintenance facilities is conservatively estimated to be 16,388,500 MMBtu annually, or 44,900 MMBtu per day under the 50% fare scenario, and 10,950,000 MMBtu annually, or 30,000 MMBtu per day under the 83% fare scenario (see Table 3.6-18). This energy estimate, reflecting a refinement of the analysis conducted in the 2008 Bay Area to Central Valley Program EIR/EIS (Authority 2011) energy assessment, utilizes current conversion factors, ridership forecasts, trainsets, and vehicle miles traveled. This is an increase in electric energy consumption of approximately 28,404 MMBtu per day, or less than 1.5% of statewide consumption under the 50% fare scenario and less than 1% of statewide consumption under the 83% fare scenario.

A comparison of the electric energy requirements calculated for the 2008 Program EIR/EIS and the current analysis is found in Appendix 3.6-C, Energy Analysis Memorandum. The energy use calculated in Table 3.6-18 has been updated to reflect refined information about traction energy consumed per trainset-mile.

Table 3.6-18
Analysis of High-Speed Train System Energy Use

	Methodology	HST System Energy Usage	Values / Unit	Assumptions
0	Trainset Definition	-	-	Assumed use of Siemens ICE-3 Velaro for calculation
1	Traction energy consumed per trainset-mile (8-car train)	47.00	kWh	Without regeneration: Ref. Traction Power Simulation Studies[a]
2	Assumed regeneration under braking	39.95	kWh	15% energy savings assumed
3	On-board services consumption	3.00	kWh	Per trainset-mile (8-car train)
4	Energy consumed	42.95	kWh	Per trainset-mile
5	Annual trainset-miles expected in the horizon year, 2035, Full System, HST fare at 50% of air	95.49	million	Draft Technical Memorandum, "High-Speed Train Service Plan - Full Build Network with Links to Sacramento and San Diego", January 2009, p. 18, with adjustment for 365 days a year at weekday service level, and 6% dead-head mileage
5 cont.	Annual trainset-miles expected in the horizon year, 2035, Full System, HST fare at 83% of air	63.69	million	Draft Technical Memorandum, "High-Speed Train Service Plan - Full Build Network with Links to Sacramento and San Diego", January 2009, p. 18, with adjustment for lower traffic of HST fare at 83% of air, 365 days a year at weekday service level, and 6% dead-head mileage
6	Traction energy consumed per year – 50% fare scenario	4,101.16	GWh	In horizon year 2035 (54 kWh per trainset x 95.49 million trainset miles)
	Traction energy consumed per year – 83% fare scenario	2,735.48	GWh	In horizon year 2035 (54 kWh per trainset x 63.69 million trainset miles)
7	Traction energy consumed per day – 50% fare scenario	11.24	GWh/day	Divide by 365 days - with regeneration
	Traction energy consumed per day – 83% fare scenario	7.49		

Table 3.6-18
Analysis of High-Speed Train System Energy Use

	Methodology	HST System Energy Usage	Values/ Unit	Assumptions
8	Total energy, including stations, facilities, dwells, maintenance, empty moves, etc. (2035) – 50% fare scenario	12.66	GWh/day	Allowance of 12.67% increase in GWh/day of consumption for facilities and empty moves
	Total energy, including stations, facilities, dwells, maintenance, empty moves, etc. (2035) – 83% fare scenario	8.44		
9	Transmission losses – 50% fare scenario	0.51	GWh/ day	Total of 4% – Includes 3% transmission line loss and 1% (2x0.5) transformer losses
	Transmission losses – 83% fare scenario	0.34		
10	Total system energy including losses (2035)[b]	13.17 (50%)	GWh/ day	Per day
		8.78 (83%)		
11		44,900 (50%)	MMBtu/ day	1 GWh = 3,414 x 10^6 Btu
		30,000 (83%)		
12		16,388,500 (50%)	MMBtu/ year	Non-leap year – 365 days
		10,950,000 (83%)		
13	Energy in BTU/trainset-mile	171,800	BTU/VMT	1 GWh = 3,414 X 10^6 BTU

[a] From Parsons Brinckerhoff EMT Traction Power Load modeling, Appendix 3.6-C, Energy Analysis Memorandum.

[b] The current analysis reflects operational, design, and analysis requirements that have occurred since the Bay Area to Central Valley Program EIR/EIS was published in 2008 (Authority 2011). For the Program EIR/EIS, an incorrect application of generation and conversion loss factors resulted in an overstated daily energy usage of 108,879 MMBtu compared to 56500 (50%) to 37,700 (83%) MMBtu calculated for the current analysis. As a result, the 2012 estimates show that the HST System will use less energy than previously predicted.

Acronyms and Abbreviations:
EMT = electro-magnetic test
GWh = gigawatt hour
HST = high-speed train
MMBtu = million British thermal units
VMT = vehicle miles travelled

The HST would decrease automobile VMT and reduce energy consumption by automobiles. This would result in an overall reduction in energy use for intercity and commuter travel. Table 3.6-19 shows the estimated daily VMT with and without the HST System. When compared to future conditions, analysis of the projected effects of the HST on VMT in the Fresno to Bakersfield region indicates that the HST would reduce daily VMT in Fresno, Kings, Tulare, and Kern counties by nearly 5 to 8 million miles a day due to travelers choosing to use the HST rather than drive. When compared to existing conditions, the reduction in VMT is estimated to be approximately 3 to 5 million miles. These values, together with associated average daily speed estimates, were used to develop predictions of the change in energy use for counties in the HST Fresno to

Bakersfield Section. The energy use calculated in Table 3.6-19 has been revised to reflect updated on-road energy consumption rates developed using EMFAC2011.

Table 3.6-19
On-Road Vehicle Energy Changes for Counties within the Fresno to Bakersfield Section

County	Future Conditions				Existing Conditions			
	VMT with HST	VMT without HST	Change in VMT with HST	Change in Energy Consumption with HST (MMBtu/Day)	VMT with HST	VMT without HST	Change in VMT with HST	Change in Energy Consumption with HST (MMBtu/Day)
Fresno	24,364,000 to 25,366,000	27,368,000	-3,004,000 to -2,002,000	-7,966 to -5,309	15,300,000 to 15,970,000	17,311,000	-2,011,000 to -1,341,000	-8,328 to -5,553
Kings	2,663,000 to 2,821,000	3,137,000	-474,000 to -316,000	-1,246 to -831	1,800,000 to 1,920,000	2,151,000	-351,000 to -231,000	-1,449 to -953
Tulare	9,649,000 to 9,803,000	10,112,000	-463,000 to -309,000	-1,209 to 807	5,770,000 to 5,860,000	-6,046,000	-276,000 to -186,000	-1,126 to -759
Kern	35,149,000 to 36,513,000	39,240,000	-4,091,000 to -2,727,000	-11,011 to -7,340	19,750,000 to 20,620,000	22,379,000	2,629,000 to -1,759,000	-11,051 to -7,396
Total	71,825,000 to 74,503,000	79,857,000	-8,032,000 to -5,354,000	-21,433 to -14,287	42,620,000 to 44,370,000	47,887,000	-5,267,000 to -3,517,000	-21,954 to -14,662

Source: Cambridge Systematics 2012.

Acronyms and Abbreviations:
HST = high-speed train
MMBtu = million British thermal units
VMT = vehicle miles travelled

As shown in Table 3.6-20, the number of airplane flights statewide (intrastate) would decrease with the California HST System when analyzed against both the future conditions and existing conditions baselines because travelers would choose to use the HST rather than fly to their destination. The average full flight cycle fuel consumption rate for aircraft is based on the profile of aircraft currently servicing the San Francisco to Los Angeles airline corridor. The number of air trips removed due to the HST System was estimated by using the travel demand modeling analysis conducted for the project. The energy use calculated in Table 3.6-20 has been revised to reflect full flight cycle consumption rates as detailed in the 2013 Report to the Legislature and ARB's 2000 – 2009 Greenhouse Gas Emission Inventory.

Table 3.6-20
Analysis of Energy Effects from Reduction of Number of Airplane Flights Statewide

Origin	Future Conditions		Existing Conditions	
	No. of Flights Removed	Change in Energy due to HST (MMBtu/Day)	No. of Flights Removed	Change in Energy due to HST (MMBtu/Day)
Central Coast	-1 to -1	-118 to -79	-1 to -1	-68 to -46
Far North	-16 to -11	-1,931 to -1,294	-9 to -6	-1,120 to -750
Fresno/Madera	0 to 0	-26 to -18	0 to 0	-15 to -10
Kern	-16 to -11	-1,915 to -1,283	-9 to -6	-1,111 to -744
Los Angeles Basin – North	-43 to -29	-5,249 to -3,517	-25 to -17	-3,044 to -2,040
Los Angeles Basin – South	-88 to -59	-10,726 to -7,186	-51 to -34	-6,221 to -4,168
Merced	-1 to 0	-90 to -60	-1 to 0	-52 to -35
Monterey Bay	-16 to -11	-1,948 to -1,305	-9 to -6	-1,130 to -757
Sacramento Region	-16 to -11	-1,9420 to -1,301	-9 to -6	-1,126 to -755
San Diego Region	-47 to -32	-5,740 to -3,846	-27 to -19	-3,329 to -2,231
San Joaquin	-7 to -5	-866 to -580	-4 to -3	-502 to -336
SF Bay Area	-130 to -87	-15,848 to -10,618	-75 to -50	-9,129 to -6,159
South SJ Valley	0 to 0	-4 to -2	0 to 0	-2 to -1
Stanislaus	-5 to -3	-619 to -415	-3 to -2	-359 to -241
Western Sierra Nevada	-1 to 0	-83 to -56	-1 to 0	-48 to -32
Statewide Total	**-387 to -259**	**-47,105 to -31,561**	**-224 to -150**	**-27,321 to -18,305**

Acronyms and Abbreviations:
HST = high-speed train
MMBtu = million British thermal units
VMT = vehicle miles travelled

The HST System would be an energy-efficient mode of transportation and would serve to decrease overall per-capita energy consumption by providing a travel alternative that is less energy-intensive than the personal vehicles and commercial air flights that would be used under the No Project Alternative; energy consumption would increase at a slower rate than under No Project Alternative conditions. The Statewide Program EIR/EIS indicates that the California HST Project could result in a total energy savings of 25% over conditions without the project.

To enhance the benefits of the HST, the Authority has set a goal of procuring renewable electricity to provide power for HST operations. The Authority is a member of the Sustainability Partnership with the FRA, the U.S. Department of Housing and Urban Development (Region 9), the Federal Transit Administration (Region 9), and the USEPA (Region 9), a partnership established by a memorandum of understanding (MOU). This MOU serves as an umbrella agreement covering broad efforts to promote sustainability for the HST System, including implementing the renewable energy policy goal for HST operations. The Authority accessed technical assistance from the Department of Energy's National Renewable Energy Laboratory (NREL) through the USEPA as part of this partnership. The NREL developed a Strategic Energy Plan (SEP) (NREL 2011) that provides signatory agencies and the Authority with guidelines to meet the goals established in the MOU. The SEP recommended a net-zero approach to powering operations with 100% renewable energy.

HST project buildings would conform to U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) rating standards for environmentally sustainable new construction. HST facilities, including HST stations and an HMF, would be certified at minimum, at the Silver Level, and would be required to meet and/or exceed energy efficiency targets with the goal of zero net energy use for facilities. Achieving the Authority's policy goal of using up to 100% renewable energy sources for the HST System would result in a total estimated reduction in fossil fuel energy resources for the HST System of up to 12.7 million barrels of oil annually by 2030 (Navigant Consulting 2008). Given the net benefit of the HST on the overall energy demand (even if the 100% renewable policy is not fully successful), operational energy consumption effects would be of negligible intensity under NEPA, and in a less-than-significant impact under CEQA.

The project would increase electricity demand. Because of the anticipated times of peak rail travel, impacts on electricity generation and transmission facilities would be particularly focused on peak electricity demand periods (4 p.m. to 6 p.m.). According to the Statewide Program EIR/EIS (Authority and FRA 2005), the HST would increase peak electricity demand on the state's generation and transmission infrastructure by an estimated 480 MW in 2020. Based on the assumption that this peak demand would be evenly spread throughout the system, the Fresno to Bakersfield Section would require approximately 78 MW of additional peak capacity.

Summer 2010 electricity reserves were estimated to be between 27,708 MW for 1-in-2 summer temperatures and 18,472 MW for 1-in-10 summer temperatures (Pryor et al. 2010). The projected peak demand of the HST is not anticipated to exceed these existing reserve amounts. Although supplies for 2035 cannot be predicted, given the planning period available and the known demand from the project, energy providers have sufficient information to include the HST in their demand forecasts. The project's effect on peak electricity demand would have negligible intensity under NEPA, and would be a less-than-significant impact under CEQA.

3.6.6 Project Design Features

Statewide Program EIR/EIS mitigation strategies have been refined and adapted for this project-level EIR/EIS as project design features that avoid and minimize impacts. The project design incorporates precautions to avoid existing utilities and design elements that minimize electricity consumption (e.g., using regenerative braking, and energy-saving equipment and facilities). Refer to Section 3.8, Hydrology and Water Resources, for project design features for stormwater management and treatment. The Authority has also adopted a sustainability policy that includes the project design and construction requirements that avoid and minimize impacts (Authority 2013).

Where necessary, project design and phasing of construction activities would be coordinated with utility service providers to minimize or avoid interruptions, including for upgrades of existing power lines to connect the HST System to existing PG&E substations. Where relocating an irrigation facility is necessary, the Authority shall ensure that where feasible the new facility is operational prior to disconnecting the original facility. Prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification would specify the estimated duration of the planned outage and would be published no fewer than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users.

3.6.7 Mitigation Measures

The following mitigation measures will be implemented during the final design phase to address impacts to public utilities:

PU&E-MM #1: Reconfigure or relocate substations and/or substation components. Reconfigure existing substation ancillary components located approximately 900 feet north of Front Street on the west side of 13th Avenue adjacent to the potential Kings/Tulare Regional Station–West Alternative; at the northwestern corner of the intersection of Kent Avenue and South 11th Avenue, south of the city of Hanford; and at the southwest corner of Grangeville Boulevard and 7½ Avenue, east of the city of Hanford.

Impacts of Mitigation

Potential impacts of mitigation, which would consist of reconfiguring potentially affected electrical lines and related components connected to an electrical substation, include brief power service interruptions when disconnecting from existing infrastructure and connecting to replacement electrical service infrastructure. Because the Authority would coordinate with the affected utility company to avoid service interruptions, for the local context, the impact of the mitigation measure would not be significant under CEQA.

3.6.8 NEPA Impacts Summary

This section summarizes the impacts identified in Section 3.6.5, Environmental Consequences, and evaluates whether they are significant according to NEPA. Under NEPA, project effects are evaluated based on the criteria of context and intensity. Context is the environment that could be affected by a proposed project, and intensity is the degree or magnitude of a potential adverse effect, described as negligible, moderate, or substantial.

The context for public utilities is typically local (i.e., immediate service area), though waste disposal impacts of the project may also have a regional (e.g., county-wide or San Joaquin Valley-wide) context, depending on the locations of waste disposal facilities (e.g., landfills) that could be used. The context for energy is regional or statewide. Intensity definitions are provided in Section 3.6.3.2. Context and intensity are considered together when determining whether an impact is significant under NEPA. The following NEPA impacts were identified under the No Project Alternative and the HST project alternatives.

3.6.8.1 Summary of Impacts

The No Project Alternative represents changes in local conditions that would occur over time without implementation of the project, including an increasing demand for utility services and energy supply as a result of population growth.

Project construction is expected to result in scheduled utility service interruptions. With advance notice, local utility customers would experience minimal changes to service, and the intensity of the impact in the local context would be considered negligible.

Project construction would require the use of water. Because various sources would supply water during construction and because of the overall decrease in demand within the project footprint that would occur post-construction, the context of the impacts would be local, and the intensity of the impacts on water resources would be negligible. This conclusion is consistent with that found in subsection 3.8.7 of Section 3.8 Hydrology and Water Resources.

Construction of the project would require removal of existing facilities, including roads and buildings. These activities would generate demolition waste, including hazardous waste (e.g., asbestos-containing materials). Because regional solid waste and hazardous waste landfills have adequate capacity through HST construction and are required to have added or expanded capacity through the life of the project, the context of the project impacts on waste disposal capacity would be regional, and the intensity of the impact would be negligible.

Construction energy use has been estimated at a maximum of 7,929,970 MMBtu. Although this energy use would be mitigated in less than 4 years by the projected energy savings for regional use of the HST rather than other forms of travel, the intensity of this impact in the regional context would be moderate.

Given the potential need to relocate connecting components to existing substations, the impact would have moderate intensity, with brief service interruptions from affected facilities. Operation of the HST stations and HMF would increase the demand for water supply, wastewater treatment, and solid waste disposal. The context of the impacts would be local to regional, and the impact would have negligible intensity because all utility service providers have sufficient capacity, and the intensity of groundwater drawdown effects would be negligible.

Operation of the HST System would increase the demand for electricity but reduce the overall demand for energy as a result of the decreased number of road vehicle and airplane trips. Operation of the Fresno to Bakersfield Section of the HST System would contribute approximately 14% to the increase in demand for electricity and to the overall reduction of energy consumption in California. The projected peak demand of the HST is not anticipated to exceed existing reserve amounts; for future forecasts that extend beyond the 2035 planning horizon, energy providers have sufficient information to include the HST in their demand forecasts. Therefore, the intensity of impacts associated with the increased demand for electricity would be negligible within the regional and statewide contexts. The reduction of energy demands associated with reduced VMT and airplane travel would have a statewide beneficial impact.

3.6.8.2 Significance Under NEPA

In consideration of the temporary disruption to existing public utilities during construction of the HST project in Fresno, Kings, Tulare, and Kern counties, impacts on public utilities during construction would not be significant under NEPA for the local service areas (i.e., local context). Operation of the HST would have effects with negligible to moderate intensity on local public utilities, but given the availability of local utility services to meet future service demands for the respective service areas, the impact on public utilities during operation of the HST would not be significant under NEPA.

Although the HST System would result in an increase in electricity demand, it would reduce the energy demands from automobile and airplane travel, resulting in an overall beneficial effect on statewide energy use. Given the negligible intensity of effects associated with the increase in electricity demand and the overall benefit to the state of California, the energy impacts would not be significant for regional or state-wide contexts under NEPA.

3.6.9 CEQA Significance Conclusions

Table 3.6-21 provides a summary of significant construction and project impacts, associated mitigation measures, and the level of significance after mitigation.

Table 3.6-21
Summary of Potentially Significant Utility Impacts and Mitigation Measures

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Project			
PU&E#8: Potential Conflicts with Fixed Electrical Facilities	Significant	**PU&E-MM#1:** Reconfigure or relocate substations and/or ancillary components	Less than significant