3.6 Public Utilities and Energy

Since publication of the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS), the following substantive changes have been made to this section:

- Construction water supply was clarified under Impact PUE #3.
- Refinements to the design as described in the Preface and Chapter 2 generally resulted in minor reductions to the previously defined footprint area for renewable energy facilities. Text was changed under Impact PUE #8 and Impact PUE #10. The refinements have not resulted in any changes to the impact analysis or conclusions.
- A total change row has been added to Table 3.6-10, and existing water usage and construction water demand estimates have been updated as a result of the engineering and design refinements. These updates are reflected in Appendix 3.6-B.
- Table 3.6-14 has been updated to correct calculation errors and to reflect water demand updates as a result of the engineering and design refinements.
- Table 3.6-17 has been updated to correct calculation errors and has been renumbered as Table 3.6-18 to account for the addition of statewide data in what is now Table 3.6-17. The associated in-text discussion has been revised to reflect these updates and the addition of statewide data. The revisions resulted in greater reductions in net energy use and did not result in any changes to the impact analysis or the conclusions.

This section describes the regulatory setting and affected environment related to public utilities and energy for the Bakersfield to Palmdale Project Section (B-P). The impact analysis addresses the potential effects the B-P Build Alternatives would have on existing public utilities and energy. The analysis considers data provided by local utilities service providers, field surveys, review and assessment of mapped coordinate-based data sources, and reports of the project vicinity, as well as estimates for water and energy demand, wastewater, stormwater, and waste removal services, based on typical rates or data analysis from similar facilities. Major public utilities within the Bakersfield to Palmdale Project Section include facilities for electricity, natural gas, and petroleum distribution; telecommunications; potable and irrigable water delivery; and stormwater, wastewater, and solid waste disposal.

Summary of Results

Under the No Project Alternative, existing development trends affecting public utilities and energy are expected to continue. Construction of the HSR system would require relocating public utilities and energy infrastructure. Therefore, service interruptions may occur. However, incorporation of impact avoidance and minimization features (IAMF) as part of project design would minimize service interruptions and other impacts that may occur during construction. Additionally, mitigation would be applied to address the reconfiguration or relocation of substations and/or substation components. During operation, increased demand for public utilities and energy may occur in order to operate the HSR system. IAMFs, standard engineering design measures, and best management practices (BMP) would minimize operations impacts related to increased demand. Therefore, with implementation of mitigation measures, public utilities and energy impacts would be less than significant under the California Environmental Quality Act (CEQA).

Utilities

It is important to understand where utility conflicts may occur early in project development. This early identification of any conflicts may identify opportunities to avoid utility relocations, decrease the public's inconveniences experienced during utility relocations, and decrease project cost.

3.6.1 Introduction

This section describes the regulatory setting, affected environment, impacts, and mitigation measures for public utilities and energy within the area potentially affected by the Bakersfield to Palmdale Project Section of the California HSR System. The *Final Program Environmental*

Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System (2005 Statewide Program EIR/EIS) (California High-Speed Rail Authority [Authority] and Federal Railroad Administration [FRA] 2005) concluded that the B-P Build 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 CEQA. Project design elements that reduce effects included 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 HSR system with regenerative braking and implementing energy-saving measures during construction. More information regarding public utilities and energy is provided in Section 3.5, Electromagnetic Fields and Electromagnetic Interference (Sections 3.5.1 and 3.5.5); Section 3.8, Hydrology and Water Resources (Section 3.8.8); Hazardous Materials and Wastes (Subsection 3.10.4); Section 3.13, Station Planning, Land Use, and Development (Subsection 3.13.5); and Section 3.14, Agricultural Lands (Subsection 3.14.5).

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

Federal Railroad Administration Procedures for Considering Environmental Impacts (64 Federal Register 28545)

These FRA procedures state that an EIS should consider possible impacts on energy production and consumption, especially for those alternatives likely to reduce the use of petroleum or natural gas, consistent with the policy outlined in Executive Order 12185.

Section 403(b) of the Power Plant and Industrial Fuel Use Act (Executive Order 12185, 44 Federal Register 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 U.S. 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 State Fire Marshal.

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission is an independent agency that regulates the interstate transmission of natural gas, oil, and electricity. The Federal Energy Regulatory Commission also regulates natural gas and hydropower projects. As part of that responsibility, the Federal Energy Regulatory Commission 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 sale of electricity in interstate commerce. The Federal Energy Regulatory Commission 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 the financial reporting regulations and conduct of regulated companies.

Corporate Average Fuel Economy

Corporate Average Fuel Economy 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 measures vehicle fuel efficiency. The standards specify minimum fuel consumption efficiency standards for new automobiles sold in the U.S. The standard at the time of publication of the Draft EIR/EIS was 27.5 miles per gallon for passenger cars and 20.7 miles per gallon 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 was extended to cover model years 2017 through 2025 light-duty vehicles and ultimately requires an average fuel economy standard of 40 miles per gallon in 2025 (45 miles per gallon for cars and 32 miles per gallon for trucks). In March 2017, the U.S. Environmental Protection Agency released information about its intent to revisit the greenhouse gas emissions standards for model years 2017–2025.

On August 2, 2018, National Highway Traffic Safety Administration (NHTSA) and the U.S. Environmental Protection Agency (USEPA) proposed to amend the fuel efficiency standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 (Safer Affordable Fuel Efficient [SAFE] Vehicles Rule). On September 19, 2019, USEPA and NHTSA issued a final action on the One National Program Rule, which is considered part 1 of the SAFE Vehicles Rule. The One National Program Rule enables USEPA/NHTSA to provide nationwide uniform fuel economy and greenhouse gas vehicle standards, specifically by (1) clarifying that federal law preempts state and local tailpipe greenhouse gas standards, (2) affirming NHTSA's statutory authority to set nationally applicable fuel economy standards, and (3) withdrawing California's Clean Air Act preemption waiver to set state-specific standards.

USEPA and NHTSA published their decisions to withdraw California's waiver and finalize regulatory text related to the preemption on September 27, 2019 (84 Federal Register 51310). USEPA and NHTSA issued final rules to amend and establish national carbon dioxide and fuel economy standards on March 30, 2020 (part 2 of the SAFE Vehicles Rule). The revised rule changes the national fuel economy standards for light-duty vehicles from 54.5 miles per gallon to 40.5 miles per gallon in the future.

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

The federal Resource Conservation and Recovery Act was enacted in 1976 to ensure that solid and hazardous wastes are properly managed from their generation to their ultimate disposal or destruction. Implementation of the Resource Conservation and Recovery Act 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 U.S. Environmental Protection Agency retains oversight of state actions under Code of Federal Regulations Title 40, Section 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 created under Assembly Bill (AB) 939, the California Integrated Waste Management Act, in 1989.

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. Sections 1001–1013 of the Public Utilities Code require that railroad companies operating railroads primarily powered by electric energy or electric companies operating power lines will not begin construction of electric railroads or power lines without first obtaining a certificate from 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 Sections

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 must be obtained from CPUC for facilities between 50 kilovolts (kV) and 200 kV. A Certificate of Public Convenience and Necessity must be obtained from CPUC for facilities 200 kV and above. Both the permit to construct and the Certificate of Public Convenience and Necessity are discretionary decisions by CPUC that are subject to CEQA.

California Public Utilities Commission General Order 176

The purpose of these proposed rules is to establish uniform safety requirements governing the design, construction, operation, and maintenance of 25 kV alternating-current railroad electrification overhead contact systems. When CPUC completes these rulemaking proceedings, there will be a new CPUC General Order that will apply to the HSR project.

The rulemaking is for the 25 kV Electrification System, which includes new safety rules only for construction and operation of HSR overhead contact systems. The traction power system, which includes all power substations and required interconnections with utilities, would be constructed per existing safety rules (General Orders) 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 would be performed based on bilateral agreements with utilities and in accordance with existing regulations and design criteria.

California Public Utilities Commission General Order 95

CPUC General Order No. 95, Rule for Overhead Electric Line Construction, formulates uniform requirements for overhead electrical line construction, including overhead catenary line construction, the application of which will ensure 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.

Designation of Transmission Corridor Zones (California Code of Regulations, Title 20, §§ 2320–2340)

The regulation on designation of transmission corridor zones specifies the scope and process required for identification, evaluation, and designation of new transmission corridor zones.

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

The regulation on 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)

This program requires retail sellers of electricity to increase their purchases of electricity generated by renewable sources and establishes a goal of having 20 percent 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 percent 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.

The 100 Percent Clean Energy Act of 2018 (Senate Bill 100)

This act states that CPUC, the State Energy Resources Conservation and Development Commission, and CARB should plan for 100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045. The act increases to 60 percent, from 50 percent, how much of California's electricity portfolio must come from renewables by 2030. It establishes a further goal to have an electric grid that is entirely powered by clean energy by 2045, which could include other carbon-free sources, like nuclear power, that are not renewable.

Integrated Waste Management Act (Assembly Bill 939)

In response to the Resource Conservation and Recovery Act, 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, for each jurisdiction. Per Public Resources Code §§ 41700–41721.5, the Countywide Siting Element provides an estimate of the total permitted disposal capacity needed for a 15-year period, or whenever additional capacity is necessary. The Countywide Siting Element in California must be updated by each operator and permitted by the California Department of Resources, Recycling, and Recovery, 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.

Sustainable Communities and Climate Protection Act of 2008 (Senate Bill 375, Chapter 728, Statutes of 2008)

Adopted in September 2008, Senate Bill (SB) 375 provides a new planning process to coordinate community development and land use planning with regional transportation plans in an effort to reduce sprawling land use patterns and dependence on private vehicles, thereby reducing vehicle miles traveled (VMT) and greenhouse gas emissions associated with VMT. SB 375 is one major tool being used to meet the goals in the Global Warming Solutions Acts (AB 32). Under SB 375, CARB sets greenhouse gas emission reduction targets for 2020 and 2035 for the metropolitan planning organizations in the state. Each metropolitan planning organization must then prepare a "sustainable communities strategy" that meets the greenhouse gas emission reduction targets set by CARB. Once adopted, the sustainable communities strategy will be incorporated into the region's regional transportation plans.

Local Government Construction and Demolition Guide (Senate Bill 1374)

The Construction and Demolition (C&D) Guide seeks to assist jurisdictions with diverting their C&D material, with a primary focus on the California Department of Resources, Recycling, and Recovery, 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)

Section 4216 of the California Government Code requires that an excavator must contact a regional notification center (i.e., Underground Service Alert) 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 locations 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 (Assembly Bill 1493)

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

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

The Water Conservation Act of 2009 (SB 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 percent reduction in per-capita water use by December 31, 2020. Agricultural water suppliers prepared and adopted agricultural water management plans in 2012 and will update those plans every 5 years thereafter. Effective 2013, agricultural water suppliers that do not meet the water management planning requirements established by this bill are not eligible for state water grants or loans.

3.6.2.3 *Regional and Local*

The Bakersfield to Palmdale Project Section of the California HSR System traverses the jurisdictions of several local governments, including Kern and Los Angeles Counties; the Cities of Bakersfield, Arvin, Tehachapi, Lancaster, and Palmdale; the community of Mojave; and the census-designated place[1] of Rosamond.

Local jurisdictions (counties and cities) have adopted plans, goals, policies, and ordinances related to public utilities and energy. The general plans for Kern and Los Angeles Counties contain goals and policies associated with the development, availability, and adequate service of public facilities. 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 Bakersfield, Arvin, Tehachapi, Lancaster, and Palmdale provide policies and regulations, respectively, to ensure the development and funding of adequate water services, sewer services, storm drainage services, and solid waste disposal services.

The counties crossed by the Bakersfield to Palmdale Project Section have developed and implemented Integrated Waste Management Plans in coordination with the cities in each county. These plans provide the jurisdictions' compliance with the state-mandated diversion rate of 50 percent by 2000 and 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.

The Energy Element of the Kern County General Plan and the Conservation and Open Space Element of the Los Angeles County General Plan define the critical energy-related issues facing the counties and set forth goals, policies, and implementation measures to protect the energy resources of the counties, encourage orderly energy development, and afford the maximum protection for the public's health and safety, as well as for the environment.

Kern County's boundaries are within the San Joaquin Valley Clean Cities Coalition, which has approximately 100 coalitions leveraging resources to create networks of local stakeholders and provide customized technical assistance to fleets implementing alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and new transportation technologies. The program is designed to encourage the use of alternative fuel vehicles, hybrid and electric vehicles, and their supporting infrastructure throughout the U.S. (Project Clean Air 2015).

3.6.3 Regional and Local Policy Analysis

State and regional policies supporting the California HSR System have been described in Section 3.1.3 of this document. Because the HSR system is an undertaking of the Authority in its capacity as state and federal lead agency, it is not required to be consistent with local plans. The Council on Environmental Quality and FRA regulations, however, require the discussion of any inconsistency or conflict of a proposed action with regional or local plans and laws. Where inconsistencies or conflicts exist, the Council on Environmental Quality and FRA require a description of the extent of reconciliation and the reason for proceeding if full reconciliation is not feasible (Code of Federal Regulations Title 40, Part 1506.2(d),[2] and Title 64 Part 28545, 14(n)(15)). The CEQA Guidelines also require that an EIR discuss the inconsistencies between the

[1] A census-designated place is a concentration of population identified by the U.S. Census Bureau for statistical purposes. Census-designated places are delineated for each decennial census as the statistical counterparts of incorporated places, such as cities, towns, and villages. Census-designated places are populated areas that lack separate municipal government, but that otherwise physically resemble incorporated places.

[2] The Council on Environmental Quality (CEQ) issued new regulations, effective September 14, 2020, updating the National Environmental Policy Act (NEPA) implementing procedures at 40 Code of Federal Regulations (C.F.R.) 1500-1508. However, because this project began the NEPA process before September 14, 2020, it is not subject to the new regulations. The Authority is relying on the regulations as they existed prior to September 14, 2020. Therefore, all citations to CEQ regulations in this environmental document refer to the 1978 regulations, pursuant to 40 CFR 1506.13 (2020) and the preamble at 85 Federal Register 43340.

proposed project and applicable general plans, specific plans, and regional plans (CEQA Guidelines Section 15125(d)).

Because the HSR system is a state and federal government project, it is not subject to local government jurisdictional issues of land use. The discussion is included to provide the local planning context. Appendix 2-H provides a detailed analysis of the B-P Build Alternatives' consistency with local planning documents. Table 3.6-1 provides the results of the consistency analysis for the Bakersfield to Palmdale Project Section. The construction and operation of the project do not conflict with policies or general plans related to utilities and energy.

Table 3.6-1 General Plan Policy Consistency Analysis Results

Plan	Segments	Alternatives	Consistency
Kern County General Plan (2009): Land Use, Open Space, and Conservation Element, Public Facilities and Services	Unincorporated Kern County	All B-P Build Alternatives	Consistent
Los Angeles County General Plan (2015): Conservation and Open Space Element	Unincorporated Los Angeles County	All B-P Build Alternatives	Consistent
Los Angeles County General Plan (2015): Public Services and Facilities Element	Unincorporated Los Angeles County	All B-P Build Alternatives	Consistent
Metropolitan Bakersfield General Plan (2002): Public Services and Facilities Element	City of Bakersfield/ Community of Edison	All B-P Build Alternatives	Consistent
Metropolitan Bakersfield General Plan (2002): Conservation Element	City of Bakersfield/ Community of Edison	All B-P Build Alternatives	Consistent
Keene Ranch Specific Plan (1997): Land Use, Open Space, and Conservation Element, Section 2.2, Public Facilities	Keene	All B-P Build Alternatives	Consistent
Golden Hills Specific Plan (1986): Land Use, Open Space, and Conservation Element, Section 1, Public Facilities and Services	Golden Hills	All B-P Build Alternatives	Consistent
Tehachapi General Plan (2012): Sustainable Infrastructure Element	City of Tehachapi	All B-P Build Alternatives	Consistent
Greater Tehachapi Area Specific Plan (2010): Conservation & Open Space Element	Greater Tehachapi Area	All B-P Build Alternatives	Consistent
Greater Tehachapi Area Specific Plan (2010): Sustainability Element	Greater Tehachapi Area	All B-P Build Alternatives	Consistent
Rosamond Specific Plan (2008): Land Use Element, Section V, Public Facilities	Community of Rosamond	All B-P Build Alternatives	Consistent
Lancaster General Plan 2030 (2009): Plan for Municipal Services and Facilities Element	City of Lancaster	All B-P Build Alternatives	Consistent
Palmdale General Plan (1993): Environmental Resources Element	City of Palmdale	All B-P Build Alternatives	Consistent
Palmdale General Plan (1993): Public Services Element	City of Palmdale	All B-P Build Alternatives	Consistent
Palmdale Energy Action Plan (2011)	City of Palmdale	All B-P Build Alternatives	Consistent

Sources: County of Kern, 1986, 1997, 2009, 2008, and 2010a; County of Los Angeles, 2015a, 2015b; City of Bakersfield, 2002a and 2002b; City of Tehachapi, 2012b; City of Lancaster, 2009; and City of Palmdale, 1993 and 2011

B-P = Bakersfield to Palmdale Project Section

MOWF = maintenance-of-way facility

LMF = light maintenance facility

In addition to the above regional policies, the U.S. Bureau of Land Management has developed the Desert Renewable Energy Conservation Plan in collaboration with the U.S. Fish and Wildlife Service, the California Energy Commission (CEC), and the California Department of Fish and Wildlife. The plan is designed to both provide effective protection and conservation of important desert ecosystems while also facilitating the development of solar, wind, and geothermal energy projects in those unique landscapes. The B-P Build Alternatives would be consistent with this conservation plan because they would take into account protections for important desert ecosystems and would not fall under the category of a renewable energy project.

3.6.4 Methods for Evaluating Impacts

3.6.4.1 Definition of Resource Study Area

The resource study area (RSA) for the analysis of public utility and energy resources includes two areas:

- **Direct RSA:** The project footprint on or across public utilities and energy infrastructure. This also includes surface, subsurface, and overhead utilities, as well as aquifers underlying the project footprint
- **Indirect RSA:** The area beyond the project footprint, where indirect impacts to public utilities associated with the B-P Build Alternatives would occur (e.g., utility relocations or use of non-HSR resources and facilities necessary for construction and operation, and electrical interconnections with local utilities)

3.6.4.2 Impact Avoidance and Minimization Features

The Authority has pledged to integrate programmatic IAMFs consistent with (1) the 2005 Statewide Program EIR/EIS, (2) the *Bay Area to Central Valley High-Speed Train Program Environmental Impact Report/Environmental Impact Statement* (2008 Bay Area to Central Valley Program EIR/EIS), and (3) the *Bay Area to Central Valley High-Speed Train Partially Revised Final Program Environmental Impact Report* (2012 Partially Revised Final Program EIR) into the HSR project. The Authority would implement these features during project design and construction, as relevant to the HSR project section, to avoid or minimize project effects.

IAMFs are incorporated into the project design and construction that would avoid or minimize the environmental or community impacts. Each IAMF is identified below.

- **PUE-IAMF#1: Design Measures:** The HSR project design incorporates utilities and design elements that minimize electricity consumption (e.g., using regenerative braking, energy-saving equipment on rolling stock and at station facilities, implementing energy saving measures during construction, and automatic train operations to maximize energy efficiency during operations). Thus, the project would not overburden utility services. The design elements are included in the design build contract. Additionally, the Authority has adopted a sustainability policy that establishes project design and construction requirements that avoid and minimize impacts.
- **PUE-IAMF#2: Irrigation Facility Relocation:** Where relocating an irrigation facility is necessary, the Contractor would verify the new facility is operational prior to disconnecting the original facility, where feasible. Irrigation facility relocation preferences are included in the design-build contract and reduce unnecessary impacts to continued operation of irrigation facilities. The Contractor shall document all relocations in a memorandum for Authority review and approval.
- **PUE-IAMF#3: Public Notifications:** 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 less than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users. The Contractor would submit the public

communication plan to the Authority 60 days in advance of the work for verification that appropriate messaging and notification are to be provided.

- **PUE-IAMF#4: Utilities and Energy:** Prior to Construction, the Contractor shall prepare a technical memorandum documenting how construction activities would be coordinated with service providers to minimize or avoid interruptions. It would include upgrades of existing power lines to connect the HSR System to existing utility substations. The technical memorandum shall be provided to the Authority for review and approval.
- **SS-IAMF#4: Oil and Gas Wells:** Prior to ground-disturbing activities, the Contractor shall identify and inspect all active and abandoned oil and gas wells within 200 feet of the HSR tracks. Any active wells would be abandoned and relocated by the Contractor in accordance with the California Department of Conservation, Division of Oil, and Gas and Geothermal Resources standards in coordination with the well owners. In the event that relocated wells do not attain the current production rates of the now-abandoned active wells, the Authority would be responsible for compensating the well owner for lost production. All abandoned wells within 200 feet of the HSR tracks would be inspected and re-abandoned, as necessary, in accordance with Department of Conservation, Division of Oil, and Gas and Geothermal Resources standards and in coordination with the well owner. The Contractor would provide the Authority with documentation that the identification and inspection of the wells has occurred prior to construction.
- **SOCIO-IAMF#2: Compliance with Uniform Relocation Assistance and Real Property Acquisition Policies Act:** The Authority must comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended (Uniform Act). The provisions of the Uniform Act, a federally mandated program, would apply to all acquisitions of real property or displacements of persons resulting from this federally assisted project. It was created to provide for fair and equitable treatment of all affected persons. Additionally, the Fifth Amendment of the U.S. Constitution provides that private property may not be taken for a public use without payment of “just compensation.”

  The Uniform Act requires that the owning agency provide notification to all affected property owners of the agency’s intent to acquire an interest in their property. This notification includes a written offer letter of just compensation. A right-of-way specialist is assigned to each property owner to assist him or her through the acquisition process. The Uniform Act also provides benefits to displaced individuals to assist them financially and with advisory services related to relocating their residence or business operation. Benefits are available to both owner occupants and tenants of either residential or business properties.

  The Uniform Act requires provision of relocation benefits to all eligible persons regardless of race, color, religion, sex, or national origin. Benefits to which eligible owners or tenants may be entitled are determined on an individual basis and explained in detail by an assigned right-of-way specialist.

  The California Relocation Assistance Act essentially mirrors the Uniform Act and also provides for consistent and fair treatment of property owners. However, because the project would receive federal funding, the Uniform Act takes precedence. Owners of private property have federal and state constitutional guarantees that their property would not be acquired or damaged for public use unless owners first receive just compensation. Just compensation is measured by the “fair market value,” where the property value is considered to be the highest price that would be negotiated on the date of valuation. The value must be agreed upon by a seller who is willing, not obliged to sell, but under no particular or urgent necessity and by a buyer who is ready, willing, and able to buy but under no particular necessity. Both the owner and the buyer must deal with the other with the full knowledge of all the uses and purposes for which the property is reasonably adaptable and available (Code of Civil Procedure Section 1263.320a).

  More detailed information about how the Authority plans to comply with the Uniform Act and the California Relocation Assistance Act is provided in the following three detailed relocation assistance documents modeled after California Department of Transportation (Caltrans) versions:

- Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Residential)
- Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Mobile Home)
- Your Rights and Benefits as a Displaced Business, Farm, or Nonprofit Organization under the Uniform Relocation Assistance Program

- **SOCIO-IAMF#3: Relocation Mitigation Plan:** Before any acquisitions take place, the Authority would develop a relocation mitigation plan in consultation with affected cities and counties and property owners. In addition to establishing a program to minimize the economic disruption related to relocation, the relocation mitigation plan would be written in a style that also enables it to be used as a public information document.

  The relocation mitigation plan would be designed to meet the following objectives:

  - Provide affected property and business owners and tenants a high level of individualized assistance in situations when acquisition is necessary and the property owner desires to relocate the existing land use
  - Coordinate relocation activities with other agencies acquiring property resulting in displacements in the study area to provide for all displaced persons and businesses to receive fair and consistent relocation benefits
  - Make a best effort to minimize the permanent closure of businesses and non-profit agencies as a result of property acquisition
  - Within the limits established by law and regulation, minimize the economic disruption caused to property owners by relocation
  - In individual situations, where warranted, consider the cost of obtaining the entitlement permits necessary to relocate to a suitable location and take those costs into account when establishing the fair market value of the property
  - Provide those business owners who require complex permitting with regulatory compliance assistance

  The relocation mitigation plan would include the following components:

  - A description of the appraisal, acquisition, and relocation process as well as a description of the activities of the appraisal and relocation specialists.
  - A means of assigning appraisal and relocation staff to affected property owners, tenants, or other residents on an individual basis.
  - Individualized assistance to affected property owners, tenants, or other residents in applying for funding, including research to summarize loans, grants, and federal aid available, and research areas for relocation.
  - Creation of an ombudsman's position to act as a single point of contact for property owners, residents, and tenants with questions about the relocation process. The ombudsman would also act to address concerns about the relocation process as it applies to the individual situations of property owners, tenants, and other residents.

- **HYD-IAMF#1: Stormwater Management:** Prior to Construction, the Contractor shall prepare a stormwater management and treatment plan for review and approval by the Authority. During the detailed design phase, each receiving stormwater system's capacity to accommodate project runoff would be evaluated. As necessary, on-site stormwater management measures, such as detention or selected upgrades to the receiving system, would be designed to provide adequate capacity and to comply with the design standards in the latest version of Authority Technical Memorandum *2.6.5 Hydraulics and Hydrology Guidelines*. On-site stormwater management facilities would be designed and constructed to capture runoff and to provide treatment prior to discharge of pollutant-generating surfaces, including station parking areas, access roads, new road overpasses and underpasses, reconstructed interchanges, and new or relocated roads and highways. Low-impact development techniques would be used to detain runoff on site and to reduce off site runoff such as constructed wetland systems, biofiltration and bioretention systems, wet ponds, organic mulch layers, planting soil beds, and vegetated systems (biofilters), such as vegetated swales and grass filter strips, would be used where appropriate.

- **HYD-IAMF#3: Prepare and Implement a Construction Stormwater Pollution Prevention Plan:** Prior to Construction (any ground disturbing activities), the Contractor shall comply with the State Water Resources Control Board Construction General Permit requiring preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The Construction SWPPP would propose BMPs to minimize potential short-term increases in sediment transport caused by construction, including erosion control requirements, stormwater management, and channel dewatering for affected stream crossings. These BMPs would include measures to incorporate permeable surfaces into facility design plans where feasible, and how treated stormwater would be retained or detained on site. Other BMPs shall include strategies to manage the amount and quality of overall stormwater runoff. The Construction SWPPP would include measures to address, but are not limited to, the following:
  - Hydromodification management to verify maintenance of pre-project hydrology by emphasizing on site retention of stormwater runoff using measures such as flow dispersion, infiltration, and evaporation (supplemented by detention where required). Additional flow control measures would be implemented where local regulations or drainage requirements dictate.
  - Implementing practices to minimize the contact of construction materials, equipment, and maintenance supplies with stormwater.
  - Limiting fueling and other activities using hazardous materials to areas distant from surface water, providing drip pans under equipment, and daily checks for vehicle condition.
  - Implementing practices to reduce erosion of exposed soil, including soil stabilization, regular watering for dust control, perimeter siltation fences, and sediment catchment basins.
  - Implementing practices to maintain current water quality, including siltation fencing, wattle barriers, stabilized construction entrances, grass buffer strips, ponding areas, organic mulch layers, inlet protection, storage tanks and sediment traps to arrest and settle sediment.
  - Where feasible, avoiding areas that may have substantial erosion risk, including areas with erosive soils and steep slopes.
  - Using diversion ditches to intercept surface runoff from off site.
  - Where feasible, limiting construction to dry periods when flows in water bodies are low or absent.
  - Implementing practices to capture and provide proper off-site disposal of concrete wash water, including isolation of runoff from fresh concrete during curing to prevent it from reaching the local drainage system, and possible treatments (e.g., dry ice).
  - Developing and implementing a spill prevention and emergency response plan to handle potential fuel and/or hazardous material spills.

  Implementation of a SWPPP would be performed by the construction Contractor as directed by the Contractor's Qualified SWPPP Practitioner or designee. As part of that responsibility, the effectiveness of construction BMPs must be monitored before, during and after storm events. Records of these inspections and monitoring results are submitted to the local Regional Water Quality Control Board as part of the annual report required by the Statewide Construction General Permit. The reports are available to the public online. The State Water Resources Control Board and the Regional Water Quality Control Board would have the opportunity to review these documents.

- **HMW-IAMF#7: Transport of Materials:** During Construction, the Contractor would comply with applicable state and federal regulations, such as the Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation, and Liability Act, the Hazardous Materials Release Response Plans and Inventory Law, and the Hazardous Waste Control Act. Prior to Construction the Contractor would provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport.

3.6.4.3 Method for Evaluating Impacts under NEPA

This section describes the sources and methods the Authority used to analyze potential impacts on public utilities and energy from implementation of the B-P Build Alternatives. These methods apply to both the National Environmental Policy Act (NEPA) and CEQA unless otherwise indicated. Refer to Section 3.1.3.4, Methods for Evaluating Impacts, for a description of the general framework for evaluating impacts under NEPA and CEQA.

The public utilities and energy impact analyses focus on direct and indirect impacts to utility facilities, resources provided by utilities, and energy sources. These impacts can be assessed locally for physical infrastructure conflicts, and the area served by utilities and energy providers is reviewed as part of the RSA to fully understand the existing capacity and reserves of utility resources and energy. These capacities and reserves are compared against the demands of the B-P Build Alternatives to determine impact type and severity.

This study also considers the potential impacts of the B-P Build Alternatives on electricity generation and transmission lines throughout the entire State of California (and western states that produce energy that is exported to California) because the HSR system would obtain electricity from the statewide grid. Therefore, this analysis cannot be based on a particular regional study area or the use of any particular generation facilities. Electrical interconnections from traction power substations to utility substations are evaluated in Section 3.6.6, Environmental Consequences. However, the locations of these interconnections are conceptual and have not been fully evaluated by the utility owners. Additional testing will be conducted by the utility companies prior to performing additional environmental review needed for permitting.

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 2015 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 telecommunications infrastructure) were verified or corrected based on field observations and then mapped by recording the geographic information system (GIS) information as well as other coordinate-based data sources. The *Preliminary Engineering for Project Definition Design Submission: High Risk Utility Report* (Authority 2018a) identifies high-risk utilities, major utilities (transmission), other significant utilities, and low-risk utilities in the Bakersfield to Palmdale Project Section. The methods used as a basis for evaluating impacts of the B-P Build Alternatives are based primarily on the Authority's *Technical Memorandum 2.7.4, Utility Requirements for 15% Design Level* (Authority 2008).

High-risk utilities are defined as existing facilities transporting the following materials:

- Petroleum products (jet fuel, crude oil, gas oil, gasoline, etc.)
- Oxygen

- Chlorine
- Toxic or flammable gases or liquids
- Natural gas
- Electricity via underground electric supply lines (300 volts and larger) directly buried or in a duct or conduit
- Water in pressured pipelines (i.e., potable water, irrigation water, and industrial water)
- Sanitary sewer force mains

Major utilities are defined as “any subsurface, aboveground, or overhead utility used for transmission regardless of size, shape, or method of conveyance” (Authority 2008). For the purpose of this analysis, major utilities include the following:

- Overhead electric power/transmission lines (69 kV and larger)

Other utility-related facilities include the following:

- Solar farms
- Wind farms
- Pump stations
- Reservoirs
- Water wells
- Substations
- Oil wells
- Measurement towers

Low-risk utilities include:

- Low-voltage distribution lines (less than 69 kV)
- Fiber-optic communication lines
- Telecommunication lines
- Sanitary sewer lines
- Drainage facilities
- Storm drain lines
- Irrigation canals and facilities

Minor utilities include any subsurface, aboveground, or overhead facility used as distribution lines or service laterals to individual parcels or properties.

This analysis considers petroleum product, natural gas, water, and sewer pressure facilities as “high-risk” utility facilities and overhead electrical power lines that carry at least 69 kV as “major utilities.” The Bakersfield to Palmdale Project Section contains significant utility-related facilities, solar farms, and wind farms. The remaining utilities, such as stormwater and wastewater pipelines, have a lower safety risk.

Methodologies for calculating water demand, wastewater, stormwater, and waste removal services for the stations are described below. Section 3.6.6, Environmental Consequences, provides demand estimates for these utilities and compares them with anticipated supply and capacity, as reported by service providers in the Bakersfield to Palmdale Project Section.

Water demand estimates are presented in Appendix 3.6-B, Technical Memorandum: Water Usage Analysis for the HSR Bakersfield to Palmdale Project Section. Water demand estimates for construction are based on an estimated 5-year period in which earthmoving and construction activities requiring water use would occur. Annual operational water use estimates are based on build out of the HSR system in 2040. Estimates of existing water use were generated by applying region-specific water use rates for the known land uses in the project footprint (Section 3.13, Station Planning, Land Use, and Development).

Engineers estimated the per-person wastewater generation at the stations would account for approximately 50 percent of total water demand. Sewer systems generally experience 65 to

85 percent return rates of water use to the sewer (Vallecitos Water District 2010). The 85 percent return rate was selected for the maintenance facilities to provide conservative wastewater estimates, because employees would be at these facilities for longer durations than passengers would be at the stations. For additional details regarding water supply, stormwater, and hydrology, see Section 3.8, Hydrology and Water Resources.

Waste generated by B-P Build Alternatives' C&D activities are based on estimates provided by Bakersfield to Palmdale Project Section engineers using the existing character of the study area and the requirements of various project attributes. Operational waste generation is based on HSR system ridership projections in the year 2040 and number of employees, taking into account the estimates of waste generation and recycling in California.

Energy

The proposed HSR system would obtain electricity from the statewide grid. None of the proposed B-P Build Alternatives would entail the construction of a separate power source. Instead, they would include the extension of existing power lines or the construction of new transmission lines to and among a series of traction power substations positioned along the HSR corridor. Any potential impacts on electrical production that may result from the proposed HSR system would affect statewide electricity reserves and, to a lesser degree, transmission capacity. The Authority adopted a policy goal in September 2008 (Hotchkiss et al. 2011) to utilize renewable energy for all traction power. Subsequent planning identified the preferred strategy to realize this goal, which is to procure or produce on-site, where feasible, enough renewable energy to feed into the California grid to offset the energy required for traction power. An April 2013 industry survey indicated that there is sufficient renewable energy capacity to meet the system demand (Authority 2014). To identify the projected energy demand of the B-P Build Alternatives, estimated energy impact for the entire HSR system was prorated based on the proportion of the length of HSR guideway within the Bakersfield to Palmdale Project Section. The HSR system would be approximately 800 miles long, and Phase 1 of the HSR system would be approximately 540 miles long. The length of the Bakersfield to Palmdale Project Section is approximately 80 miles, depending on which of the B-P Build Alternatives is selected (Section 2.4.2, Bakersfield to Palmdale Project Section Build Alternatives). The B-P Build Alternatives account for approximately 15 percent of the length of the Phase I HSR system and therefore would consume approximately 15 percent of the electrical requirements of the Phase I HSR system.

Energy Measurement

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 1 pound of water by 1 degree 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 120,524 Btu (U.S. Energy Information Administration 2014); 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 HSR project.

In calculating estimated energy savings for the B-P Build Alternatives, two ridership probability forecasts were used for the Phase 1 HSR system: medium (42.8 million) and high (56.8 million). These forecasts are based on probabilistic estimates for the HSR system to achieve its ridership projections by 2040. In the case of HSR, probabilistic is defined as numerous possible ridership outcomes, each having varying degrees of certainty or uncertainty of occurring. For more information about the ridership forecasts and their use in the EIR/EIS, see Sections 2.5 and 3.1.

The proposed stations, light maintenance facility (LMF), and maintenance-of-way facility (MOWF) would use natural gas for heating, cooling, hot water, and cooking. Existing natural gas lines would be extended to connect to these HSR facilities. Estimates for projected natural gas demand were calculated in millions of British thermal units (MMBtu) using building square footage from the 2016 Business Plan Operations and Maintenance Cost Model (Authority 2016b) and California Emissions Estimator Model assumptions for the general light industry land use category.

The B-P Build Alternatives' opening year (2029) and horizon year (2040) energy impacts are evaluated against existing conditions and also No Project conditions as they are expected to be in 2029 and 2040, respectively. Analysts calculated operational energy consumption for the medium and high ridership forecasts. All applicable forecasts are based on the level of ridership as presented in the Authority's 2016 Business Plan (Authority 2016b). The complete statewide analysis is included in Appendix 3.6-A, with detailed calculations on the reduction in energy consumption from transportation (vehicles and aircraft). Existing and projected statewide energy demand for the State of California, including the implementation of the B-P Build Alternatives, is presented in Section 3.6.6, Environmental Consequences.

Energy impacts are defined to include the consumption of electricity required to power the HSR system (direct use) and consumption of resources to construct the B-P Build Alternatives (indirect use).

Direct Energy Consumption

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 HSR system and growth projections performed by the CEC. These consumption rates were used to determine the amount of petroleum used for transportation under the No Project Alternative and B-P Build Alternatives. Current electricity consumption rates from the CEC (2016a) are compared with the projected energy consumption of the HSR system.

The electrical demand for the propulsion and operation of the trains at terminal stations and in storage depots and maintenance facilities was calculated as part of the project design. Analysts estimated the energy use based on the ridership estimates and train operating characteristics as presented in the Authority's 2016 Business Plan (Authority 2016b). Energy rates were determined through the use of carbon balance equations as recommended by CARB. Analysts also provided the change in energy consumption from on-road vehicle and aircraft travel with operation of the B-P Build Alternatives.

On-Road Vehicle Energy Usage

Analysts conducted the on-road vehicle energy analysis using average daily VMT estimates and associated average daily speed estimates by county and statewide. Parameters were set in the program to reflect conditions within each county, as well as statewide parameters to reflect travel through each county.

Aircraft Energy Usage

Analysts calculated aircraft energy use by using the fuel consumption factors from CARB's 2000–2014 Greenhouse Gas Emissions Inventory (CARB 2016a) and the accompanying technical support document (CARB 2016b). The energy use includes both landing and take-off and cruise operations. Analysts calculated average aircraft energy based on the profile of intrastate aircraft currently servicing the San Francisco to Los Angeles corridor. Analysts estimated the number of air trips removed attributable to the project section through the travel demand modeling analysis conducted for the project section, based on the ridership estimates presented in the Authority's 2016 Business Plan (Authority 2016b).

Indirect Energy Consumption

As previously described, the length of the Bakersfield to Palmdale Project Section is approximately 80 miles, depending on which of the B-P Build Alternatives is selected. Indirect energy consumption involves the nonrecoverable, one-time energy expenditure required to construct the B-P Build Alternatives. Indirect energy impacts are evaluated quantitatively. Construction energy consumption factors identified for the proposed HSR system are derived from data gathered for typical heavy-rail systems and the San Francisco Bay Area Rapid Transit District heavy-rail commuter system because energy information for comparable HSR systems is not readily available. These data were used to estimate the projected construction energy consumption for the B-P Build Alternatives, including the proposed stations, the LMF, and the MOWF, and are presented in Table 3.6-2.

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

B-P Build Alternatives	Surface (guideway miles)[2]	Elevated (guideway miles)[2]	Underground (guideway miles)[2]	Stations (number of stations)	Maintenance Facilities (guideway miles)[2,3]	Btu (billion)
Energy Consumption Factor[1]	**19.11 Billion Btu/One-Way Guideway Miles**	**55.63 Billion Btu/One-Way Guideway Miles**	**328.33 Billion Btu/One-Way Guideway Miles**	**78 Billion Btu/Station**	**19.11 Billion Btu/One-Way Guideway Miles**	**–**
Alternative 1	2,007 (105 miles)	2,170 (39 miles)	6,107 (18.6 miles)	156 (2 stations)	134 (7 miles)	10,573
Alternative 2	1,976 (103.4 miles)	2,259 (40.6 miles)	6,107 (18.6 miles)	156 (2 stations)	134 (7 miles)	10,631
Alternative 3	1,942 (101.6 miles)	2,103 (37.8 miles)	7,552 (23 miles)	156 (2 stations)	134 (7 miles)	11,886
Alternative 5	2,007 (105 miles)	2,170 (39 miles)	6,107 (18.6 miles)	156 (2 stations)	134 (7 miles)	10,573
CCNM Design Option	-4 (-0.20 mile)	+6 (0.11 mile)	+39 (0.12 mile)	N/A	N/A	+42
Refined CCNM Design Option[4]	-8 (-0.43 mile)	-46 (-0.83 mile)	535 (1.63 miles)	N/A	N/A	+481

Source: California High-Speed Rail Authority, 2016a

[1] Factors for energy consumption for Bay Area Rapid Transit system construction (as a surrogate for HSR 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* (California High-Speed Rail Authority and FRA 2011b).

[2] The values for "guideway miles" for each B-P Build Alternative and the maintenance facilities account for each direction.

[3] Assumed for each direction 3.5 guideway miles for Lancaster North B MOWF and Avenue M LMF/MOWF combined.

[4] The CCNM Design Option and Refined CCNM Design Option data are applicable to all of the B-P Build Alternatives. The values represent the increase/decrease compared to the B-P Build Alternatives. Note that the Refined CCNM Design Option is longer than the original CCNM Design Option; therefore, the data may seem exaggerated for the refined option. These issues are addressed in the text of this chapter section.

B-P = Bakersfield to Palmdale
Btu = British thermal units
CCNM Design Option = César E. Chávez National Monument Design Option
LMF = light maintenance facility
MOWF = maintenance-of-way facility
N/A = not applicable

Actual energy consumption may differ from these estimates, depending on the final design. To compare the B-P Build Alternatives, Table 3.6-2 shows the estimated construction energy consumption in billions of British thermal units (Btu) for Alternatives 1, 2, 3, and 5 based on the length of their anticipated at-grade or elevated/below-grade construction elements.

Specific rail profile data are not available for the maintenance facilities. The Lancaster North B MOWF and the Avenue M LMF/MOWF would require the greatest length of total combined guideway at approximately 3.5 miles. Because these maintenance facility sites would only require a limited length of elevated track, energy consumption is calculated using the surface factor for preliminary estimates. Analysis for this limited length would not be substantially different even if an elevated factor were 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 B-P Build Alternatives prorated to statewide energy savings. The payback period is calculated for the Bakersfield to Palmdale Project Section by dividing the estimated HSR system construction energy by the amount of energy that would later be saved by the full operation of the HSR system (based on the prorated statewide value). The calculations assume that the amount of energy saved in the study year (2040) would remain constant throughout the payback period.

3.6.4.4 Method for Determining Significance under CEQA

Public Utilities

CEQA requires that an EIR identify the significant environmental impacts of a project (CEQA Guidelines § 15126). One of the primary differences between NEPA and CEQA is that CEQA requires a threshold-based analysis of the impacts (see Section 3.1.3.4 for further information). Accordingly, Section 3.6.9, CEQA Significance Conclusions, summarizes the significance of the environmental impacts on public utilities and energy resources for the B-P Build Alternatives. The Authority is using the following thresholds to determine if a significant impact on public utilities would occur as a result of the Bakersfield to Palmdale Project Section:

- Relocation or construction of new water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, including pump stations, structures, intakes, etc., the construction or relocation of which could cause significant environmental effects
- New or expanded entitlements to supply water to the project and to reasonably foreseeable future development during normal, dry and multiple dry years
- 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
- Generation of solid waste in excess of State or local standards, or impairment of the attainment of solid waste reduction goals
- Noncompliance with federal, state, and local management and reduction statutes and regulations related to solid waste
- Conflict with a fixed facility such as an electrical substation or wastewater treatment plant

Energy

Section 3.6.9, CEQA Significance Conclusions, also summarizes the significance of the environmental impacts on energy resources for the B-P Build Alternatives. The Authority is using the following thresholds to determine if a significant impact on energy would occur as a result of the Bakersfield to Palmdale Project Section:

- Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

3.6.5 Affected Environment

This section describes the existing conditions for public utilities and infrastructure. The affected environment related to public utilities and energy is similar for all of the B-P Build Alternatives. Therefore, the following discussion applies to all of the B-P Build Alternatives.

3.6.5.1 Fresno to Bakersfield Locally Generated Alternative from the Intersection of 34th Street and L Street to Oswell Street

The affected environment for utilities and energy generation/transmission for the portion of the Fresno to Bakersfield Locally Generated Alternative (F-B LGA) alignment from the intersection of 34th Street and L Street to Oswell Street is included in the *Fresno to Bakersfield Section Draft Supplemental EIR/EIS* (Authority and FRA 2017) and *Fresno to Bakersfield Section Final Supplemental EIR* (Authority 2018b). However, the affected environment discussions included in Sections 3.6.5.2 and 3.6.5.3 below also reflect this portion of the F-B LGA alignment between the intersection of 34th Street and L Street and Oswell Street.

3.6.5.2 Public Utilities

Major public utilities within the study area include facilities for electricity, natural gas, and petroleum distribution; telecommunications; potable, recycled, 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 RSA.

Table 3.6-3 Resource Study Area Utility and Energy Providers

<table>
<tr><th colspan="2">Utility Type</th><th>Provider</th><th>County/City</th></tr>
<tr><td colspan="2" rowspan="2">Electrical</td><td>PG&E</td><td>Western Kern County</td></tr>
<tr><td>Southern California Edison</td><td>Eastern Kern and Los Angeles Counties</td></tr>
<tr><td colspan="2" rowspan="2">Natural Gas</td><td>Southern California Gas Company</td><td>Kern and Los Angeles Counties</td></tr>
<tr><td>PG&E</td><td>Kern County</td></tr>
<tr><td colspan="2" rowspan="2">Petroleum and Fuel Pipelines</td><td>Phillips66</td><td>Kern County</td></tr>
<tr><td>Naftex Operating Company</td><td>Kern County</td></tr>
<tr><td rowspan="2">Communications</td><td>Telephone</td><td>AT&T</td><td>Kern and Los Angeles Counties</td></tr>
<tr><td>Cable/Internet</td><td>Various</td><td>Kern and Los Angeles Counties</td></tr>
<tr><td colspan="2" rowspan="11">Water Supply</td><td>Kern Delta Water District</td><td>City of Bakersfield</td></tr>
<tr><td>Interstate 5 Utility Company</td><td>City of Bakersfield</td></tr>
<tr><td>Long Canyon Water Company</td><td>City of Bakersfield</td></tr>
<tr><td>California Water Service</td><td>City of Bakersfield</td></tr>
<tr><td>East Niles Community Services District</td><td>City of Bakersfield</td></tr>
<tr><td>Arvin-Edison Water Supply District</td><td>City of Arvin</td></tr>
<tr><td>City of Tehachapi</td><td>City of Tehachapi</td></tr>
<tr><td>Tehachapi-Cummings County Water District</td><td>Kern County</td></tr>
<tr><td>Rosamond Community Services District</td><td>Community of Rosamond</td></tr>
<tr><td>Los Angeles County Waterworks District No. 40</td><td>City of Lancaster</td></tr>
</table>

Utility Type	Provider	County/City
	Palmdale Water District	City of Palmdale
	Landale Mutual Water Company	City of Lancaster
	California Department of Water Resources	Kern and Los Angeles Counties
Recycled Water Supply	Los Angeles County Waterworks District No. 40	City of Lancaster
	Palmdale Recycled Water Authority	City of Palmdale
Sewer/Wastewater	City of Bakersfield Public Works	City of Bakersfield
	City of Tehachapi Public Works	City of Tehachapi
	Rosamond Community Services District	Community of Rosamond
	Sanitation Districts of Los Angeles County	City of Lancaster
	Sanitation Districts of Los Angeles County	City of Palmdale
Solid Waste Collection	Bakersfield Metropolitan (Bena) Sanitary Landfill Mojave-Rosamond Landfill Tehachapi Landfill Lancaster Landfill and Hauling Antelope Valley Public Landfill	Kern and Los Angeles Counties

Sources: PG&E, 2016; Southern California Edison, 2016; California High-Speed Rail Authority, 2018a; Water Association of Kern County, 2017a, 2017b; Interstate 5 Utility Company, 2016; State Water Resources Control Board, 2016; California Water Service, 2016a, 2016b; East Niles Community Services District, 2015; California Department of Water Resources, 2010, 2015; City of Tehachapi, 2012b, 2012c, 2016a, 2016b; Tehachapi-Cummings County Water District, 2017; Rosamond Community Services District, 2017; Los Angeles County Waterworks District, 2017a; Palmdale Water District, 2010, 2016; City of Bakersfield, 2016; California Regional Water Quality Control Board, Lahontan Region, 2015; City of Palmdale, 2012, 2017; Sanitation Districts of Los Angeles County, 2016a, 2016b; California Department of Resources Recycling and Recovery, 2016b

PG&E = Pacific Gas and Electric Company

Electrical Lines

Both electrical transmission lines and electrical distribution lines exist within the RSA. Pacific Gas and Electric Company (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 16 million people throughout a 70,000-square-mile service area in Northern and Central California (PG&E 2016). Within the RSA, PG&E provides electricity to western Kern County. Southern California Edison (SCE) provides electricity to those areas not served by PG&E. SCE serves more than 15 million people in a 50,000-square-mile area of Central, coastal, and Southern California (SCE 2019). SCE's renewable power sources include hydroelectric, solar, and wind facilities (SCE 2019).

Electrical Transmission versus Electrical Distribution Lines

The main characteristics that distinguish transmission lines from distribution lines are that transmission lines operate at relatively high voltages, transmit large quantities of power, and transmit power over large distances. Distribution lines carry lower-voltage electricity and deliver electricity to neighborhoods and communities over a shorter distance than transmission lines.

SCE, the Bonneville Power Administration, the Imperial Irrigation District, the Los Angeles Department of Water and Power, AEP Texas Central Company, and PG&E have transmission lines within the RSA.

High-Pressure Natural Gas Pipelines

PG&E and Southern California Gas Company provide natural gas service and are responsible for maintaining the infrastructure for natural gas distribution in the RSA. Other natural gas pipelines within the RSA include the El Paso Natural Gas Co., Kern River Gas Transmission Co., and the

Mojave Pipeline Operating Co. The B-P Build Alternatives would potentially affect high-pressure natural-gas pipelines in Tehachapi.

Petroleum and Fuel Pipelines

California is the third-largest oil-producing state in the U.S., and many of its onshore oilfields are in the San Joaquin Valley between Bakersfield 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 RSA. These pipelines are owned and operated by SCE, PG&E, Kern Oil and Refining Co., Mojave Pipeline, British Petroleum, Chevron Corporation, Conoco Philips, Exxon-Mobile Corporation, Shell Oil Company, Tricor Refining LLC, and Kinder Morgan. Kinder Morgan is the largest independent transporter of refined petroleum products in the U.S. Kinder Morgan owns and operates many miles of fuel pipelines in California, including within the RSA.

Communication Facilities

Communication facilities (including both telecommunication lines and fiber-optic lines) in the RSA are owned and operated by AT&T. Other communication service providers, including Time Warner Cable, the Los Angeles Utility Services Department, CVIN LLC, Transcontinental, and Bright House Network, may also own or lease cellular service or microwave towers and antennas, or telecommunication cable or overhead distribution lines. Both underground and aboveground components of this infrastructure are located within the RSA.

Water Supply Infrastructure

Surface water and groundwater are the basic sources of drinking water and irrigation in the region and are transported by means of gravity or pump stations when necessary. Municipal service providers typically use groundwater sources; however, surface water sources may also supplement supplies. Agricultural water users augment their groundwater supplies with surface water that is conveyed through a network of natural and constructed channels. Numerous large- and small-scale districts provide municipal and irrigation water service to the communities in the RSA. The predominant domestic water source in unincorporated portions of the RSA is individual private well systems, and many residents in rural and unincorporated areas rely on private wells for drinking water. Thirteen water companies and districts are located within the RSA. The largest is the Tehachapi-Cummings County Water District, and the smallest is the water service area for the community of Rosamond. Table 3.6-4 lists the water sources and uses, among other key features, of the water supply companies and districts potentially affected by the B-P Build Alternatives, stations, and maintenance facilities. Table 3.6-5 summarizes the existing water treatment capacity for facilities that would supply water to the stations and maintenance facilities in the Bakersfield to Palmdale Project Section. Appendix 3.6-B, Technical Memorandum: Water Usage Analysis for HSR Bakersfield to Palmdale Project Section, calculates existing water demand and is described in further detail in Section 3.6.6, Environmental Consequences, under Impact PU&E #11.

Table 3.6-4 Water Suppliers in the Bakersfield to Palmdale Project Section

Water District	Water Sources	Predominant Uses	Total Area (acres unless otherwise noted)
Kern Delta Water District	Groundwater, Kern River, California Aqueduct, Friant-Kern Canal, local streams	Agricultural, industrial, and municipal	125,000
Interstate 5 Utility Company	Groundwater	Commercial	20
Long Canyon Water Company	Groundwater	Predominantly residential	65 service connections

Water District	Water Sources	Predominant Uses	Total Area (acres unless otherwise noted)
California Water Service	**Bakersfield:** Groundwater, surface water purchased from the Kern County Water Agency and the City of Bakersfield **Antelope Valley/Lancaster:** Groundwater, reserves (Los Angeles County and Antelope Valley-East Kern Water Agency)	Almost entirely residential, with few commercial and industrial uses	62,654 municipal connections (Bakersfield) 668 municipal connections (Lancaster)
East Niles Community Services District	Kern County Water Agency Improvement District No. 4, groundwater	Predominantly residential	5,500
Arvin-Edison Water Supply District	Central Valley Project, groundwater	Agricultural, groundwater recharge, and other water agencies	131,660
City of Tehachapi	Tehachapi Groundwater Basin,[1] California Aqueduct	Residential, commercial, industrial, and groundwater recharge	4,800
Tehachapi-Cummings County Water District	Brite, Cummings, and Tehachapi Basins;[1] California Aqueduct	Water supply, water resource management, and flood protection	266,000
Rosamond Community Services District	Local groundwater, Antelope Valley-East Kern Water Agency	Water supply	Approximately 5,000 households and businesses
Los Angeles County Waterworks District No. 40	Antelope Valley-East Kern Water Agency, groundwater	Municipal	57,000 service connections
Palmdale Water District	Littlerock Dam, California Aqueduct, groundwater	Municipal and industrial water	29,440
Landale Mutual Water Company	Groundwater, Antelope Valley-East Kern Water Agency	Municipal and residential	166 service connections
California Department of Water Resources (California Aqueduct)	California State Water Project	Municipal and agricultural	34 storage facilities, reservoirs, and lakes; 20 pumping plants; 4 pumping/generating plants; 5 hydroelectric power plants; and about 701 miles of open canals and pipelines[2]

Sources: Water Association of Kern County, 2017a, 2017b; Interstate 5 Utility Company, 2016; State Water Resources Control Board, 2016; California Water Service, 2016a, 2016b; East Niles Community Services District, 2015; California Department of Water Resources, 2015; City of Tehachapi, 2016a; Tehachapi-Cummings County Water District, 2017; Rosamond Community Services District, 2017; Los Angeles County Waterworks District, 2017b; Palmdale Water District, 2016; California Department of Water Resources, 2010

[1] The Brite, Cummings, and Tehachapi groundwater basins are all adjudicated. Brite Basin, Case No. 97211, is limited to 500 acre feet annually; Cummings Basin, Case No. 97209, is limited to 4,090 acre feet annually; and Tehachapi Basin, Case No. 97210, was limited to 5,500 acre feet annually. The City of Tehachapi manages approximately 2,770 acre feet within the adjudicated Tehachapi Basin.

[2] The information provided for the California Department of Water Resources California Aqueduct is systemwide and not exclusive to the resource study area.

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.

Table 3.6-5 Water Treatment Plant Existing Capacity Summary for the Bakersfield to Palmdale Project Section

Jurisdiction	Purveyor	Water Treatment Plant Name	Water Treatment Plant Address	Capacity (mgd)
City of Bakersfield	California Water Service	North Garden Water Treatment Plant	Bakersfield, CA	10.4
City of Bakersfield	California Water Service	Northeast Bakersfield Water Treatment Plant	Bakersfield, CA	23.0
City of Lancaster	Los Angeles County Waterworks Districts, District No. 40	Quartz Hill Water Treatment Plant	6500 W Avenue N Palmdale, CA	65.0
City of Palmdale	Palmdale Water District	Leslie O. Carter Water Treatment Plant	700 E Avenue S Palmdale, CA	35.0
Total	**N/A**	**N/A**	**N/A**	**133.4**

Sources: California Water Service, 2011; Los Angeles County Waterworks District, 2014; Palmdale Water District, 2017
mgd = million gallons per day

Wastewater Infrastructure

Generally, on-site sewage systems (e.g., septic tanks) treat rural and low-density areas of the RSA. Table 3.6-6 summarizes municipal wastewater systems for the urban areas of each city.

Table 3.6-6 Wastewater Treatment Plant Existing Average Flow and Capacity Summary for the Bakersfield to Palmdale Project Section

Jurisdiction	Agency	Wastewater Treatment Plant Name	Wastewater Treatment Plant Address	Average Flow/ Capacity (mgd)
City of Bakersfield	City of Bakersfield Public Works	City of Bakersfield Wastewater Treatment Facility No. 2	Mt. Vernon Avenue and White Lane Bakersfield, CA	13.7/25.0
City of Bakersfield	City of Bakersfield Public Works	City of Bakersfield Wastewater Treatment Facility No. 3	6901 McCutchen Road Bakersfield, CA	17.3/32.0
City of Tehachapi	City of Tehachapi Public Works	Tehachapi Municipal Wastewater Treatment Facility	800 Enterprise Way, Tehachapi, CA	0.85/1.25
City of Lancaster	Sanitation Districts of Los Angeles County	Lancaster Water Reclamation Plant	1865 W Avenue D Lancaster, CA	14.0/18.0
City of Palmdale	Sanitation Districts of Los Angeles County	Palmdale Water Reclamation Plant	39300 30th Street E Palmdale, CA	9.5/12.0
Total	**N/A**	**N/A**	**N/A**	**54.5/87.0**

Sources: City of Bakersfield, 2016; City of Tehachapi, 2012a, 2016b; California Regional Water Quality Control Board, Lahontan Region, 2015; City of Palmdale, 2012; Sanitation Districts of Los Angeles County, 2016a, 2016b; Palmdale Water District, 2010
mgd = million gallons per day N/A = not applicable

Storm Drains

Storm drain systems are more prominent in developed urban areas. In rural areas, roadside ditches, irrigation canals, and natural drainages convey stormwater runoff. The storm drainage systems for the counties and cities in the Bakersfield to Palmdale Project 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 Los Angeles County Flood Control District and Kern County Flood Control District are responsible for planning and managing flood control areas within the RSA.

Solid Waste Facilities

Under the Resource Conservation and Recovery Act and AB 939, county or municipal solid waste disposal facilities are required to plan for nonhazardous solid waste facility expansions or additions from all anticipated sources. Following reuse or recycling, anticipated HSR solid waste disposal volumes destined for county and municipal facilities would be considered in the mandated 5-year Countywide Siting Element review process, along with all other prospective sources, and eventually included in the affected Integrated Waste Management Plan documentation.

The following sections discuss solid waste facilities that may serve the Bakersfield to Palmdale Project Section. No active solid waste disposal facilities (i.e., landfills) or recycling facilities are located within the RSA. The nearest landfill is in Lancaster and approximately 1.25 miles east of the project footprint.

The Kern County Waste Management Department operates landfills in Bakersfield, Mojave-Rosamond, and Tehachapi (Kern County), and Waste Management operates landfills in Lancaster and Palmdale (Los Angeles County) (California Department of Resources, Recycling, and Recovery 2016b). Table 3.6-7 lists the permitted daily disposal capacities, remaining capacities, and estimated closure dates for the landfills within 10 miles of the project footprint.

Wind Turbines

The Tehachapi Mountains region of California is considered to be the birthplace of wind power in North America. The open spaces, along with winds averaging 14 to 20 miles per hour, make it ideal for a renewable and clean energy center. While the first turbines installed in the 1980s stood between 45 and 60 feet high, they now stretch up to between 400 and 500 feet high and can produce from 1 to 2.4 megawatts (MW) of power. Several wind turbines cross into the RSA and are within the project footprint.

3.6.5.3 Energy

California is ranked second in energy consumption in the U.S., behind Texas. The transportation sector consumes 38.7 percent of California's energy, the industrial sector consumes 24.4 percent, the residential sector consumes 18.3 percent, and the commercial sector consumes 18.6 percent (U.S. Energy Information Administration 2016a). In California, electricity (0.1 percent), natural gas (1.2 percent), and petroleum (98.7 percent) comprise nearly all of the transportation energy, while coal (2.0 percent), natural gas (55.88 percent), electricity (11.8 percent), petroleum (27.4 percent), and renewable sources (2.9 percent) comprise the industrial sector's energy (U.S. Energy Information Administration 2015a).

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 227,606 gigawatt-hours (GWh) in 1990 to 281,916 GWh in 2014. Electricity consumption growth rates fell from an estimated rate of 3.2 percent in the 1980s to a rate of 0.52 percent between 2000 and 2014 (CEC 2016c). Table 3.6-8 summarizes electricity consumption in Kern and Los Angeles Counties in 2015.

Table 3.6-7 Landfill Facility Summary for the Bakersfield to Palmdale Project Section

Facility Name	Activity	Type of Waste Accepted	Location	Permitted Daily Disposal Capacity (tons per day)	Remaining Capacity (million cubic yards)[1]	Permitted Disposal Area (acres)	Estimated Closure Date
Bakersfield Metropolitan (Bena) Sanitary Landfill	Solid waste landfill	Municipal solid waste, appliances, construction and debris waste, dead animals, electronics, furniture, green waste, tires, treated wood, used motor oil	2951 Neumarkel Road, Caliente, CA (approximately 1.5 miles east of the project footprint)	4,500	32.81	229.0	2046
Mojave-Rosamond Landfill	Solid waste landfill	Appliances, construction, dead animals, electronics, furniture, green waste, tires, treated wood, used motor oil	400 Silver Queen Road, Mojave, CA (approximately 10 miles east of the project footprint)	3,000	76.31	544.0	2123
Tehachapi Landfill	Solid waste landfill	Appliances, construction, dead animals, electronics, furniture, green waste, tires, treated wood	12001 E Tehachapi Boulevard, Tehachapi, CA (approximately 3 miles east of the project footprint)	1,000	0.52	31.7	2020
Lancaster Landfill and Hauling	Solid waste landfill	Municipal solid waste, asphalt/concrete, dirt, wood waste and green waste, construction and demolition waste, appliances, tires, electronic waste	600 E Avenue F, Lancaster, CA (approximately 1.25 miles east of the project footprint)	5,100	14.51	210.0	2044
Antelope Valley Public Landfill	Solid waste landfill	Municipal solid waste, nonfriable asbestos, drum management—solids, tires	1200 W City Ranch Road, Palmdale, CA (approximately 1.75 miles west of the project footprint)	3,564	18.30	125.0	2042
Total				**17,164**	**142.45**	**1,139.7**	**N/A**

Source: California Department of Resources Recycling and Recovery, 2016b

[1] Daily disposal volumes are obtained from the average of the first quarter (the months of January, February, and March).

N/A = not applicable

Table 3.6-8 2015 Electricity Consumption in Kern and Los Angeles Counties

County	2015 Usage (million kilowatt-hours)
Kern	15,071
Los Angeles	69,529

Source: California Energy Commission, 2016a

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 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 3:00 p.m. and 5:00 p.m. In the San Joaquin Valley, high air conditioning loads and irrigation pumping contribute to this summer peak demand.

Generation

California is ranked second in the nation for retail electricity sales (U.S. Energy Information Administration 2016a). The projected net qualifying capacity within the grid controlled by the California Independent System Operator for summer 2016 was 54,459 MW (California Independent System Operator 2016). Table 3.6-9 summarizes fuel sources for electric power in California for 2015. In-state electricity generation accounted for 66 percent of the total electricity supply for California in 2015.

Electricity Demand and Generation Capacity Outlook

Statewide, the projected average summer power supply in 2015 was forecast at 63,822 MW. Assuming 1-in-2 summer temperatures,[3] demand was approximately 47,188 MW. The result is an average planning reserve margin of 39.1 percent (California Independent System Operator 2015). California's population is projected to exceed 49 million by 2025 and more than 53 million by 2030, requiring an additional 92,000 MW of peak summer capacity in 2030 to meet demand and have an adequate reserve margin (Electric Power Group 2004).

Table 3.6-9 Fuel Sources for Electric Power in California in 2015

Fuel Source	In-State Generation (gigawatt-hours)	Imports (gigawatt-hours)	Percentage of Fuel Mix
Coal	538	17,197	6.0
Oil	54	0	0.0
Nuclear	18,525	8,726	9.2
Hydroelectric	13,992	4,572	6.3
Renewable	45,582	16,583	21.0
Natural Gas	117,490	12,260	44.0
Unspecified Sources of Power	NA	39,873	13.5
Total	**196,181**	**99,211**	**100.0**

Source: California Energy Commission, 2016d
NA = not available

Projections of in-state generation capacity for 2040 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 2010 power supply assessment projects that

[3] 1-in-2 forecasted temperatures are temperatures with a 50 percent chance of not being exceeded.

sufficient electricity generation resources exist or have been proposed such that all subregions meet their planning reserve margins. 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) (Western Electricity Coordinating Council 2010).

California's Renewable Portfolio Standards, established in 2002 and expanded in 2011 under SB 2, require investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020. CPUC and the CEC jointly implement the Renewable Portfolio Standards program. SB 350 has recently reaffirmed California's commitment to the Renewable Portfolio Standards. Specifically, SB 350 requires that California increase the amount of electricity procured from renewable energy sources from 33 percent to 52 percent by 2030, with interim targets of 40 percent by 2024 and 25 percent by 2027.

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] 2011b). 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 managing 80 percent of the system's reliability and nondiscriminatory transmission of energy, operates the majority of California's transmission system.

In addition to the in-state transmission connections, there is a system of transmission interconnections that connects 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] 2011b). 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 2.31 trillion cubic feet in 2015 (U.S. Energy Information Administration 2016c). Natural gas is the most used fuel for electricity generation in California, and approximately 45 percent of the natural gas consumption is for electricity generation (CEC 2016e). In 2015, California produced 10 percent of the natural gas consumed in the state, with 90 percent imported (U.S. Energy Information Administration 2016d). By 2025, California is expected to import 98 percent of its natural gas demand. According to the CEC, these imports will likely be received from the Southwest (47 percent), the Malin Hub in Oregon (36 percent), the Rocky Mountains, and the Kern River (15 percent) (CEC 2016e).

The CEC predicts that overall natural gas demand for power generation in California will decline by about 37 percent over the period from 2013 to 2030, due in part to increasing renewable generation and energy efficiency (CEC 2016c). Due to new technologies, natural gas production within the contiguous U.S. is projected to grow at an annual average rate of 4 percent over the period from 2016 to 2020. Beyond 2020, production is projected to grow at an annual average rate of 1 percent (U.S. Energy Information Administration 2017a). Natural gas supplies are not considered to limit California's projected demand.

Petroleum

Even though California's crude oil production has declined overall in the past 30 years, the state remains one of the top producers of crude oil, ranking third in the nation and accounting for about 6 percent of total U.S. production in 2015. Petroleum reservoirs in the geologic basins along the

Pacific Coast and in the Central Valley contain major crude oil reserves. The most prolific oil-producing area is the San Joaquin basin in the southern half of the Central Valley. California ranks third in the nation in petroleum refining capacity and accounts for more than 10 percent of the total U.S. capacity (U.S. Energy Information Administration 2016b).

California is the second-largest consumer of petroleum in the nation, consuming approximately 9.1 percent of U.S. shares. Motor vehicle travel within the state contributes to energy use by California's transportation sector, and transportation dominates the state's energy consumption profile. More motor vehicles are registered in California than in any other state, and commute times in California are among the longest in the country (U.S. Energy Information Administration 2016b, 2017b). Automobile travel is the predominant mode of passenger transportation within the RSA. Historically, demand for transportation services (and petroleum consumption) in California has mirrored the growth of the state's population and economic output. The *Transportation Energy Demand Forecast, 2016-2026* (CEC 2016b) indicates that VMT has been steadily increasing since the 2008 economic recession, at an average rate of 1.4 percent annually, with a new high in 2014 at 326 billion miles. The report projects that on-road gasoline demand will decrease from approximately 14 billion gallons to 10 billion gallons between 2015 and 2026 (a 28.5 percent decrease), due in part to Corporate Average Fuel Economy and zero-emission vehicles regulations. Diesel demand is projected to increase modestly from 2015 to 2020. It is then expected to decrease from 2020 to 2026 under a low-petroleum-demand case and increase from 2020 to 2026 under a high-petroleum-demand case.

3.6.6 Environmental Consequences

This section provides the impact analysis related to public utilities and energy for the B-P Build Alternatives, which includes tracks, stations, and maintenance facilities, unless otherwise noted. The 2005 Statewide Program EIR/EIS addressed consultation with each utility provider and owner to avoid or reduce potential impacts on existing and planned utilities. The impacts related to public utilities and energy are similar among the B-P Build Alternatives. Therefore, for the purposes of this analysis, the impacts would be the same for each B-P Build Alternative.

3.6.6.1 Overview

This section evaluates how the No Project Alternative and the B-P Build Alternatives could affect public utilities and energy. The impacts of the B-P Build Alternatives are described and organized as follows:

Public Utilities

- **Construction Impacts**
  - Impact PU&E #1: Planned Temporary Interruption of Utility Service
  - Impact PU&E #2: Accidental Disruption of Services
  - Impact PU&E #3: Effects from Water Demand during Construction
  - Impact PU&E #4: Effects from Stormwater during Construction
  - Impact PU&E #5: Effects from Waste Generation during Construction
- **Operations Impacts**
  - Impact PU&E #6 Conflicts with Existing Utilities
  - Impact PU&E #7: Reduced Access to Existing Utilities in the HSR Right-of-Way
  - Impact PU&E #8: Effects from Upgrade or Construction of Power Lines
  - Impact PU&E #9: Potential Conflicts with Oil Wells
  - Impact PU&E #10: Potential Conflicts with Renewable Energy Facilities
  - Impact PU&E #11: Operational Water Supply Demand
  - Impact PU&E #12: Operational Wastewater Service Demand
  - Impact PU&E #13: Effects on Storm Drain Facilities
  - Impact PU&E #14: Effects on Waste Generation during Operation
  - Impact PU&E #15: Effects from Hazardous Waste Generation

The B-P Build Alternatives are in the San Joaquin Valley, the Tehachapi Mountains, and the Antelope Valley, which includes rural areas in unincorporated Kern and Los Angeles Counties as well as urban areas in Bakersfield, Tehachapi, Lancaster, and Palmdale. Public utilities currently operate within these areas. Construction and operation of the B-P Build Alternatives could result in interruptions of utility services, utility relocation or encasement, and the expansion of existing facilities or construction of new facilities or entitlements, although impacts would be minimized through project design. Figure 3.6-1, Figure 3.6-2, Figure 3.6-3, Figure 3.6-4, Figure 3.6-5, Figure 3.6-6, Figure 3.6-7, and Figure 3.6-8 identify various utilities and facilities located along the Bakersfield to Palmdale Project Section.

Energy

- **Construction Impacts**
  - Impact PU&E #16: Construction Energy Consumption
- **Operations Impacts**
  - Impact PU&E #17: Operational Energy Demand (Btu per day)

As described above, the B-P Build Alternatives are in rural and urban areas between the cities of Bakersfield and Palmdale. Energy demand currently occurs within these areas. Construction and operation of the B-P Build Alternatives could result in additional energy demand within these areas, although impacts would be minimized through project design.

3.6.6.2 No Project Alternative

The population in Los Angeles and Kern Counties is projected to grow, as discussed in Chapter 1, Project Purpose, Need, and Objectives, and 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 commercial centers, industrial parks, road network improvements, and residential developments, between the Cities of Bakersfield and Palmdale. These projects are planned or approved to accommodate the growth projections in the area. As discussed in Section 3.6.5, Affected Environment, local utilities have capital improvement plans to accommodate anticipated population growth. These improvements include expansion of wastewater treatment plants and infrastructure additions, as well as upgrades to provide services to accommodate growth and development. Upgrades to existing utility suppliers may therefore still occur due to population or development growth.

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, daily VMT in Kern and Los Angeles Counties would increase by 2040. In 2040, VMT would consume an estimated 975,577 MMBtu per day in the Bakersfield to Palmdale region (Bureau of Transportation Statistics 2014). Potential increases in petroleum demand due to increased vehicle travel could be a concern under the No Project Alternative.

3.6.6.3 Bakersfield to Palmdale Project Section Build Alternatives

The B-P Build Alternatives incorporate elements that minimize electricity consumption (e.g., using regenerative braking and energy-saving equipment and facilities). The B-P Build Alternatives would be constructed and operated in an energy-efficient manner. For example, the stations and maintenance facilities would qualify for Leadership in Energy and Environmental Design certification, and renewable energy would power the B-P Build Alternatives 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 locate public utilities within the potential impact area (by probing, potholing, electronic detection, as-built designs, or other means) prior to construction, in compliance with state law (i.e., California Government Code 4216). Where it is not possible to avoid utilities, the utilities would be improved (e.g., steel pipe encasement) so there would be no damage or impairment to the operation of these utilities from the B-P Build Alternatives.

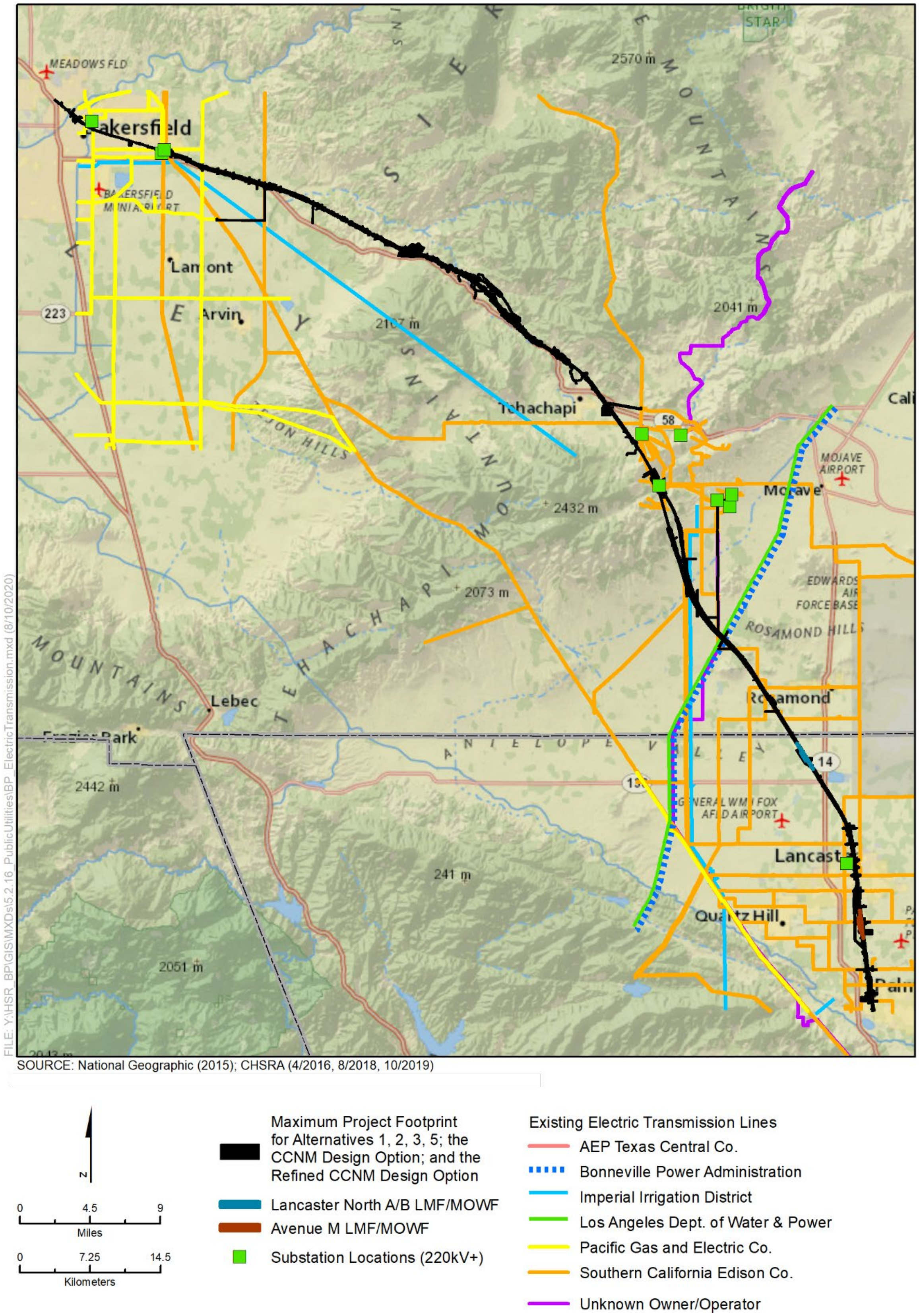
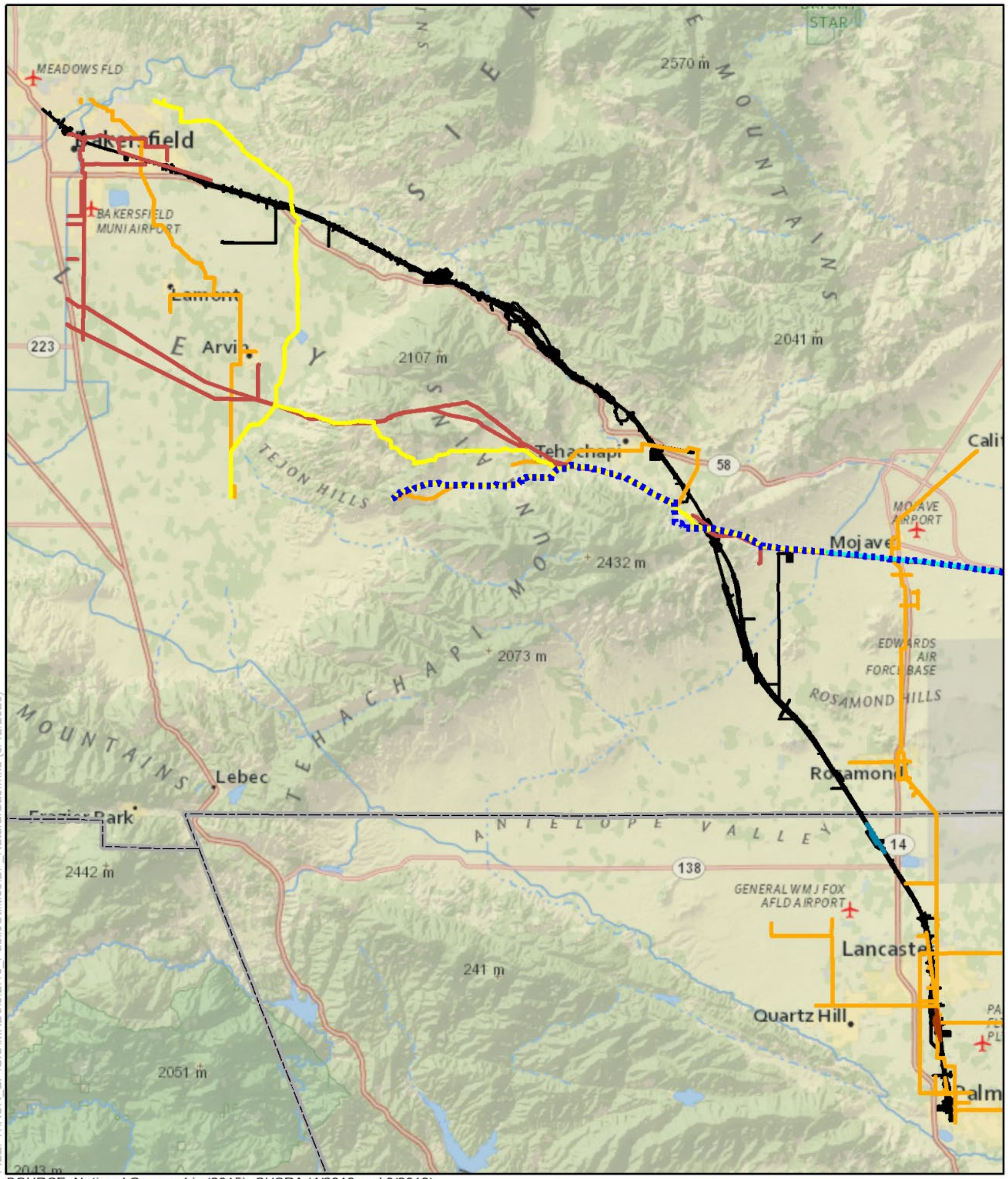


Figure 3.6-1 Electric Transmission Lines and Substations



SOURCE: National Geographic (2015); CHSRA (4/2016 and 8/2018)

N

0 4.5 9 Miles

0 7.25 14.5 Kilometers

Maximum Project Footprint for Alternatives 1, 2, 3, 5; the CCNM Design Option; and the Refined CCNM Design Option

Lancaster North A/B LMF/MOWF

Avenue M LMF/MOWF

Natural Gas Pipelines

El Paso Natural Gas Co.

Kern River Gas Transmission Co.

Mojave Pipeline Operating Co.

Pacific Gas and Electric Co.

Southern California Gas Co.

Figure 3.6-2 Natural Gas Pipelines

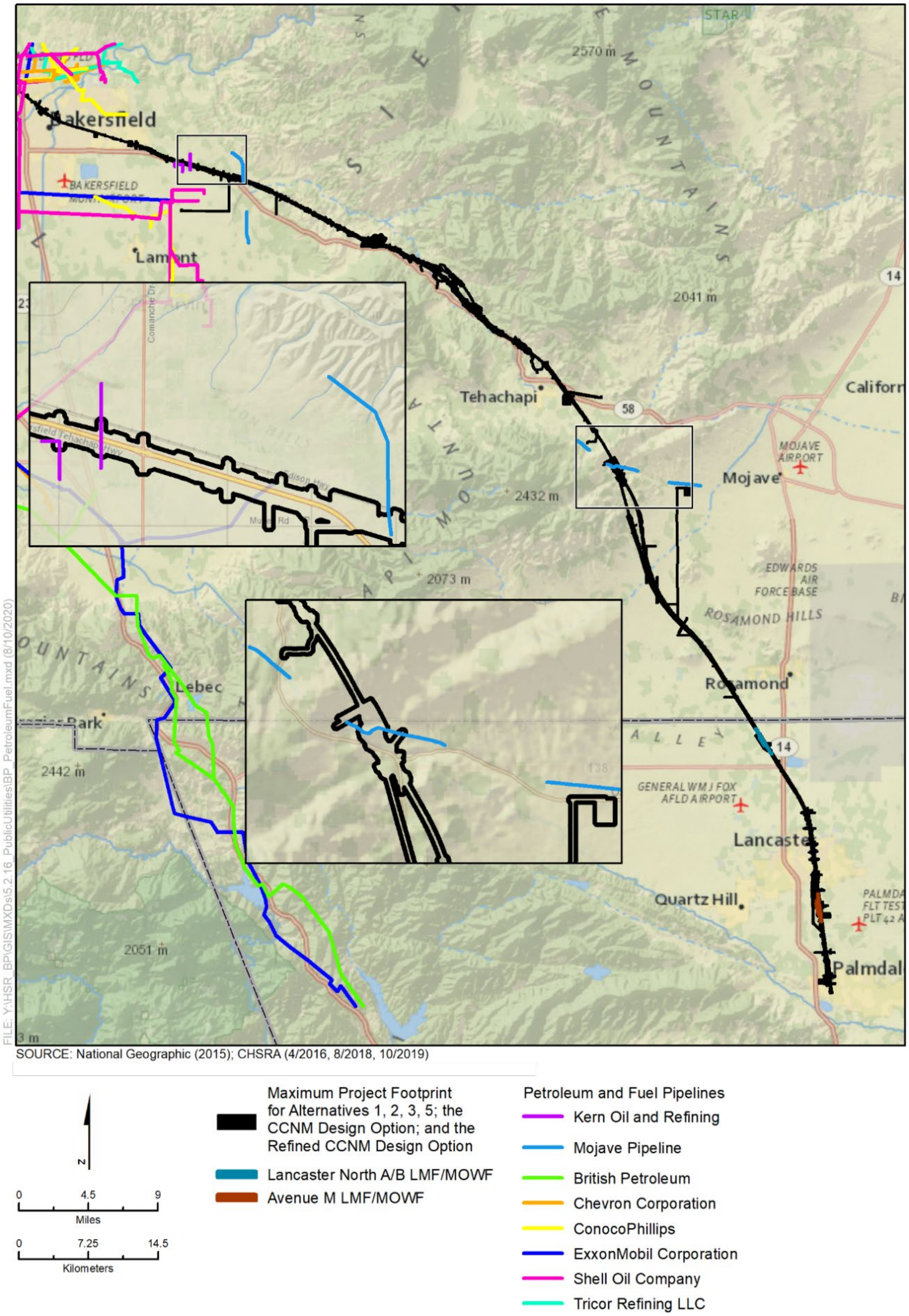
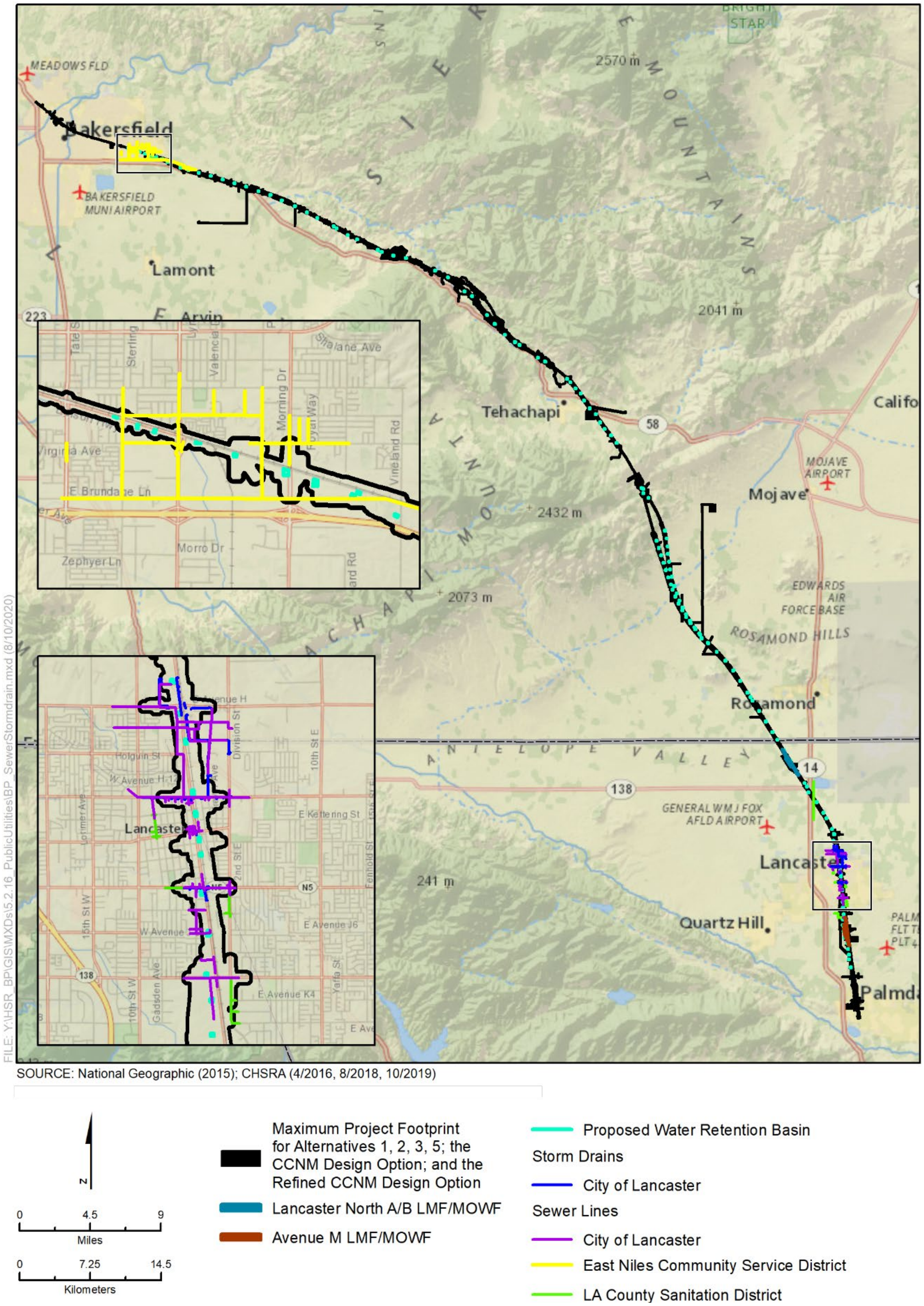


Figure 3.6-3 Petroleum and Fuel Pipelines



SOURCE: National Geographic (2015); CHSRA (4/2016, 8/2018, 10/2019)

Figure 3.6-4 Sewer Pipelines, Storm Drains, and Proposed Stormwater Retention Basins

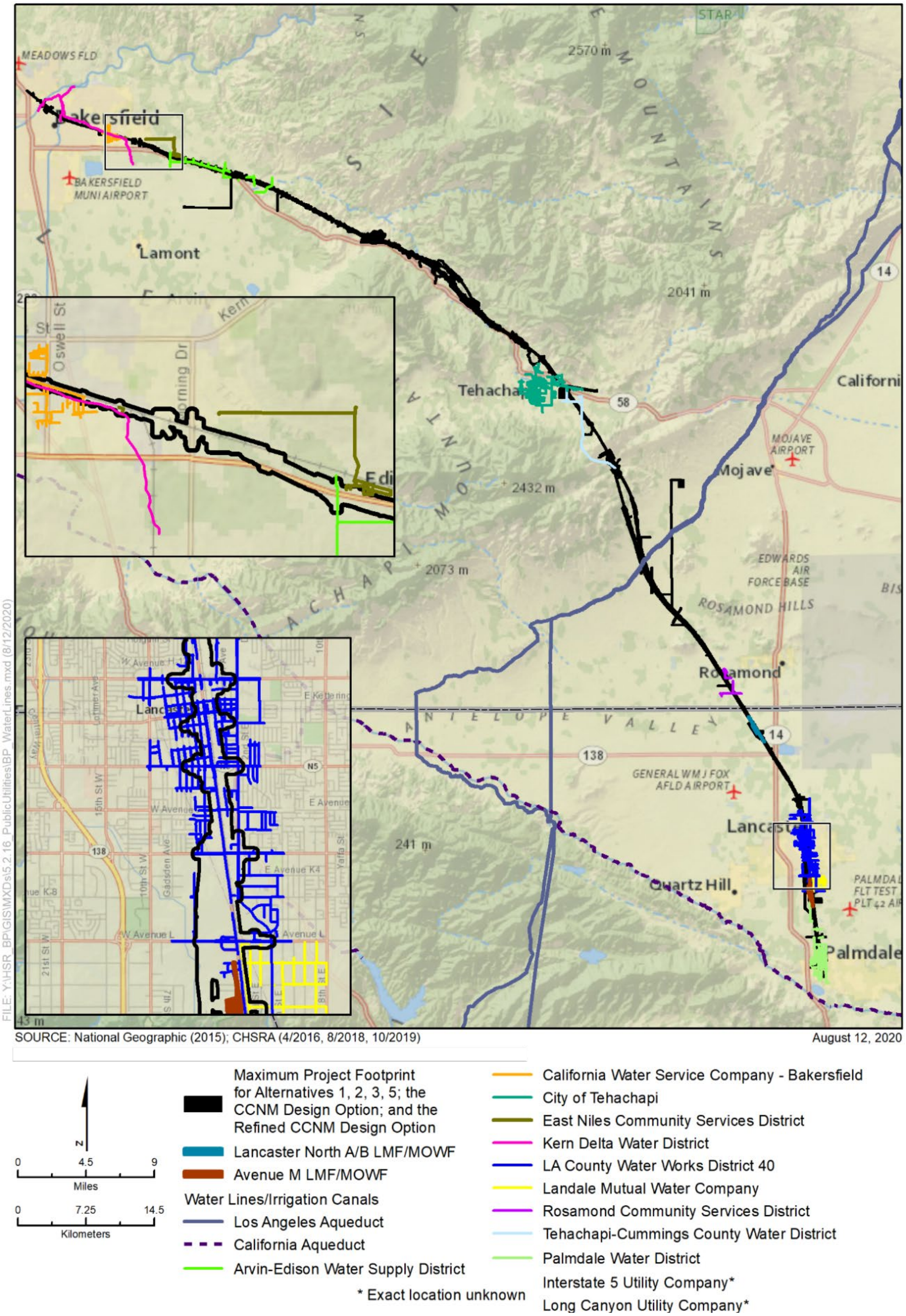
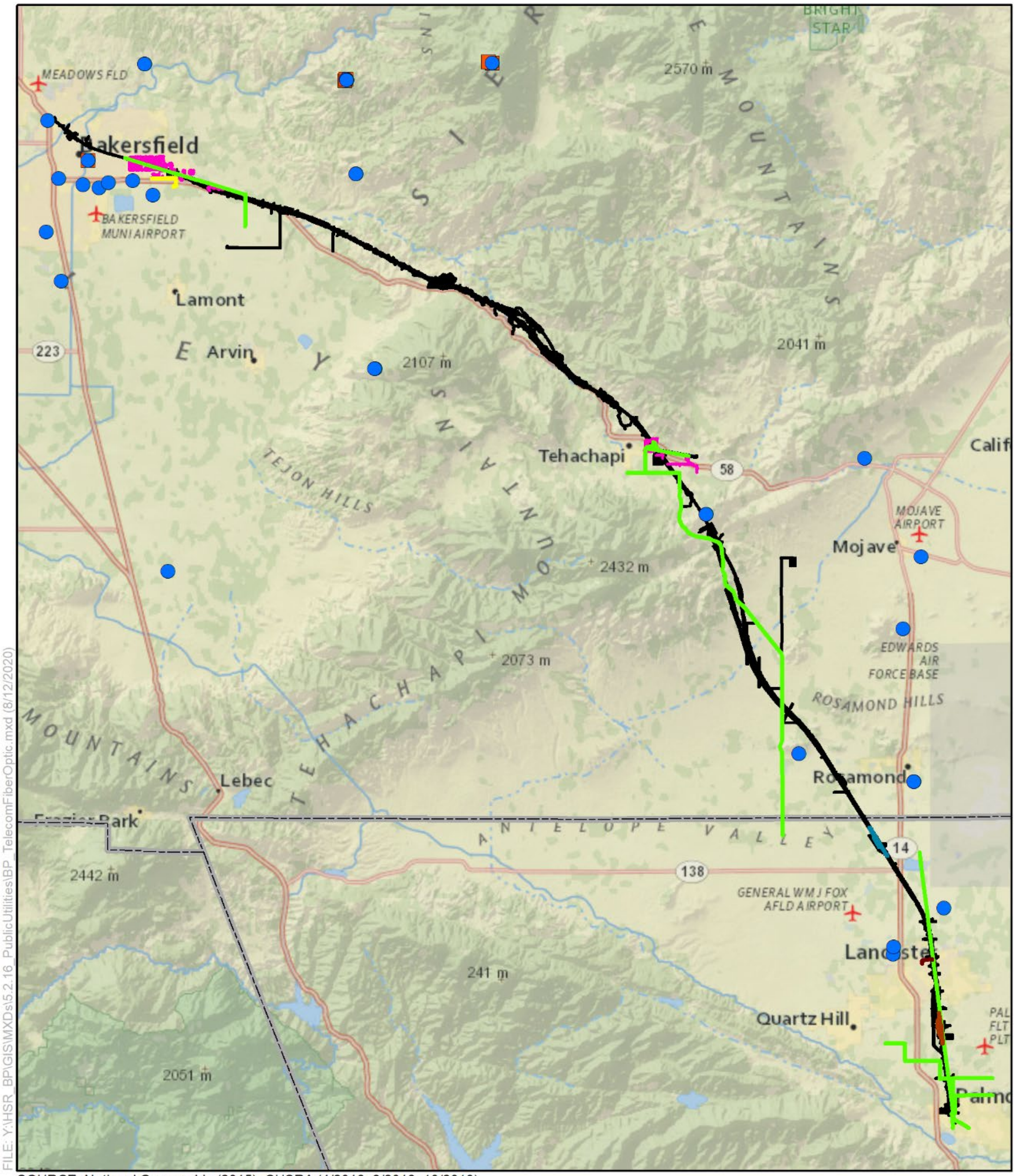


Figure 3.6-5 Water Pipelines and Irrigation Canals



FILE: Y:\HSR_BP\GIS\MXDs\5.2.16_PublicUtilities\BP_TelecomFiberOptic.mxd (8/12/2020)

SOURCE: National Geographic (2015); CHSRA (4/2016, 8/2018, 10/2019)

N

0 4.5 9 Miles

0 7.25 14.5 Kilometers

- Maximum Project Footprint for Alternatives 1, 2, 3, 5; the CCNM Design Option; and the Refined CCNM Design Option
- Lancaster North A/B LMF/MOWF
- Avenue M LMF/MOWF

Communication Facilities

- Radio Broadcast Facility
- TV Broadcast Facility

Fiber Optic Lines

- Central Valley Information Network, LLC
- LA County Utility Services Department
- Transcontinental (Long Distance)

Telecom Lines

- Bright House Networks

Figure 3.6-6 Communication Facilities and Sites

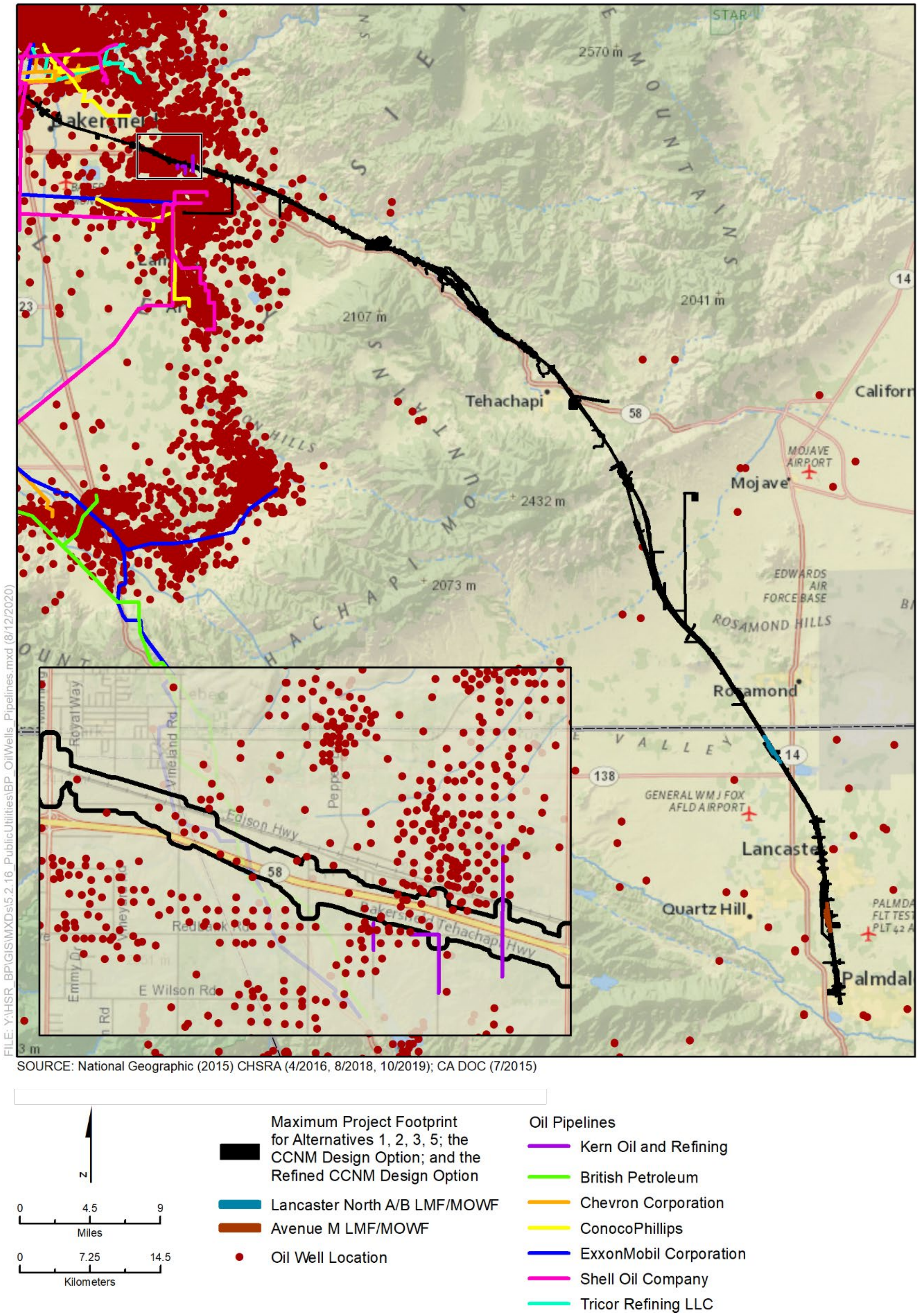


Figure 3.6-7 Oil Wells and Pipelines

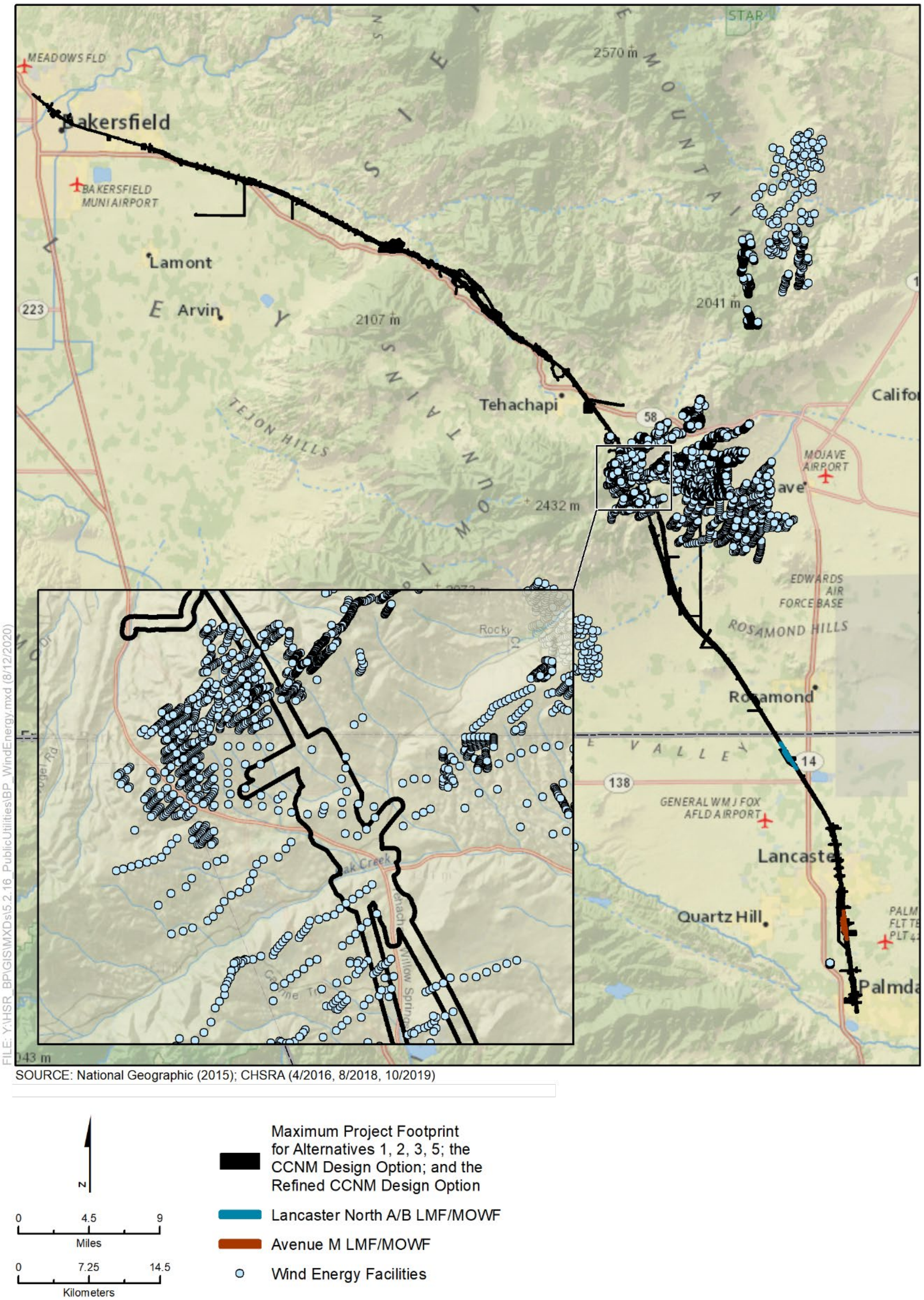


Figure 3.6-8 Wind Turbines

This section evaluates direct and indirect impacts associated with public utilities and energy that would result from construction and operation of the B-P Build Alternatives. For CEQA, impacts are assessed after consideration of the IAMFs listed in Section 3.6.4.2 but before consideration of the mitigation measures identified in Section 3.6.7, Mitigation Measures. For NEPA, impacts are assessed after consideration of both IAMFs and mitigation measures.

Fresno to Bakersfield Locally Generated Alternative from the Intersection of 34th Street and L Street to Oswell Street Environmental Consequences and CEQA Significance

The impacts to utilities and energy generation/transmission for the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street are addressed in the *Fresno to Bakersfield Section Draft Supplemental EIR/EIS* (Authority and FRA 2017) and *Fresno to Bakersfield Section Final Supplemental EIR* (Authority 2018b). However, the analysis within this EIR/EIS below also reflects this portion of the F-B LGA alignment between the intersection of 34th Street and L Street and Oswell Street in Bakersfield.

Public Utilities

Construction Impacts

Common Utility Impacts

The construction of any of the B-P Build Alternatives, station sites, electrical interconnections, and maintenance facilities could result in planned temporary interruption of utility service, accidental disruption of service, increased water use, and increased stormwater and waste generation.

Impact PU&E #1: Planned Temporary Interruption of Utility Service

Construction could require the temporary shutdown of utility lines (e.g., water, sewer, electricity, telecommunications, fuel/petroleum, or gas) to safely move or extend these lines. Shutdown could interrupt utility services to industrial, commercial, agricultural, and residential customers.

Project design and phasing of construction activities would minimize interruptions, including for new transmission lines and upgrades of existing power lines to connect the B-P Build Alternatives to existing PG&E and SCE substations, new traction power substations, switching stations, and paralleling stations. As described in PUE-IAMF#3, prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public within that jurisdiction and the affected service providers of the planned outage through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means). 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. Additionally, as described in PUE-IAMF#4, prior to construction, the contractor would prepare a technical memorandum documenting how construction activities would be coordinated with service providers to minimize or avoid interruptions.

CEQA Conclusion

With implementation of PUE-IAMF#3 and PUE-IAMF#4 as identified above, the impact of temporary interruption of services under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

Impact PU&E #2: Accidental 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, sewer, and natural gas pipelines), is low due to the established practices of utility identification and notification (PUE-IAMF#4 and PUE-IAMF#3). In addition, California Government Code Section 4216 establishes required procedures for identifying buried utilities prior to initiating excavation. 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 to help avoid accidental disruption of utility services.

CEQA Conclusion
With implementation of PUE-IAMF#3 and PUE-IAMF#4 during construction, as identified above, the impact of accidents and disruption of services under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

Impact PU&E #3: Effects from Water Demand during Construction
Construction activities would use water to prepare concrete, to increase the water content of soil to optimize compaction for dust control, to re-seed disturbed areas, for earthwork, and for tunnel construction and excavation. Table 3.6-10 shows a summary of the estimated water usage for the B-P Build Alternatives, maintenance facilities, and station facilities.[4] Detailed information regarding existing water use and the anticipated water demand for the B-P Build Alternatives is provided in Appendix 3.6-B, Technical Memorandum: Water Usage Analysis, for the Bakersfield to Palmdale Project Section.

The average annual water use over the construction period[5] for Alternatives 1, 2, and 5 is 1,815.6 acre-feet/year. Alternative 3 would result in the greatest amount of construction water use, 1,819.5 acre-feet/year, which is less than the 2,940.99 acre-feet/year of existing demand, due to the elimination of water use for existing purposes (including agriculture) within the HSR construction footprint. Because there would be a decrease in water demand, sufficient water supplies would be available to serve the B-P Build Alternatives, as well as reasonably foreseeable developments, during normal, dry, and multiple dry years. Water for construction of the B-P Build Alternatives would be hauled by truck from existing municipal providers, and these supplies are sufficient to meet construction water demands for the whole alignment in addition to existing municipal supply demands (Authority 2019a). Due to groundwater constraints in the City of Tehachapi, water for construction in the Tehachapi area would be obtained from municipal providers in Bakersfield or Lancaster and trucked to Tehachapi-area construction sites. Water trucks would also provide water for dust control, compaction needs, and mix-water in rural and undeveloped areas. Water trucks could be used in remote areas. Construction of the B-P Build Alternatives would not require construction, relocation, or expansion of a water treatment facility.

CEQA Conclusion
Because construction of the B-P Build Alternatives would not require construction, relocation, or expansion of a water treatment facility and would also have sufficient water supplies available to serve the project and reasonably foreseeable development during normal, dry and multiple dry years, the impact of water demand during construction under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

Impact PU&E #4: Effects from Stormwater during Construction
As discussed in Section 3.8, Hydrology and Water Resources, construction activities such as grading and excavation could redirect stormwater runoff and increase the volume and rate of stormwater runoff through soil compaction during ground-disturbing activities. Further, construction has the potential to generate wastewater and create a need for dewatering. However, construction activities associated with the B-P Build Alternatives would be subject to the requirements of the Construction General Permit, as specified in HYD-IAMF#3: Prepare and Implement a Construction Stormwater Pollution Prevention Plan. Compliance with the Construction General Permit requires the implementation of hydromodification controls to maintain pre-project hydrology by emphasizing on-site retention of stormwater during construction. Through compliance with the requirements of HYD-IAMF#3, the volume and rate of stormwater runoff from construction sites would not require the construction, relocation, or expansion of existing stormwater infrastructure.

[4] As explained in Appendix 3.6-B, to estimate "existing water usage" for the B-P Build Alternatives and maintenance facility sites, water usage factors from the Regional Urban Water Management Plan (adopted in June 2011) and crop-specific water usage rate tables published in 2010 by the California Department of Water Resources were applied to the existing land uses.
[5] Per the 2012 Business Plan, the construction period was estimated to last at least 8 years.

Table 3.6-10 Construction Water Demand Summary for the Bakersfield to Palmdale Project Section

Facility Type	Facility Name	Annual Water Usage (acre-feet)
Existing Water Usage		
Track and Maintenance Facilities	Alternative 1	2,760.16
	Alternative 2	2,848.32
	Alternative 3	2,847.21
	Alternative 5	2,709.66
	CCNM Design Option	+2.26
	Refined CCNM Design Option	+60.97
Stations	Bakersfield Station—F-B LGA	84.37
	Palmdale Station	144.70
Minimum Use Total		**2,940.99**
Construction Water Usage[1]		
Track and Maintenance Facilities[2]	Alternatives 1, 2, 3, and 5; LMF; and MOWF	1,719.80[1]
Tunnel Liner	Alternatives 1, 2, and 5	11.00
	Alternative 3	11.60
	CCNM Design Option	+0.20
	Refined CCNM Design Option	+2.00
Tunnel Portal	Alternatives 1, 2, 3, and 5	0.90
Tunnel Excavation	Alternatives 1, 2, and 5	48.40
	Alternative 3	53.00
	CCNM Design Option	+0.60
	Refined CCNM Design Option	+4.20
Stations	Bakersfield Station—F-B LGA	21.28
	Palmdale Station	6.72
Maximum Use Total		**1,819.50**
Total Change		**-948.69**

[1] Construction water is annualized for a 5-year construction period, except as noted otherwise.
[2] Maximum Use Total is the combination of facility alternatives with the highest demand, not including stations.
CCNM = César E. Chávez National Monument
F-B LGA = Fresno to Bakersfield Locally Generated Alternative
LMF = light maintenance facility
MOWF = maintenance-of-way facility

CEQA Conclusion

With implementation of HYD-IAMF#3, as identified above, the impacts from stormwater during construction under CEQA would be less than significant, because construction activities would not result in the construction of new stormwater drainage facilities or the relocation or expansion of existing facilities. Therefore, CEQA does not require any mitigation.

Impact PU&E #5: Effects from Waste Generation during Construction

Temporary housing, workers (meals, restrooms, office supplies, trailer cleaning, etc.), construction debris, clearing and grubbing, excess construction materials, forms, and demolition of bridges would generate solid waste. Construction of any of the B-P Build Alternatives and maintenance facilities would generate an estimated 889,494 cubic yards of solid waste. The MOWF would generate 7,468 cubic yards of solid waste during construction. The LMF would generate 8,614 cubic yards of solid waste during construction. Additionally, construction of the Palmdale Station would generate approximately 416,000 cubic yards of solid waste.

As standard construction practice, to the extent practicable, the contractor would divert C&D waste from landfills by reusing or recycling to aid with implementing the Local Government C&D Guide (SB 1374) and to meet solid waste diversion goals. 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 California Green Building Standards Code requires every city and county to develop a waste management plan and divert at least 65 percent of the construction materials generated (California Department of Resources, Recycling, and Recovery 2016a). The Authority's 2013 sustainability policy specifies all (100 percent) steel and concrete would be recycled, and a minimum of 75 percent construction waste would be diverted from landfills (Authority 2016a). The landfills to which C&D material from the B-P Build Alternatives 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 four active landfills that accept C&D material, other regional facilities may be used for waste disposal. It is estimated that the total volume of C&D material would be approximately 1.3 million cubic yards before recycling (approximately 1 percent of the total remaining capacity of the four active landfills that accept C&D material, which were previously identified in Table 3.6-7). After diversion, C&D materials would occupy approximately 0.26 percent of the total remaining capacity of the active landfills. Existing landfills serving counties within which the B-P Build Alternatives would be constructed have adequate estimated capacities through 2040 or longer. Under the Resource Conservation and Recovery Act and AB 939, affected county or municipal solid waste disposal facilities are required to plan for nonhazardous solid waste facility expansions or additions from all anticipated sources. Following reuse or recycling, anticipated HSR solid waste disposal volumes destined for county and municipal facilities would be considered in the mandated 5-year Countywide Siting Element review process, along with all other prospective sources, and eventually included in the affected Integrated Water Management Plan documentation. The B-P Build Alternatives would comply with federal, state, and local management and reduction statutes and regulations related to solid waste, and there is sufficient permitted capacity at the landfills serving the Bakersfield to Palmdale Project Section to accommodate solid waste disposal needs.

As discussed in Section 3.10, Hazardous Materials and Wastes, construction would generate hazardous wastes such as diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals. During demolition, excavation, tunneling, or other activities, contaminated media currently in-situ could become hazardous waste, such as asbestos-containing materials and lead. The Authority would handle, store, and dispose of all hazardous waste in accordance with applicable requirements, including the Resource Conservation and Recovery Act (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. The Kettleman Hills Landfill is a chemical waste disposal and treatment facility with a capacity of 10 million cubic yards. The 1,600-acre site accepts waste from all over the western U.S., although it primarily serves California. It has approximately 4.9 million cubic yards of permitted capacity, with a projected life remaining of 30 years or more (beyond 2045) (Waste Management 2015). Hazardous waste could be disposed of at permitted landfills that have sufficient capacity through any of the B-P Build Alternatives' construction periods.

CEQA Conclusion

With implementation of the above-stated regulatory requirements, the impact of construction waste generation under CEQA would be less than significant because it would not exceed state or local standards, nor the capacity of local infrastructure, and would not otherwise impair the attainment of solid waste reduction goals. Therefore, CEQA does not require any mitigation.

Operations Impacts

Common Utility Impacts

The operation and maintenance of the B-P Build Alternatives could result in permanent relocation and extension of utilities; reduced access to existing utilities in the project footprint; and increased demand for water, wastewater, and waste disposal services. None of the B-P Build Alternatives would physically encroach on the footprint of water or wastewater treatment facilities.

Impact PU&E #6: Conflicts with Existing Utilities

Table 3.6-11, Table 3.6-12, and Table 3.6-13 show the number of high-risk and major utilities, other significant utility facilities, and low-risk utilities, respectively, that the B-P Build Alternatives could affect. Alternative 5 would conflict with, or require the relocation of, 243 high-risk and major utilities, which is the largest number among the B-P Build Alternatives. Alternative 2 would conflict with 187 high-risk and major utilities, which is the smallest number among the B-P Build Alternatives. Alternatives 1 and 3 would conflict with 193 and 190 high-risk and major utilities, respectively.

Table 3.6-11 Bakersfield to Palmdale Project Section Impacts to High-Risk and Major Utilities.

Facility Type	Electrical Lines (greater than 69 kV)	Natural Gas Distribution Pipelines	Petroleum and Fuel Pipelines	Oil Wells	Water Pipelines	Sewer Force Mains	Electrical Substations	Total
Track Alignments and Maintenance Facilities[1]								
Alternative 1	37	44	5	8	96	2	1	**193**
Alternative 2	37	45	4	8	90	2	1	**187**
Alternative 3	35	43	5	8	97	2	0	**190**
Alternative 5	34	69	5	8	124	2	1	**243**
CCNM Design Option	0	0	0	0	0	0	0	**0**
Refined CCNM Design Option	0	0	0	0	0	0	0	**0**
Range of Impacts	**34–37**	**43–69**	**4–5**	**8**	**90–124**	**2**	**0–1**	**187–243**
Station Sites								
Bakersfield Station—F-B LGA[2]	3	1	1	N/A	0	0	0	**5**
Palmdale Station[3]	0	0	0	0	6	0	0	**6**
Range of Impacts	**0–3**	**0–1**	**0–1**	**0**	**0–6**	**0**	**0**	**0–11**
Total Range of Impacts	**37–40**	**44–70**	**5–6**	**8**	**96–130**	**2**	**0–1**	**187–254**

[1] Data for the B-P Build Alternatives and maintenance facilities are from the *Bakersfield to Palmdale Project Section Draft Preliminary Engineering for Project Definition Design Submission High Risk Utility Report* (Authority 2018a).
[2] Data for the Bakersfield Station—F-B LGA are from the *Fresno to Bakersfield Section Draft Supplemental EIR/EIS* (Authority and FRA 2017). High-risk and low-risk utility conflicts from the proposed F-B LGA would be comparable to those conflicts described in the *Fresno to Bakersfield Section Final EIR/EIS.*
[3] Data for the Palmdale Station are based on engineering estimates.
Authority = California High-Speed Rail Authority
CCNM = César E. Chávez National Monument
EIR/EIS = environmental impact report/environmental impact statement
F-B LGA = Fresno to Bakersfield Locally Generated Alternative
kV = kilovolt(s)
N/A = not applicable

Table 3.6-12 Bakersfield to Palmdale Project Section Impacts to Other Significant Utility Facilities

Facility Type	Wind Turbines	Solar Farms	Water Wells	Pump Stations	Reservoirs	Measurement Towers	Total
Track Alignments and Maintenance Facilities[1]							
Alternative 1	7	1	6	3	2	1	**20**
Alternative 2	7	0	9	2	2	1	**21**
Alternative 3	22	1	8	3	2	1	**37**
Alternative 5	7	1	4	2	2	1	**17**
CCNM Design Option	0	0	0	0	0	0	**0**
Refined CCNM Design Option	0	0	0	0	0	0	**0**
Range of Impacts	**7–22**	**0–1**	**4–9**	**2–3**	**2**	**1**	**17–37**
Station Sites							
Bakersfield Station—F-B LGA[2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Palmdale Station[3]	0	0	0	0	0	0	**0**
Range of Impacts	0	0	0	0	0	0	**0**
Total Range of Impacts	**7–22**	**0–1**	**4–9**	**2–3**	**2**	**1**	**17–37**

[1] Data for the B-P Build Alternatives and maintenance facilities are from the *Bakersfield to Palmdale Project Section Draft Preliminary Engineering for Project Definition Design Submission High Risk Utility Report* (Authority 2018a).
[2] Data for the Bakersfield Station—F-B LGA are from the *Fresno to Bakersfield Section Draft Supplemental EIR/EIS* (Authority and FRA 2017). High-risk and low-risk utility conflicts from the proposed F-B LGA would be comparable to those conflicts described in the *Fresno to Bakersfield Section Final EIR/EIS*.
[3] Data for the Palmdale Station are based on engineering estimates.
Authority = California High-Speed Rail Authority
CCNM = César E. Chávez National Monument
EIR/EIS = environmental impact report/environmental impact statement
F-B LGA = Fresno to Bakersfield (Locally Generated Alternative)
N/A = not applicable

Table 3.6-13 Bakersfield to Palmdale Project Section Impacts to Low-Risk Utilities

Facility Type	Electrical Lines (less than 69 kV)	Communications Facilities (telecom | fiber-optic)	Stormwater Pipelines/ Drainage Basins	Sewer Pipelines	Total
Track Alignments and Maintenance Facilities[1]					
Alternative 1	64	20 | 38	38	25	**185**
Alternative 2	63	19 | 37	31	25	**175**
Alternative 3	59	19 | 40	38	24	**180**
Alternative 5	78	28 | 28	51	35	**220**
CCNM Design Option	2	0	21	0	**23**
Refined CCNM Design Option	2	0	21	0	**23**
Range of Impacts	**61–80**	**19–28 | 28–40**	**52–72**	**24–35**	**198–243**
Station Sites					
Bakersfield Station—F-B LGA[2]	N/A	0 | N/A	0	16	**16**
Palmdale Station[3]	0	0	0	6	**6**
Range of Impacts	**0**	**0**	**0**	**22**	**22**
Total Range of Impacts	**61–80**	**19–28 | 28–40**	**52–72**	**46–57**	**220–265**

Source: California High-Speed Rail Authority, 2019

[1] Data for the B-P Build Alternatives and maintenance facilities are from the *Bakersfield to Palmdale Project Section Draft Preliminary Engineering for Project Definition Design Submission High Risk Utility Report* (Authority 2018a).

[2] Data for the Bakersfield Station—F-B LGA are from the *Fresno to Bakersfield Section Draft Supplemental EIR/EIS* (Authority & FRA 2017). High-risk and low-risk utility conflicts from the proposed F-B LGA would be comparable to those conflicts described in the *Fresno to Bakersfield Section Final EIR/EIS.*

[3] Data for the Palmdale Station are based on engineering estimates.

Authority = California High-Speed Rail Authority
CCNM = César E. Chávez National Monument
EIR/EIS = environmental impact report/environmental impact statement
F-B LGA = Fresno to Bakersfield (Locally Generated Alternative)
kV = kilovolt(s)
N/A = not applicable

As shown in Table 3.6-12, Alternative 3 would conflict with 37 significant utility facilities, which is the largest number among the B-P Build Alternatives. Alternative 5 would conflict with 17 significant utility facilities, which is the smallest number among the B-P Build Alternatives. Alternatives 1 and 2 would conflict with 20 and 21 significant utility facilities, respectively.

As shown in Table 3.6-13, Alternative 5 would conflict with 220 low-risk utilities, which is the largest number among the B-P Build Alternatives. Alternative 2 would conflict with 175 low-risk utilities, which is the smallest number among the B-P Build Alternatives. Alternatives 1 and 3 would conflict with 185 and 180 significant utility facilities, respectively.

Where overhead distribution lines conflict with the HSR facilities, 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. As discussed in Section 3.5, Electromagnetic Interference and Electromagnetic Fields, if adjacent pipelines and other linear metallic structures are not sufficiently grounded through the direct contact with earth, the project would include additional grounding of pipelines and other linear metallic objects. Relocated 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.

Where the B-P Build Alternatives would be on an elevated guideway, it is likely that disturbance to these utilities would be avoided during final engineering design for the specific placement of columns. However, at-grade guideways could result in the relocation of utilities and the construction of new transmission lines. Where existing underground utilities (e.g., gas, fuel, petroleum, water pipelines, pump stations, water wells, and communication facilities) conflict with the B-P Build Alternatives, these affected utilities would be placed in a protective casing or relocated so that future maintenance of the line could be accomplished outside the B-P Build Alternatives' rights-of-way. Construction of pump stations may also be necessary to provide adequate water pressure for emergency situations and would be connected to existing water pipelines.

Additionally, the Authority would work with irrigation districts and landowners to protect pipelines, ditches, reservoirs, and related irrigation systems including pump stations. As described in PUE-IAMF#2, where relocating irrigation infrastructure is necessary, the Authority would 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 HSR right-of-way.

The B-P Build Alternatives 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 B-P Build Alternatives to relocate utilities or protect them in place.

The B-P Build Alternatives may conflict with existing stormwater retention ponds and basins. However, the Authority would replace any stormwater basin capacity lost due to construction of the B-P Build Alternatives. Preliminary engineering has established the feasibility of either avoiding impacts on existing stormwater basins or relocating the stormwater basins within the B-P Build Alternatives' construction footprints. Any loss in capacity at the existing retention ponds would be restored within the existing utility footprint, as feasible, or the B-P Build Alternatives would be modified to avoid impacts (HYD-IAMF#1).

There are 10 electrical substations located within the RSA. Two are owned by PG&E and four are owned by SCE. The ownership of the remaining four is unknown. One PG&E substation would be displaced. Adjacent electrical lines leading into the substations are within the HSR construction footprint and may result in an indirect conflict with each substation. Where the B-P Build Alternatives would conflict with an existing electrical substation's ancillary infrastructure, and without taking the appropriate measures to reduce these conflicts, there is the potential for disruption in electric power within the area serviced by the substation. It is anticipated that utilities can be relocated and modified within the construction footprint. Additionally, as described in PU&E-MM#1, the existing substation ancillary components located approximately 250 feet north of the Union Pacific Railroad mainline in Bakersfield, south of Mills Drive, would be reconfigured within the construction footprint.

CEQA Conclusion

Even with implementation of PUE-IAMF#2 and HYD-IAMF#1, as identified above, and with the negotiation of utility agreements between the Authority and the utility owners to avoid, protect, or relocate potentially affected existing utility infrastructure, this impact would be significant under CEQA because of the potential disruption in electric power within the area serviced by the impacted substation. The HSR project would conflict with a fixed facility, an electrical substation. Therefore, CEQA requires mitigation. Mitigation Measure PUE-MM#1 would be needed and is described in more detail in Section 3.6.7. With the implementation of PUE-MM#1, and reconfiguration or relocation of substations and/or substation components, the impact under CEQA would be less than significant.

Impact PU&E #7: Reduced Access to Existing Utilities in the HSR Right-of-Way

The B-P Build Alternatives' rights-of-way would be fenced and secured after construction. Any underground utilities that conflict with the B-P Build Alternatives' rights-of-way would be relocated or reinforced underneath the B-P Build Alternatives' rights-of-way inside a casing pipe strong enough to carry the B-P Build Alternatives' facilities and allow for utility maintenance access from outside the B-P Build Alternatives' rights-of-way. Underground wet utilities, such as water, sewer, storm drains, gas, and petroleum pipelines, are conveyed inside a pipeline material with a service life typically of 50 years or more. Dry utilities, such as electrical, fiber-optic, and telephone lines, are encased in a durable pipeline (e.g., a pipeline made of steel, which would protect the dry utilities from deterioration and also would have 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 HSR system 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. These standard engineering and utility access practices would be implemented in addition to the casing and maintenance access requirements of utilities located underneath HSR right-of-way.

CEQA Conclusion

With implementation of the above-stated standard engineering and utility access practices, in addition to the casing and maintenance access requirements of utilities underneath the B-P Build Alternatives' right-of-way, the impact of reduced access to utilities under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

Impact PU&E #8: Effects from Upgrade or Construction of Power Lines

The B-P Build Alternatives 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 2010). The B-P Build Alternatives would connect to existing substations as well as traction power substations, switching stations, and paralleling stations that would be newly constructed as a result of the B-P Build Alternatives. Establishing connections to existing substations and the new traction power substations, switching stations, and paralleling stations may require the upgrade of the substations, the upgrade of existing transmission lines, or the 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 designed and engineered, PG&E and SCE 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.

After publication of the Bakersfield to Palmdale Section Draft EIR/EIS, several refinements to the design were made, as described in the Preface and Chapter 2. These refinements generally resulted in minor additions to or reductions from the previously defined footprint. Revisions to the design of the relocated Challenger Drive Traction Power Substation site also resulted in a modified interconnect run outside the Union Pacific Railroad (UPRR) right-of-way, as well as allowance for an access road around the utility provider substation at Williamson Road (approximately 2 miles east of the HSR alignment) in order to allow access to that interconnect run. The Caliente Creek Traction Power Substation site was eliminated from the project design, along with the associated elimination of 6 miles of interconnect run, resulting in a footprint reduction of roughly 72 acres.

Potential impacts include temporary interruption of utility service. Where necessary and possible, project design and phasing of construction activities would include relocating utilities prior to disruption, such as agricultural irrigation lines, or minimizing interruptions, including for upgrades of existing power lines and construction of new transmission lines to connect the HSR system to existing PG&E substations, as well as upgrades of substations themselves. As described in PUE-IAMF#3, prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public within the jurisdiction and affected service providers of the planned outage using a combination of communication media (e.g., telephone, email, mail, newspaper notices, or other means). The notification would specify the estimated duration of the planned outage and would be published no less than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users. Per the requirements of CPUC General Order 131-D, potential impacts from the construction of additional utility facilities would be assessed under separate environmental documentation specific to the equipment and location of the additional utility facilities. The removal of the Caliente Creek Traction Power Substation site would reduce the impacts initially assessed in the Bakersfield to Palmdale Section Draft EIR/EIS.

CEQA Conclusion

Because any upgrades and construction of any new transmission lines would be conducted in accordance with applicable regulations, and because of the minimization of any potential interruptions and the interruption notification procedures, this impact would be less than significant under CEQA. Regulations such as CPUC General Order 131-D require that CEQA issues be addressed prior to the construction of any new electric generating plant, electric transmission/power/distribution line, or substation. With implementation of the above-stated regulatory requirements, the impact from upgrading or constructing power lines under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

Impact PU&E #9: Potential Conflicts with Oil Wells

Table 3.6-11 identifies the number of potential conflicts between existing oil wells and the B-P Build Alternatives. The B-P Build Alternatives would conflict with approximately eight oil wells located along the alignment.

As described in SS-IAMF#4, identified oil wells, as well as any unidentified wells encountered during construction, would be relocated or abandoned in accordance with California Department of Conservation, Division of Oil, Gas, and Geothermal Resources standards, in coordination with the well owners. SS-IAMF#4 would also require the Authority to coordinate with the impacted oil well owners to provide compensation for acquisition if there would be a loss of well production.

CEQA Conclusion

With implementation of the above-stated IAMF, the impact to oil wells under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

Impact PU&E #10: Potential Conflicts with Renewable Energy Facilities
Table 3.6-12 identifies the number of potential conflicts between existing renewable energy facilities and the B-P Build Alternatives, maintenance facilities, and station sites. A 750-foot offset from the nearest track centerline was used to determine wind turbine impacts because wind turbine impacts are within a slightly larger area than the direct RSA described in Section 3.6.4.1. Depending on which B-P Build Alternative, maintenance facilities, and station alternatives are selected, the B-P Build Alternatives would conflict with 7 to 22 wind turbines and 1 measurement tower (measurement towers are used to assess wind resources). Alternative 3 would impact the most wind turbines among the B-P Build Alternatives. Additionally, as shown on Figure 3.6-9, Alternatives 1, 3, and 5 would each require 12 acres of property for temporary construction easements and 13 acres for permanent acquisition from the solar farm located adjacent to SR 58 and Towerline Road. By comparison, Alternative 2 would require 15 acres for temporary construction easements and 15 acres for permanent acquisition. As a result, Alternative 2 would have the largest acreage impact for the solar farm. The acreage that would be used for temporary construction easements or that would be permanently acquired decreased as a result of the design refinements. For Alternatives 1, 3, and 5, there was a decrease of 3.58 acres of temporary construction easements and a decrease of 2.20 acres of permanent acquisition compared to acreage reported in the Draft EIR/EIS. For Alternative 2, there was a decrease of 6.66 acres of temporary construction easements and a decrease of 1.62 acres of permanent acquisition compared to acreage reported in the Draft EIR/EIS. Alternative 2 would still have the largest acreage impact for the solar farm.

Section 3.12, Socioeconomics and Communities, discusses that in accordance with SOCIO-IAMF#2, all residents and businesses displaced by the B-P Build Alternatives would receive relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended; however, some may not be relocated near their current locations. Additionally, before any acquisitions occur, the Authority would develop a relocation mitigation plan in consultation with affected cities, counties, and property owners (SOCIO-IAMF#3). Therefore, the Authority would work with wind turbine and solar farm owners to relocate displaced wind turbines and solar panels. If existing wind turbines and solar panels are displaced before relocations are complete, there may be a temporary loss in energy generation. However, if the wind turbines and solar panels are relocated prior to displacement, energy production would continue and there would be no longer-term loss in energy production. Therefore, the B-P Build Alternatives would not disrupt renewable energy production. However, if wind turbines and solar farms are unable to be relocated, there would be a minor decrease in renewable energy production. California has more than 13,000 wind turbines (CEC 2017) and 681,488 solar projects (State of California 2017). The B-P Build Alternatives would impact less than 0.01 percent of all wind turbines and solar projects in California.

CEQA Conclusion
With implementation of SOCIO-IAMF#2 and SOCIO-IAMF#3, as described above, the impact to renewable energy facilities under CEQA would be less than significant. Although the project would conflict with a small number of existing renewable energy facilities, most of the facilities would be relocated, and there would not be a significant loss of renewable energy production. Therefore, CEQA does not require any mitigation.

Figure 3.6-9 Solar Farm Impacts

Impact PU&E #11: Operational Water Supply Demand

Table 3.6-14 identifies the estimated existing water use based on land use, as well as the anticipated water demand for the stations and maintenance facilities.

Table 3.6-14 Estimated Existing Water Use and Anticipated Water Demand for the Bakersfield to Palmdale Project Section

Facility	Existing Water Use (ac-ft/yr)	Anticipated Water Demand (ac-ft/yr)
Station Sites		
Bakersfield Station—F-B LGA	84.37	52
Palmdale Station	144.7	80
Stations Subtotal	**229.07 (Minimum Use)**	**132**
Maintenance Facilities		
Avenue M LMF/MOWF	29.1	23.8
Lancaster North B MOWF	5.6	17
Maintenance Facilities Subtotal	**34.7**	**40.8**
Total	**263.8**	**172.8**

ac-ft/yr = acre-feet per year
F-B LGA = Fresno to Bakersfield Locally Generated Alternative
LMF = light maintenance facility
MOWF = maintenance-of-way facility

As described in Appendix 3.6-B, Technical Memorandum: Water Usage Analysis for the California HSR Bakersfield to Palmdale Project Section, the only water usage associated with the B-P Build Alternatives would be at tunnels and portals during operations for tunnel cleaning, fire and life safety, domestic needs, and general maintenance operations. The number, size, and end use of the facilities have not been fully established at this time. Water needs would be updated as the operation plans of the tunnel facilities are updated. Where domestic water pipelines are not available at the portal locations, potable water would need to be stored on-site in approved water storage tanks.

Associated water districts for possible tunnel water supply connections are listed below:

- **North Connection:** East Niles Community Service District (Bakersfield)
- **Middle Connection A:** City of Tehachapi (Tehachapi)
- **Middle Connection B:** Tehachapi-Cummings County Water District (Tehachapi)
- **South Connection:** Antelope Valley-East Kern Water Agency (Rosamond)

The Bakersfield Station is located within the 2010 Bakersfield Urban Water Management Plan service area. The Bakersfield District 2010 Urban Water Management Plan has a supply of 85,257 acre-feet/year during a normal season to meet water demand within the City of Bakersfield service area (Authority 2014). By comparison, the proposed Bakersfield Station alternative would require an estimated 52 acre-feet/year.

The Palmdale Station is located within the Palmdale Water District Urban Water Management Plan service area. This plan projects the total water supply for the City of Palmdale would be 37,240 acre-feet/year by 2025 and 36,870 acre-feet/year by 2040. The Palmdale Water District Urban Water Management Plan has a supply of 13,200 acre-feet/year of imported water, 4,000 acre-feet/year of surface water supplies, and 6,280 acre-feet per year of groundwater supplies (as well as other sources) during a normal season to meet water demand within the City of Palmdale service area. By comparison, the proposed Palmdale Station would require an estimated 80 acre-feet/year.

The Lancaster North B MOWF site is located within the geographical area serviced by the Antelope Valley-East Kern Water Agency, which is covered by its own Antelope Valley-East Kern Water Agency Urban Water Management Plan. The proposed Avenue M LMF/MOWF is currently supplied with treated municipal water from the geographic area serviced by Los Angeles County Waterworks District No. 40, which is covered by the Antelope Valley Integrated Regional Water Management Plan.

The existing and planned water supplies for the cities of Bakersfield, Tehachapi, Lancaster, and Palmdale are adequate to meet projected demand during normal water years through 2040, according to the applicable Urban Water Management Plans for these areas (City of Bakersfield [2014]; California Water Service [2016b]; Arvin-Edison Water Storage District [2015]; Tehachapi-Cummings County Water District, Golden Hills Community Services District, Stallion Springs Community Services District, Bear Valley Community Services District, City of Tehachapi [2016a]; Rosamond Community Services District [2011]; Antelope Valley East Kern Water Agency [2015]; Los Angeles County Waterworks District No. 40 [2014]; and Palmdale Water District [2016]).

As indicated in Table 3.6-14, water usage would increase at the Lancaster North B MOWF and would decrease at the Avenue M LMF/MOWF, Bakersfield Station—F-B LGA, and Palmdale Station. Because the water demand increase is relative to available supply, the proposed HSR facilities would not require or result in the construction of new water treatment facilities or the expansion of existing facilities.

CEQA Conclusion

Because the water demand usage increase is relative to available supply, overall, the project would reduce water demand compared to existing conditions, and there are adequate supplies to meet project demand. Therefore, the proposed HSR facilities would not require or result in the construction of new water treatment facilities or the expansion of existing facilities, and the impact of water use during operation under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

Impact PU&E #12: Operational Wastewater Service Demand

Table 3.6-15 identifies the estimated wastewater demand for each proposed facility, including the stations and maintenance facilities.

Table 3.6-15 Wastewater Capacity and Estimated Wastewater (Sewage) Generation for the Bakersfield to Palmdale Project Section

Facility	Estimated Wastewater Generation (gallons/day)	Excess Capacity (gallons/day)[4]	% Excess Capacity Used by HSR Facilities
Station Sites			
Bakersfield Station——F-B LGA[1]	25,300	32,500,000	0.08
Palmdale Station[2]	36,117		0.11
Stations Subtotal	**61,417**		**0.19**
Maintenance Facilities[3]			
Avenue M LMF/MOWF	5,161	32,500,000	0.02
Lancaster North B MOWF	12,903		0.04
Maintenance Facilities Subtotal	**18,064**		**0.06**
Total	**79,481**	**32,500,000**	**0.24**

[1] Data for the Bakersfield Station—F-B LGA are from the *Fresno to Bakersfield Section Draft Supplemental EIR/EIS* (Authority and FRA 2017).
[2] Data for the Palmdale Station are based on engineering estimates.
[3] Data for the maintenance facilities are based on 85 percent of the domestic water demand generated by the maintenance facilities.
[4] Data are calculated from Table 3.6-5.

Authority = California High-Speed Rail Authority
EIR/EIS = environmental impact report/environmental impact statement
F-B LGA = Fresno to Bakersfield (Locally Generated Alternative)
HSR = high-speed rail
LMF = light maintenance facility
MOWF = maintenance-of-way facility

As previously shown in Table 3.6-6, wastewater treatment facilities for the Bakersfield to Palmdale Project Section are located in Bakersfield, Lancaster, and Palmdale. Existing wastewater capacity was totaled for all of these treatment facilities and included in Table 3.6-15.

HSR system operations would generate wastewater at the stations and maintenance facilities. As shown in Table 3.6-15, these volumes represent less than 1 percent of the capacity of all of the wastewater treatment facilities in the Bakersfield to Palmdale Project Section. Therefore, wastewater generated by the maintenance facilities and stations is within the capacity of the regional wastewater treatment facilities.

CEQA Conclusion
Based on the estimated wastewater service demand for the proposed station and maintenance facilities, the impact of wastewater service demand during operation under CEQA would be less than significant because there is sufficient capacity to meet project-generated demand. Therefore, the project would not result in new, relocated, or expanded facilities, and CEQA does not require any mitigation.

Impact PU&E #13: Effects on Storm Drain Facilities
Table 3.6-13 identifies the number of low-risk potential conflicts between existing stormwater pipelines and the B-P Build Alternatives, maintenance facilities, and station sites.

As discussed in Section 3.8, Hydrology and Water Resources, the B-P Build Alternatives have the potential to increase stormwater runoff by increasing impervious surface area in the RSA. Introducing new impervious surfaces where they currently do not exist, especially directly connected impervious surfaces, has the potential to increase the rate and volume of stormwater runoff reaching receiving waters. During final design, an evaluation of each receiving stormwater system's capacity to accommodate project runoff would be conducted, as specified in HYD-IAMF#1: Stormwater Management. As necessary, on-site stormwater management measures, such as detention basins or selected upgrades to the receiving system, would be included in the design to provide adequate capacity. Overall, the proposed drainage system would include a network of channels, ditches, and culverts to collect, convey, and discharge surface water runoff from the track. On-site stormwater runoff would be directed to infiltration/detention basins in compliance with the Authority's Phase II Municipal Separate Storm Sewer System Permit. Off-site stormwater would be conveyed to the existing drainage system. Additional information on the proposed storm drain system is included in Section 3.8, Hydrology and Water Resources.

CEQA Conclusion
With implementation of HYD-IAMF#1, as described above, the impact on storm drain facilities during operation under CEQA would be less than significant. The IAMF would ensure that no significant environmental effects would occur as a result of any new, relocated, or expanded stormwater drainage facilities. Therefore, CEQA does not require any mitigation.

Impact PU&E #14: Effects on Waste Generation during Operation
Project operation activities that would generate solid waste include passenger refuse disposal at stations and materials used for HSR maintenance. Solid waste would be generated by the operation and use of each of the stations in the Bakersfield to Palmdale Project Section.

Total estimated solid waste generation for the Bakersfield Station site alternatives was obtained from the *Fresno to Bakersfield Section Final EIR/EIS* (Authority 2014) and the *Fresno to Bakersfield Section Draft Supplemental EIR/EIS* (Authority and FRA 2017). The anticipated amount of nonhazardous solid waste for Bakersfield Station site alternatives is 1.3 tons per day. The total anticipated solid waste generation for the Palmdale Station site was estimated by engineers to be 3.1 tons per day. These amounts are based on the anticipated station ridership per year (0.00025 tonne [0.551 pound] per passenger per year).

Activities at the maintenance facility sites, including administrative (office) work, packaging of materials and equipment used for maintenance of the HSR system, and incidental waste from maintenance facility employees, would generate solid waste (e.g., paper, cardboard, plastics, and other materials similar to household waste). Non-air-travel-related transportation businesses dispose of approximately 1.3 tons per employee of waste per year (California Department of

Resources, Recycling, and Recovery 2011). Estimates indicate that the MOWF, with up to 300 employees, and the LMF, with up to 120 employees, would dispose of 546 tons of waste annually (1.5 tons per day), which is less than 1 percent of the estimated total permitted daily disposal for landfills in the area (Table 3.6-7). Existing landfill capacity would be either adequate or sufficiently added to during the life of the project. As shown in Table 3.6-7, each of the affected counties has two existing solid waste disposal facilities with adequate capacity beyond the date the project would commence operation. The estimated closure dates for these facilities occur during the service life of the B-P Build Alternatives. Under 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 the currently projected closure dates would not occur solely due to operation of the B-P Build Alternatives. Estimates for the stations and maintenance facilities are less than 1 percent of the estimated permitted daily disposal capacity provided in Table 3.6-7 for landfills in the area. Under the Resource Conservation and Recovery Act and AB 939, affected county or municipal solid waste disposal facilities are required to plan for nonhazardous solid waste facility expansions or additions from all anticipated sources. Disposal of the B-P Build Alternatives' operations-related nonhazardous solid wastes in landfills is not anticipated to trigger the need for new or expanded facilities prior to the date the facilities ceased operations.

CEQA Conclusion

With implementation of the above-stated regulatory requirements, the impact of waste generation during operation under CEQA would be less than significant because disposal of the B-P Build Alternatives' operations-related solid waste in landfills would not trigger the need for new or expanded facilities prior to the date the facilities cease operations, nor would it exceed State or local standards, nor impair the attainment of solid waste reduction goals. Therefore, CEQA does not require any mitigation.

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

As discussed in Chapter 3.10, Hazardous Materials and Wastes, routine maintenance of the B-P Build Alternatives would produce small quantities of hazardous waste. Operation of the maintenance facilities would involve the use, storage, and disposal of hazardous materials and petroleum products associated with maintenance of HSR equipment. Hazardous materials and wastes and storage equipment could include fuel storage tanks, storage tanks for lubricants and used oils, wash racks, storage tanks for degreasing solvents and for used solvents, paints/coatings, and associated solvents.

All hazardous wastes would be handled, stored, and disposed of in accordance with applicable requirements, such as the Resource Conservation and Recovery Act (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 (HMW-IAMF#7). Landfills, such as the 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 (Waste Management 2015). Hazardous wastes would be disposed of at permitted landfills that have sufficient capacity.

CEQA Conclusion

With implementation of HMW-IAMF#7, as described above, and regulatory requirements during operation, the impact of hazardous waste generation under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

Energy

Construction Impacts

Common Energy Impacts

The construction of any of the B-P Build Alternatives could result in a temporary increase in energy use.

Impact PU&E #16: Construction Energy Consumption

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 trackwork, guideways, maintenance yards, stations, support facilities, and other structures would be a one-time, nonrecoverable energy cost. The Authority has undertaken coordination with utility companies to develop conceptual locations for electrical interconnections along the Bakersfield to Palmdale alignment. Based on that conceptual framework, electrical interconnections have been incorporated into the environmental footprint for the Bakersfield to Palmdale Project Section. Additional design work, including detailed engineering of electrical interconnection network upgrade components, would be completed closer to construction. Therefore, although the analysis in this Draft EIR/EIS includes an assessment of electrical interconnections within the conservative footprint that was developed to accommodate such future design details, a quantitative assessment of electricity and indirect energy consumption associated with construction of these power lines is not feasible in this document.

Energy consumption during construction of the Bakersfield to Palmdale Project Section depends on the characteristics of the B-P Build Alternative selected, particularly the length of elevated and at-grade guideway work. As previously shown in Table 3.6-2, the energy consumption estimate for constructing the project section varies from 10,573 billion Btu to 11,886 billion Btu.

Construction would result in the direct use of fuels (primarily gasoline and diesel) for construction equipment and vehicles, as well as electricity for ancillary construction equipment. Construction would also result in the indirect use of energy associated with the extraction, manufacturing, and transportation of construction materials. Because of the preliminary nature of project design, the direct and indirect energy usage cannot be estimated because it would be too speculative given existing data. However, the amounts would not be expected to be substantial.

The design of the B-P Build Alternatives would include the use of energy-saving measures during construction to minimize both electricity and fossil fuel consumption (PUE-IAMF#1). As stated in *Contribution of the High-Speed Rail Program to Reducing California's Greenhouse Gas Emission Levels* (Authority 2013), all contractors would be required to incorporate the following energy- and greenhouse gas-saving measures: reduce energy use on construction sites, increase energy and fuel efficiency through energy-efficient on- and off-road equipment, and consider cost-effective renewable energy. These requirements would be part of the final contract requirements for the design-build contractor and its subcontractors. Further, energy efficiency is assumed for the off-site production of construction materials (Authority and FRA 2005). This assumption is based on the cost of nonrenewable resources and the economic incentives for efficiency.

Most of the equipment used during construction would use liquid fuel and would not require electricity from the electrical grid to operate. Although energy would be used for construction of the B-P Build Alternatives, the continued operation of the high-speed trains would result in overall energy savings through the system’s use of renewable energy supply during operations. Moreover, HSR would be an energy-efficient mode of transportation and would provide a travel alternative that is less energy-intensive than other modes of transportation currently used for travel within the state, such as personal vehicles and commercial air flights.

Table 3.6-16 provides construction energy use assumptions and payback information for the B-P Build Alternatives. As previously discussed, the Bakersfield to Palmdale Project Section would contribute approximately 15 percent to the HSR system’s energy demand and annual energy savings. As shown in Table 3.6-16, the 2040 annual energy savings under the medium ridership forecast would be 1,928,160.81 MMBtu compared to 2,810,877.57 MMBtu for the high ridership forecast. The payback period for energy consumed during construction would range by B-P Build Alternative from 5.48 to 6.16 years for the medium ridership forecast and from 3.76 to 4.23 years for the high ridership forecast. Refer to Section 3.1 of this Draft EIR/EIS for descriptions of the medium and high ridership forecasts.

Table 3.6-16 Construction Energy Payback Period

B-P Build Alternative	Total 5-Year Energy Consumption (MMBtu/year)	Medium Ridership Forecast		High Ridership Forecast	
		2040 Annual Energy Saving (MMBtu/year)	Payback Period for Energy Used during Construction (years/year)	2040 Annual Energy Savings (MMBtu/year)	Payback Period for Energy Used during Construction (years/year)
Alternative 1	10,573,000		5.48		3.76
Alternative 2	10,631,000		5.51		3.78
Alternative 3	11,886,000		6.16		4.23
Alternative 5	10,573,000	1,928,160.81	5.48	2,810,877.57	3.76
CCNM Design Option	+42,000		+0.02		+0.01
Refined CCNM Design Option	+481,000		+0.25		+0.17

Source: California High-Speed Rail Authority, 2019
B-P = Bakersfield to Palmdale Project Section
CCNM = César E. Chávez National Monument
MMBtu = million British thermal units
VMT = vehicle miles traveled

Although measurable, the energy used for construction of the B-P Build Alternatives would not require significant additional capacity or significantly increase peak- or base-period demands for electricity and other forms of energy. Energy efficiency is assumed for the off-site 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 BMPs would be implemented on-site so that nonrenewable energy would not be consumed in a wasteful, inefficient, or unnecessary manner. BMPs would include, but would not be limited to, use of regenerative braking, energy-saving equipment on rolling stock and at station facilities, and implementing energy saving measures during construction. In addition, project design would incorporate utilities and design elements to minimize electricity consumption and not overburden utility services. The Authority has adopted a sustainability policy that establishes project design and construction requirements to avoid and minimize energy consumption (PUE-IAMF#1) and is consistent with state and local plans for renewable energy and energy efficiency (see Table 3.6-1 and analysis in Appendix 2-H).

CEQA Conclusion

With implementation of the above-stated IAMF and standard BMPs, project construction would not result in wasteful, inefficient, or unnecessary consumption of energy, or in wasteful use of energy resources, nor would it conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The impact of energy consumption during construction under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

Operations Impacts

Common Energy Impacts

Impact PU&E #17: Operational Energy Demand

The electric vehicles of the HSR system would use an electrified line with traction power connected to existing PG&E substations. For determining HSR system energy consumption, the analysis assumed use of a Siemens ICE-3 Velaro vehicle operating as two eight-car trainsets at total annual train miles of 43.1 million miles over the entire HSR system in 2040.

Table 3.6-17 shows the estimated regional change in energy consumption with operation of HSR service. These estimates assume 2015 baseline conditions.

Table 3.6-17 2015 & 2040 Estimated Regional (Bakersfield to Palmdale) Change in Energy Consumption from the High-Speed Rail Build Alternatives

Projected Outcome of the HSR System	Medium Ridership Forecast		High Ridership Forecast	
	Change in Energy Usage in Current Conditions (2015) With Project vs. Current (2015) No Project Conditions (MMBtu/year)	Change in Energy Usage in 2040 vs. 2040 No Project Conditions (MMBtu/year)	Change in Energy Usage in Current Conditions (2015) With Project vs. Current (2015) No Project Conditions (MMBtu/year)	Change in Energy Usage in 2040 vs. 2040 No Project Conditions (MMBtu/year)
Reduced VMT	-6,058,484	-4,727,236	-8,328,545	-6,498,017
Reduced Airplane Travel	-4,143,532	-5,758,701	-3,904,461	-5,426,438
Increased Electricity Consumption	588,125	588,125	646,937	646,937
Net Change in Energy Use	-9,613,891	-9,897,812	-11,586,069	-11,277,518

Source: California High Speed Rail, 2021
EIR/EIS = environmental impact report/environmental impact statement
EMT = electromagnetic test
GWh = gigawatt-hour(s)
HSR = high-speed rai
kWh = kilowatt-hour(s)
MMBtu = million British thermal units
VMT = vehicle miles traveled

Table 3.6-18 shows the estimated change in energy consumption with operation of HSR service statewide. These estimates assume 2015 baseline conditions.

Table 3.6-18 2040 Estimated Statewide Change in Energy Consumption from the High-Speed Rail Build Alternatives

Projected Outcome of the HSR System	Medium Ridership Forecast		High Ridership Forecast	
	Change in Energy Usage in Current Conditions (2015) With Project vs. Current (2015) No Project Conditions (MMBtu/year)	Change in Energy Usage in 2040 vs. 2040 No Project Conditions (MMBtu/year)	Change in Energy Usage in Current Conditions (2015) With Project vs. Current (2015) No Project Conditions (MMBtu/year)	Change in Energy Usage in 2040 vs. 2040 No Project Conditions (MMBtu/year)
Reduced VMT	-15,564,006.58	-7,487,640.52	-21,398,681.84	-16,978,030.33
Reduced Airplane Travel	-9,614,376.65	-13,362,106.91	-9,250,002.99	-12,855,698.64
Increased Electricity Consumption	5,346,588	5,346,588	5,881,246	5,881,246
Net Change in Energy Use	-19,831,795.56	-15,503,159.75	-24,767,438.38	-23,952,482.53

Source: California High Speed Rail, 2021
EIR/EIS = environmental impact report/environmental impact statement
EMT = electromagnetic test
GWh = gigawatt-hour(s)
HSR = high-speed rail
kWh = kilowatt-hour(s)
MMBtu = million British thermal units
VMT = vehicle miles traveled

HSR service would decrease automobile VMT and would reduce energy consumption by automobiles, resulting in an overall reduction in energy use both regionally and statewide for intercity and commuter travel under the medium and high ridership forecasts compared to the current conditions and 2040 No Project conditions. The estimated decrease in energy use associated with HSR service from reduced automobile VMT would be 4,727,236 MMBtu/year regionally and 7,487,640.52 MMBtu/year statewide in 2040 under the medium ridership forecast and 6,498,017 MMBtu/year regionally and 16,978,030.33 MMBtu/year statewide in 2040 under the high ridership forecast compared to the 2040 No Project conditions. In addition, the number of airplane flights statewide (intrastate) would decrease with operation of HSR service in 2040 when analyzed against the 2040 No Project conditions because travelers would choose to use the HSR system rather than fly to their destinations. The estimated decrease in energy use associated with HSR service from reduced air travel would be 5,758,701 MMBtu/year regionally and 13,362,106.91 MMBtu/year statewide in 2040 under the medium ridership forecast and 5,426,438 MMBtu/year regionally and 12,855,698.64 MMBtu/year statewide in 2040 under the high ridership forecast compared to the 2040 No Project conditions. The level of energy savings from HSR operations would be lower in the opening year because ridership would be lower than in 2040, but would build over time (Authority 2016b).

Approximately 588,125 MMBtu/year regionally and 5,346,588 MMBtu/year statewide of electrical energy in 2040 would be required to operate HSR service under the medium ridership forecast, and approximately 646,937 MMBtu/year regionally and 5,881,246 MMBtu/year statewide would be required under the high ridership forecast. As described in PUE-IAMF#1, the HSR project design incorporates utilities and design elements that minimize electricity consumption (e.g., regenerative braking, energy-saving equipment on rolling stock and at station facilities, implementation of energy-saving measures during construction, and automatic train operations to maximize energy efficiency during operations). The net change in energy use (i.e., after the energy savings from reduction in roadway VMT and in air trips are factored in) would result in an energy savings of 9,897,812 MMBtu/year regionally and 15,503,159.75 MMBtu/year statewide under the medium ridership forecast and 11,277,518 MMBtu/year regionally and 23,952,482.53 MMBtu/year statewide under the high ridership forecast compared to the 2040 No Project condition.

The HSR system would increase regional and statewide 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 (4:00 p.m. to 6:00 p.m.). The HSR system would increase peak electricity demand on the state's generation and transmission infrastructure by an estimated 480 MW in 2020 (Authority and FRA 2005). Based on the assumption that this peak demand would be evenly spread throughout the HSR system, the B-P Build Alternatives would require approximately 48 MW of additional peak capacity. Summer 2010 electricity reserves were estimated to be between 21,236 MW for 1-in-2 summer temperatures and 16,874 MW for 1-in-10 summer temperatures (CEC 2015. The projected peak demand of the HSR system is not anticipated to exceed these existing reserve amounts. Although supplies for 2040 cannot be predicted, given the planning period available and the known demand from the project, energy providers have sufficient information to include the B-P Build Alternatives in their demand forecasts.

Heating, cooling, hot water, and cooking would also generate natural gas demand at the HSR stations, the LMF, and the MOWF. Natural gas demand was estimated at 2,851.8 MMBtu per year (28,518 therms per year) for the Palmdale Station and 5,303.5 MMBtu per year (53,035 therms) for the LMF and MOWF combined. In 2015, California consumed 2,381,700,000 MMBtu of natural gas (U.S. Energy Information Administration 2015b). Estimates for the Palmdale Station and the maintenance facilities would use an additional 0.000003 percent of natural gas per year.

Operation of the project would be consistent with state and local plans for renewable energy and energy efficiency (see Table 3.6-1 and analysis in Appendix 2-H).

CEQA Conclusion

With implementation of PUE-IAMF#1, the project would not place a substantial demand on regional energy supply, require significant additional capacity, or significantly increase peak- and base-period electricity demand, nor would it conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The impact of operational energy demand under CEQA would be less than significant. Therefore, CEQA does not require any mitigation.

3.6.7 Mitigation Measures

The *Fresno to Bakersfield Section Final Supplemental EIR* (Authority 2018b) and the *Final Supplemental EIS* (Authority 2019b) did not identify significant public utilities and energy impacts requiring mitigation measures; therefore, no public utilities or energy-related mitigation measures apply to the portion of the F-B LGA from 34th Street and L Street to Oswell Street.

As described under Impact PU&E #6 in Section 3.6.6, one PG&E substation would be displaced. Where the B-P Build Alternatives would conflict with an existing electrical substation's ancillary infrastructure, and without taking the appropriate measures to reduce these conflicts, this impact would have a significant impact under CEQA. Mitigation Measure PU&E-MM#1 would reconfigure the existing substation ancillary components located approximately 250 feet north of the Union Pacific Railroad mainline in Bakersfield, south of Mills Drive. With implementation of PU&E-MM#1, this impact would have a less than significant impact under CEQA.

3.6.7.1 PU&E-MM#1: Reconfigure or Relocate Substations and/or Substation Components

Reconfigure existing Magunden Substation ancillary components located approximately 250 feet north of the Union Pacific Railroad mainline in Bakersfield, south of Mills Drive.

3.6.7.2 Impacts from Implementing 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. Where necessary and possible, project design and phasing of construction activities would include constructing new utilities and relocating existing utilities prior to disruption. As described in PUE-IAMF#3, prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public within the jurisdiction and affected service providers of the planned outage through a combination of communication media (e.g., telephone, email, mail, newspaper notices, or other means). The notification would specify the estimated duration of the planned outage and would be published no less than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users. Further, per the requirements of CPUC General Order 131-D, environmental impacts that might occur would be addressed in separate environmental documentation that is specific to the relocated substation ancillary components. Because of the temporary duration of any potential interruptions, the interruption notification procedures, and the Authority's coordination with the affected utility company to avoid service interruptions, this impact would be less than significant under CEQA.

3.6.8 NEPA Impact Summary

This section summarizes and compares the impacts of the B-P Build Alternatives and the No Project Alternative. The NEPA process takes into account the potential impacts to public utilities and energy in conjunction with potential impacts to all resources to determine the effects of each B-P Build Alternative. The No Project Alternative provides a benchmark for resource impacts.

Under the No Project Alternative, existing development trends affecting public utilities and energy are expected to continue. Expanded development in the region would continue to result in an increase in demand for public utilities and energy. This continued expansion would likely result in the need for expansion or existing utilities and facilities, which could result in temporary utility service interruptions. The No Project Alternative could result in similar public utility and energy impacts as the B-P Build Alternatives.

The B-P Build Alternatives could result in potential impacts related to public utilities and energy, including impacts from temporary construction activities and during operation and maintenance activities.

Public Utilities

Table 3.6-19 provides a comparison of the impacts of the B-P Build Alternatives on public utilities. Data from these tables and the information summarized below are described in detail in Section 3.6.6. The B-P Build Alternatives incorporate IAMFs that would reduce impacts on public utilities. These IAMFs would minimize service interruptions and other impacts that may occur during construction. Additionally, mitigation would be applied to address the reconfiguration or relocation of substations and/or substation components. During operation, increased demand for public utilities may occur in order to operate the HSR system. IAMFs, standard engineering design measures, and BMPs would minimize operational impacts related to increased demand.

Construction could require the temporary shutdown of utility lines, such as water, sewer, electricity, telecommunications, fuel/petroleum, or gas, to safely move or extend these lines, which could interrupt utility services. Project design include PUE-IAMF#3 and PUE-IAMF#4, which require notification to the public within that jurisdiction and the affected service providers of the planned outage, and preparation of a technical memorandum documenting how construction activities would be coordinated with service providers to minimize or avoid interruptions, respectively.

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, sewer, and natural gas pipelines), is low due to the established practices of utility identification and notification (PUE-IAMF#4 and PUE-IAMF#3). In addition, California Government Code Section 4216 establishes required procedures for identifying buried utilities prior to initiating excavation to help avoid accidental disruption of utility services.

Construction activities would use water to prepare concrete, to increase the water content of soil to optimize compaction for dust control, to re-seed disturbed areas, for earthwork, and for tunnel construction and excavation. While Alternative 3 would result in the most construction water use, all of the B-P Build Alternatives would use less than existing demand. Because there would be a decrease in water demand, sufficient water supplies would be available; the B-P Build Alternatives would not require the construction or expansion of a water treatment facility and would not require new or expanded entitlements.

Construction activities such as grading and excavation could redirect stormwater runoff and increase the volume and rate of stormwater runoff through soil compaction during ground-disturbing activities. Project design would include HYD-IAMF#3, which requires compliance with the Construction General Permit, which requires the implementation of hydromodification controls to maintain pre-project hydrology by emphasizing on-site retention of stormwater during construction.

Construction of any of the B-P Build Alternatives would generate solid waste from temporary housing, workers (e.g., meals, restrooms, office supplies, trailer cleaning), construction debris, clearing and grubbing, excess construction materials, forms, and demolition of bridges. The Authority's 2013 sustainability policy specifies all (100 percent) steel and concrete would be recycled and a minimum of 75 percent of construction waste would be diverted from landfills (Authority 2016a). The B-P Build Alternatives would comply with federal, state, and local statutes and regulations related to solid waste and recycling, and there is sufficient permitted capacity at the landfills serving the Bakersfield to Palmdale Project Section to accommodate solid waste disposal needs. Construction would also generate hazardous waste such as diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals. During demolition, excavation, tunneling, or other activities, contaminated media currently in-situ could become hazardous waste, such as asbestos-containing materials and lead. Hazardous waste could be disposed of at permitted landfills that have sufficient capacity through any of the B-P Build Alternatives' construction periods.

Table 3.6-19 Comparison of the Bakersfield to Palmdale Project Section Build Alternative Impacts for Public Utilities

Resource Category	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Construction						
Impact PU&E #1: Planned Temporary Interruption of Utility Service	All of the B-P Build Alternatives would avoid or minimize impacts related to planned temporary interruption of utility service.					
Impact PU&E #2: Accidental Disruption of Services	All of the B-P Build Alternatives would avoid or minimize impacts related to accidental disruptions of services.					
Impact PU&E #3: Effects from Water Demand During Construction	None of the B-P Build Alternatives would result in impacts from water demand during construction.					
Impact PU&E #4: Effects from Stormwater During Construction	All of the B-P Build Alternatives would avoid or minimize impacts from stormwater during construction.					
Impact PU&E #5: Effects from Waste Generation During Construction	All of the B-P Build Alternatives would implement regulatory requirements that would avoid and minimize impacts from waste generation during construction.					
Operations						
Impact PU&E #6 Conflicts with Existing Utilities	All of the B-P Build Alternatives would avoid, minimize, or mitigate impacts related to conflicts with existing utilities.					
High-Risk and Major Utilities	193	187	190	243	0	0
Significant Utility Facilities	20	21	37	17	0	0
Low-Risk Utilities	185	175	180	220	0	0
Total Utility Conflicts	398	383	407	480	0	0
Conflicts with Substations	1	1	0	1	0	0
Impact PU&E #7: Reduced Access to Existing Utilities in the HSR Right-of-Way	All of the B-P Build Alternatives would implement standard engineering and utility access practices, which would avoid and minimize impacts related to reduced access to existing utilities in the HSR right-of-way.					
Impact PU&E #8: Effects from Upgrade or Construction of Power Lines	All of the B-P Build Alternatives would implement regulatory requirements that would avoid and minimize impacts from upgrade or construction of power lines.					

Resource Category	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Impact PU&E #9: Potential Conflicts with Oil Wells	All of the B-P Build Alternatives would avoid or minimize impacts related to conflicts with oil wells.					
Impact PU&E #10: Potential Conflicts with Renewable Energy Facilities	All of the B-P Build Alternatives would avoid or minimize impacts related to conflicts with renewable energy facilities.					
Acreage of Solar Farm Conflicts	13	15	13	13	0	0
Conflicts with Wind Turbines	7	7	22	7	0	0
Impact PU&E #11: Operational Water Supply Demand	None of the B-P Build Alternatives would result in impacts from water demand during operation.					
Impact PU&E #12: Operational Wastewater Service Demand	None of the B-P Build Alternatives would result in impacts from wastewater demand during operation.					
Impact PU&E #13: Effects on Storm Drain Facilities	All of the B-P Build Alternatives would avoid or minimize impacts to storm drain facilities.					
Number of Storm Drain Conflicts	38	31	38	51	The CCNM Design Option would reduce the storm drain conflicts for all B-P Build Alternatives by 1.	
Impact PU&E #14: Effects on Waste Generation During Operation	None of the B-P Build Alternatives would result in impacts from waste generation during operation.					
Impact PU&E #15: Effects from Hazardous Waste Generation	None of the B-P Build Alternatives would result in impacts from hazardous waste generation during operation.					

Source: California High-Speed Rail Authority, 2019
B-P = Bakersfield to Palmdale
CCNM = César E. Chávez National Monument
LMF = light maintenance facility
MOWF = maintenance-of-way facility

The operation and maintenance of the B-P Build Alternatives could result in permanent relocation and extension of utilities, as well as reduced access to existing utilities in the project footprint. Alternative 5 would conflict with 480 existing utilities, resulting in the highest number of existing utility impacts. Alternative 2 would conflict with 383 existing utilities, resulting in the lowest number of existing utility impacts. Alternative 1 and Alternative 3 would conflict with 398 and 407 existing utilities, respectively. The B-P Build Alternatives would avoid, protect, or relocate potentially affected existing utility infrastructure. Project design would also include PUE-IAMF#2, which requires the relocation of irrigation infrastructure as necessary. Alternatives 1, 2, and 5 would displace one PG&E substation. Alternative 3 would not displace any substations. Alternatives 1, 2, and 5 would implement Mitigation Measure PUE-MM#1, which would reconfigure or relocate the impacted substation.

The B-P Build Alternatives' rights-of-way would be fenced off and secured after construction. Any underground utilities that conflict with the B-P Build Alternatives' rights-of-way would be relocated or reinforced underneath the rights-of-way inside a casing pipe that is strong enough to carry the B-P Build Alternatives' facilities and allow for utility maintenance access from outside the B-P Build Alternatives' rights-of-way. Standard engineering and utility access practices would be implemented that would result in coordination by utility districts with the owner of the property within which their facilities lie. This coordination would take place in advance of any field visits to the facilities.

The B-P Build Alternatives would connect to existing substations as well as traction power substations, switching stations, and paralleling stations that would be newly constructed because of the B-P Build Alternatives. This may require the upgrade of the substations, the upgrade of existing transmission lines, or the construction of new overhead 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.

The B-P Build Alternatives would conflict with approximately eight oil wells. Project design would include SS-IAMF#4, which would result in the relocation or abandonment of any identified and unidentified oil wells encountered during construction, in accordance with California Department of Conservation, Division of Oil, Gas, and Geothermal Resources standards, as well as compensation to the well owners.

Alternative 2 would impact the greatest solar farm acreage. Alternatives 1, 3, and 5 would impact the smallest solar farm acreage. Alternative 3 would conflict with the greatest number of wind turbines. Alternatives 1, 2, and 5 would conflict with the smallest number of wind turbines. The Authority would work with wind turbine and solar farm owners to relocate displaced wind turbines and solar panels. If existing wind turbines and solar panels are displaced before relocations are complete, there may be a temporary loss in energy generation. However, if the wind turbines and solar panels are relocated prior to displacement, energy production would continue and there would be no longer-term loss in energy production.

Operation of the B-P Build Alternatives would result in water demand for the stations and maintenance facilities. Water usage would increase at the Lancaster North B MOWF and would decrease at the Avenue M LMF/MOWF, the Bakersfield Station—F-B LGA, and the Palmdale Station. Because the water demand usage increase is relative to the available supply, the proposed HSR facilities would not require or result in the construction of new water treatment facilities or the expansion of existing facilities.

Operation of the B-P Build Alternatives would result in wastewater demand for each proposed facility, including the stations and maintenance facilities. The wastewater generated by the maintenance facilities and stations is within the capacity of the regional wastewater treatment facilities. Additionally, the Authority would coordinate with the Cities of Bakersfield, Lancaster, and Palmdale for the construction of adequate wastewater infrastructure and pay its fair share of the impact fee for any improvements to the cities' sewer systems. The only water usage associated with the HSR alignment would occur at tunnels and portals during operations for tunnel cleaning, fire and life safety, domestic needs, and general maintenance operations. The number, size, and end uses of the facilities have not been fully established at this time. Wastewater demand would be updated as the operation plans of the tunnel facilities are updated.

Alternative 5 would conflict with the most existing storm drains. Alternative 2 would conflict with the smallest number of existing storm drains. The B-P Build Alternatives would avoid, protect, or relocate potentially affected existing utility infrastructure. The project design would include HYD-IAMF#1, which would require an evaluation of the capacity of each existing stormwater system. Any necessary upgrades to accommodate any additional stormwater runoff would be implemented.

Project operation activities that would generate solid waste include passenger refuse disposal at stations and materials used for HSR maintenance. Activities at the maintenance facility sites, including administrative (office) work, packaging of materials and equipment used for maintenance of the HSR system, and incidental waste from maintenance facility employees, would generate solid waste (e.g., paper, cardboard, plastics, and other materials similar to household waste). Disposal of the B-P Build Alternatives' operations-related nonhazardous solid wastes in landfills is not anticipated to trigger the need for new or expanded facilities prior to the date the facilities would cease operations. Operation of the maintenance facilities would also involve the use, storage, and disposal of hazardous materials and petroleum products associated with the maintenance of HSR equipment. Hazardous wastes would be disposed of at permitted landfills that have sufficient capacity.

Energy

Table 3.6-20 provides a comparison of the impacts of the B-P Build Alternatives on energy. Data from these tables and the information summarized below are described in detail in Section 3.6.6. The B-P Build Alternatives incorporate IAMFs that would reduce impacts on energy resources. These IAMFs would minimize energy consumption during construction. During operation, increased demand for energy may occur in order to operate the HSR system. IAMFs would minimize operational impacts related to increased demand.

Table 3.6-20 Comparison of the Bakersfield to Palmdale Project Section Build Alternative Impacts for Energy Resources

Resource Category	B-P Build Alternatives					
	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Construction						
Impact PU&E #16: Construction Energy Consumption	All of the B-P Build Alternatives would avoid or minimize impacts related to construction energy consumption.					
Consumption in Billion Btu	10,115	10,166	10,576	10,115	42	481
Operations						
Impact PU&E #17: Operational Energy Demand (Btu per day)	All of the B-P Build Alternatives would avoid or minimize impacts related to operational energy demand.					

Source: California High-Speed Rail Authority, 2019
B-P = Bakersfield to Palmdale
Btu = British thermal units
CCNM =César E. Chávez National Monument

Alternative 3 would consume the greatest amount of energy during construction. Alternatives 1 and 5 would consume the lowest amount of energy during construction. Alternative 2 would consume an amount between those of the other B-P Build Alternatives. Although measurable, the energy used for construction of the B-P Build Alternatives would not require significant additional capacity or significantly increase peak- or base-period demands for electricity and other forms of energy. Standard BMPs would be implemented on-site so that nonrenewable energy would not be consumed in a wasteful, inefficient, or unnecessary manner. Project design would include PUE-IAMF#1, which would require implementation of the Authority's adopted sustainability policy that establishes project design and construction requirements to avoid and minimize energy consumption. The Bakersfield to Palmdale Project Section would contribute approximately 10 percent to the HSR system's energy demand and annual energy savings. The payback period for energy consumed during construction would be approximately 3 to 5 years of full project operations (i.e., the project would remove more energy-inefficient cars and planes from the system).

Operation of the HSR system would decrease automobile VMT and airplane flights statewide (intrastate), which would reduce energy consumption. The HSR system would increase electricity demand. The HSR system would increase peak electricity demand on the state's generation and transmission infrastructure by an estimated 480 MW in 2020 (Authority and FRA 2005). However, the projected peak demand of the HSR system is not anticipated to exceed existing reserve amounts. Although supplies for 2040 cannot be predicted, given the planning period available and the known demand from the project, energy providers have sufficient information to include the B-P Build Alternatives in their demand forecasts. Project design would also include PUE-IAMF#1, Design Measures, which would incorporate utilities and design elements that minimize electricity consumption (e.g., using regenerative braking, energy-saving equipment on rolling stock and at station facilities, implementing energy-saving measures during construction, and automatic train operations to maximize energy efficiency during operations). Heating, cooling, hot water, and cooking would also generate natural gas demand at the HSR stations, the LMF, and the MOWF. Natural gas demand was estimated at 2,851.8 MMBtu per year (28,518 therms per year) for the Palmdale Station and 5,303.5 MMBtu per year (53,035 therms) for the LMF and MOWF combined. Estimates for the Palmdale Station and the maintenance facilities would use an additional 0.000003 percent of natural gas per year compared to existing natural gas usage in the City of Palmdale.

3.6.9 CEQA Significance Conclusions

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

Table 3.6-21 Summary of CEQA Significance Conclusions and Mitigation Measures for Public Utilities and Energy

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Construction			
PU&E #1: Temporary Interruption of Utility Service	Less than Significant	N/A	N/A
PU&E #2: Accidents and Disruption of Services	Less than Significant	N/A	N/A
PU&E #3: Effects from Water Demand During Construction	Less than Significant	N/A	N/A
PU&E #4: Effects from Stormwater Demand During Construction	Less than Significant	N/A	N/A
PU&E #5: Effects from Waste Generation During Construction	Less than Significant	N/A	N/A

Impact	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Operations			
PU&E #6: Potential Conflicts with Existing Utilities	Significant	PU&E-MM#1: Reconfigure or Relocate Substations and/or Substation Components	Less than Significant
PU&E #7: Reduced Access to Existing Utilities in the HSR Right-of-Way	Less than Significant	N/A	N/A
PU&E #8: Effects from Upgrade or Construction of Power Lines	Less than Significant	N/A	N/A
PU&E #9: Potential Conflicts with Oil Wells	Less than Significant	N/A	N/A
PU&E #10: Potential Conflicts with Renewable Energy Facilities	Less than Significant	N/A	N/A
PU&E #11: Operational Water Supply Demand	Less than Significant	N/A	N/A
PU&E #12: Operational Wastewater Service Demand	Less than Significant	N/A	N/A
PU&E #13: Effects on Storm Drain Facilities	Less than Significant	N/A	N/A
PU&E #14: Effects on Waste Generation During Operation	Less than Significant	N/A	N/A
Impact PU&E #15: Effects from Hazardous Waste Generation	Less than Significant	N/A	N/A
Construction			
PU&E #16: Construction Energy Consumption	Less than Significant	N/A	N/A
Operations			
PU&E #17: Operational Energy Demand	Less than Significant	N/A	N/A

Source: California High-Speed Rail Authority, 2019
CEQA = California Environmental Quality Act
N/A = not applicable