

California High-Speed Rail Authority

Fresno to Bakersfield Section

Draft Supplemental Environmental Impact Report/Environmental Impact Statement

Appendix 8-A
Analysis of the Comparable Section
(May 2014 Project)

November 2017



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ACRONYMS AND ABBREVIATIONS

APE	area of potential effect
Authority	California High-Speed Rail Authority
BNSF	BNSF Railway
CEQA	California Environmental Quality Act
CH ₄	methane
CIA	Community Impact Assessment
CO	carbon monoxide
CO ₂	carbon dioxide
dBA	A-weighted decibels
DOGGR	(California) Division of Oil, Gas, and Geothermal Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMF	electromagnetic field
EMI	electromagnetic interference
F-B LGA	Fresno to Bakersfield Locally Generated Alternative
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GC	General Conformity
GHG	greenhouse gas
HMF	heavy maintenance facility
HSR	high-speed rail
L _{dn}	day-night sound level, dBA
LOS	level-of-service
mG	milligauss
MOIF	maintenance of infrastructure facility
N ₂ O	nitrous oxide
NEPA	National Environmental Policy Act
NO _x	oxides of nitrogen
O&M	operating and maintenance
PEC	potential environmental concern
PM ₁₀	particulate matter smaller than or equal to 10 microns in diameter
PM _{2.5}	particulate matter smaller than or equal to 2.5 microns in diameter
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO ₂	sulfur dioxide
SR	State Route

TCP	traditional cultural property(ies)
U.S.	United States
VdB	vibration velocity decibel(s)

APPENDIX 8-A: ANALYSIS OF THE COMPARATIVE SECTION (MAY 2014 PROJECT)

8-A-1 Introduction

This Technical Appendix analyzes the portion of the Preferred Alternative identified in the *Fresno to Bakersfield Section California High-Speed Train Final Project Environmental Impact Report/Environmental Impact Statement* (EIR/EIS) which is comparable to the Fresno to Bakersfield Locally Generated Alternative (F-B LGA). As discussed in Section 1.1.3 of this Draft Supplemental EIR/EIS, the complementary portion of the Preferred Alternative consists of the portion of the BNSF Alternative from Poplar Avenue to Hageman Road and the Bakersfield Hybrid from Hageman Road to Oswell Street (further referenced as the “May 2014 Project” in this Draft Supplemental EIR/EIS). Since the Fresno to Bakersfield Section Final EIR/EIS does not evaluate the May 2014 Project as a discrete alternative of the Fresno to Bakersfield Project (as it did for example for the Allensworth Bypass), affected environment and impact summary discussion included in this section for the May 2014 Project has been extrapolated from the available information contained within the Fresno to Bakersfield Section Final EIR/EIS.

The purpose of Appendix 8-A is to present the reader with a more detailed analysis of the impacts associated with the May 2014 Project (as presented for the Preferred Alternative in Chapters 3, 4, and 5 of the Fresno to Bakersfield Section Final EIR/EIS) to allow for a subsequent summary comparison with the impacts associated with the F-B LGA (as presented in Chapters 3, 4, 5, and 6 of this Draft Supplemental EIR/EIS).¹

As described in Chapter 2 of this Draft Supplemental EIR/EIS the LGA alignment would begin north of Shafter, continuing southeasterly until just north of Burbank Street where it would turn east until reaching the Union Pacific Railroad corridor. At this point, the alignment would turn and continue southeasterly, adjacent to and west of, the Union Pacific Railroad corridor. The alignment would continue southeasterly into Bakersfield and would parallel the Union Pacific Railroad corridor to the F-B LGA southern terminus. Southwest of the Oil Junction community, the alignment would cross State Route (SR) 99 and continue southeast. South of Airport Drive, the alignment would cross and run parallel to the west side of SR 204. This route would continue until the SR 178 crossing, where the alignment would turn east and parallel to the Union Pacific Railroad corridor. The F-B LGA would continue generally east within the Sumner Street and Edison Highway corridors and would terminate at Oswell Street. The F-B LGA station would be located at the intersection of SR 204 and F Street. A Maintenance of Infrastructure Facility (MOIF) would be located along the F-B LGA in the City of Shafter between Fresno Avenue and Poplar Avenue.

Comparatively, the May 2014 Project included a station that would be constructed at the corner of Truxtun and Union Avenues/SR 204 as well as an MOIF that would be located along the alignment just north of the city of Bakersfield and 7th Standard Road. Figure 8-A-1 shows the F-B LGA and the May 2014 Project that is analyzed in this Draft Supplemental EIR/EIS as well as in this Appendix.

The resource sections below provide a summary of the impacts associated with the May 2014 Project followed by a comparison between the F-B LGA and the May 2014 Project. Comparative data between these two alternatives is presented in tables and exhibits, as appropriate. Where applicable, shading has been incorporated into the tables to characterize the alternative with the lesser quantity of impact.

¹ Chapter 5 of this Draft Supplemental EIR/EIS evaluates the environmental justice impacts that would result from the F-B LGA; whereas, environmental justice impacts associated with the May 2014 Project were evaluated in Section 3.12 of the Fresno to Bakersfield Section Final EIR/EIS.

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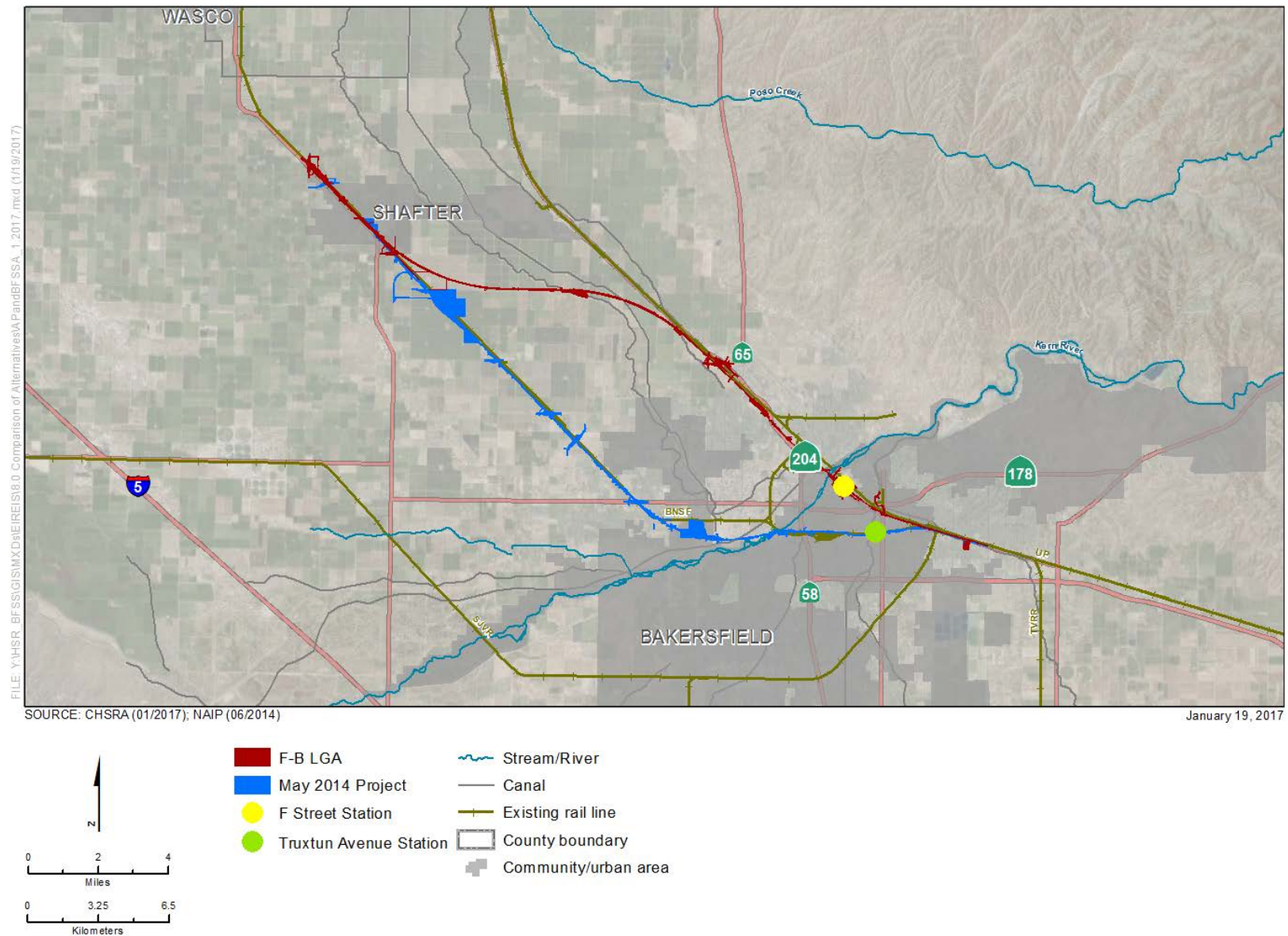


Figure 8-A-1 F-B LGA and May 2014 Project

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8-A-2 F-B LGA Comparison with the May 2014 Project

Transportation

Summary of May 2014 Project Transportation Impacts

The purpose of the Transportation section in an EIR/EIS is to describe existing and future traffic circulation and parking patterns, and to evaluate the impact of the proposed project on these conditions. The evaluation also considers impacts on alternative methods of transportation, such as public transportation, bicycles, and pedestrians. Key issues include traffic patterns and delays, trip generation, transit availability, parking availability, and bicycle and pedestrian flows.

This section describes the potential impacts of the May 2014 Project as compared to the F-B LGA. For more details on the transportation analysis, see Section 3.2 of this Draft Supplemental EIR/EIS or the *Fresno to Bakersfield Project Section Transportation Technical Report* (California High-Speed Rail Authority [Authority] and Federal Railroad Administration [FRA] 2014c).

Methodology

The Transportation section includes analysis of two project alternatives: the May 2014 Project and the proposed F-B LGA. (It should be noted that the *Fresno to Bakersfield Section: Supplemental EIR/EIS – Transportation Analysis Technical Report* includes a No Project Alternative as a baseline for the analysis; however, the analysis used below dismissed the No Project Alternative as the focus is on the May 2014 Project versus the F-B LGA.) The baseline and future (year 2035) conditions for the proposed F-B LGA have been analyzed using new baseline data (year 2015) and the updated Kern Council of Governments traffic model. Therefore, both the No Project and May 2014 Project Alternatives analyses have been updated to the same data assumptions thereby allowing for comparison of all three alternatives under the same baseline and future conditions.

The study area for the comparative analysis has been divided into two key sub-areas where impacts related to the May 2014 Project and the F-B LGA are expected to occur. The two key sub-area locations are:

- Truxtun Avenue Station Alternative, included within the May 2014 Project
- F Street Station Alternative, included within the F-B LGA

Since the Truxtun Avenue Station Alternative analysis is part of the approved Fresno to Bakersfield Transportation Analysis Technical Report (2014c), the same study area as analyzed in the Fresno to Bakersfield Transportation Analysis Technical Report has been included in this analysis. A new study area has been identified for the proposed F Street Station Alternative (see Figure 8-A-2). The purpose of this analysis is to provide a comparative evaluation of the effects of the station construction within the study areas. The following sections discuss and analyze the existing conditions for the Truxtun Avenue and F Street stations.

Detailed discussion regarding the stations and the corresponding study areas are included in Section 3.2 of this Draft Supplemental EIR/EIS or the Fresno to Bakersfield Project Section Transportation Technical Report (Authority and FRA 2014c).

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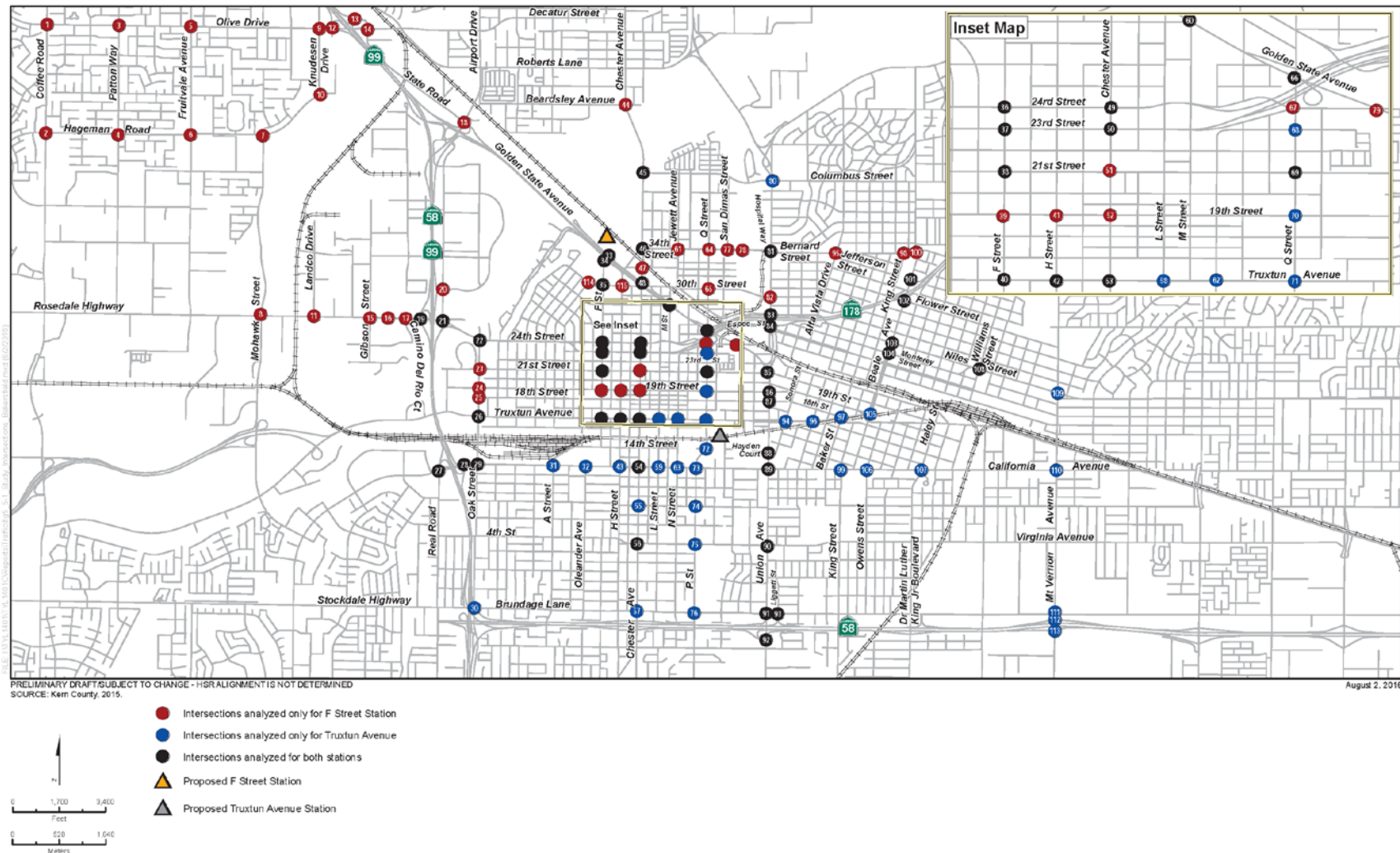


Figure 8-A-2 Study Intersections at Bakersfield Station

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Impacts

Operation Impacts

As discussed in Section 3.2 of this Draft Supplemental EIR/EIS, level-of-service (LOS)² is the primary unit of measure for stating the operating quality of a highway or roadway. The traffic impact criteria used in evaluating traffic LOS for roadway segments and signalized and unsignalized intersections during the project operation phase are presented in Section 3.2.3.5 of the Fresno to Bakersfield Section Final EIR/EIS and is included here (Authority and FRA 2014a, pages 3.2-10 and 3.2-11).

Mitigation measures for operational impacts include a wide variety of roadway improvements including restriping, installation of signals, modification of signal timing, and roadway widening. Following mitigation, the impacts would be less than significant under the California Environmental Quality Act (CEQA). However, effects on the local circulation would occur in the congested areas of Bakersfield from the extension of the duration of peak periods of congestion. The effect of this increased congestion would be less than significant under CEQA.

Roadway Segments

For roadway segments, a substantial change in the volume-to-capacity³ ratio between the No Project and project conditions would be:

- A reduction in LOS below LOS D.

For segments that currently, operate at LOS E or F:

- An increase in the volume-to-capacity ratio of 0.04 or more.

Existing Plus May 2014 Project Conditions

Ten of the roadway segments projected to operate at LOS D, E, or F under Existing Conditions are projected to continue to operate at LOS D, E, or F under Existing Plus May 2014 Project Conditions. No additional roadway segments are projected to operate at LOS D, E, or F with the addition of traffic from the Truxtun Avenue Station.

Future (Year 2035) with May 2014 Project Conditions

All the roadway segments projected to operate at LOS E or F under Future No-Build Conditions are projected to continue to operate at LOS E or F under the Future with May 2014 Project Conditions. No additional roadway segments are projected to operate at LOS E or F with the addition of the traffic from the Truxtun Avenue Station.

As described above, following mitigation, impacts to roadway segments would be less than significant under CEQA.

Study Intersections

Similarly, local jurisdictions typically consider a substantial change between No Project and project conditions as a 4-second to 1-second increase in average delay (frequently on a “sliding” scale), depending on the specific LOS at an intersection. Therefore a substantial change resulting from the project would be:

- A reduction in LOS below LOS D.

For intersections that currently, operate at LOS E or F:

- An increase in average delay at an intersection by 4 seconds or more.

² LOS is calculated by comparing the actual number of vehicles using a roadway to its carrying capacity. In general, LOS is measured by the ratio of traffic volume to capacity or by the average delay experienced by vehicles on the facility. The Highway Capacity Manual (Transportation Research Board 2010) is a recognized source for the techniques used to measure transportation facility performance. Using the Highway Capacity Manual procedures, the quality of traffic operation is graded into one of six LOS designations: A, B, C, D, E, or F. LOS A represents the best range of operating conditions and LOS F represents the worst.

³ Volume-to-capacity ratio, or the average delay experienced by vehicles on the facility.

Existing Plus May 2014 Project Conditions

Eleven study intersections that are projected to operate at LOS E or F under Existing Conditions are projected to continue to operate at LOS E or F under Existing plus May 2014 Project Conditions (Figure 8-A-3 and Figure 8-A-4). The following additional intersection is projected to operate at LOS E or F under Existing plus May 2014 Project Conditions:

- Union Avenue/Hayden Court

Three of the study intersections are projected to be substantially affected (i.e., an increase in delay of four or more seconds) by the May 2014 Project. Those intersections are:

- Real Road: SR 99 Southbound Ramps/California Avenue
- F Street/SR 204
- Union Avenue/Hayden Court

Future (Year 2035) with May 2014 Project Conditions

Thirty-five study intersections that are projected to operate at LOS E or F under Future No-Build Conditions are forecast to continue to operate at LOS E or F. This is based on intersections that have been analyzed for the May 2014 Project. In addition, the following intersection is projected to operate at LOS E or F under Future plus May 2014 Project Conditions.

- P Street and 8th Street

Eleven of the study intersections are projected to be significantly affected by the May 2014 Project. Those intersections are:

- Oak Street and Truxtun Avenue
- F Street and SR 204
- F Street and 30th Street
- F Street and 23rd Street
- M Street and SR 204 and 28th Street
- Q Street and 23rd Street
- P Street and 8th Street
- Union Avenue and Hayden Court-Sonora Street
- Union Avenue and California Avenue
- Tulare Street and Truxtun Avenue
- Beale Avenue and Jefferson Street-SR 178 Westbound Ramps

As described above, following mitigation, impacts to study intersections would be less than significant under CEQA.

Road Closures

Under the May 2014 Project, 14 local roads would be closed and traffic would be diverted to adjacent roads:

- Madera Avenue, Kern County
- Mettler Avenue, Kern County
- Reina Road, Kern County
- Glenn Street, Bakersfield, Kern County
- Palm Avenue, Bakersfield, Kern County
- Eye Street, Bakersfield, Kern County
- Chico Street, Bakersfield, Kern County
- Inyo Street, Bakersfield, Kern County
- Dolores Street, Bakersfield, Kern County
- Kern Street, Bakersfield, Kern County
- Eureka Street, Bakersfield, Kern County
- King Street, Bakersfield, Kern County
- E 18th Street, Bakersfield, Kern County
- E 21st Street, Bakersfield, Kern County

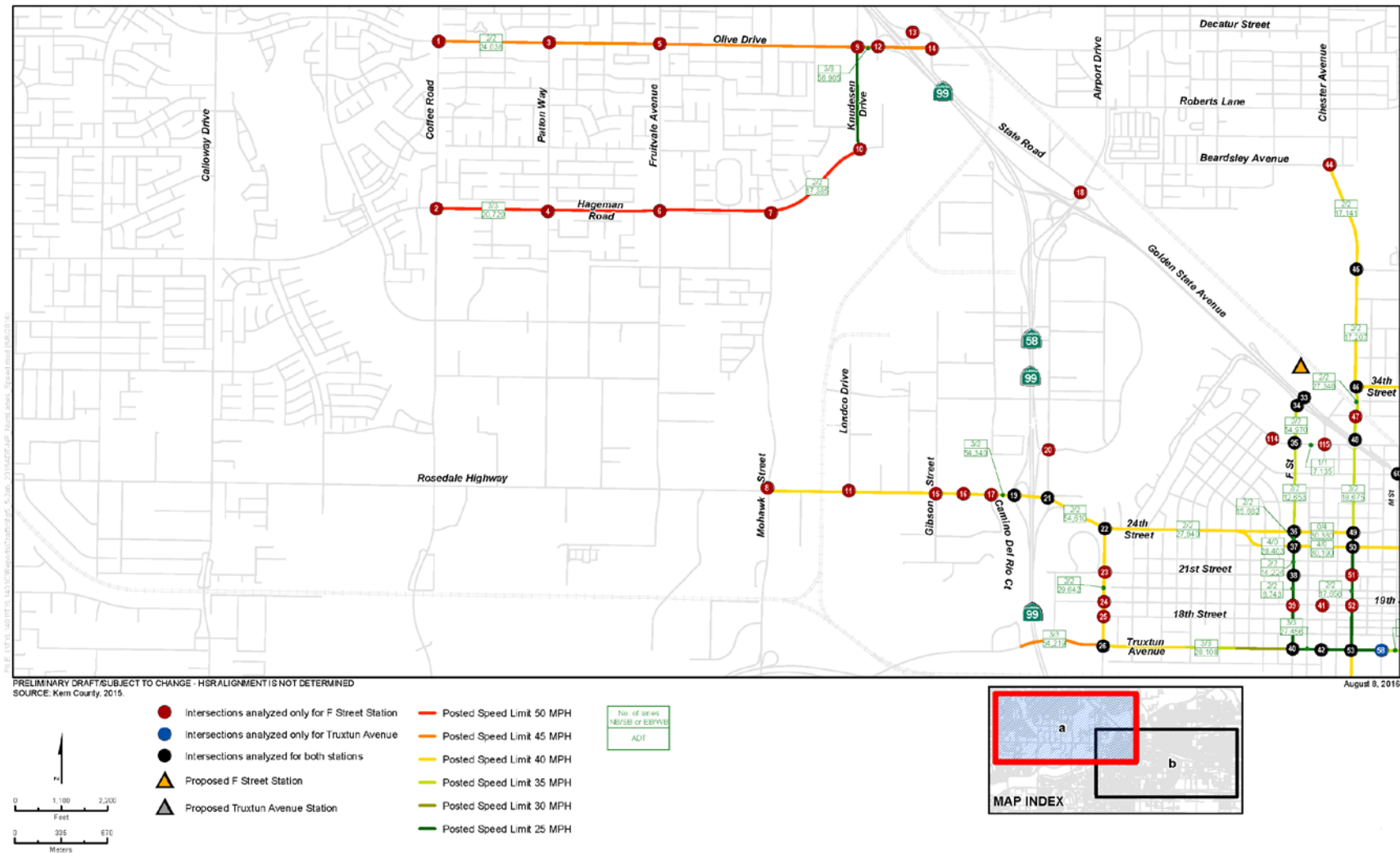


Figure 8-A-3 Existing Plus May 2014 Project: Average Daily Traffic and Number of Lanes: Map A

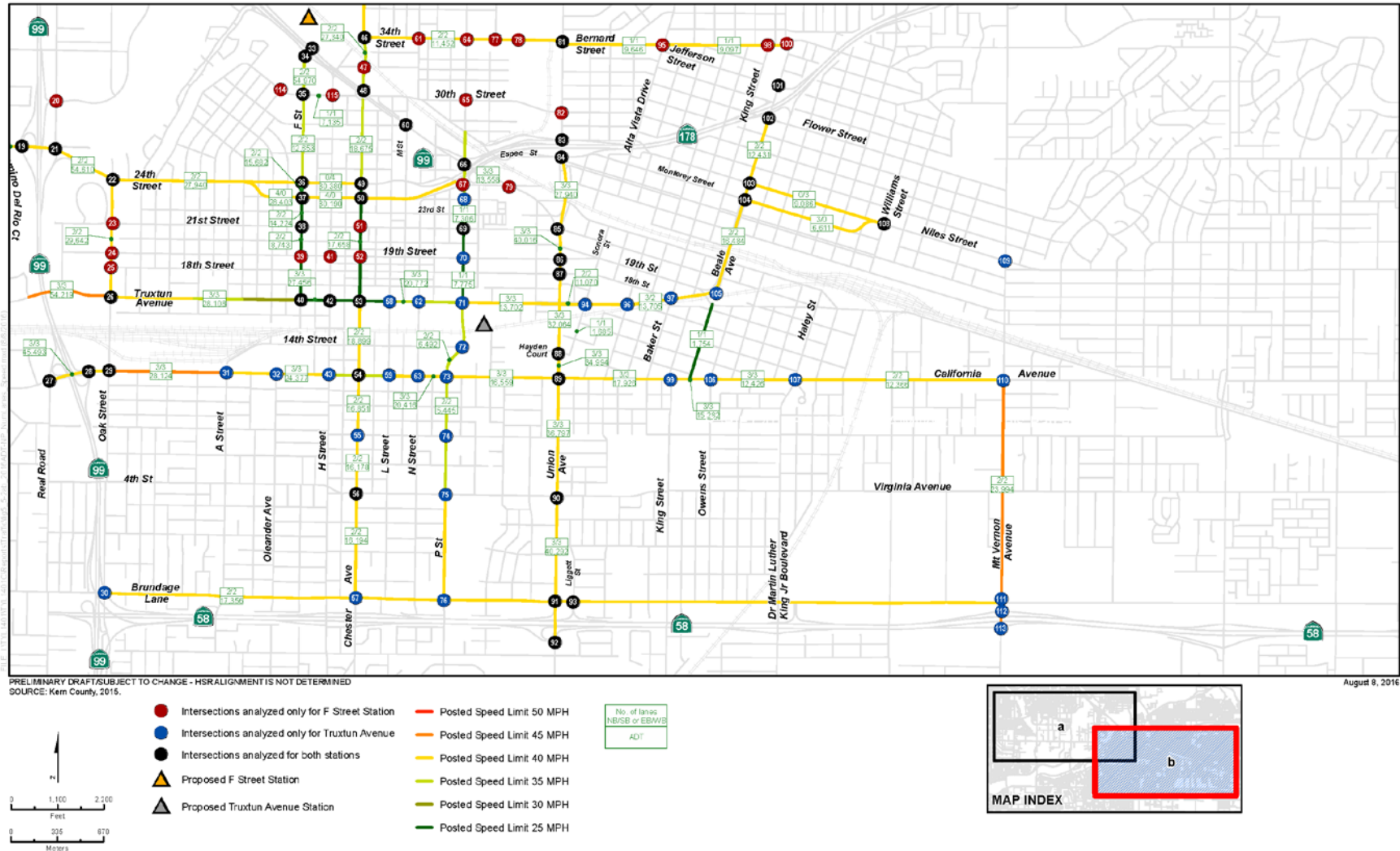


Figure 8-A-4 Existing Plus May 2014 Project: Average Daily Traffic and Number of Lanes: Map B

In the rural areas, the roads proposed for closure have very low traffic volumes and necessary traffic diversions can be accomplished without causing any significant traffic impacts under CEQA. Where these impacts would occur in the congested urban areas of Bakersfield, which could extend the duration of peak periods of congestion, these project impacts are less than significant under CEQA.

Transit

The May 2014 Project would add approximately 900 daily passengers to transit service in the city of Bakersfield, but only a nominal amount to the City of Shafter, since no station is proposed in Shafter. The May 2014 Project would add approximately 135 peak-hour passengers in Bakersfield. Approximately 17 transit routes serve the Truxtun Avenue Station area, and the addition of approximately 135 passengers on existing transit routes in the Truxtun Avenue Station area averages about 8 additional passengers per route, assuming equal distribution. The existing transit fleet is expected to be able to accommodate the per route increases associated with the May 2014 Project. Impacts would be less than significant under CEQA.

Bicycle/Pedestrians

The May 2014 Project would not close any of the existing or planned bicycle routes or pedestrian access/routes in the immediate vicinity of the Truxtun Avenue Station. Approximately 500 passengers would access the Truxtun Avenue Station area. Approximately 75 passengers during the peak hour in the city of Bakersfield would arrive or leave the station area either by walking or on bicycle. The station would include bicycle racks, pedestrian connections to the existing sidewalks, and bicycle lanes and facilities where they can be accommodated. The addition of these pedestrian and bike trips during the peak hour (an average of about one pedestrian or bike per minute) in the Truxtun Avenue Station area would not substantially affect existing pedestrian and bike facilities. Impacts would be less than significant under CEQA.

Parking

The Truxtun Avenue Station would include passenger drop-off areas ("park-and-ride" locations) at the entrances to the station or within the parking area. The station parking areas would accommodate up to approximately 4,500 parking spaces at the Truxtun Avenue Station. These parking facilities would be designed to accommodate demand and to avoid overflow parking on nearby area streets. Impacts would be less than significant under CEQA.

Construction Impacts

Approximately 170 peak-hour trips would be added to the transportation infrastructure in the city of Bakersfield during construction of the May 2014 Project. One study intersection (South Union Avenue/Eastbound SR 58 ramps) within the city of Bakersfield is projected to be substantially impacted by the May 2014 Project. Because project construction traffic would be temporary, any associated delays would be less than significant under CEQA.

Comparison between the May 2014 Project and F-B LGA

Table 8-A-1 provides a comparison of transportation-related impacts under the May 2014 Project and the F-B LGA.

Table 8-A-1 Transportation Impact Comparison between the May 2014 Project and F-B LGA

		May 2014 Project	F-B LGA
Roadway Segments	Existing Plus Project Conditions (operational)	There would be no significant impacts to any roadway segments.	One roadway segment will experience a significant impact as a result of the Project
	Future (Year 2035) with Project Conditions (operational)	There would be no significant impacts to any roadway segments.	Two roadway segments will experience a significant impact as a result of the Project
Study Intersections	Construction Period	1 intersection would experience a significant impact during construction	9 intersections would experience a significant impact during construction
	Existing Plus Project Conditions (operational)	3 intersections would experience a significant impact	3 intersections would experience a significant impact
	Future (Year 2035) with Project Conditions (operational)	No intersections would be improved. Eleven intersections would experience a significant impact	Twenty-one intersections would be improved. Thirteen intersections would experience a significant impact
Road Closures		14 road closures	10 road closures
Transit		Existing transit fleet is expected to be able to accommodate the per route increases	Existing transit fleet is expected to be able to accommodate the per route increases
Bicycle/Pedestrians		The addition of trips would not substantially affect existing facilities	The addition of trips would not substantially affect existing facilities
Parking		The total parking count on the site is approximately 4,500 spaces	The total parking count on the site is approximately 5,200 spaces
At-Grade Crossings		No BNSF at-grade crossings would be removed	7 BNSF at-grade crossings would be removed
Construction Impacts		Approximately 170 peak-hour trips would be added to the transportation infrastructure during construction	Approximately 170 peak-hour trips would be added to the transportation infrastructure during construction

least-impact alternative

BNSF = BNSF Railway

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Table 8-A-1 provides a comparison of transportation impacts between the May 2014 Project and the F-B LGA. As shown, the May 2014 Project would result in no roadway segments operating below standards during either the Existing Plus May 2014 Project Conditions or the Future (Year 2035) with May 2014 Project conditions. The F-B LGA would have fewer impacts to study intersections during Future (Year 2035) with Project Conditions compared to the May 2014 Project within the Bakersfield station area (nine versus eleven). The analysis of the May 2014 Project evaluated only the Station Area subarea and did not evaluate the remaining study areas. The F-B LGA would have four additional impacts to study intersections in the rest of the study region under Future (Year 2035) with Project Conditions. Additionally, the F-B LGA would also have fewer road closures when compared to the May 2014 Project. Overall, the F-B LGA would have similar impacts to transportation resources when compared to the May 2014 Project.

Air Quality and Global Climate Change

Summary of May 2014 Project Air Quality and Global Climate Change Impacts

The Air Quality and Global Climate Change section analyzes the impacts of the project on ambient air quality. The section also addresses the exposure of people, especially sensitive individuals, to air pollutant concentrations that could be dangerous. The pollutants of concern include both criteria pollutants and toxic air contaminants. The criteria pollutants are those regulated by federal and State laws since the 1970s: ozone, carbon monoxide (CO), suspended particulate matter (PM₁₀ and PM_{2.5}), oxides of nitrogen (NO_x), and sulfur dioxide (SO₂). Toxic air contaminants are identified by State regulation: particulate matter from diesel-fueled engines, asbestos, chlorinated organic compounds, metals, radon and iodine gas, and other contaminants.

Greenhouse gas (GHG) emissions are also considered. State law defines GHG to include the following: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride (Health and Safety Code, section 38505[g]).

Methodology

Air Quality

The methods for evaluating impacts are intended to satisfy the federal and state requirements, including National Environmental Policy Act (NEPA), CEQA, and general conformity. In accordance with CEQA requirements, an EIR must include a description of the existing physical environmental conditions in the vicinity of the project. Those conditions, in turn, “will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant” (CEQA Guidelines Section 15125[a]).

For a project such as the HSR project that would not commence operation of HSR service for almost 10 years and would not reach full operation for almost 25 years, use of only existing conditions as a baseline for air quality impacts would be misleading. It is more likely that existing background traffic volumes (and background roadway changes from other programmed traffic improvement projects) and vehicle emission factors would change between today and 2020/2035 than it is that existing conditions would remain unchanged over the next 10 to 25 years. For example, Regional Transportation Plans include funded transportation projects programmed to be constructed by 2035. To ignore that these projects would be in place before the HSR project reaches maturity (i.e., the point/year at which HSR-related traffic emissions reaches its maximum), and to evaluate the HSR project’s air quality impacts ignoring that these Regional Transportation Plan improvements would change the underlying background conditions to which HSR project traffic would be added, would be misleading because it would represent a hypothetical comparison.

Therefore, the air quality analysis for operations uses a dual-baseline approach. That is, the HSR project’s air quality impacts are evaluated both against existing conditions and against background (i.e., No Project) conditions as they are expected to be in 2035.

Construction air quality emissions are largely a function of alignment length. The Fresno to Bakersfield Section Final EIR/EIS calculated the emissions for the 114 miles of the BNSF Alternative.⁴ The construction air quality emission values referenced in Table 8-A-2 represent emission calculations for the entire 114-mile-long Fresno to Bakersfield Section including the May 2014 Project. The construction of the Fresno to Bakersfield Section would occur between 2014 and 2023. The 2014 start date for the construction air analysis reflected in Table 8-A-2 is to account for the construction of the entire Fresno to Bakersfield alignment, which began in 2014.

⁴ The length of the May 2014 Project was comparable to the BNSF Alternative for the equivalent length of at-grade and elevated alignments. Therefore, alignment construction emissions for the BNSF Alternative were analyzed and presented in the Fresno to Bakersfield Section Final EIR/EIS. The emissions presented in the Fresno to Bakersfield Final EIR/EIS are representative of the construction emissions from all of the considered alternatives, including the May 2014 Project.

Table 8-A-3 represents emission calculations for the entire 114-mile-long Fresno to Bakersfield Section with the F-B LGA. Emissions presented include emissions from all construction phases of the HSR and the regional roadway realignment. The emission estimates presented in Table 8-A-3 were calculated assuming a viaduct structure for the F-B LGA. The structure on retained fill would result in slightly different emission estimates including lower estimates for construction mobilization, demolition, road crossings, and demobilization. Emissions would be approximately 1 percent higher for land clearing and earth moving. All other construction-phase emissions would remain the same. Therefore, construction of the structure on retained fill would result in emissions similar to those presented in Table 8-A-2. Table 8-A-4 shows a summary of total emissions for the May 2014 Project and the F-B LGA.

Table 8-A-2 May 2014 Project Construction Emissions for Years 2014–2023 (tons/year)

	VOC	CO	NO _x	SO ₂	PM ₁₀ ³	PM _{2.5} ³
SJVAPCD annual CEQA significance thresholds ¹	10	N/A	10	N/A	15	15
Annual general conformity (GC) <i>de minimis</i> levels applicable to the SJVAPCD ²	10	N/A	10	100	100	100
Year 2014						
Emissions (tons/year)	16.86	104.03	380.80	0.63	42.66	13.40
Exceeds SJVAPCD CEQA thresholds?	Yes	N/A	Yes	N/A	Yes	No
Exceeds GC threshold?	Yes	N/A	Yes	No	No	No
Year 2015						
Emissions (tons/year)	36.69	289.42	617.99	1.17	67.63	30.85
Exceeds SJVAPCD CEQA thresholds?	Yes	N/A	Yes	N/A	Yes	Yes
Exceeds GC threshold?	Yes	N/A	Yes	No	No	No
Year 2016						
Emissions (tons/year)	32.27	256.37	500.73	0.88	60.47	27.22
Exceeds SJVAPCD CEQA thresholds?	Yes	N/A	Yes	N/A	Yes	Yes
Exceeds GC threshold?	Yes	N/A	Yes	No	No	No
Year 2017						
Emissions (tons/year)	8.51	48.99	161.43	0.22	15.79	12.03
Exceeds SJVAPCD CEQA thresholds?	No	N/A	Yes	N/A	Yes	No
Exceeds GC threshold?	No	N/A	Yes	No	No	No
Year 2018						
Emissions (tons/year)	3.89	30.27	70.89	0.24	14.90	9.67
Exceeds SJVAPCD CEQA thresholds?	No	N/A	Yes	N/A	No	No
Exceeds GC threshold?	No	N/A	Yes	No	No	No
Year 2019						
Emissions (tons/year)	0.42	4.07	4.17	0.01	8.63	6.94

	VOC	CO	NO _x	SO ₂	PM ₁₀ ³	PM _{2.5} ³
Exceeds SJVAPCD CEQA thresholds?	No	N/A	No	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No
Year 2020						
Emissions (tons/year)	0.25	2.50	1.95	0.01	2.95	0.14
Exceeds SJVAPCD CEQA thresholds?	No	N/A	No	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No
Year 2021						
Emissions (tons/year)	3.87	19.56	79.74	0.12	4.33	2.49
Exceeds SJVAPCD CEQA thresholds?	No	N/A	Yes	N/A	No	No
Exceeds GC threshold?	No	N/A	Yes	No	No	No
Year 2022						
Emissions (tons/year)	0.09	1.13	0.53	0.00	0.13	0.05
Exceeds SJVAPCD CEQA thresholds?	No	N/A	No	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No
Year 2023						
Emissions (tons/year)	0.03	0.39	0.19	0.00	0.08	0.02
Exceeds SJVAPCD CEQA thresholds?	No	N/A	No	N/A	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No

¹ The SJVAPCD has significance thresholds for NO_x, ROG/VOC, PM₁₀, and PM_{2.5}. The district currently does not have thresholds for CO or SO_x. Section 3.3.11 in the Fresno to Bakersfield Section Final EIR/EIS summarizes the CEQA significance threshold for these pollutants.

² The GC de minimis thresholds for criteria pollutants are based on the SJVAPCD federal attainment status. The SJVAPCD is considered in extreme nonattainment for the ozone NAAQS, is a nonattainment area for PM_{2.5}, and is a maintenance area for the CO NAAQS (Fresno and Bakersfield urbanized areas only) and PM₁₀ NAAQS. Although the SJVAPCD is in attainment for SO_x, since SO_x is a precursor for PM_{2.5}, the PM_{2.5} GC de minimis threshold was used.

³ PM₁₀ and PM_{2.5} emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures the California High-Speed Rail Authority committed to in the Statewide Program EIR/EIS.

CEQA = California Environmental Quality Act

CO = carbon monoxide

EIR = environmental impact report

EIS = environmental impact statement

GC = general conformity

N/A = not applicable

NAAQS = National Ambient Air Quality Standards

NO_x = oxide of nitrogen

PM₁₀ = particulate matter smaller than or equal to 10 microns in diameter

PM_{2.5} = particulate matter smaller than or equal to 2.5 microns in diameter

ROG = reactive organic gases

SJVAPCD = San Joaquin Valley Air Pollution Control District

SO₂ = sulfur dioxide

SO_x = oxides of sulfur

VOC = volatile organic compound

Table 8-A-3 Programmatic Construction Emissions: F-B LGA (tons/year)^a

Activities	VOC	CO			NO _x	SO ₂	PM ₁₀ ^d	PM _{2.5} ^d
		Total	Fresno ^e	Bakersfield ^e				
SJVAPCD annual CEQA significance thresholds ^b	10	100	N/A	N/A	10	27	15	15
Annual general conformity <i>de minimis</i> levels applicable to the SJVAB ^c	10	N/A	100	100	10	100	100	100
Year 2014								
Emissions (tons/year)	16.33	99.92	59.95	24.71	373.42	0.62	40.16	12.44
Exceeds SJVAPCD CEQA thresholds?	Yes	No	N/A	N/A	Yes	No	Yes	No
Exceeds GC threshold?	Yes	N/A	No	No	Yes	No	No	No
Year 2015								
Emissions (tons/year)	36.1	284.39	91.77	60.30	610.46	1.16	66.42	29.35
Exceeds SJVAPCD CEQA thresholds?	Yes	Yes	N/A	N/A	Yes	No	Yes	Yes
Exceeds GC threshold?	Yes	N/A	No	No	Yes	No	No	No
Year 2016								
Emissions (tons/year)	31.71	251.68	75.27	56.47	493.70	0.87	59.34	26.03
Exceeds SJVAPCD CEQA thresholds?	Yes	Yes	N/A	N/A	Yes	No	Yes	Yes
Exceeds GC threshold?	Yes	N/A	No	No	Yes	No	No	No
Year 2017								
Emissions (tons/year)	8.49	48.86	16.56	15.27	161.23	0.22	15.76	11.8
Exceeds SJVAPCD CEQA thresholds?	No	No	N/A	N/A	Yes	No	Yes	No
Exceeds GC threshold?	No	N/A	No	No	Yes	No	No	No
Year 2018								
Emissions (tons/year)	3.89	30.27	6.19	3.74	70.89	0.24	14.90	9.43
Exceeds SJVAPCD CEQA thresholds?	No	No	N/A	N/A	Yes	No	No	No
Exceeds GC threshold?	No	N/A	No	No	Yes	No	No	No
Year 2019								
Emissions (tons/year)	0.42	4.07	6.33	1.70	4.17	0.01	8.63	6.93
Exceeds SJVAPCD CEQA thresholds?	No	No	N/A	N/A	No	No	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No	No	No

Activities	VOC	CO			NO _x	SO ₂	PM ₁₀ ^d	PM _{2.5} ^d
		Total	Fresno ^e	Bakersfield ^e				
Year 2020								
Emissions (tons/year)	0.25	2.50	4.18	1.21	1.95	0.01	2.95	0.14
Exceeds SJVAPCD CEQA thresholds?	No	No	No	No	No	No	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No	No	No
Year 2021								
Emissions (tons/year)	3.87	19.56	10.11	9.26	79.74	0.14	4.33	2.36
Exceeds SJVAPCD CEQA thresholds?	No	No	No	No	Yes	No	No	No
Exceeds GC threshold?	No	N/A	No	No	Yes	No	No	No
Year 2022								
Emissions (tons/year)	0.09	1.13	0.54	0.00	0.53	0.00	0.13	0.05
Exceeds SJVAPCD CEQA thresholds?	No	No	No	No	No	No	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No	No	No
Year 2023								
Emissions (tons/year)	0.03	0.39	0.00	0.00	0.19	0.00	0.08	0.02
Exceeds SJVAPCD CEQA thresholds?	No	No	No	No	No	No	No	No
Exceeds GC threshold?	No	N/A	No	No	No	No	No	No

^a These construction emissions were established for the F-B LGA, including the entire alignment from Fresno to Bakersfield.

^b The SJVAPCD has identified construction emissions significance thresholds for CO, SO₂, NO_x, ROG, VOC, PM₁₀, and PM_{2.5} in the 2015 GAMAQI.

^c The GC *de minimis* thresholds for criteria pollutants are based on the SJVAB federal attainment status. The SJVAB is considered in extreme nonattainment for the ozone NAAQS, is a nonattainment area for PM_{2.5}, and is a maintenance area for the CO NAAQS (Fresno and Bakersfield urbanized areas only) and PM₁₀ NAAQS. Although the SJVAB is in attainment for SO_x, since SO_x is a precursor for PM_{2.5}, the PM_{2.5} GC *de minimis* threshold was used.

^d PM₁₀ and PM_{2.5} emissions have incorporated the SJVAPCD Regulation VIII requirements and dust control measures.

^e The Fresno urbanized area and the Bakersfield metropolitan area are separate CO maintenance areas. CO emissions presented for these areas represent the Fresno and Bakersfield urbanized maintenance areas only.

CEQA = California Environmental Quality Act

CO = carbon monoxide

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

GAMAQI = Guide for Assessing and Mitigating Air Quality Impacts

GC = general conformity

N/A = not applicable

NO_x = nitrogen oxides

PM₁₀ = particulate matter smaller than or equal to 10 microns in diameter

PM_{2.5} = particulate matter smaller than or equal to 2.5 microns in diameter

ROG = reactive organic gas

SJVAB = San Joaquin Valley Air Basin

SJVAPCD = San Joaquin Valley Air Pollution Control District

SO₂ = sulfur dioxide

VOC = volatile organic compound

Table 8-A-4 Total F-B HSR Unmitigated Construction Emissions –Total (tons)

Alternative	Emissions ^a					
	VOC	CO	NO _x	SO ₂	PM ₁₀ ^b	PM _{2.5} ^b
F-B Section including F-B LGA	101	743	1,796	3	212	99
F-B Section including May 2014 Project	103	757	1,818	3	218	103

^a Emissions include HSR project construction as well as roadway projects that are not included in Regional Transportation Plans that would occur over a period of years.

^b The PM₁₀ and PM_{2.5} emissions consist of the exhaust and fugitive dust emissions.

CO = carbon monoxide

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

HSR = high-speed rail

NO_x = nitrogen oxides

PM₁₀ = particulate matter smaller than or equal to 10 microns in diameter

PM_{2.5} = particulate matter smaller than or equal to 2.5 microns in diameter

SO₂ = sulfur dioxide

VOC = volatile organic compound

Operational air quality emissions calculations considered the indirect emissions from regional vehicle travel, aircraft, and power plants, and direct project operational emissions including emissions from high-speed rail (HSR) stations, maintenance facilities, and train movements.

Greenhouse Gas Emissions

The methodology for estimating GHG emissions associated with construction is included in Section 3.3.4.10 of the Fresno to Bakersfield Section Final EIR/EIS. Construction GHG emissions were quantitatively estimated for the earthwork and major civil construction activity during construction, as described in the *Fresno to Bakersfield Section Final Air Quality Technical Report* (Authority and FRA 2014a).

Operational emissions calculations for GHG emissions considered on-road vehicle emissions, airport emissions, and power plants. Vehicle emissions were generated by multiplying estimated vehicle miles traveled by appropriate GHG emission factors, which are based on speed, vehicle mix, and analysis year. The number of air travel trips removed due to the HSR was estimated as part of the travel demand modeling analysis conducted for the May 2014 Project. GHG emissions from power generation were predicted on a statewide level since no specific source facilities were identified.

Impacts

Construction

Construction of the May 2014 Project has the potential to cause temporary and significant localized air quality impacts.

Table 8-A-2 identifies the years in which the May 2014 Project mass emissions would exceed either the GC or the SJVAPCD CEQA thresholds. The May 2014 Project would exceed the SJVAPCD and GC standards for NO_x in Years 2014, 2015, 2016, 2017, and 2021.⁵

As documented in the Fresno to Bakersfield Section Final EIR/EIS, the construction emissions associated with HSR station construction were modeled for the Bakersfield Station using local meteorological data sets (Bakersfield Airport). These emissions were modeled using United States (U.S.) Environmental Protection Agency's AERMOD atmospheric dispersion model to predict pollutant concentrations at locations near the construction of the station. The modeled work area for each station was based on the approximate station footprint. The analysis used station footprints for the station alternatives associated with the BNSF Alternative (Bakersfield

⁵ Data from Table 8-A-2 is from Table 3.3-7 of the Fresno to Bakersfield Section Final EIR/EIS. At the time of preparation of the table, the initial construction year was assumed to be 2014.

Station-North Alternative). These footprints were assumed to be representative of the other station alternatives in terms of size and distance to sensitive receptors, and are also representative of the F Street Station under the F-B LGA. The increase in pollutant concentration associated with the project emissions is added to the background concentration to estimate the ambient air pollutant concentration for comparison to the applicable National Ambient Air Quality Standards and California Ambient Air Quality Standards. The modeled diesel particulate matter concentrations were used to determine the exposure dose and associated health impact following Office of Environmental Health Hazard Assessment guidance for health risk assessments. Specific details of the air dispersion modeling and health risk assessment are found in Appendix H of the Fresno to Bakersfield Section Final Air Quality Technical Report.

Sensitive receptors (such as schools, residences, and health-care facilities) are located near the construction areas in Bakersfield. During construction, sensitive receptors would be exposed to increased concentrations of toxic air contaminants (TAC), such as diesel particulate matter, which may present cancer risks. The long-term (cancer risk) impacts from toxic air contaminant emissions associated with construction would be less than significant under CEQA because the proposed F-B construction would not exceed the applicable threshold of 10 in a million. Exposure to toxic air contaminant emissions associated with station construction would not result in substantial short-term (acute) impacts.

Construction emissions would only occur during the construction period. However, construction of the project would facilitate emission reductions of VOC, CO, NO_x, SO₂, PM₁₀, and PM_{2.5} during project operations throughout the lifetime of the project. Construction air quality impacts will be mitigated by entering into a Voluntary Emission Reduction Agreement (VERA) with the SJVAPCD by providing funds to the SJVAPCD are used by the SJVAPCD to administer emission reduction projects on behalf of the project proponent. The emissions would be mitigated to negligible intensity and therefore the impacts are less than significant under CEQA.

Operation

As discussed in Impact AQ#10 of the Fresno to Bakersfield Section Final EIR/EIS (pages 3.3-59 through 3.3-64), motor vehicle emissions would decrease in the region as a result of the project. These reductions, however, would be partially offset by operational emissions associated with the train itself (the HSR would be powered by electricity from the regional power grid), by station operations, and by heavy maintenance facility (HMF) and MOIF operations. The project would result in a regional decrease in emissions of criteria pollutants compared to the No Project Alternative (see Table 3.3-11, page 3.3-60, of the Fresno to Bakersfield Section Final EIR/EIS or Table 3.3-13 in this Draft Supplemental EIR/EIS). Operation of the May 2014 Project would provide a net regional air quality benefit. Operation of the May 2014 Project would generally reduce regional criteria and GHG pollutants and would have a less-than-significant impact under CEQA on air quality.

CO Hot-Spot

A CO hot-spot analysis was performed for intersections that could potentially cause a localized CO hot-spot and for parking structures associated with implementation of the proposed F-B LGA. The modeled CO concentrations were combined with CO background concentrations and compared with the air quality standards. CO concentrations for the May 2014 Project station are included in Section 3.3.6.3 of the Fresno to Bakersfield Section Final EIR/EIS (pages 3.3-71 through 3.3-79).

The Fresno to Bakersfield Section Final EIR/EIS indicated that intersections in the project vicinity would not cause violations of CO National Ambient Air Quality Standards at affected intersections. The report indicated that the localized CO emissions from existing plus project and future plus project would not be expected to cause a violation of ambient air quality standards.

To evaluate the impacts of the F-B LGA, a CO hot-spot analysis was conducted at affected intersections in the vicinity of the proposed F-B LGA and parking structures. The changes were evaluated by modeling CO concentrations at intersections in the vicinity of the proposed F-B LGA. The model results, as shown in Table 3.3-14, indicate that CO levels would remain below

the California Ambient Air Quality Standards and National Ambient Air Quality Standards for all study intersections.

Since the modeled CO concentrations would be below the California Ambient Air Quality Standards for the proposed F-B LGA, these impacts would be less than significant under CEQA.

Particulate Matter

As discussed in Section 3.3.5.2 of this Draft Supplemental EIR/EIS, the F-B LGA would have similar particulate matter impacts as those identified for the May 2014 Project. The project-related particulate matter hot-spot analysis is discussed in Section 3.3.6.3 of the Fresno to Bakersfield Section Final EIR/EIS (pages 3.3-79 and 3.3-80).

As with the May 2014 Project, the F-B LGA would not be considered a project of air quality concern, as defined by 40 C.F.R. 93.123(b)(1), and would not likely cause violations of PM₁₀/PM_{2.5} National Ambient Air Quality Standards during its operation. Therefore, quantitative PM_{2.5} and PM₁₀ hot-spot evaluations are not required. The requirements of 40 C.F.R. § 93.116 are therefore met without a quantitative hot-spot analysis. The HSR project would not likely cause an adverse impact on air quality for PM₁₀/PM_{2.5} standards because, based on these criteria, it is not a project of air quality concern.

As with the May 2014 Project, as discussed in Section 3.3.6.3 of the Fresno to Bakersfield Section Final EIR/EIS (pages 3.3-79 and 3.3-80), implementation of the F-B LGA is unlikely to cause any localized adverse impact on air quality for the PM₁₀/PM_{2.5} National Ambient Air Quality Standards. Therefore, the PM₁₀ hot-spot impact on air quality would be less than significant under CEQA.

Localized Air Quality Impacts to Sensitive Receptors

As with the May 2014 Project, implementation of the F-B LGA would result in a reduction in annual mobile source air toxics emissions impacts to sensitive receptors at schools around the station by 83 percent from 2010 to 2050 due to recent current regulatory requirements. Emergency generators would be located at the station and would also be screened during the permitting phase with the SJVAPCD to ensure that sensitive receptors, including schools, are not exposed to concentrations of TACs exceeding significance thresholds. Therefore, as with the May 2014 Project, by the time exposure of sensitive receptors including schools under the proposed F-B LGA is operational in 2020, the project would have a less-than-significant impact under CEQA related to mobile source air toxics for schools in the vicinity.

Greenhouse Gas Emissions

As discussed under Impact AQ#11 of the Fresno to Bakersfield Section Final EIR/EIS (pages 3.3-64 through 3.3-69), the increase in GHG emissions generated during construction and operation would be offset by the net GHG reductions in operation (because automobile and plane trips would be removed in the Fresno to Bakersfield area) during the first 12 months of operation (using the F-B LGA as a proxy since calculations were not completed for the May 2014 Project).

Comparison between the May 2014 Project and F-B LGA

Table 8-A-5 provides a comparison of air quality impacts between the May 2014 Project and F-B LGA.

Table 8-A-5 Air Quality Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Construction	The May 2014 Project would exceed the SJVAPCD and GC standards for NO _x in Years 2014, 2015, 2016, 2017, 2018, and 2021 and for VOC in 2014, 2015, and 2016.	The F-B LGA would exceed the SJVAPCD and GC standards for NO _x in Years 2014, 2015, 2016, 2017, 2018, and 2021 and for VOC in 2014, 2015, and 2016.
	The May 2014 Project would not exceed the applicable threshold of 10 in a million for exposure of sensitive receptors to toxic air contaminant emissions.	The F-B LGA would not exceed the applicable threshold of 10 in a million for exposure of sensitive receptors to toxic air contaminant emissions.
Operation	The Project would provide a net regional air quality benefit.	The Project would provide a net regional air quality benefit.
	Project operation would reduce annual MSAT emissions impacts to sensitive receptors at schools around the station.	Project operation would reduce annual MSAT emissions impacts to sensitive receptors at schools around the station.
Greenhouse gas emissions	The Project would emit approximately 225,728 metric tons of carbon dioxide equivalent over the construction period. The increase in GHG emissions would be offset in less than 12 months.	The Project would emit approximately 224,065 metric tons of carbon dioxide equivalent over the construction period. The increase in GHG emissions would be offset in less than 12 months.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative
 GC = General Conformity
 GHG = greenhouse gas
 MSAT = mobile source air toxics
 NO_x = oxides of nitrogen
 SJVAPCD = San Joaquin Valley Air Pollution Control District
 VOC = volatile organic compounds

Based on emissions calculations conducted for the F-B LGA, it is estimated that construction emissions from the F-B LGA would be similar to those estimated for the May 2014 Project although impacts to sensitive receptor locations would be different under each alternative. As presented in Section 3.3 of this Draft Supplemental EIR/EIS, the emission estimates calculated for the F-B LGA assumed a viaduct structure. The structure on retained fill would result in slightly different emission estimates, including lower estimates for construction mobilization, demolition, road crossings, and demobilization. Emissions would be approximately 1 percent higher for land clearing and earth moving. All other construction phase emissions would remain the same. Therefore, construction of the structure on retained fill would result in emissions similar to those presented in Table 8-A-2. See Appendix A of the Fresno to Bakersfield Section Final Air Quality Technical Report (Authority and FRA 2014a) and the *Fresno to Bakersfield Section Draft Supplemental Environmental Impact Report/Environmental Impact Statement: Air Quality and Global Climate Change Technical Report* (Authority and FRA 2017b) for details. Construction emissions from the F-B LGA would differ from the BNSF Alternative (May 2014 Project) by less than 10 percent and would be offset during the first 12 months of operation.

As shown in Table 8-A-5, GHG emissions associated with construction of the F-B LGA would be offset by the net GHG reductions in operation in less than 12 months for the F-B LGA, which is similar to the May 2014 Project. Construction emissions are slightly less for construction years 2014 through 2017 and the same for years 2018 through 2023. Construction of the F-B LGA would emit approximately 224,065 metric tons of carbon dioxide equivalent over the construction period, while the May 2014 Project would emit approximately 225,728 metric tons; therefore, the F-B LGA would emit approximately 1,663 metric tons of carbon dioxide equivalent less than the May 2014 Project over the construction period.

Noise and Vibration

Summary of May 2014 Project Noise and Vibration Impacts

The purpose of the noise and vibration section is to evaluate noise sources and potential land use impacts related to noise. Potential ground-borne vibration is also addressed in this section. To determine the potential for significant noise or ground-borne vibration impacts, the existing noise and ground-borne vibration conditions need to be documented. Then, surrounding existing sensitive land uses must be noted. Finally, changes in noise levels or exposure to these sensitive land uses caused by the proposed project must be evaluated.

Methodology

As described in Section 3.4.2 of this Draft Supplemental EIR/EIS, the methodology applied to the analysis of the May 2014 Project and the F-B LGA was consistent with the methodology used in the Fresno to Bakersfield Section Final EIR/EIS (pages 3.4-2 through 3.4-16). The noise and vibration impact assessment used the methodology described in the Federal Transit Administration (FTA) guidance manual (FTA 2006) and FRA guidance manual (FRA 2012). The Authority applies uniform noise and vibration criteria for construction and operation based on FTA and FRA guidance.

The noise study area for both the May 2014 Project and the F-B LGA includes sensitive receivers located up to approximately 2,500 feet from the proposed track centerline. For the May 2014 Project and the F-B LGA, the study area for vibration includes the HSR alignment study areas, including existing railroads up to 275 feet from the edge of the right-of-way.

The construction noise and vibration methodology includes the following:

- Noise emissions from equipment expected to be used by contractors.
- Construction methods using the equipment identified above.
- Usage scenarios for how the equipment will be operated.
- Estimated site layouts of equipment along the right-of-way.
- Relationship of the construction operations to nearby noise-sensitive receivers.

HSR operation noise and vibration levels were projected using a conservative HSR System operation plan with a high frequency of train operations and the prediction models provided in the FRA guidance manual (FRA 2012).

Existing Conditions

Noise

In Shafter, noise levels measured along the May 2014 Project alignment generally ranged from 70 to 79 A-weighted decibels (dBA)⁶ day-night sound level, dBA (L_{dn}).⁷ These levels reflect the proximity of an active freight rail line. Between Shafter and Bakersfield, the May 2014 Project alignment continues through agricultural land, which includes some of the least-populated areas in the study area. Noise levels measured along this segment of the May 2014 Project alignment ranged from 54 to 61 dBA L_{dn}, as expected in a quiet, rural environment. For residences adjacent to well-traveled roadways, noise levels ranged from 67 to 71 dBA L_{dn}. South of Reina Road, land uses transition from agricultural to residential, with several single-family residential neighborhoods. The noise levels measured at these residences ranged from 65 to 77 dBA L_{dn},

⁶ dBA: Sound is measured in terms of sound pressure level and is usually expressed in decibels. The human ear is less sensitive to higher and lower frequencies than it is to mid-range frequencies. All noise ordinances, and this noise analysis, use the A-weighting system, which measures what humans hear in a more meaningful way because it reduces the sound levels of higher- and lower-frequency sounds—similar to what humans hear. Measurements taken with this A-weighted filter are referred to as dBA readings.

⁷ L_{dn}: The average level of sound over a 24-hour period with 10 decibels added nighttime sound levels (between 10 p.m. and 7 a.m.) as a penalty to account for the greater sensitivity and lower background sound levels during this time. The Fresno to Bakersfield Section: Noise and Vibration Technical Report provides details regarding noise and noise descriptors.

which is reflective of residences directly adjacent to an active railroad line. Beyond this point, the May 2014 Project alignment turns east toward the freight yard and station in the city of Bakersfield. The land uses along this segment of the alignment are urban; roadways, freeways, and rail lines dominate the noise environment. The noise measurements conducted near the May 2014 Project alignment and the Truxtun Avenue Station in this area ranged from 59 to 70 dBA L_{dn} , which are consistent with an urban environment.

Vibration

Vibration measurements ranged between 70 and 80 vibration velocity decibels (VdB)⁸ with the highest measured vibration level being 92 VdB and the lowest measurement being 59 VdB. Specific vibration measurements were not taken at the Truxtun Avenue Station location as vibration sensitive receivers were not located within the FRA screening distances (275 feet from edge of right-of-way). As discussed in Section 3.4.4.2 of the Fresno to Bakersfield Section Final EIR/EIS, the Truxtun Avenue Station is not expected to have vibration levels above residential standards.

Impacts

Noise Impacts

Table 8-A-6 summarizes the number of sensitive receivers within the May 2014 Project study area that would experience severe intensity noise impacts based on the maximum frequency of trains anticipated with full system operations without mitigation. These impacts are also shown in Figure 8-A-5a and Figure 8-A-5b. It should be noted that the number of sensitive receptors under the May 2014 Project is much lower than the F-B LGA because the F-B LGA alignment is located in closer proximity (within 2,500 feet – The May 2014 Project has a total of 8,624 sensitive receptors while the F-B LGA has a total of 13,836 within 2,500 feet of the corresponding alignments) of denser residential areas compared to the May 2014 Project. Therefore, pre-mitigation noise impacts under the May 2014 Project would be lower than the F-B LGA. Project noise impacts are highly dependent on the number of sensitive receptors being affected, the number of trains operated; therefore, the impacts presented are a conservative, worst-case analysis assuming the maximum frequency of trains anticipated with full system operations. The initial stages of system development would have considerably lower noise impacts. For sections of the alignment constructed on slab track, noise levels from HSR operations would be 3 decibels higher than for ballast and tie track, and therefore may result in additional noise impacts.

Table 8-A-6 Severe and Moderate Noise Impacts from the May 2014 Project (Pre-Mitigation)

Level of Impact	Impact Type	Number of Impacted Noise-Sensitive Receivers (Pre-Mitigation)
		May 2014 Project ⁴
Severe	Category 1 ¹	--
	Category 2 ²	3,887 (3,886 residential units)
	Category 3 ³	13
Moderate	Category 1 ¹	--
	Category 2 ²	4,696 (4,695 residential units)
	Category 3 ³	28

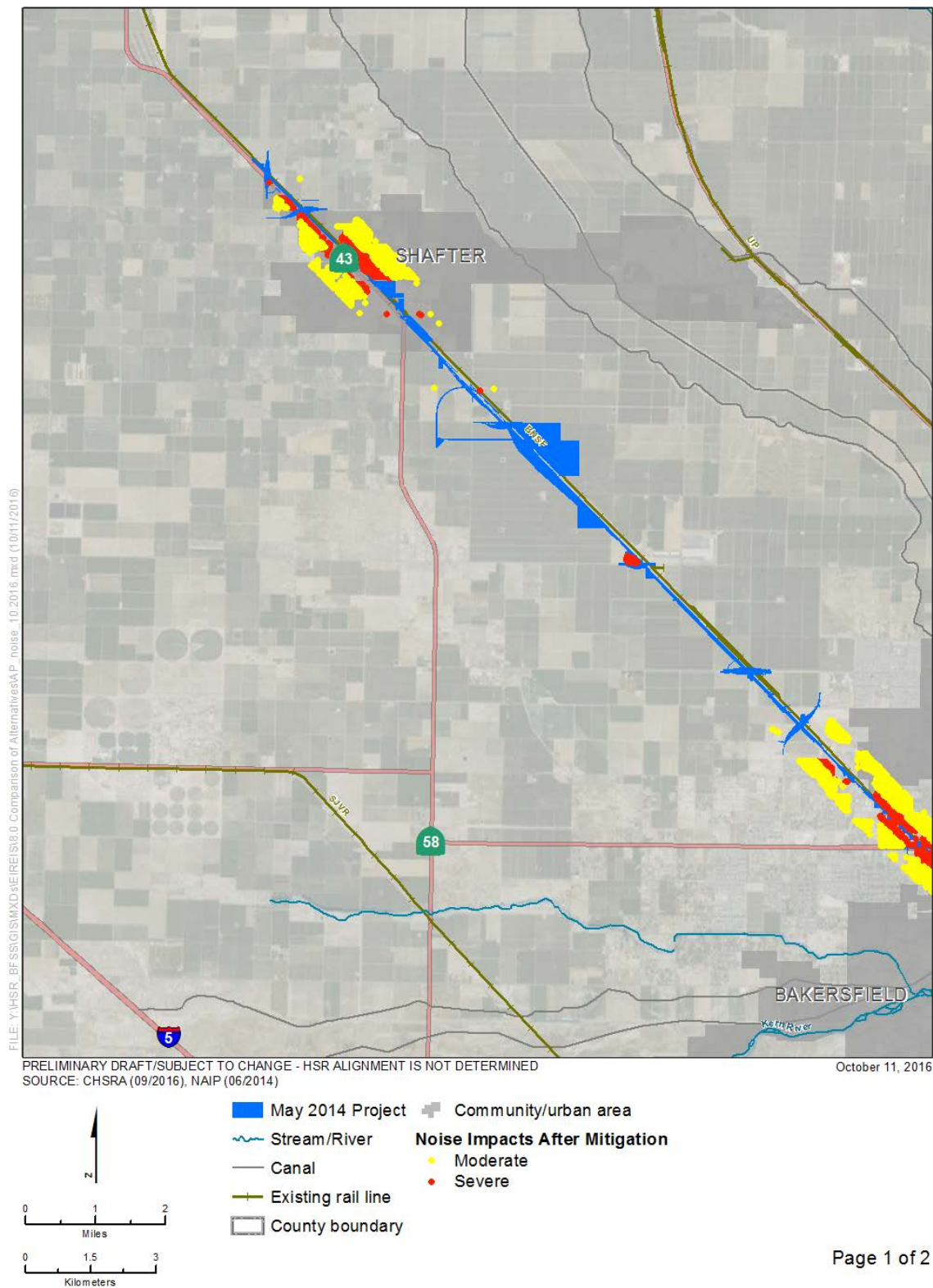
¹ Category 1 includes recording studios.

² Category 2 includes residential uses, hospitals, hotels, homeless shelters and prisons/correctional facilities.

³ Category 3 includes schools, churches, parks, meeting halls, mortuaries, libraries, museums, theaters, daycare facilities, cemeteries, disability services and clubs.

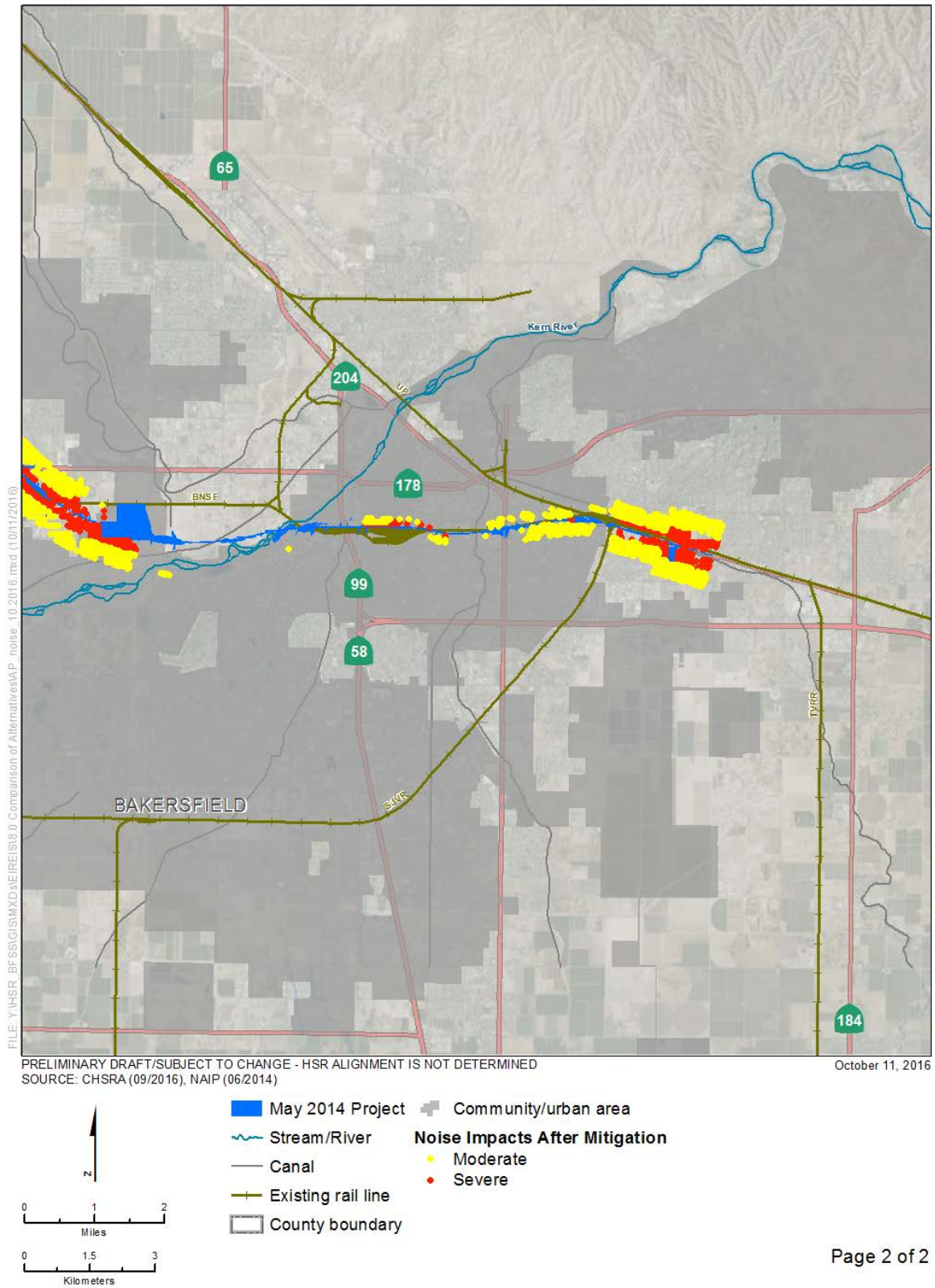
⁴ The numbers for the May 2014 Project were interpreted based on available information provided.

⁸ VdB: In this analysis, vibration velocity is expressed in terms of VdB as the primary measurement to evaluate the effects of vibration. VdB means the root-mean-square vibration velocity level.



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Figure 8-A-5a May 2014 Project Noise Impacts After Mitigation (Shafter)



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Figure 8-A-5b May 2014 Project Noise Impacts After Mitigation (Bakersfield)

Vibration Impacts

During construction, building damage due to vibration is only anticipated from pile-driving in close proximity (within 25 to 50 feet) of existing buildings. Pile driving is only expected to occur where there is the need for a bridge, aerial structure, or road crossing and is only one of several proposed construction methods. When a construction scenario has been established, preconstruction surveys will be conducted at locations within 50 feet of pile driving to document the existing condition of buildings in case damage is reported during or after construction. The Authority will arrange for the repair of damaged buildings or will pay compensation to the property owner. Although vibration impacts would occur during construction activities, these activities are considered temporary, as they would cease after completion. With implementation of proposed mitigation, construction vibration impacts would be substantially lessened or avoided, and reduced to a less-than-significant impact under CEQA.

Several sensitive receivers would be displaced by the May 2014 Project. None of the sensitive receivers to remain (i.e., that will not be displaced by the May 2014 Project) will be impacted by HSR operational vibration. Therefore, no operational vibration effects under NEPA, and no impacts under CEQA would result from the May 2014 Project.

Comparison between the May 2014 Project and F-B LGA

As shown in Table 8-A-7, post-mitigation noise impacts along the project alignment would be greater under the May 2014 Project than the F-B LGA. However, vibration impacts would be greater under the F-B LGA when compared to the May 2014 Project alignment.

Noise impacts during construction would be similar for both alternatives based on the distance to the construction activity. These impacts would be temporary and mitigated through the implementation of impact avoidance and minimization measures and mitigation measures identified in the Fresno to Bakersfield Section Mitigation and Monitoring Enforcement Plan (Authority 2014).

Table 8-A-7 Noise and Vibration Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Severe Noise Impacts Post Mitigation from Operations		
<i>Residences</i>	299	149
<i>Churches</i>	3	0
<i>Hospitals</i>	1	0
<i>Parks</i>	0	1
<i>Historic Properties</i>	2	0
<i>Other¹</i>	N/A	2
Total	305	152
Vibration Impacts	No effect	18 properties impacted

 least-impact alternative

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

¹ Land uses include a prison/correctional facility and a museum identified under Categories 2 and 3, respectively.

Additionally, the F-B LGA would result in elevation of the BNSF and HSR on parallel but separated retained fill tracks through Shafter. Existing operations associated with the BNSF line produce noise impacts from the traveling of the existing trains as well as the horns sounded for emergency purposes near at-grade crossings. As a result of elevating the tracks, horns will no longer be necessary. Noise impacts associated with the operation of BNSF trains are likely to be generally the same or lower for sensitive receivers located adjacent to the elevated BNSF due to shielding by the retained fill and elimination of the train horns resulting in reduced noise levels. For noise sensitive receptors located further away, there is a potential for some increase in noise

from the BNSF operations, due to the lack of shielding from intervening buildings. However, it is expected that elevations from HSR operations will produce a greater noise impact overall as compared to operations on the BNSF line and specifically freight trains. While the single pass-by of a freight train may potentially be louder than one pass-by of a high-speed passenger train, the frequency of operations on the HSR line would produce higher noise levels for the peak-hour and daily scenarios.

Mitigation for operational noise includes the installation of sound barriers, vehicle noise specifications, special track work at crossovers and turnouts, and additional noise analysis during final design. As shown in Table 8-A-7, after mitigation, severe noise effects would remain for 152 receivers under the F-B LGA compared with 305 receivers under the May 2014 Project. These receivers would be eligible for either sound insulation or payment of property for noise easements. Overall, the May 2014 Project would have greater noise impacts than the F-B LGA. Projected vibration levels were calculated at receivers within 275 feet from the nearest HSR rail line for both the May 2014 Project and the F-B LGA. Several sensitive receivers would be displaced by the May 2014 Project. None of the sensitive receivers to remain (i.e., that will not be displaced by the May 2014 Project) will be impacted by HSR operational vibration. For the F-B LGA, a total of 80 vibration-sensitive receivers are located within 275 feet of the nearest track. Of the 80 vibration-sensitive receivers, 18 receivers would be impacted by the proposed F-B LGA, including 14 residences. Therefore, vibration effects would be noticeable to 18 receivers under the F-B LGA and to no receivers under the May 2014 Project.

Electromagnetic Field/Electromagnetic Interference

Summary of May 2014 Project Electromagnetic Field/Electromagnetic Interference Impacts

The electromagnetic field/electromagnetic interference (EMF/EMI) EIR/EIS section describes the measured levels of EMFs, as well as the potential for EMI from operation of the HSR. This section focuses on land uses that are particularly sensitive to EMF/EMI, such as businesses and institutions that use equipment that may be highly susceptible to EMI, or that engage in medical research activities that might be affected by HSR-operation EMFs.

Sensitive human receptors, such as hospitals, medical centers, schools, and colleges are concentrated in urban areas. In some cases, these locations may be associated with the use, assembly, calibration, or testing of sensitive and unshielded radio frequency equipment. For unshielded equipment that is sensitive to magnetic fields in the range of 1 to 3 milligauss (mG) (such as magnetic resonance imaging systems), interference is possible at distances of up to approximately 200 feet from the centerline of the HSR right-of-way. For the most sensitive electron-beam microscopes, which are sensitive to magnetic fields in the range of 0.1 to 0.3 mG, interference would be possible to approximately 700 feet from the centerline of the HSR right-of-way. From a practical standpoint, local 60-hertz magnetic field sources would be dominant well before this distance, as evidenced by the median magnetic field levels measured along the spatial profiles during the baseline survey (these field levels ranged from 0.12 to 4.77 mG).

Methodology

The study area for EMFs that has been applied to the May 2014 Project and the F-B LGA is as follows:

- 200 feet on both sides of the proposed HSR right-of-way centerline (a 400-foot-wide strip centered on the proposed HSR alignment). The study area includes urban and developed areas in Shafter and Bakersfield.
- 200 feet on both sides of the transmission lines supplying traction power substation (a 400-foot-wide strip).

Computer modeling shows that the EMF level will decay to a level below 2 mG at 200 feet from either side of the HSR right-of-way centerline. The potential for EMI would no longer exist for equipment beyond 500 feet from the HSR right-of-way centerline.

The Authority identified existing land uses that could be affected by the EMFs resulting from HSR operations. Baseline measurements were made to understand existing conditions. Then, a mathematical model of the HSR traction electrical system was used to calculate the anticipated maximum 60-hertz magnetic fields that a single HSR train would produce. The model incorporates conservative assumptions for the potential EMF impacts of the HSR.

A significant impact on the environment would occur if the May 2014 Project exposes people to a documented EMF health risk, or if operations interfere with implanted biomedical devices and unshielded sensitive equipment.

Impacts

Construction

EMF/EMI effects that would occur during construction would have negligible intensity under NEPA and would be less than significant under CEQA, because only a slight measurable increase of EMF/EMI levels would occur and within a very limited geographical area.

Operation

Operation of the HSR would generate 60-hertz electric and magnetic fields on and adjacent to trains, including in passenger station areas. Table 8-A-8 presents the HSR project model results for the May 2014 Project. As shown, EMF impacts on the general public and people in nearby schools, hospitals, businesses, colleges, and residences would be below the Institute of Electrical and Electronics Engineers Standard limit of 9,040 mG⁹ because even within the mainline right-of-way, these levels would not be reached.

Table 8-A-8 Summary of Electromagnetic Field Modeling Results for the May 2014 Project

EMF Analysis	Platform – 16 feet from Alignment Centerline	Fence Line – 30 feet from Alignment Centerline	Study Area – 350 feet from Alignment Centerline
Magnetic Field (mG) Single-Train	720	177	Less than 1

Source: California High-Speed Rail Authority and USDOT Federal Railroad Authority 2011a
EMF = electromagnetic field
mG = milligauss

Magnetic fields of 1,000 to 12,000 mG (1 to 12 g [acceleration of gravity]) may interfere with implanted medical devices (Electric Power Research Institute 2004). EMF levels above the recommended limits for employees with implanted medical devices could exist inside traction power facilities and emergency power generator rooms. Traction power facilities and emergency power generator room sites would be unmanned, and workers would enter them only periodically (e.g., to perform routine maintenance). With implementation of the Electromagnetic Compatibility Program Plan (Authority 2010), persons with an implanted medical device would not be permitted near the traction power facilities. Therefore, these effects on maintenance workers would be avoided (i.e., no impact under NEPA and CEQA).

A review of land uses along the May 2014 Project identified two potentially sensitive receptors (i.e., medical imaging) within the 200-foot study area. These receptors are shown in Figure 8-A-6.

⁹ For information on the EMF exposure guidelines and standards, see the Fresno to Bakersfield Section Final EIR/EIS.

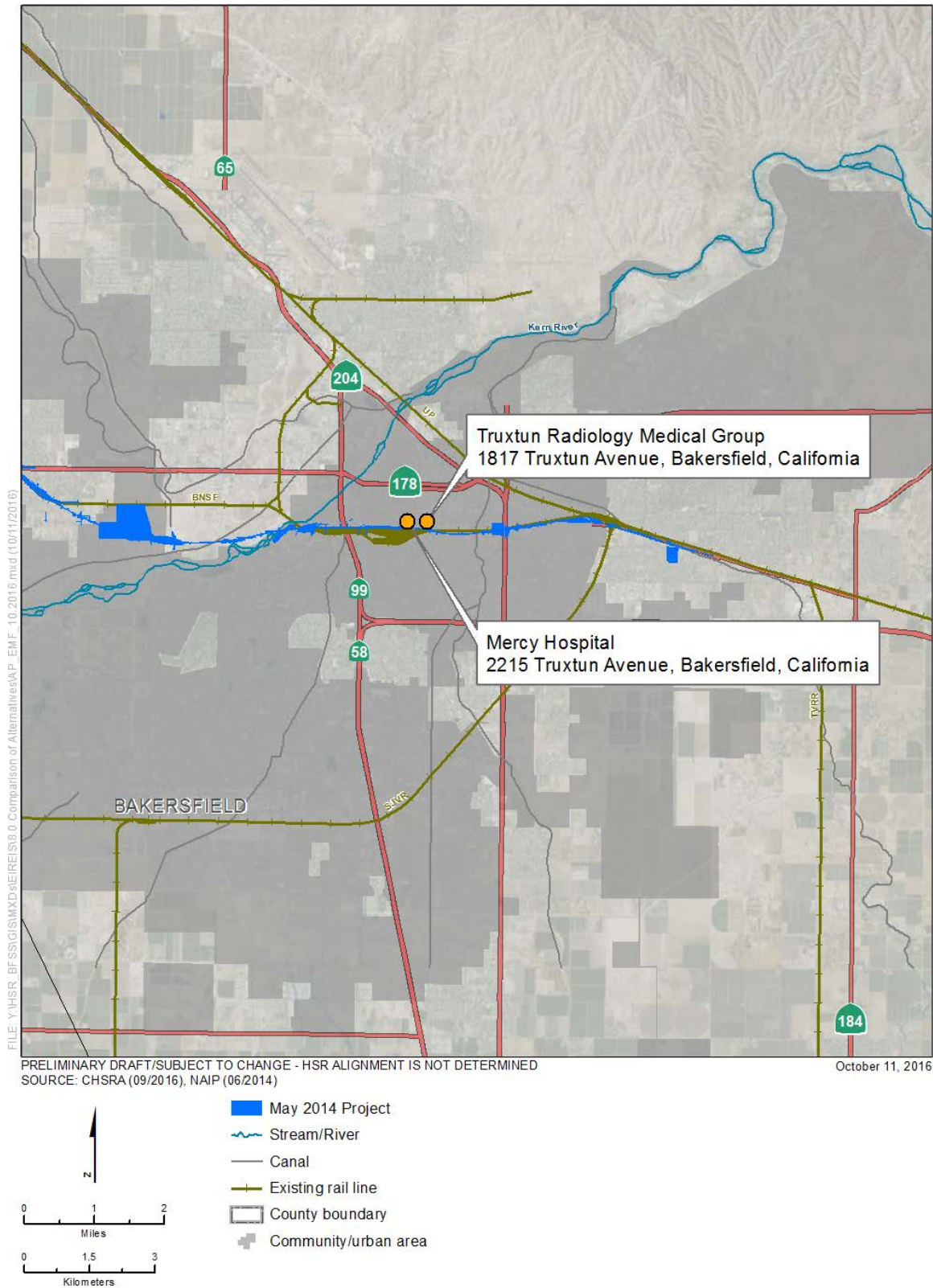


Figure 8-A-6 Electromagnetic Field Sensitive Receptors Along the May 2014 Project

Both receptors, Mercy Hospital and Truxtun Radiology Medical Group, are located in Bakersfield and utilize medical imaging equipment. As such, the susceptibility levels, if they use unshielded equipment, would typically be in the 1 to 3 mG range. Table 8-A-9 summarizes the expected worst-case 60-hertz magnetic fields based on the closest distances from the May 2014 Project centerline to each facility. Operation of the May 2014 Project could result in EMI with medical imaging equipment exposed to magnetic fields in the range of 1 to 3 mG. In the absence of magnetic shielding installed in accordance with the Electromagnetic Compatibility Program Plan, these EMFs could have substantial impact on sensitive receptors.

Table 8-A-9 Expected Worst-Case 60-Hertz Magnetic Fields Based on Closest Distances to Sensitive Receptors from the Centerline of May 2014 Project

	Smallest Distance from Centerline of HSR Right-of-Way (feet)	Calculated HSR Worst-Case Magnetic Fields ¹ (mG)
Mercy Hospital ²	180	1.8
Truxtun Radiology Medical Group ³	450	0.3

¹ Calculated HSR worst-case magnetic field at comparable distances relative to centerline of right-of-way

² Mercy Hospital, 2215 Truxtun Avenue, Bakersfield, California

³ Truxtun Radiology Medical Group, 1817 Truxtun Avenue, Bakersfield, California

HSR = high-speed rail

mG = milligauss

Standard HSR avoidance and minimization measures would preclude other potential effects, such as nuisance shocks when touching ungrounded metal fences and ungrounded metal irrigation systems, and interference with the signal systems of adjoining rail lines. These measures would include the grounding of fences on affected adjacent properties and coordination with adjoining railroads to implement suitable track signal equipment on adjoining railroad tracks.

Comparison between the May 2014 Project and F-B LGA

Table 8-A-10 provides a comparison of EMI/EMF impacts between the May 2014 Project and the F-B LGA during construction and operation.

Table 8-A-10 Electromagnetic Interference/Electromagnetic Field Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Construction	Slight measureable increase in EMF/EMI levels within a limited geographical area	Slight measureable increase in EMF/EMI levels within a limited geographical area
Operation	Two sensitive receptors within 200 feet of the May 2014 centerline.	No sensitive receptors within 200 feet of the F-B LGA centerline.

 = least-impact alternative

EMF = electromagnetic field

EMI = electromagnetic interference

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Due to the similarity of EMF/EMI-dependent land uses along the May 2014 Project and F-B LGA alignments, EMFs along the F-B LGA would be similar to measurements taken along the May 2014 Project alignment between Shafter and Bakersfield; therefore, EMF/EMI impacts resulting from the F-B LGA would be similar to those identified for the May 2014 Project. Sensitive receptors identified for the F-B LGA are greater than 1,000 feet from the alignment; therefore, no impacts associated HSR-produced EMI would occur. This impact would be less than the May 2014 Project.

Public Utilities and Energy

Summary of May 2014 Project Public Utilities and Energy Impacts

Construction of the May 2014 Project could result in planned temporary interruption of utility service, accidental disruption of services, increased water use, and an increase in waste generation. This section also analyzes energy use and savings as a result of the May 2014 Project.

Methodology

The methodologies used to assess potential impacts associated with public utilities and energy under the May 2014 Project and the F-B LGA are summarized below.

Existing Conditions

Public Utilities

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

- High-voltage electrical lines (70 kilovolts or greater).
- High-pressure natural gas lines.
- Petroleum and fuel lines.
- Water, wastewater, irrigation and stormwater canals, conduits, and pipes (outside diameter of 6 inches or larger).
- Fiber optic lines and communication infrastructure (i.e., towers and antennas).

The analysis conducted for the May 2014 Project considered high-voltage, underground and aboveground electrical lines, underground high-pressure natural gas lines, and petroleum lines and facilities “high-risk” utilities as discussed in the Fresno to Bakersfield Section Final EIR/EIS (page 3.6-11). In addition, the analysis considered electrical substations to be high risk. The remaining utilities, such as water and wastewater lines, have a lower safety risk. The study area for evaluating conflicts with public utilities is the construction footprint and includes surface, subsurface, and overhead utilities, as well as aquifers underlying the construction footprint.

Water Supply

Water demand estimates for construction are based on an estimated 5-year time period during which earthmoving and construction activities requiring water use would occur. Annual operational water use estimates are based on full buildout of the project in 2035. Estimates of existing water use were generated by applying region-specific water use rates for the known land uses in the study area. Wastewater generation would be approximately 50 percent of total water demand during operation. For additional detail regarding water supply and demand analysis, please see the Fresno to Bakersfield Section Final EIR/EIS, Section 3.6, Public Utilities and Energy (pages 3.6-20 through 3.6-23), and Section 3.8, Hydrology and Water Resources (page 3.8-29).

Waste Generation

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

Energy

The proposed HSR System would obtain electricity from the statewide grid. 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. Therefore, this analysis cannot apportion to a particular regional study area the use of any particular generation facilities. To identify the projected energy demand of the May 2014 Project, estimated energy demands of the

entire HSR System were prorated based on the length of HSR elevated viaduct within the May 2014 Project study area.

Since publication of the Fresno to Bakersfield Section Final EIR/EIS, which assessed energy requirements of the overall HSR system including the portion of the Fresno to Bakersfield Section comprised by the May 2014 Project, further engineering and design has determined that upgrades to the existing PG&E network would be required to meet the projected power demands of the HSR system; this determination was made for the F-B LGA, but it is reasonably anticipated that comparable upgrades would also be required for the May 2014 Project, as it connects the same geographic areas as the F-B LGA. These improvements would include: minor movement of traction power supply stations, switching stations, and electrical tie line; expansion of the existing PG&E substation north of SR 178 near the intersection of 30th Street and Union Avenue; implementation of new utility switching stations and an HSR traction power supply station. Specific configurations and required actions would be determined based on coordination between the Authority and individual utility providers during the final engineering and design phase.

Impacts

Impacts associated with public utilities and energy could occur as a result of conflicts with existing utilities, water use, waste generation, and energy use, as summarized below.

Public Utilities

Implementation of the May 2014 Project would result in a number of conflicts between the approved rail alignment and both high risk utilities (i.e., electrical lines, natural gas distribution lines, petroleum and fuel pipelines, electrical substations), and low risk utilities (i.e., communication facilities, irrigation canals, water lines, sewers, stormwater retention ponds). See Figures 8-A-7 through 8-A-10 and Table 8-A-25 for some of the utilities and waterbodies that would be crossed by the May 2014 Project. May 2014 Project-related demand on existing utility facilities is not expected to require expansion of those facilities or the construction of new facilities or entitlements. Avoidance and minimization measures would help reduce, avoid, or minimize adverse impacts resulting from the May 2014 Project. Construction of the May 2014 Project would result in scheduled utility service interruptions. With advance notice, local utility customers would experience minimal changes to service, and the intensity of the impact in the local context would be considered negligible. Any potential conflicts with utility lines or facilities would be mitigated to a less-than-significant impact under CEQA.

Water Supply

Construction of the May 2014 Project would require the use of water to prepare concrete, increase the water content of soil to optimize compaction for dust control, rinse the tires of vehicles and equipment, re-seed disturbed areas, and install landscaping, as determined during the final engineering and design phase. Table 8-A-11 shows the estimated water use for the May 2014 Project. The average annual water use over the construction period would not be greater than existing demand as water used for existing agricultural purposes within the HSR construction footprint would be eliminated. Water used during construction of the May 2014 Project would be supplied from various sources. Demand for water supply within the study area would decrease post-construction, and the context of impacts would be local, resulting in a less-than-significant impact under CEQA.

Operation and maintenance of the May 2014 Project would introduce a water demand of approximately 116 acre-feet per year, accounting for the 180-employee MOIF and the 9,200-passenger Bakersfield station. Existing land uses along the May 2014 Project alignment and facilities consume an estimated 4,999.27 acre-feet per year of water (see Table 8-A-13, below); therefore, water uses associated with operating and maintenance (O&M) of the May 2014 Project would be less than those associated with existing land uses.

Table 8-A-11 Construction Water Consumption Assumptions for the May 2014 Project

Facility	Item	Total Volume (MG)	Total Volume (acre-feet)	Annualized Water Use ¹ (AFY)
May 2014 Project (Alignment)	Concrete Work	57.9	176.9	35.6
	Earthwork	4.0	12.4	2.4
	Dust Control (tracks)	146.2	448.7	89.9
	Irrigation (tracks)	33.5	101.8	20.2
	Total	240.6	739.7	147.5
MOIF	Concrete Work	14.7	44.0	9.8
	Dust Control	132.0	405.8	80.7
	Irrigation	14.7	41.6	7.3
	Total	161.4	491.4	97.8
Truxtun Avenue Station (24 Acres)	Concrete Work ²	6.0	18.0	4.4
	Dust Control	27.0	82.0	16.0
	Irrigation	0.4	2.0	0.2
	Total	33.0	102.0	20.0
Total		434.9	1,333.1	265.3

¹ Annualized water use is for a five-year construction period (for consistency with the approach used in the Fresno to Bakersfield Section Final EIR/EIS).

² Construction water use for the May 2014 Project was estimated by extrapolating water use quantities on a per-mile or per-acre basis, as identified in Appendix 3.6-B of the Fresno to Bakersfield Section Final EIR/EIS.

AFY = acre-feet per year

MG = million gallons

MOIF = maintenance of infrastructure facility

Table 8-A-12 Construction Energy Consumption Assumptions for the May 2014 Project

	At-Grade Design ²	Elevated/Below-Grade Design ²	Passenger Stations	MOIF	Total Btu (billion)
Energy Consumption Factor ¹	19.11 billion Btu/one-way guideway mile	55.63 million Btu/one-way guideway mile	78 billion Btu/station	38.22 billion Btu/MOIF ³	--
May 2014 Project (between Poplar Avenue and Fresno Avenue to Oswell Street)	11.57 one-way guideway miles	12.59 one-way guideway miles	1 Station	1 MOIF	--
Energy Consumption (billion Btu)	221.10	700.38	78	38.22	1,037.7

¹ Factors for energy consumption for BART system construction (as 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 Program Environmental Impact Report/ Environmental Impact Statement (California High-Speed Rail Authority and Federal Railroad Administration 2012).

² Data for number of elevated viaduct miles and stations based on estimates by URS Corporation. The values for "elevated viaduct miles" for the May 2014 Project accounts for a "one-way" elevated viaduct.

³ Energy Consumption factor for MOIF is based on energy consumption factor for two guideway miles.

Btu = British thermal unit

HSR = high-speed rail

MOIF = maintenance of infrastructure facility

Water supply providers along the study area are listed in Table 3.6-1, Study Area Utility and Energy Providers in this Draft Supplemental EIR/EIS. The May 2014 Project would decrease water supply requirements in the study area and existing water supply would be sufficient to meet the needs for construction of May 2014 Project.

Waste Generation

During construction of the May 2014 Project, waste would be generated as a result of vegetation clearing, removal of existing asphalt and gravel, and demolition of existing structures; it is estimated that approximately 484,068 cubic yards of solid waste¹⁰ would be generated during construction of the May 2014 Project. This waste would be diverted for recycling to the maximum extent practicable, and would otherwise be diverted to regional landfills with sufficient disposal capacity.

Energy

The length of the May 2014 Project alignment is approximately 3 percent of the total length of the entire HSR System. Table 8-A-12 shows the estimated construction energy consumption in billions of British thermal units for the May 2014 Project based on the length of the anticipated at-grade or elevated/below-grade construction elements.

The May 2014 Project would complete one portion of the proposed HSR System, and energy savings associated with the May 2014 Project are accounted for in energy savings calculated for the overall HSR System, as discussed in Appendix 3.6-A of the Fresno to Bakersfield Section Final EIR/EIS (page 3.6-A-3). The analysis estimated the energy changes from reduced on-road vehicle miles traveled, reduced intrastate airplane travel, and increased electrical demand. Although the HSR System would result in an increase in electricity demand, it would reduce the energy demands from automobile and airplane travel, resulting in an overall beneficial effect on statewide energy use. As discussed in the Fresno to Bakersfield Section Final EIR/EIS (page 3.6-72), it is anticipated that energy use associated with construction of the project would be mitigated in less than 4 years by the projected energy savings associated with use of the HSR rather than other forms of travel.

Comparison between the May 2014 Project and F-B LGA

The F-B LGA would result in similar impacts associated with public utilities and energy as those described above for the May 2014 Project. Site-specific differences in the location of potential impacts would occur due to routing variations included under the F-B LGA; however, the nature and intensity of potential impacts would be comparable. Table 8-A-13 provides a direct comparison of differences between the May 2014 Project and the F-B LGA, with regards to public utilities and energy. In addition, Figures 8-A-7 through 8-A-11 show the utilities that would be crossed by the May 2014 Project and the F-B LGA.

¹⁰ This estimate is based on a per mile waste generation amount extrapolated from the total waste generation amount for the entire alignment in Fresno to Bakersfield Section. The variations in waste generation between the alternatives in the Fresno to Bakersfield Section Final EIR/EIS are only based on length and do not incorporate any project features or geographic variations.

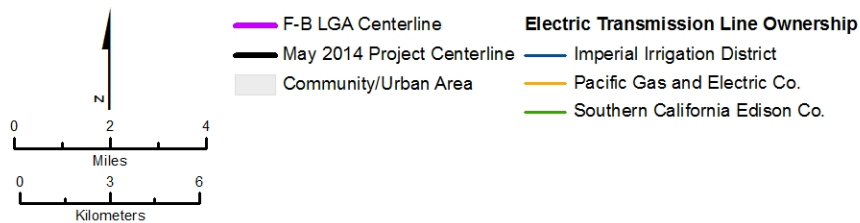
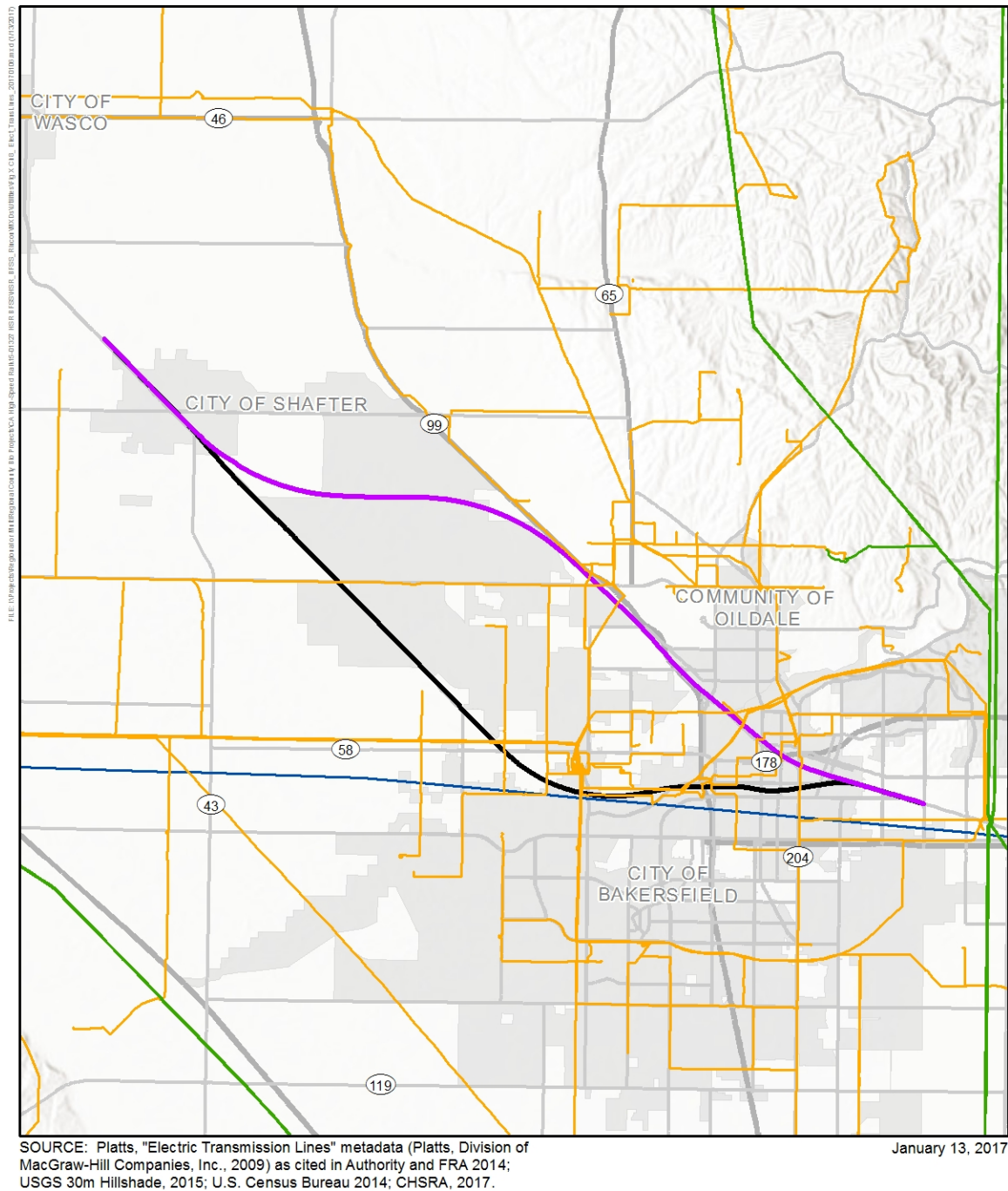


Figure 8-A-7 Electrical Transmission Lines

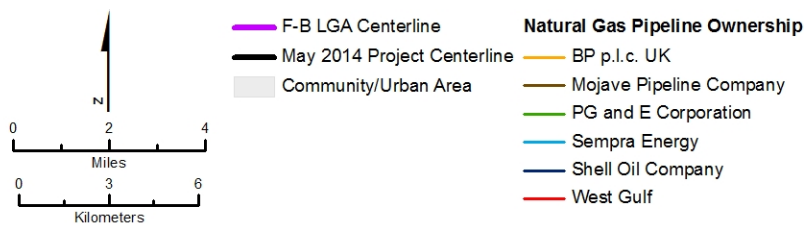
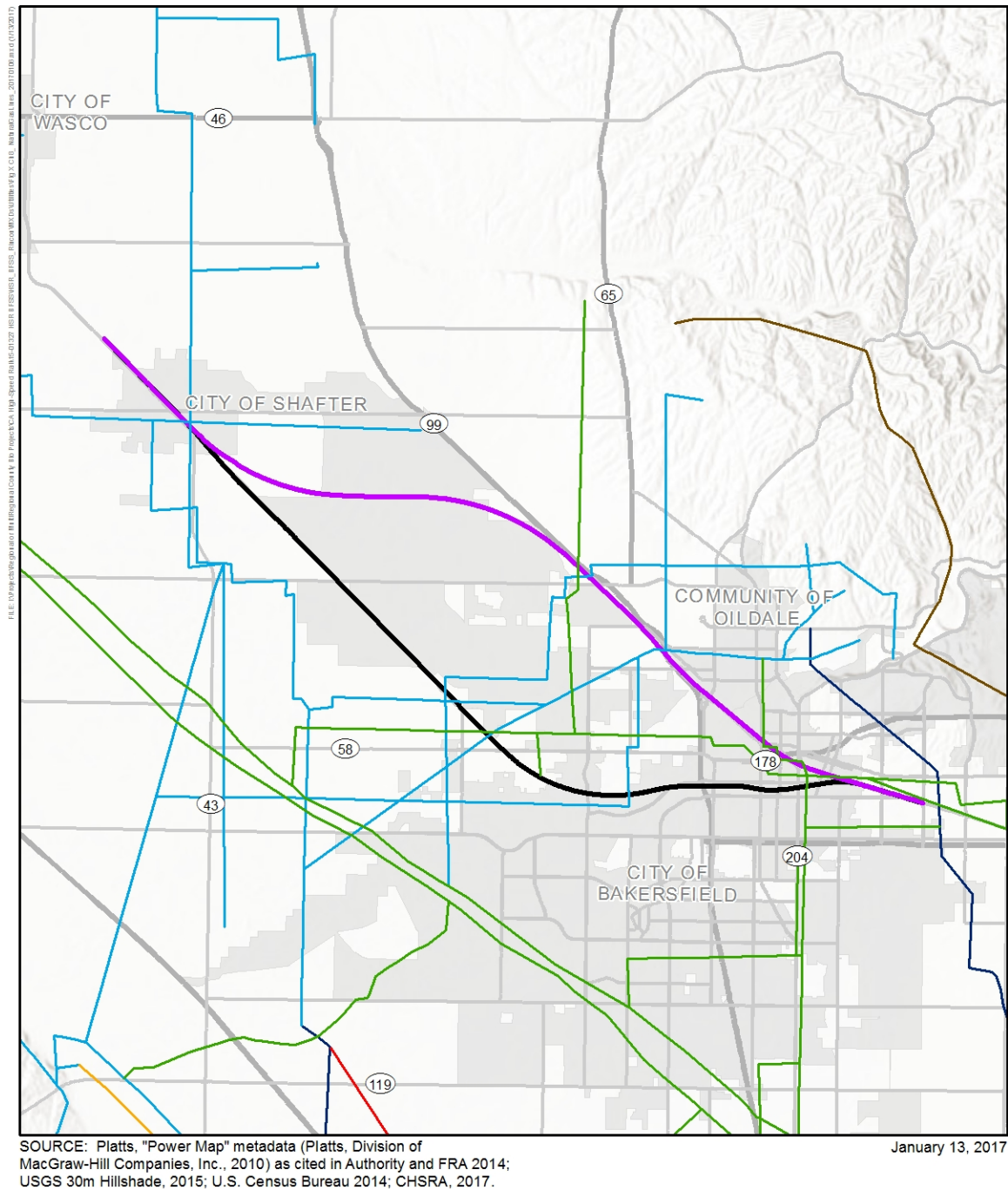


Figure 8-A-8 Natural Gas Pipelines

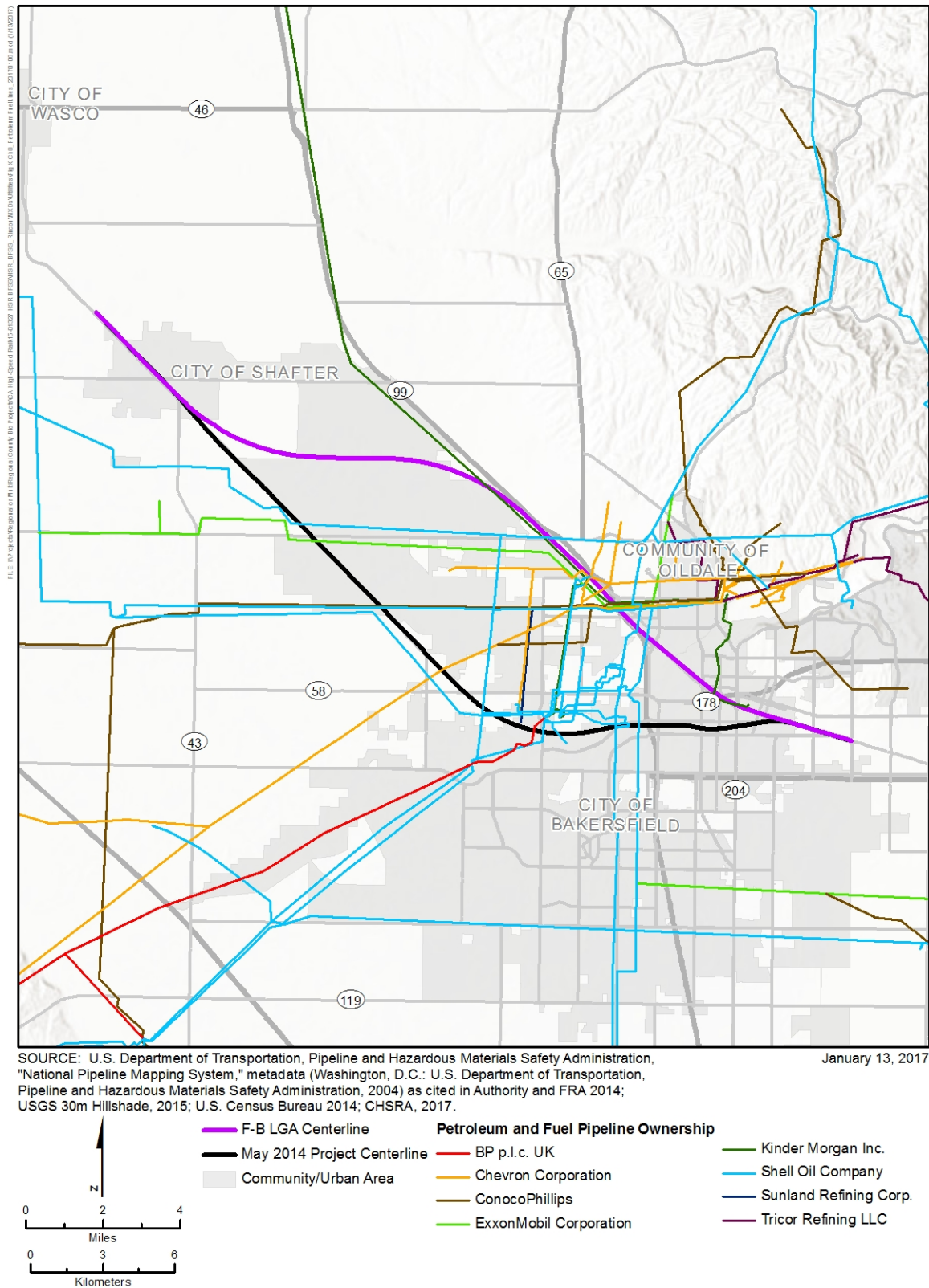


Figure 8-A-9 Petroleum and Fuel Pipelines



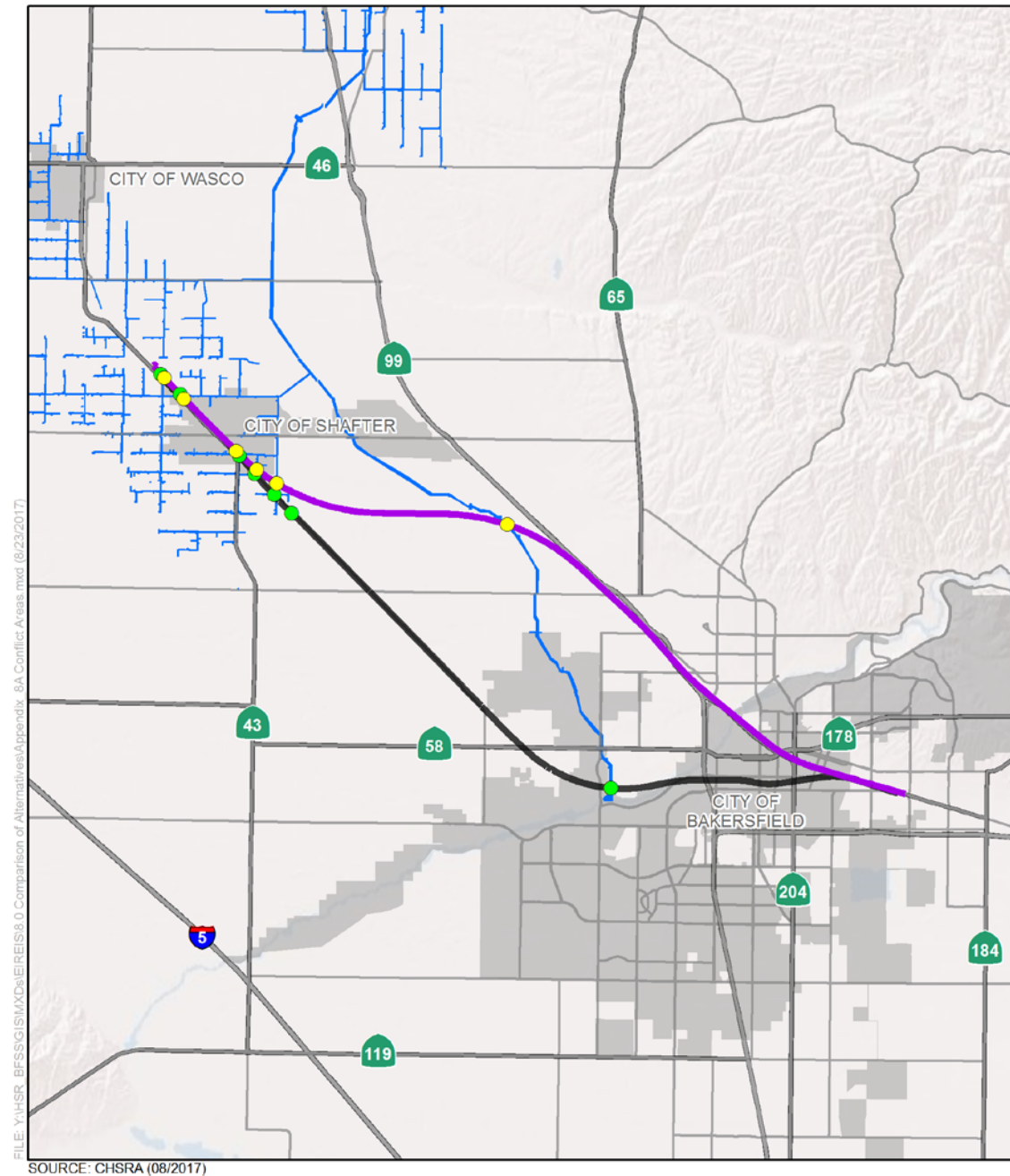



Figure 8-A-11 U.S. Bureau of Reclamation Lands

Table 8-A-13 Summary of Differentiating Features between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Construction Water Requirements (AFY)	265.3 (1,333.1 total acre-feet)	244.05 (1,201.25 total acre-feet)
Operation Water Requirements (AFY)	65	65
Existing Water Uses Along Proposed Alignment (AFY)	4,999.27 (24.16 miles)	1,892.3 (23.37 miles)
Construction Waste Generation (cubic yards) ¹	484,068	468,000
Construction Energy Requirements (billion Btu)	998.48 (no MOIF) 1,037.7 (with MOIF)	980.53 (no MOIF) 1,018.75 (with MOIF)

 = least-impact alternative

¹ Estimated as a quantity of waste generated per elevated viaduct mile, based on an estimated 2.6 million cubic yards of waste generated by the entire Fresno to Bakersfield Section analyzed in the *Fresno to Bakersfield Section Final Environmental Impact Report/Environmental Impact Statement*.

AFY = acre-feet per year

MOIF = maintenance of infrastructure facility

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Table 8-A-13 indicates that the F-B LGA would result in lesser impacts to public utilities and services in the areas of construction water requirements, construction waste generation, and construction energy requirements; it is important to note that these features were all calculated as a function of length, and the F-B LGA is slightly shorter than the May 2014 Project, which accounts for slightly smaller numbers for these features.

Also as shown in Table 8-A-13, the intensity of existing water uses along the May 2014 Project alignment is greater than along the F-B LGA; this difference is due to the different land uses traversed by each alignment. Water use factors from the Fresno to Bakersfield Section Final EIR/EIS (Appendix 3.6-B, page 3.6-B-40) were used for this analysis (a water use factor is measured in acre-feet per acre per year, and applied to the number of acres of each land use affected, in order to estimate total acre-feet per year of water associated with land uses along the proposed alignments). The F-B LGA would affect more acres of Industrial, Institutional, and Commercial lands, which have a low water factor (1.9 acre-feet per acre per year), whereas the May 2014 Project would affect more acres of Agriculture lands, which have a higher water use factor (2.91 acre-feet per acre per year). The F-B LGA would affect approximately twice as many acres designated as Multi-Family, which has a high water use factor (6.20 acre-feet per acre per year), but substantially fewer acres designated as Single-Family, which also has a high water use factor (3.50 acre-feet per acre per year). Under both the May 2014 Project and the F-B LGA, implementation of the proposed rail and associated facilities would decrease rates of water use along the alignment because operation and maintenance of the project would require a substantially smaller water supply compared to existing conditions.

As shown on Figures 8-A-7 through 8-A-11, both the May 2014 Project and the F-B LGA would traverse and be in proximity to multiple existing utility facilities. Transmission line crossings are more concentrated on the May 2014 Project alignment (approaching Bakersfield) than on the F-B LGA alignment. The extent of natural gas pipeline crossings would be comparable between the May 2014 Project and the F-B LGA: to the northwest of Bakersfield for the May 2014 Project and to the north of Bakersfield / west of Oildale for the F-B LGA. Regarding communication facilities, there is one AM Radio Broadcast Facility adjacent to the F-B LGA and no similar sites adjacent to the May 2014 Project; however, there is also one FM Radio Broadcast Facility and one Television Broadcast Facility adjacent to the May 2014 Project and no similar sites adjacent to the F-B LGA. Crossings of petroleum and fuel pipelines are comparable for both the May 2014 Project and the F-B LGA, although crossings by the F-B LGA are more concentrated near Oildale, while crossings by the May 2014 Project are more distributed between the area just south of Shafter and just north of Bakersfield.

Overall, as shown on Figures 8-A-7 through 8-A-11, the extent and intensity of utility crossings would be comparable under the May 2014 Project and the F-B LGA, with the exception of location-specific differences associated with the specific alignments. Under each alignment, utilities traversed by the rail alignment and other project features would either be protected in-place or would be relocated as needed to maintain utility service. Specific configurations and required actions would be determined based on coordination between the Authority and individual utility providers during the final engineering and design phase.

In summary, the differences between the May 2014 Project and the F-B LGA relevant to public utilities and services are not substantial, and there are no significant differentiating features for this issue area.

Biological Resources and Wetlands

Summary of May 2014 Project Biological Resources and Wetlands Impacts

This section describes the potential impacts on biological resources that would result from implementing the May 2014 Project. The term “biological resources” includes special-status plant and wildlife species, habitats of concern (including special-status plant communities, jurisdictional waters, critical habitat, conservation areas [i.e., Recovery Plan areas for federally listed species, conservation easements, public lands, conservation banks, and Habitat Conservation Plans], and protected trees), and wildlife movement corridors. This section summarizes detailed information contained in the *Fresno to Bakersfield Section: Biological Resources and Wetlands Technical Report* (Authority and FRA 2012c).

Methodology

The study areas for jurisdictional waters, plants, wildlife, and habitats considered those resources that occur or have the potential to occur in the study area. Literature review and aerial and ground surveys were completed within the study area to determine direct and indirect impacts.

- The Wetland Study Area is the project footprint plus a 250-foot buffer to evaluate direct and indirect impacts on wetlands and special-status wildlife using vernal pools. Direct impacts on wetlands are within the project footprint and indirect impacts are within the 250-foot buffer.
- The Special-Status Plant Study Area is the project footprint plus a 100-foot buffer to evaluate direct and indirect impacts on sensitive plant resources (including special-status plants, special-status plant communities, protected trees, and elderberry shrubs). Direct impacts are within the project footprint and indirect impacts are within the 100-foot buffer.
- The Habitat Study Area is the project footprint plus a 1,000-foot buffer to evaluate direct and indirect impacts on habitats and the special-status wildlife species that use them. The Habitat Study Area was divided into two areas: a core Habitat Study Area and an auxiliary Habitat Study Area, both shown on Figure 8-A-12 and Figure 8-A-13. A third, or supplemental Habitat Study Area was identified for select species that required further analysis based on agency- or protocol-recommended species-specific buffers:
 - The core Habitat Study Area includes the May 2014 Project footprint and a 250-foot buffer. The core Habitat Study Area was the area that was physically surveyed.
 - The auxiliary Habitat Study Area, which extends from the edge of the core area laterally 750 feet for a total of 1,000 feet, was surveyed through extrapolation of observations made in the core Habitat Study Area, from aerial photograph interpretation, and in windshield surveys.
 - The supplemental Habitat Study Area extends laterally from the May 2014 Project footprint up to 1.24 miles, depending on the target species, and identifies species-specific habitats based on aerial photograph interpretation and documented occurrences of the species, and on observations of special-status species and their habitats made in the field.

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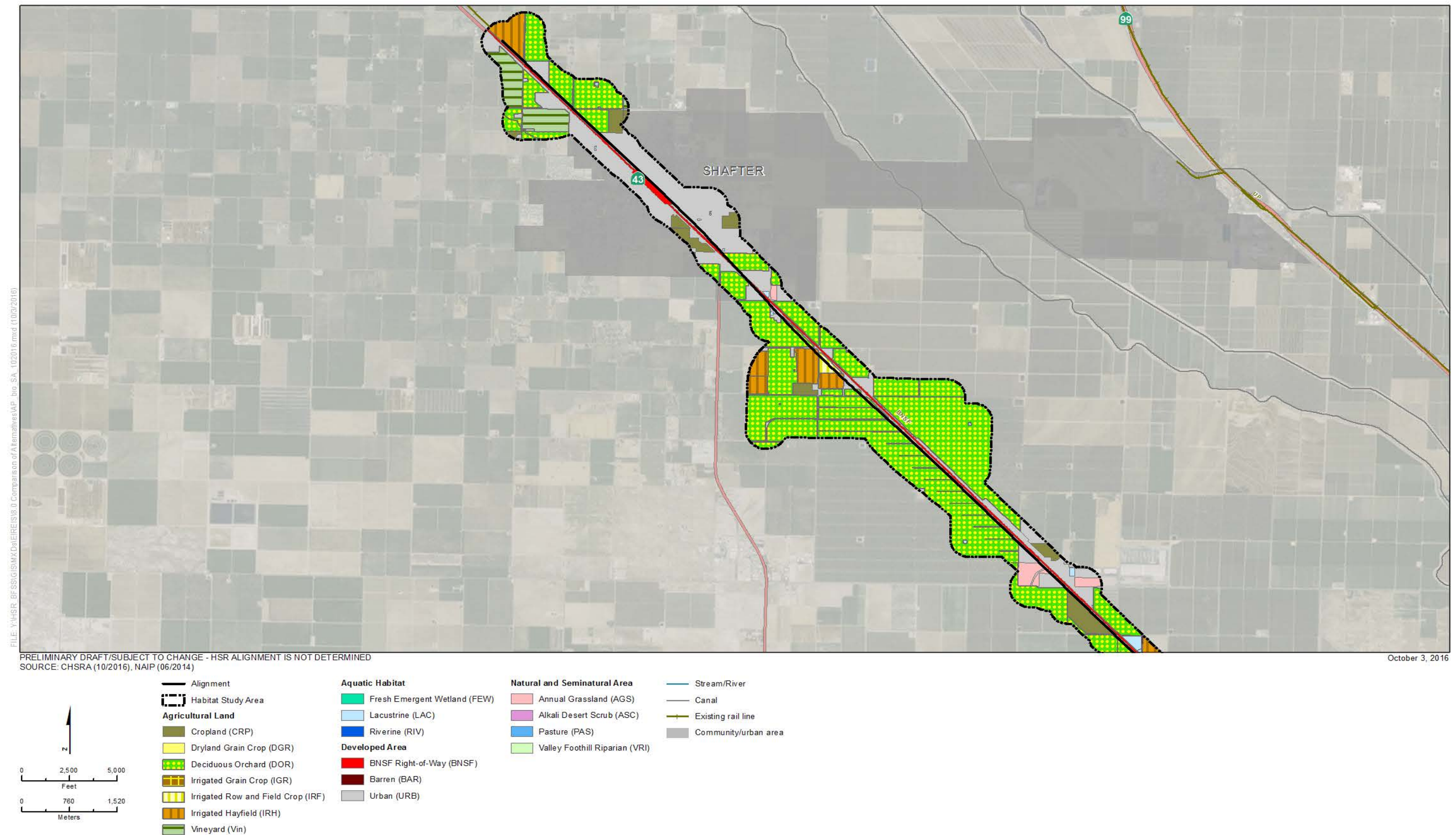


Figure 8-A-12 May 2014 Project Habitat Study Areas (Shafter)

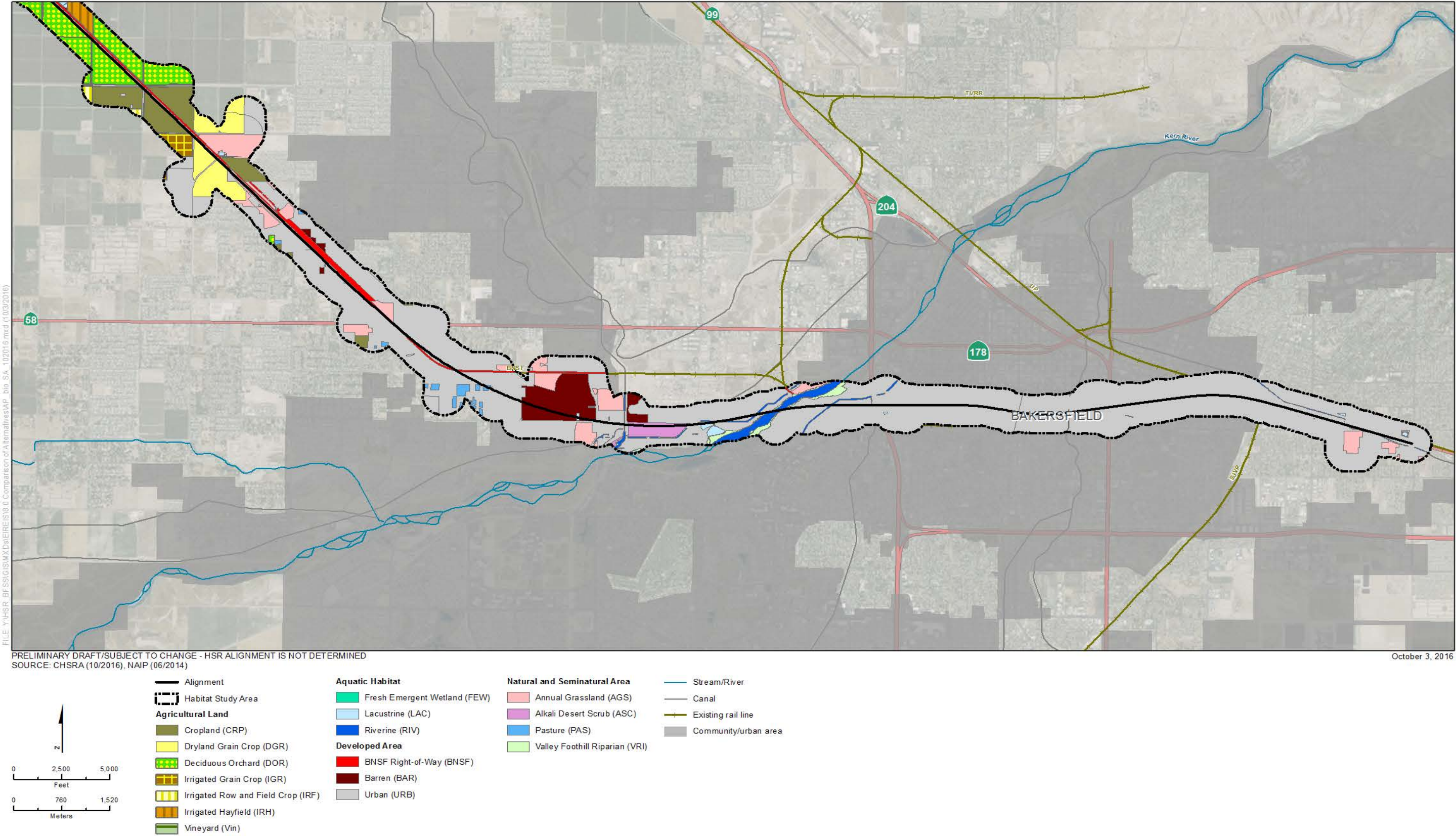


Figure 8-A-13 May 2014 Project Habitat Study Areas (Bakersfield)

Impacts

Special-Status Plant Species

Several special-status plant species are known to occur within the construction footprint and could be adversely affected by the May 2014 Project: California jewelflower, Kern mallow, San Joaquin woolly threads, Bakersfield smallscale, Bakersfield cactus, Horn's milk- vetch, brittlescale, earlimart orache, lesser saltscare, subtle orache, round-leaved filaree, alkali mariposa lily, slough thistle, Hoover's woolly-star, California satintail, Munz's tidy-tips, and king's gold. Surveys for the five federally listed species, Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), California jewelflower (*Caulanthus californicus*), Hoover's woolly-star (*Eriastrum hooveri*), Kern mallow (*Eremalche kernensis*), and San Joaquin woolly-threads (*Monopolies congdonii*) complied with the supplemental guidance provided in *General Rare Plant Survey Guidelines* and in the *Supplemental Survey Methods* (ESRP 2002). Additional supplemental surveys for botanical resources were conducted in 2010 and 2011. No special-status plants were identified in the surveys completed in the May 2014 Project Special-Status Plant Study Area, totaling 24.34 acres; however, there is potential for special-status plant species to occur in areas of unsurveyed suitable habitat identified via visual surveys (i.e., from adjacent public roads or parcels) and aerial interpretation, totaling 112.26 acres. Unserved suitable habitat included: annual grassland, valley foothill riparian, and alkali desert scrub. Direct impacts on the unsurveyed suitable habitat are shown in Table 8-A-14.

Table 8-A-14 Potential Acreage of Special-Status Plant Species Habitat Impacted by the May 2014 Project

	Direct Impacts (acres)
Special-status plant species (Unsurveyed potential suitable habitat that could support special-status plant species)	112.26

Construction

Direct and indirect project impacts are anticipated to occur as a result of the May 2014 Project, resulting in the permanent loss or damage of special-status plant species. Construction period impacts of the May 2014 Project would result in a significant impact under CEQA on special-status plant species and their habitats prior to implementation of mitigation measures.

Operation

Special-status plant species have a moderate potential of being present in unsurveyed suitable habitats in areas where suitable habitat is limited to small isolated areas. Therefore, the May 2014 Project would result in a less-than-significant impact under CEQA on special-status plant species prior to implementation of mitigation measures.

Special-Status Wildlife Species

Several special-status wildlife species are known to occur within the footprint and could be adversely affected by the May 2014 Project. Direct impacts on the special-status wildlife species are shown in Table 8-A-15.

Table 8-A-15 Potential Acreage of Special-Status Wildlife Species Habitat Impacted by the May 2014 Project

	CWHR Vegetation Community or Wildlife Association	Permanent Impacts (acres)	Temporary Impacts (acres)
Tipton kangaroo rat	ASC, AGS, BAR, PAS, VOW	68.83	194.51
Buena Vista Lake ornate shrew	AGS, CRP, IRF, IRH, LAC, RIV (Kern River)	2.56	0.71
San Joaquin kit fox (Bakersfield)		413.84	265.04
<i>Urban</i>		322.65	68.92
<i>Agricultural</i>	CRP, DGR, DOR, EOR, IGR, IRF, IRH, VIN)	29.13	194.11
<i>Natural</i>	ASC, AGS, BAR, PAS, VOW)	61.86	2.01
Vernal pool fairy shrimp		0.51	N/A
Vernal pool tadpole shrimp		0.51	N/A
Golden eagle	ASC, AGS, BAR, CRP, FEW, IRH, PAS, URB, VFR, VOW	626.49	371.65
Swainson's hawk	AGS, BAR, CRP, IRH, PAS, URB, VFR, VOW	634.08	371.23
Western snowy plover	LAC	7.59	1.89
White tailed kite	ASC, AGS, CRP, BAR, DOR, DGR, EOR, FEW, IRH, IRF, IGR, URB, VFR, VIN, VOW	957.32	675.48
American peregrine falcon	AGS, BAR, CRP, FEW, IGR, IRH, LAC, RIV, URB, VFR, VOW	632.47	373.62
Greater sandhill crane	AGS, DGR, CRP, FEW, IGR, IRH, IRF, LAC, VFR	143.99	43.15
Bald eagle	AGS, BAR, FEW, LAC, RIV, VFR, VOW	74.16	195.75
Nelson's (San Joaquin) antelope squirrel	ASC, AGS, BAR, PAS	68.83	194.51
Ringtail	AGS, RIV, VFR	49.07	37.88
Kern brook lamprey (Friant Kern Canal)	Friant-Kern Canal	0.40	0.07
Western spadefoot toad	ASC, AGS, FEW, RIV, VOW	60.58	39.98
Western pond turtle	AGS, FEW, LAC, PAS, RIV, VFR, VOW	58.30	39.86
Silvery legless lizard	RIV (Kern River), VFR, VOW	0.70	0.30

	CWHR Vegetation Community or Wildlife Association	Permanent Impacts (acres)	Temporary Impacts (acres)
San Joaquin whipsnake	ASC, AGS, PAS, VFR, VOW	52.05	38.84
Coast (California) horned lizard	ASC, AGS, VFR, VOW	50.41	38.75
Western burrowing owl	ASC, AGS, PAS, BAR, URB, VOW	560.27	368.02
Special-Status Raptor Species	ASC, AGS, CRP, PAS, VFR, DGR, IGR, IRH, IRF, VOW	150.24	43.74
Special-Status Passerine Species	ASC, AGS, CRP, PAS, VFR, FEW, LAC, RIV, DGR, IGR, IRH, IRF, VOW	168.71	47.15
Special-Status Wading Birds, Shorebirds, And Duck Species	ASC, AGS, CRP, PAS, DGR, IGR, IRH, IRF, RIV, FEW, LAC	168.00	46.85
Pallid bat	ASC, AGS, BAR, CRP, DGR, IGR, IRH, IRF, PAS, RIV, URB, VFR, VIN, VOW	685.22	374.76
Dulzura pocket mouse	AGS, VOW	37.50	36.10
Townsend's big-eared bat	ASC, AGS, BAR, CRP, IGR, IRH, IRF, PAS, VFR, URB, VIN, RIV, VOW	661.46	374.55
Western mastiff bat	ASC, AGS, BAR, CRP, FEW, IGR, IRH, IRF, PAS, URB, VFR, VIN, VOW	650.60	373.03
Western red bat	AGS, FEW, IRH, LAC, PAS, RIV, URB, VOW, VFR	572.71	213.53
Tulare grasshopper mouse	ASC, AGS, VFR	50.41	38.75
American badger	ASC, AGS, BAR, PAS, VFR, VOW	69.54	194.81

ASC = Alkali Desert Scrub
 AGS = Annual Grassland
 BAR = Barren
 CRP = Cropland
 CWHR = California Wildlife Habitat Relationship System
 DGR = Dryland Grain Crops
 DOR = Deciduous Orchard
 EOR = Evergreen Orchard
 FEW = Fresh Emergent Wetland
 IGR = Irrigated Grain Crops
 IRH = Irrigated Hayfield
 IRF = Irrigated Row and Field Crops
 LAC = Lacustrine
 N/A = not applicable
 PAS = Pasture
 RIV = Riverine
 VIN = Vineyard
 VFR, VRI = Valley Foothill Riparian
 VOW = Valley Oak Woodland
 URB = Urban

Construction and operation impacts are discussed below.

- **Special-status Invertebrates.** Due to the presence of suitable habitat, including sensitive wetland habitat, construction of the May 2014 Project may result in the loss of special-status

invertebrate species and their habitat. Construction impacts of the May 2014 Project would result in a significant impact under CEQA on special-status invertebrate species and their habitat prior to implementation of mitigation measures.

- **Special-status Fish Species.** Due to the limited amount of suitable habitat present for special-status fish species, such as the Kern brook lamprey, construction of the May 2014 Project would result in a slight change from existing environmental conditions and little or no regional effects. Therefore, construction period impacts of the May 2014 Project would result in a less-than-significant impact under CEQA on special-status fish species prior to implementation of mitigation measures.
- **Special-status Amphibians.** Because suitable habitats in the May 2014 Project are small and fragmented, the potential for special-status amphibians to occur may be limited. Therefore, construction period impacts of the May 2014 Project would result in a significant impact under CEQA on the western spadefoot toad prior to implementation of mitigation measures.
- **Special-status Reptiles.** The May 2014 Project contains suitable habitat for special-status reptiles, including coast horned lizard. Special-status reptiles would be temporarily affected, both directly and indirectly, by construction of the May 2014 Project. Due to the considerable amount of natural habitat present, construction of the May 2014 Project would result in a relatively high-intensity loss of habitat that has limited potential to support special-status reptiles. Therefore, construction period impacts of the May 2014 Project would result in a significant impact under CEQA on special-status reptile species prior to implementation of mitigation measures.
- **Special-status Birds.** The May 2014 Project contains suitable habitat (including both natural habitats and agricultural land uses) for a variety of special-status birds. The natural areas provide suitable habitat for breeding, foraging, and migration stopover habitat. Special-status bird species and their habitat would be temporarily affected, both directly and indirectly, by construction of the May 2014 Project. Due to the considerable amount of natural habitat present, construction of the May 2014 Project would result in a relatively high-intensity loss of habitat that may support special-status birds. Therefore, construction period impacts of the May 2014 Project would result in a significant impact under CEQA on special-status bird species prior to implementation of mitigation measures.
- **Special-status Mammals.** Special-status mammals including the American badger, San Joaquin kit fox, ringtail, five rodent species, and four bat species would be temporarily affected, both directly and indirectly, by construction of the May 2014 Project. Due to the considerable amount of natural habitat present, construction of the May 2014 Project would result in a relatively high-intensity loss to special-status mammals. Therefore, construction period impacts of the May 2014 Project would result in a significant impact under CEQA on special-status mammal species prior to implementation of mitigation measures.
- **Native Fauna.** Native fauna would be permanently affected, both directly and indirectly, by construction impacts associated with the May 2014 Project. Due to the large area of habitat that would be affected, approximately 59 percent (991 acres) of the total May 2014 Project, the May 2014 Project would have influential regional effects on native fauna and would result in relatively high-intensity loss of this resource. Therefore, construction period impacts of the May 2014 Project would result in a significant impact under CEQA on native fauna prior to implementation of mitigation measures.

Special-Status Plant Communities

During the field surveys, black willow thickets (riparian areas) were identified along the Kern River portion of the May 2014 Project (Table 8-A-16).

Table 8-A-16 Comparison of Quantity of Impacts on Riparian Areas (acres) for the May 2014 Project

	Impact Type ¹	May 2014 Project
Riparian Areas ¹	Direct permanent	0.70
	Direct temporary	0.30
GRAND TOTAL		1.00

¹ Calculations are based on raw, unrounded geographic information system source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.

Impacts for the May 2014 Project were calculated based on the Final Environmental Impact Report/Environmental Impact Statement 15% engineering design Project Footprint.

Construction

As noted above, black willow thickets were identified along the Kern River corridor within the May 2014 Project. With the exception of the Kern River, the May 2014 Project is located in an urban setting and the remaining natural areas are small and fragmented; therefore, other special-status plant communities are not expected to be present. However, because the project design across the Kern River includes a viaduct, 45 feet above the banks of the river, indirect impacts (e.g., due to shading from the viaduct) would be less likely to result in degradation of the adjacent black willow thickets (e.g., changes in hydrology, habitat fragmentation, or the introduction of non-native, invasive species). Construction period impacts of the May 2014 Project would result in a significant impact under CEQA on special-status plant communities and their habitats prior to implementation of mitigation measures.

Operation

Black willow thickets would be directly affected by actions associated with operation and maintenance. Operations may also result in indirect effects to the Kern River linkage wildlife migration corridor during maintenance activities along the viaduct structure over the Kern River which includes areas with black willow thickets. Thus, the May 2014 Project would result in only a slight change from existing biological conditions, with few if any regional effects. Therefore, the project impacts of the May 2014 Project would result in a less-than-significant impact under CEQA on special-status plant communities prior to implementation of mitigation measures.

Jurisdictional Waters

Wetlands and other waters, including seasonal wetlands, canals/ditches, lacustrine, and riverine features are present throughout the May 2014 Project Wetland Study Area as shown in Figure 8-A-14 and Figure 8-A-15.

Construction

Direct impacts would occur during construction of the May 2014 Project, resulting in the temporary disturbance of jurisdictional waters as shown in Table 8-A-17. Impacts on jurisdictional waters, including natural features in good condition such as seasonal riverine (e.g., Kern River) would result in influential regional effects and high-intensity loss to jurisdictional waters. Therefore, the construction period impacts of the May 2014 Project would result in a significant impact under CEQA prior to implementation of mitigation measures.

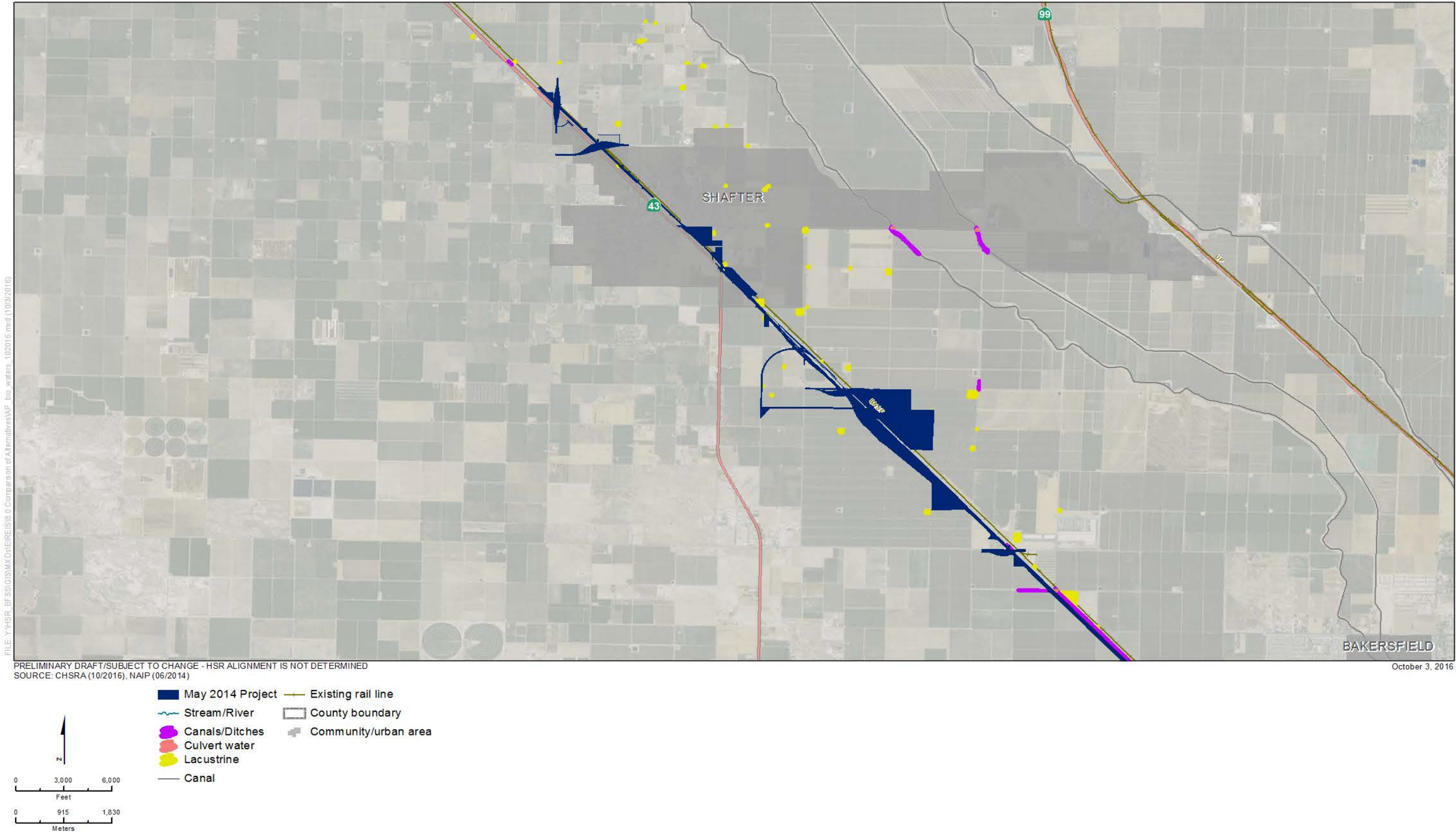


Figure 8-A-14 Waters near the May 2014 Project (Shafter)

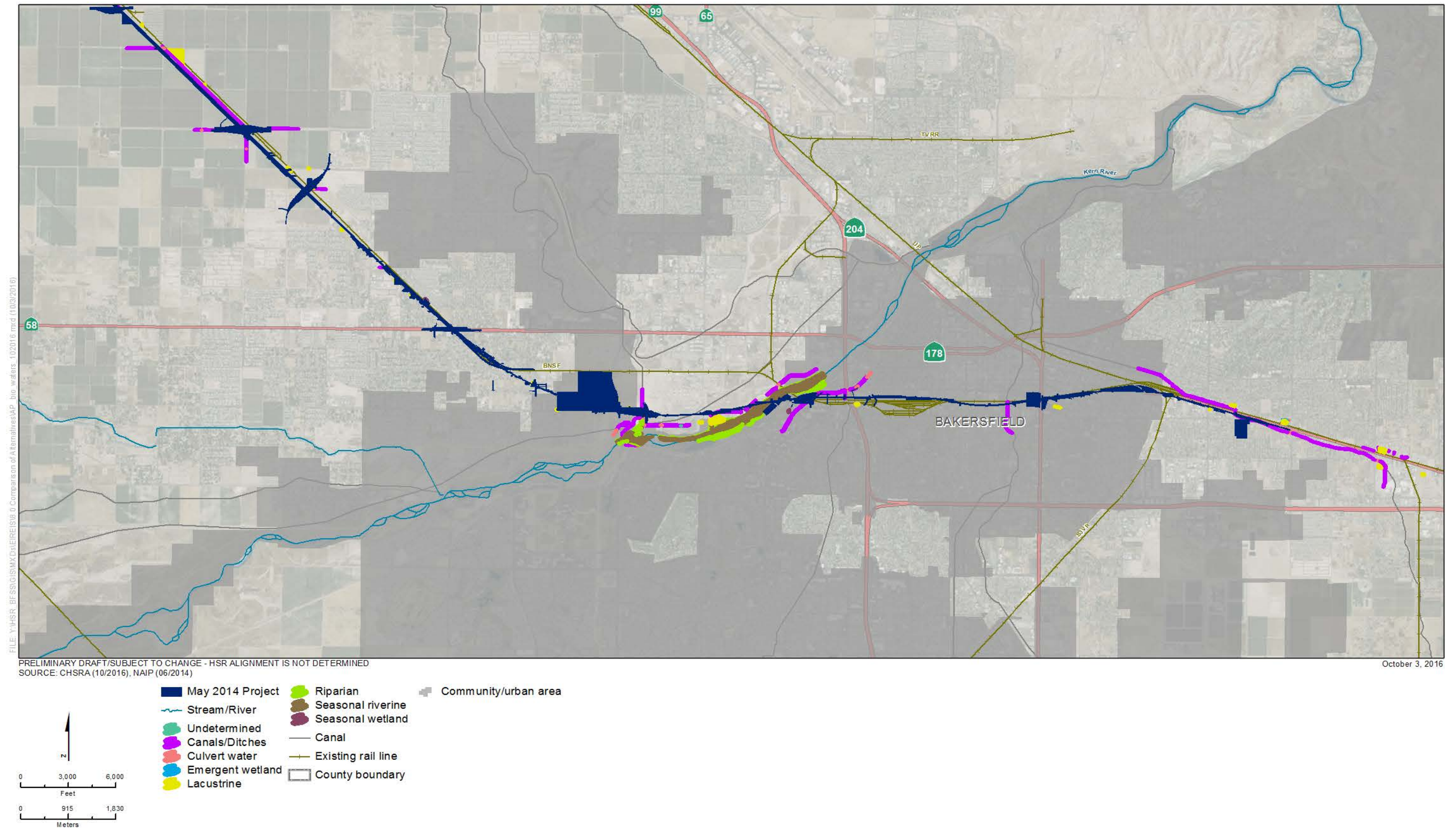


Figure 8-A-15 Waters near the May 2014 Project (Bakersfield)

Table 8-A-17 Quantity of Impacts on Waters of the U.S. (acres) for the May 2014 Project

Wetlands and Other Waters (TYPE/HSR Water Type)	Impact Type	May 2014 Project
Total Impacts on Wetlands ^a	Direct permanent	0.51
	Direct temporary	—
Seasonal Wetland	Direct permanent	0.51
	Direct temporary	—
Total Impacts on Other Waters of the U.S. ^a	Direct permanent	16.52
	Direct temporary	3.11
Canals/Ditches	Direct permanent	8.31
	Direct temporary	1.10
Artificial lacustrine	Direct permanent	6.35
	Direct temporary	1.61
Seasonal riverine	Direct permanent	1.86
	Direct temporary	0.40
Total Impacts on Waters of the U.S. ^a	Direct permanent	17.03
	Direct temporary	3.11
	Total direct	20.14

— = no impact or not applicable

^a Calculations are based on raw, unrounded Geographic Information System (GIS) source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.

Operation

Operations will not result in any additional direct impacts on jurisdictional waters. However, due to the magnitude of the impact incurred during construction and the quality of the waters, as shown in Table 8-A-18, the May 2014 Project would result in relatively high-intensity loss of these resources. Therefore, the project impacts of the May 2014 Project would result in a significant impact under CEQA on jurisdictional waters prior to implementation of mitigation measures.

Table 8-A-18 Quality (Relative Condition) of Impacts on Waters of the U.S. (acres) for the May 2014 Project

Impact Type	Relative Condition	May 2014 Project
Direct permanent	Poor	15.17
	Fair	—
	Good	1.86
Direct temporary	Poor	2.70
	Fair	—
	Good	0.40
TOTAL DIRECT ^a	Poor	17.87
	Fair	—
	Good	2.26

— = no impact or not applicable

^a Calculations are based on raw, unrounded geographic information system source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.

Impact calculations in this table include Project alternatives and station alternatives but do not include the heavy maintenance facility site alternatives.

Impacts for the May 2014 Project were calculated based on the Final Environmental Impact Report/Environmental Impact Statement 15% engineering design Project Footprint

Impact types and/or existing condition types that do not appear in the table are not present in these alternatives.

U.S. = United States

Conservation Areas and Recovery Plans

The May 2014 Project crosses the recovery plan areas identified in the Recovery Plan for Upland Species of the San Joaquin Valley, California (U.S. Fish and Wildlife Service 1998) and the Metropolitan Bakersfield Habitat Conservation Plan (City of Bakersfield and Kern County 1994) (Figure 8-A-16).

Construction

Construction activities could result in temporary disturbance of recovery plan areas. Indirect construction impacts on these plan areas would include fragmentation of satellite areas and linkages where recovery areas are crossed by temporary construction activities (e.g., staging areas and access roads) and disturbance of natural lands within recovery areas that reduces habitat value for species recovery.

Project direct impacts on federal recovery plan areas include the creation of permanent partial or total movement barriers to special-status species, the loss or degradation of special-status plant and wildlife species, and the loss or degradation of the lands that could support or provide habitat for these species. Due to the large area of impact, construction of the May 2014 Project would result in relatively high-intensity loss to recovery plan areas. Therefore, construction period impacts under the May 2014 Project would result in a significant impact under CEQA on recovery plans prior to implementation of mitigation measures.

The May 2014 Project overlaps the Metropolitan Bakersfield Habitat Conservation Plan. Construction of the May 2014 Project would result in temporary disturbance within the plan area of the Metropolitan Bakersfield Habitat Conservation Plan. The May 2014 Project does not conflict with the provisions of the Metropolitan Bakersfield Habitat Conservation Plan because proposed mitigation ratios are similar to the “adequate mitigation” ratios presented in the plan. Also, the May 2014 Project does not overlap with the Conceptual Focus Areas identified as potential preserve areas. Therefore, construction period impacts of the May 2014 Project would result in no impact under CEQA on habitat conservation plans prior to implementation of mitigation measures.

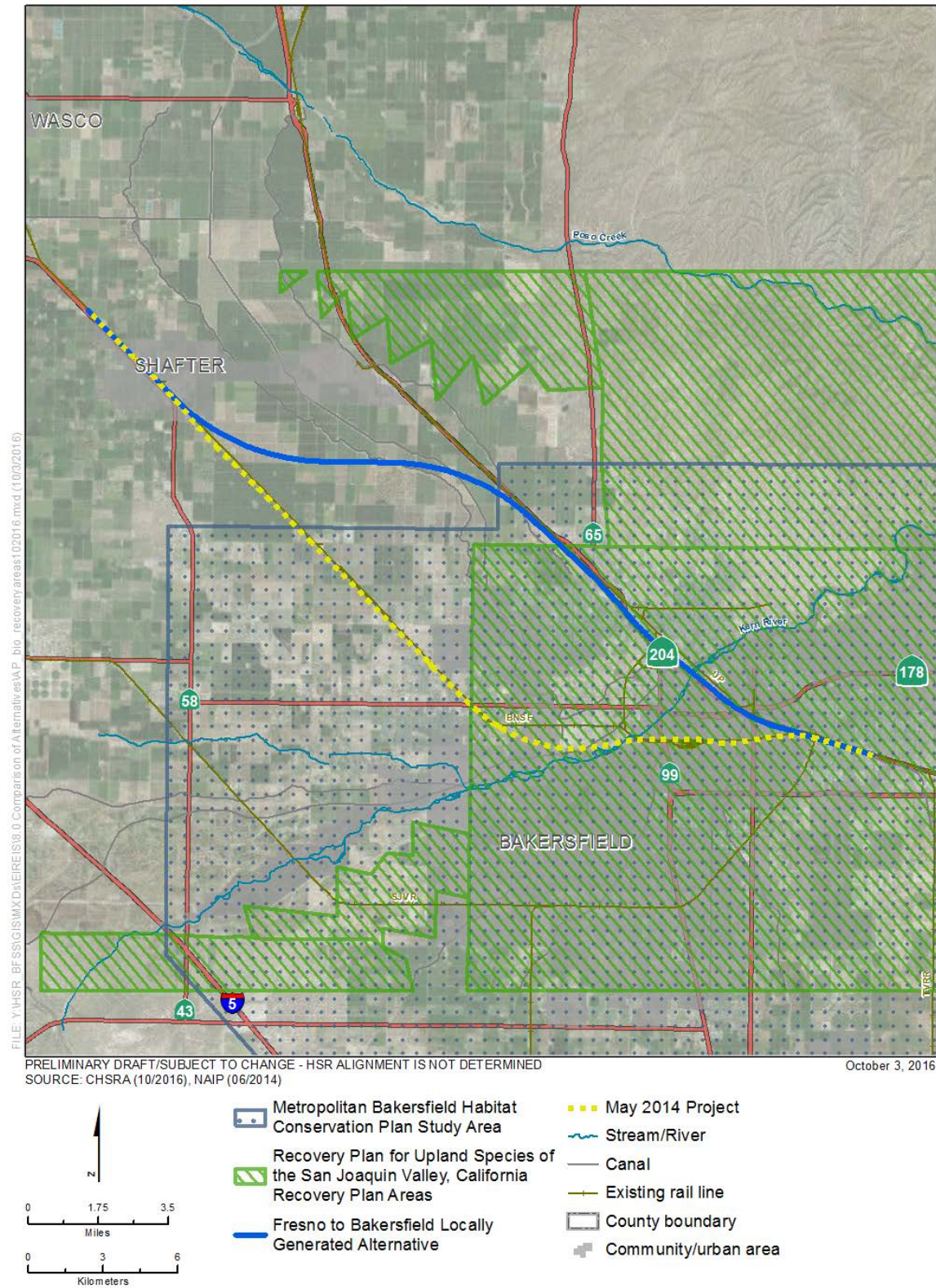


Figure 8-A-16 Conservation Areas

Operation

Operations will not result in any additional impacts to recovery plan areas. However, due to the large area of impact incurred during construction, 59.85 percent of the project area, the May 2014 Project would result in relatively high intensity loss to recovery plan areas. Therefore, the project impacts of the May 2014 Project would result in a significant impact under CEQA on recovery plans prior to implementation of mitigation measures.

The May 2014 Project uses similar mitigation measures and does not overlap with the Conceptual Focus Areas associated with the habitat conservation plans previously mentioned, the project impacts would result in no impact under CEQA prior to implementation of mitigation measures.

Protected Trees

Protected trees are trees or tree communities that have special significance, are afforded protection by, and specifically identified in county and city ordinances, codes, or general plans. Cities and counties traversed by the proposed project alternatives include Kern county and the cities of Shafter and Bakersfield. The types of trees and specific physical characteristics required to meet the local definitions vary by city and county.

Construction

Construction of the May 2014 Project would result in the temporary removal or modification of protected trees within the construction footprint, which could conflict with the objectives goals, and/or provisions identified in approved local, regional, or state conservation plans. Where the alignment is located at-grade, removal, or trimming of all protected trees is anticipated. In urban areas where the majority of the landscaped ornamental trees are located and where the alignment is on an elevated structure, trimming and limited removal of protected trees would occur. Protected tree removal and trimming as a result of construction of the May 2014 Project would be considerable and would result in relatively high-intensity loss of this resource. Therefore, construction period impacts of the May 2014 Project would result in a significant impact under CEQA.

Operation

No direct or indirect effects to protected trees are expected during operations, as project construction activities would remove all protected trees prior to operations. Therefore, the operations of the May 2014 Project would result in no impact under CEQA on protected trees prior to implementation of mitigation measures.

Wildlife Movement Corridors

The May 2014 Project passes through the Kern River linkage and has the potential to affect wildlife movement within this linkage because construction activities would affect approximately 50 acres of natural lands as shown in Figure 8-A-17.

Construction

Construction activities occurring at or in the vicinity of wildlife movement corridors (linkages) or natural lands may result in indirect disruption of wildlife movement through lighting, noise, motion, and startle effects. However, temporary disturbance areas are generally small and non-linear; therefore, wildlife should be able to move around these barriers. The Kern River linkage corridor would be temporarily blocked by fencing during construction activities, which may result in adverse effects on local wildlife movement. Because construction period impacts are not expected to significantly impede movement, construction of the May 2014 Project would result in only a slight change from existing biological conditions and little to no regional effects. Therefore, construction period impacts of the May 2014 Project would result in a less-than-significant impact under CEQA on wildlife movement corridors prior to implementation of mitigation measures.

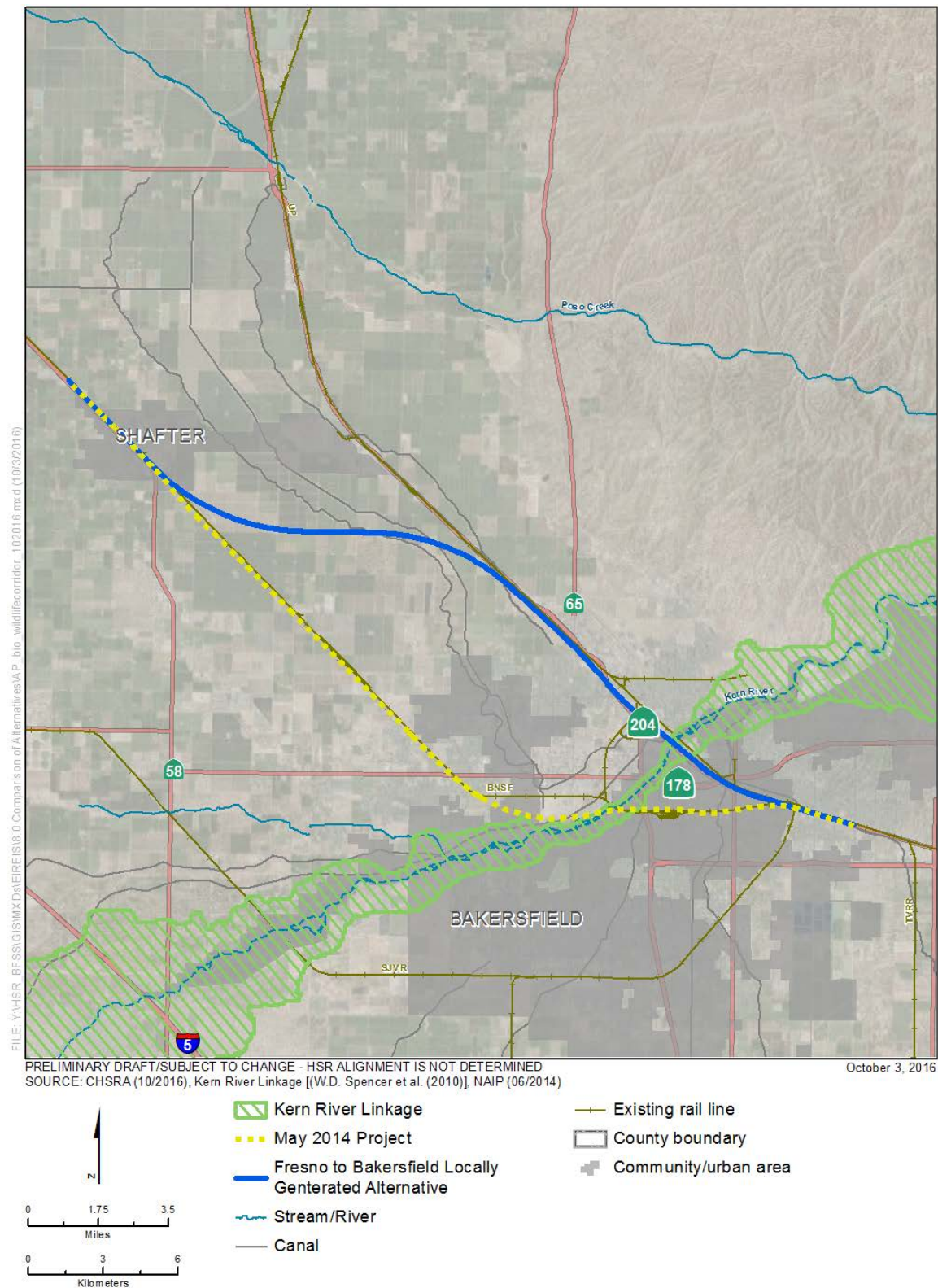


Figure 8-A-17 Kern River Linkage

Operation

Design elements of the May 2014 Project would facilitate wildlife movement, including elevated tracks, road overcrossings and undercrossings, and specific structures designed for wildlife crossings, which could allow for unimpeded wildlife movement; however, sections of the May 2014 Project over the Kern River Linkage would result in direct impacts on wildlife movement, which could ultimately preclude the use of that corridor by wildlife. Direct impacts include the placement of temporary and permanent linear barriers to wildlife movement with restricted crossing opportunities, resulting in habitat shifts (toward nonnative and/or disturbed type communities) over time. These shifts in habitat use can result in increased competition for resources, as well as the potential for genetic isolation of populations.

In addition to HSR tracks passing through wildlife movement corridors, implementation of the May 2014 Project would require ongoing O&M activities (e.g., routine inspection and maintenance of the HSR right-of-way). These operational activities occurring at or in the vicinity of wildlife movement corridors or natural lands may result in indirect disruption of wildlife movement through lighting, noise, motion, and startle effects. For a more detailed discussion of potential impacts on these linkages, refer to Section 5.6 of the Fresno to Bakersfield Section: Biological Resources and Wetlands Technical Report (Authority and FRA 2012c). Due to the design elements, impacts of the May 2014 Project on wildlife movement would be minimal and would have little or no regional effects. Therefore, the project impacts of the May 2014 Project would result a less-than-significant impact under CEQA on wildlife movement corridors prior to implementation of mitigation measures.

Comparison between the May 2014 Project and F-B LGA


Special-Status Plant Species

Similar to the May 2014 Project, no special-status plants were identified in the surveys completed for the F-B LGA; however, there is a potential for special-status plant species to occur in unsurveyed suitable habitat. Unserved suitable habitat also includes areas surveyed outside the normal blooming period of the target species. Unserved suitable habitat for the May 2014 Project includes: annual grassland, valley foothill riparian, and alkali desert scrub. Unserved suitable habitat for the F-B LGA consists of annual grasslands.

Direct impacts on the unserved suitable habitat are shown in Table 8-A-19.

Table 8-A-19 Potential Acreage of Special-Status Plant Species Habitat Impacted by the May 2014 Project and the F-B LGA

	May 2014 Project	F-B LGA
	Direct Impacts (acres)	Direct Impacts (acres)
Special-status plant species (Unsurveyed potential suitable habitat that could support special-status plant species)	112.26	62.13

 = least-impact alternative

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

The F-B LGA would have fewer potential direct impacts (in acres) to special-status plant species when compared to the May 2014 Project as shown above in Table 8-A-19.

Special-Status Wildlife Species

Direct impacts on the special-status wildlife species are shown in Table 8-A-20.

Table 8-A-20 Potential Acreage of Special-Status Wildlife Species Habitat Impacted by the May 2014 Project and the F-B LGA (acres)

	May 2014 Project		F-B LGA	
	Permanent Impacts	Temporary Impacts	Permanent Impacts	Temporary Impacts
<i>Federally and State-Listed Species</i>				
Tipton kangaroo rat (ASC, AGS, BAR, PAS)	68.83	194.51	77.59	39.74
Buena Vista Lake ornate shrew	2.56	0.71	2.44	0.74
San Joaquin kit fox (Bakersfield)	413.64	265.04	258.04	161.73
<i>Urban</i>	322.65	68.92	228.15	116.27
<i>Agricultural (CRP, DGR, DOR, IGR, IRF, IRH, VIN)</i>	29.13	194.11	15.41	6.71
<i>Natural (ASC, AGS, BAR, PAS)</i>	61.86	2.01	14.48	38.75
Nelson's (San Joaquin) antelope squirrel (ASC, AGS, BAR, PAS)	68.83	194.51	77.59	39.74
Ringtail (AGS, RIV, VFR)	49.07	37.88	65.75	35.00
Golden eagle (ASC, AGS, BAR, CRP, FEW, IRH, PAS, URB, VFR)	626.49	371.65	525.61	157.03
Swainson's hawk (AGS, BAR, CRP, IRH, PAS, URB, LAC, VFR)	634.08	371.23	526.69	157.44
Western snowy plover (LAC)	7.59	1.89	0.00	0.00
White tailed kite (ASC, AGS, CRP, BAR, DOR, DGR, FEW, IRH, IRF, IGR, URB, VFR, VIN)	957.32	675.48	795.67	169.14
American peregrine falcon (AGS, BAR, CRP, FEW, IGR, IRH, LAC, RIV, URB, VFR)	632.47	373.62	545.96	160.65
Greater sandhill crane (AGS, DGR, CRP, FEW, IGR, IRH, IRF, LAC, VFR)	143.99	43.15	86.53	32.31
Bald eagle (AGS, BAR, FEW, LAC, RIV, VFR)	74.16	195.75	97.94	43.36
<i>Other Special-Status Species</i>				
Kern brook lamprey (Friant Kern Canal)	0.40	0.07	0.00	0.00

	May 2014 Project		F-B LGA	
	Permanent Impacts	Temporary Impacts	Permanent Impacts	Temporary Impacts
Western spadefoot (ASC, AGS, FEW, RIV)	60.58	39.98	62.75	35.00
Western pond turtle (AGS, FEW, LAC, PAS, RIV, VFR)	58.30	39.86	63.84	35.41
Silvery legless lizard (VFR)	0.70	0.30	1.13	0.41
San Joaquin whipsnake (ASC, AGS, PAS, VFR)	52.05	38.84	43.49	31.80
Coast (California) horned lizard (ASC, AGS, VFR)	50.41	38.75	43.49	31.80
Western burrowing owl (ASC, AGS, PAS, BAR, URB)	560.27	368.02	483.65	156.93
Special-Status Raptor Species (ASC, AGS, CRP, PAS, VFR, DGR, IGR, IRH, IRF)	150.24	43.74	85.44	31.90
Special-Status Passerine Species (ASC, AGS, CRP, PAS, VRI, FEW, LAC, RIV, DGR, IGR, IRH, IRF)	168.71	47.15	105.79	35.51
Special-Status Wading Birds, Shorebirds, and Duck Species (ASC, AGS, CRP, PAS, DGR, IGR, IRH, IRF, RIV, FEW, LAC, MBTA)	168.00	46.85	105.79	35.51
Pallid bat (ASC, AGS, BAR, CRP, DGR, IGR, IRH, IRF, PAS, RIV, URB, VFR, VIN)	685.22	374.76	615.83	168.76
Dulzura pocket mouse (AGS)	37.50	36.10	—	—
Townsend's big-eared bat (ASC, AGS, BAR, CRP, IGR, IRH, IRF, PAS, VFR, URB, VIN, RIV)	661.46	374.55	—	—
Western mastiff bat (ASC, AGS, BAR, CRP, FEW, IGR, IRH, IRF, PAS, URB, VFR, VIN)	650.60	373.03	596.57	165.56
Western red bat (AGS, FEW, IRH, LAC, PAS, RIV, URB, VFR)	572.71	213.53	469.90	152.60

	May 2014 Project		F-B LGA	
	Permanent Impacts	Temporary Impacts	Permanent Impacts	Temporary Impacts
Tulare grasshopper mouse (ASC, AGS, VFR)	50.41	38.75	43.49	31.80
American badger (ASC, AGS, BAR, PAS, VFR)	69.54	194.81	77.59	39.74

☐ = least-impact alternative

ASC = Alkali Desert Scrub

AGS = Annual Grassland

BAR = Barren

CRP = Cropland

CWHR = California Wildlife Habitat Relationship System

DGR = Dryland Grain Crops

DOR = Deciduous Orchard

EOR = Evergreen Orchard

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

FEW = Fresh Emergent Wetland

IGR = Irrigated Grain Crops

IRH = Irrigated Hayfield

IRF = Irrigated Row and Field Crops

LAC = Lacustrine

MBTA = Migratory Bird Treaty Act

N/A = not applicable

PAS = Pasture

RIV = Riverine

VIN = Vineyard

VFR, VRI = Valley Foothill Riparian

VOW = Valley Oak Woodland

URB = Urban

Table 8-A-20 shows that the F-B LGA would generally have less of a direct impact (in acres) on special-status wildlife species when compared to the May 2014 Project. Only one of the special-status wildlife species (silvery legless lizard) listed above would have less permanent and temporary impacts with the implementation of the May 2014 Project. In comparison, 19 of the species would have less permanent and temporary impacts with the implementation of the F-B LGA. Nine others have mixed results with having either the May 2014 Project or F-B LGA having lower impacts in either the permanent and temporary categories.

Special-Status Plant Communities

Black Willow Thickets associated with the Kern River Riparian Corridor is the only special-status plant community within the May 2014 Project and F-B LGA. Table 8-A-21 shows impacts on Black Willow Thickets for the May 2014 Project compared to the F-B LGA. Table 8-A-22 shows impacts on riparian areas for the May 2014 Project compared to the F-B LGA.

Table 8-A-21 Potential Acreage of Black Willow Thicket Impacts for the May 2014 Project and F-B LGA (acres)

	Impact Type ¹	May 2014 Project	F-B LGA
Black Willow Thickets	Direct Permanent	0.70	1.13
	Direct Temporary	0.30	0.41
GRAND TOTAL		1.00	1.54

☐ = least-impact alternative

¹ Impacts for the May 2014 Project were calculated based on the Final Environmental Impact Report/Environmental Impact Statement EIR/EIS 15% engineering design Project Footprint, and impacts for the F-B LGA were calculated based on the Supplemental Draft EIR/EIS Preliminary Engineering for Project Definition Project Footprint.

EIR = environmental impact report

EIS = environmental impact statement

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Table 8-A-22 Potential Acreage of Riparian Area Impacts for the May 2014 Project and F-B LGA (acres)

	Impact Type ¹	May 2014 Project	F-B LGA
Riparian Areas ^a	Direct permanent	0.70	—
	Direct temporary	0.30	—
GRAND TOTAL		1.00	—

 = least-impact alternative

¹ Calculations are based on raw, unrounded geographic information system source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.

Impacts for the May 2014 Project were calculated based on the Final Environmental Impact Report/Environmental Impact Statement 15% engineering design Project Footprint, and impacts for the F-B LGA were calculated based on the Preliminary Engineering for Project Definition Project Footprint.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Table 8-A-21 and Table 8-A-22 indicate that the May 2014 Project would have less of a direct permanent and direct temporary impact on Black Willow Thickets when compared to the F-B LGA. The F-B LGA would have less impact on riparian areas when compared to the May 2014 Project, as no riparian areas are located within the F-B LGA footprint.

Jurisdictional Waters

A comparison of impacts to jurisdictional waters between the May 2014 Project and F-B LGA is presented in Table 8-A-23. A comparison of quality of habitat impacted is also analyzed and presented in Table 8-A-24.

Table 8-A-23 Comparison of Quantity of Impacts on Waters of the U.S. (acres)

Wetlands and Other Waters (TYPE/HSR water type)	Impact Type	May 2014 Project	F-B LGA
TOTAL IMPACTS ON WETLANDS ¹	Direct permanent	0.51	—
	Direct temporary	—	—
Seasonal wetland	Direct permanent	0.51	—
	Direct temporary	—	—
TOTAL IMPACTS ON OTHER WATERS OF THE U.S. ^a	Direct permanent	16.52	15.96
	Direct temporary	3.11	1.18
Canals/Ditches	Direct permanent	8.31	13.45
	Direct temporary	1.10	0.11
Retention/Detention Basin	Direct permanent	6.35	1.38
	Direct temporary	1.61	0.66
Seasonal riverine	Direct permanent	1.86	1.13
	Direct temporary	0.40	0.41
TOTAL IMPACTS ON WATERS OF THE U.S. ¹	Direct permanent	17.03	15.96
	Direct temporary	3.11	1.18
	TOTAL DIRECT	20.14	17.14

 = least-impact alternative

— = no impact or not applicable

^a Calculations are based on raw, unrounded geographic information system source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.

Impact calculations in this table include Project alternatives and station alternatives but do not include the heavy maintenance facility site alternatives.

Impacts for the May 2014 Project were calculated based on the Final Environmental Impact Report/Environmental Impact Statement 15% engineering design Project Footprint, and impacts for the F-B LGA were calculated based on the Preliminary Engineering for Project Definition Project Footprint.

Impact types and/or existing condition types that do not appear in the table are not present in these alternatives.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative


HSR = high-speed rail

U.S. = United States

As shown in Table 8-A-23 the F-B LGA would have less of a direct impact on Waters of the United States (U.S.) when compared to the May 2014 Project. The quality of Waters of the U.S. directly impacted would be similar with implementation of the F-B LGA or the May 2014 Project as shown in Table 8-A-24; however, the F-B LGA would not impact any good quality Waters of the U.S., while the May 2014 Project would impact 2.26 acres of good quality Waters of the U.S.

Table 8-A-24 Comparison of Quality (Relative Condition) of Impacts on Waters of the U.S. for the May 2014 Project and F-B LGA (acres)

Impact Type	Relative Condition	May 2014 Project	F-B LGA
Waters of the U.S.			
Direct permanent	Poor	15.17	14.83
	Fair	—	1.13
	Good	1.86	—
Direct temporary	Poor	2.71	0.77
	Fair	—	0.41
	Good	0.40	—
TOTAL DIRECT ^a	Poor	17.88	15.60
	Fair	—	1.54
	Good	2.26	—

 = least-impact alternative

— = no impact or not applicable

¹ Calculations are based on raw, unrounded geographic information system source data. As a result, the subtotals and totals may not match the rounded feature values because of the number of aquatic features. These minor discrepancies may result in small differences in the presentation of the acreage.

Impact calculations in this table include Project alternatives and station alternatives but do not include the heavy maintenance facility site alternatives.

Impacts for the May 2014 Project were calculated based on the Final Environmental Impact Report/Environmental Impact Statement 15% engineering design Project Footprint, and impacts for the F-B LGA were calculated based on the Preliminary Engineering for Project Definition Project Footprint.

Impact types and/or existing condition types that do not appear in the table are not present in these alternatives.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

U.S. = United States

Wildlife Movement Corridors

Field surveys identified and confirmed the presence of one wildlife movement corridor (Kern River Riparian Corridor) intersecting both the May 2014 Project and the F-B LGA. Although this major linkage is associated with a riparian corridor, construction of the rail would not impede movement of aquatic species, such as the Kern brook lamprey, which may be present in the Friant–Kern Canal in the city of Bakersfield. The project would have negligible impacts on the migration and dispersal of this and other aquatic species since the rail would be constructed on elevated structures or bridges spanning the canal and Kern River riparian corridor to allow wildlife passage.

Hydrology and Water Resources

Summary of May 2014 Project Hydrology and Water Resources Impacts

This section evaluates the impacts on hydrology and water resources that may result from the May 2014 Project. The analysis includes a range of topics related to water resources, including surface water hydrology, water quality, groundwater, and floodplains.

Methodology

The study area for hydrology and water resources for the May 2014 Project and the F-B LGA is within the South Valley Floor in the Tulare Lake Basin. The study area includes the following elements:

- Surface Water: receiving waters of project runoff.
- Groundwater: aquifer(s) underlying the construction footprint.

- Flooding: FEMA-designated flood-hazard areas within the physical ground disturbance of the project footprint, as well as areas where flood frequency, extent, and duration could be affected by the project.

The methodologies implemented were consistent between the May 2014 Project and the F-B LGA. Preliminary design plans for the project, federal and state statutes, available documents from various agencies, associated geographic information system (GIS) data, and floodplain maps were reviewed to describe the environmental setting considered to analyze project impacts. The methodologies used for determining impacts for the May 2014 Project are discussed in further detail in Section 3.8.3 of the Fresno to Bakersfield Section Final EIR/EIS. The methodologies used for determining impacts for the F-B LGA are discussed in further detail in Section 3.8.3 of this Draft Supplemental EIR/EIS.

Impacts

Surface Water Hydrology

Water bodies and canal crossings within the May 2014 Project study area are summarized in Table 8-A-25. The May 2014 Project would cross approximately eight water bodies. Water bodies are listed from north to south.

Table 8-A-25 Water Bodies Crossed by the May 2014 Project

Water Body ¹	Type ²	Approximate Crossing Width ³	Crossing Method ⁴
Arvin Edison Canal	C	100	Aerial structure
Friant-Kern Canal	C	150	Aerial structure
Cross Valley Canal	C	180—600	Aerial structure
Kern River ⁵	P	540–720	Aerial structure
Carrier Canal	C	120—150	Aerial structure
Stine Canal	C	60	Aerial structure
Kern Island Canal	C	100	Aerial structure
East Side Canal	C	160–800	Aerial structure

¹ Features identified from review of U.S. Geological Survey topographic maps and aerial photographs. Unnamed irrigation canals and distribution pipelines are also crossed by the May 2014 Project; these features are not listed on this table.

² Type: C = irrigation canal, P = perennial.

³ Crossing widths subject to change once high-speed rail alternative alignments are finalized.

⁴ Based on 15% Design. Crossing method is subject to change as design progresses. Water bodies are crossed by bridge or culvert when adjacent track is at-grade and are crossed by aerial structure when adjacent track is elevated.

⁵ The May 2014 Project does not cross perpendicularly to Kern River; therefore, approximate crossing width is greater than the perpendicular width of Kern River.

As shown in Table 8-A-26, eight large- and small-scale special districts that provide local water supply, flood control, sanitation, and agricultural water supply, storage, and groundwater banking infrastructure cross the May 2014 Project alignment. Details on the districts, including their locations, are provided in Section 3.6 of the Fresno to Bakersfield Section Final EIR/EIS. For comparison, the districts serving the F-B LGA area are shown in Table 8-A-27. The districts serving both the May 2014 Project and F-B LGA are shown in Figure 8-A-18.

Table 8-A-26 Districts Supplying Water, Sanitation, or Flood Control That Potentially Have Infrastructure Crossing the May 2014 Project

Water Districts	
Arvin-Edison Water Storage District	Rosedale Ranch Improvement District
California Water Service Company	Rosedale-Rio Bravo Water Storage District
Kern County Water Agency Improvement District No. 4	Shafter-Wasco Irrigation District
North Kern Water Storage District	Vaughn Water Company Service Area

Sources: U.S. Bureau of Reclamation 2009 (for federal water district boundaries). U.S. Bureau of Reclamation 2003a (for private water district boundaries). U.S. Bureau of Reclamation 2003b (for state water district boundaries). California High-Speed Rail Authority 2013b (Fresno to Bakersfield Section: Hydrology, Hydraulics, and Drainage Report)

Table 8-A-27 Districts Supplying Water, Sanitation, or Flood Control That Potentially Have Infrastructure Crossing the F-B LGA

Water Districts	
Arvin-Edison Water Storage District	Cawelo Water District
California Water Service Company	East Niles Community Services District
Kern County Water Agency Improvement District No. 4	Shafter-Wasco Irrigation District
North Kern Water Storage District	North of the River Municipal Water District
Oildale Mutual Water Company	

Sources: United States Bureau of Reclamation (2003a); United States Bureau of Reclamation (2003b); Cawelo Water District (2015); East Niles Community Services District (2016); North of the River Municipal Water District (2014); Oildale Mutual Water Company (2010); Arvin-Edison Water Storage District (2008); California Water Service Company (2011); David Beard (2014); North Kern Water Storage District (2016); Shafter-Wasco Irrigation District (2013)

Construction

Construction activities such as grading and establishing construction staging areas could alter existing drainage patterns and redirect stormwater runoff. However, the May 2014 Project's design incorporated avoidance and minimization measures, such as the preparation of a Stormwater Pollution Prevention Plan, to reduce impacts on drainage patterns and stormwater runoff during construction.

Operation

Direct impacts on surface water from operation of the project would include changes to the hydrology and connectivity of natural waterbodies in the study area. Project facilities would result in changes to existing drainage, as well as increased runoff from project impervious surfaces. Placing at-grade track sections on embankments with adequately- sized and placed culverts would minimize drainage problems. The May 2014 Project would incorporate avoidance and minimization measures to maintain pre-project drainage conditions to the extent practicable (e.g., emphasizing onsite retention of stormwater runoff using measures such as flow dispersion, infiltration, and evaporation, supplemented by detention, where required).

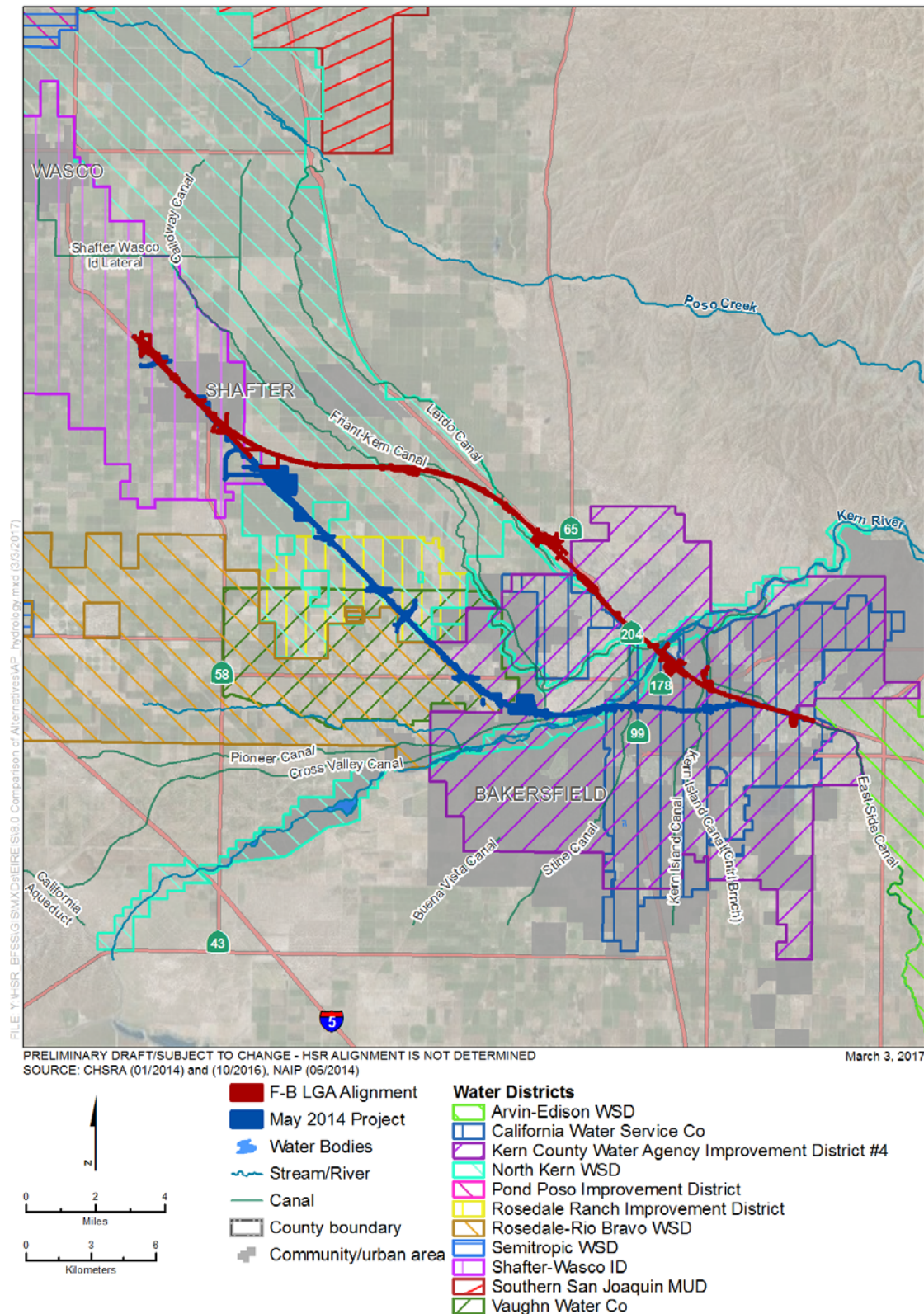


Figure 8-A-18 Water Districts Serving the May 2014 Project and the F-B LGA Areas

Surface Water Quality

Construction

Soil-disturbing activities during construction (i.e., excavation and grading) of the May 2014 Project could lead to erosion and sedimentation. Bare soil exposed to stormwater is more likely to erode than vegetated areas that provide infiltration, retention, and dispersion. The risk of polluted runoff and the potential for sedimentation effects on water quality would be minimized through implementation of the avoidance and minimization measures discussed in further detail in Section 3.8.6 of the Fresno to Bakersfield Section Final EIR/EIS (pages 3.8-72 through 3.8-75), which consist of project design features for stormwater management and treatment and preparation of a Stormwater Pollution Prevention Plan.

Dewatering groundwater during construction could impact water quality. Water produced during dewatering activities could contain sediments and contaminants that could degrade water quality if the water were to be discharged directly to surface water or land without treatment. If groundwater is encountered during construction, groundwater would be disposed of according to the requirements of the applicable dewatering permit. Compliance with the dewatering permit would ensure that the water discharged to surface water or land would not degrade existing water quality.

Operation

Potential pollutants of concern for the HSR are similar to those in existing and active railroads. Therefore, the HSR would not introduce new types of pollutants to the Tulare Lake Basin but would increase the amount of pollutants associated with rail operations that may already exist in the watershed because of the increased rail service. No water bodies in the study area are listed as impaired on the 303(d) List. However, implementation of the project would result in an increase in impervious surface area which can increase the volume of stormwater runoff, thereby increasing the amount of pollutants reaching downstream receiving waters. The May 2014 Project includes the implementation of infiltration basins and swales to target pollutants of concern in stormwater runoff. All stormwater runoff would be treated before draining to the existing storm drain system.

Groundwater

The May 2014 Project is located within the Kern County subbasin of the San Joaquin Groundwater Basin. Groundwater levels in the project area are generally deep; most of the water depths in the project study area are greater than 50 feet.

Construction

Because groundwater levels in the project study area are generally deep, it is not expected that much dewatering would be required during construction. If groundwater is encountered during construction, groundwater would be disposed of according to the requirements of the applicable dewatering permit. However, it is anticipated that the volume of groundwater that would be removed would be minor due to the depth of groundwater.

As discussed in Section 3.6 Public Utilities and Energy of this Draft Supplemental EIR/EIS, water to be used during construction activities would be supplied by the eight water districts described above. However, existing water uses along the alignment would be reduced under construction of the May 2014 Project because project-related water requirements would be less intense than those associated with existing agricultural land uses along the alignment.

Operation

Portions of the study area near rivers and creeks serve as groundwater recharge areas. However, due to the small overall footprint of the project relative to the size of the groundwater recharge area, the effects to groundwater basin recharge would be minimal. In addition as stated above, the project could result in an overall reduction in water use compared to existing use due primarily to the conversion of currently irrigated agricultural lands.

Floodplains

The May 2014 Project crosses three 100-year floodplains: a Zone AH and Zone AO floodplain in Shafter, a Zone A floodplain south of Shafter, and a Zone AE floodplain associated with the Kern River. Figure 8-A-19 shows the flood zones that the May 2014 Project and F-B LGA would cross.

Construction

Construction in a floodplain could temporarily impede or redirect flood flows because of the presence of construction equipment and materials in the floodplain, depending on the activity occurring within a specific area. Construction staging would occur within the Kern River floodplain but would be temporary; a construction staging area may be active for 1 to 3 years. Construction within the Kern River floodplain, a Central Valley Flood Protection Board-designated floodplain, would require an encroachment permit from the Central Valley Flood Protection Board.

Operation

In overland areas subject to shallow flooding during the 100-year event (i.e., local flooding in Shafter and south of Shafter), flood water would pond and drain slowly with minimal energy due to the flat topography and shallow land gradient. Openings in the embankment (e.g., culverts) would continue to allow drainage to pass in the down-gradient direction. The May 2014 Project would cross the Kern River floodplain on an aerial structure of sufficient length to provide adequate clearance and conveyance of flood flows and designed to pass the 100-year flood flows without increasing the water surface elevation in the floodplain by more than 1 foot, or as required by State or local agencies. The aerial structure would be parallel to the Kern River between Friant-Kern Canal and the Mohawk Street Bridge, and would cross over the Kern River at a 30-degree angle. Piers would be placed and designed to minimize backwater effects and local scouring. The shape and alignment of the piers would be designed to minimize adverse flood flow effects.

Comparison between the May 2014 Project and F-B LGA

This section compares the impacts on hydrology and water resources that may result from the May 2014 Project and the F-B LGA. The F-B LGA would result in impacts associated with hydrology and water quality in similar ways to the summary provided above for the May 2014 Project, as shown in Table 8-A-28. There may be site-specific differences in the location of potential impacts due to routing variations included under the F-B LGA (e.g., water body crossings, water districts); however, the nature and intensity of potential impacts would be largely comparable.

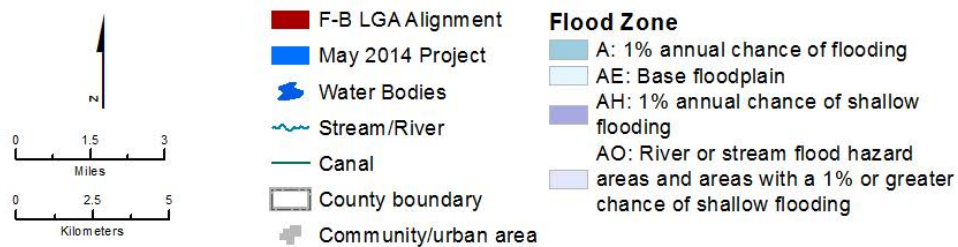
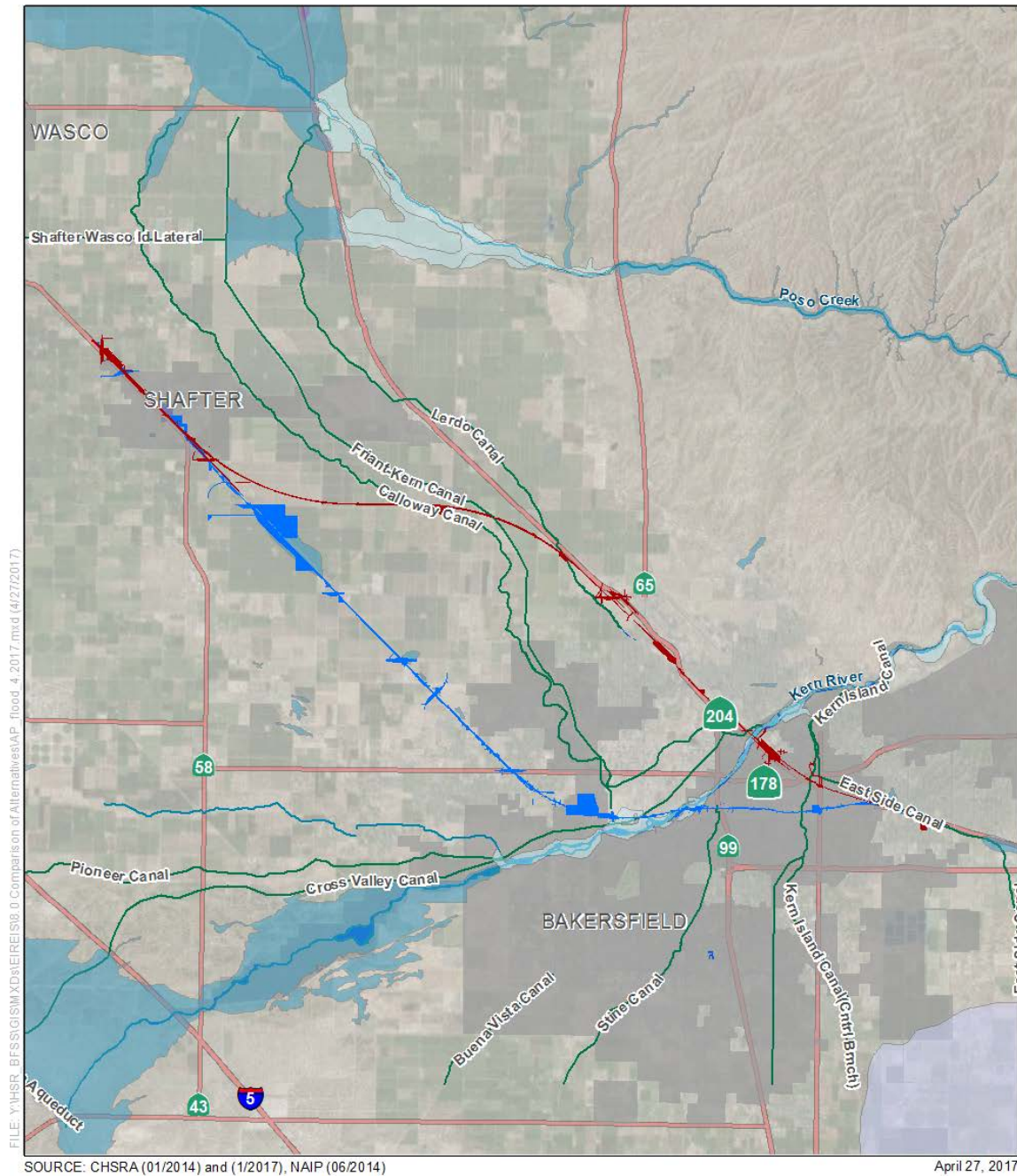


Figure 8-A-19 Flood Zones Crossing the May 2014 Project and the F-B LGA

Table 8-A-28 Hydrology Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Surface Water	8 water body crossings, all on aerial structures.	10 water body crossings, 1 on embankment or retaining wall, the rest on viaduct or elevated structures.
Water Districts	8 water districts have infrastructure within the study area.	9 water districts have infrastructure within the study area.
Disturbed Surface Area	570 acres (total of approximately 1,100 acres including alignment, station, and MOIF).	780 acres (total of 921 acres including alignment, station, and MOIF).
Net Impervious Surface Area	72 acres (total of 161 acres including alignment, station, and MOIF).	82 acres (total of 147 acres including alignment, station, and MOIF).
Groundwater	Kern County Subbasin in Shafter, groundwater depth is approximately 250—260 feet; in Bakersfield, groundwater depth is approximately 150 feet.	Kern County Subbasin; in Shafter, groundwater depth is approximately 250—260 feet; in Bakersfield, groundwater depth is approximately 150 feet.
Floodplains	Local flooding in Shafter (Zone AH and Zone AO), local flooding south of Shafter (Zone A), flooding near Kern River (Zone AE).	Local flooding in Shafter (Zone AO), flooding near Kern River (Zone AE).

 = least-impact alternative
F-B LGA = Fresno to Bakersfield Locally Generated Alternative
MOIF = maintenance of infrastructure facility

The table above indicates that the F-B LGA would require two more water body crossings and would affect one additional water district with infrastructure in the study area than the May 2014 Project. Impacts associated with groundwater and floodplains would be the same for the May 2014 Project and the F-B LGA.

Geology, Soils, Seismicity, and Paleontology

Summary of May 2014 Project Geology, Soils, Seismicity, and Paleontology Impacts

This section identifies geologic, soils, and seismic, and paleontological conditions that could affect or be affected by the May 2014 Project. Geologic, soils, and seismic hazards that could affect the design, construction, and operation of the project include unstable slopes, soil settlement, accelerated erosion, expansive and corrosive soil properties, and earthquake-induced ground liquefaction and slope destabilization. Because they do not present a risk in the May 2014 Project, discussions that are omitted from this analysis include those related to the following: landslides, volcanic ash, seiches and tsunami flooding, and excavation in rock.

The May 2014 Project could result in impacts associated with geologic, soils, and seismic hazards. Potential impacts would be addressed through implementation of conventional foundation design methods for elevated structure, retained-fill, at-grade, and retained-cut facilities. These methods are included in American Association of State Highway and Transportation, American Railway Engineering and Maintenance-of-Way Association, California Department of Transportation, and International Building Code standards and guidelines, which are included as Avoidance and Minimization Measures of the May 2014 Project, as described in the Fresno to Bakersfield Mitigation Monitoring and Enforcement Plan (pages 2-1 through 2-24).

Methodology

The study area for geology, soils, and seismicity for the May 2014 Project is defined as 0.5-mile radius for subsurface gas hazards, mineral resources, and oil and gas resources, which expands to 2 miles around the Truxtun Avenue Station. The regional study area encompasses the San

Joaquin Valley for review of seismicity, faulting, and dam failure inundation. Research for seismicity was conducted out to 62 miles (100 kilometers) from the May 2014 Project. For paleontological resources, the study area is a 1-mile radius around the proposed HSR right-of-way and any potential facilities, including the potential stations. No specific guidance dictates the radius width used for paleontological resource studies; however, a 1-mile radius allows for the development of a more complete context because paleontological resources tend to be distributed widely across the landscape.

Impacts

Mineral Resources

Aggregate resources, consisting of sand, gravel, crushed stone, and similar materials, are the only mineral resources within the study area for the May 2014 Project. No mineral resources are known to exist within the footprint of the May 2014 Project, and no loss of availability of minerals of statewide significance or hazards associated with encountering such surface or sub surface mineral deposits would occur.

Non-seismic Geologic Hazards

- **Unstable Slopes.** The study area for the May 2014 Project is dominated by competent soils near the ground surface, although unstable soils can occur on a localized basis, particularly near river and stream crossings. This area is susceptible to strong ground shaking generated during earthquakes on nearby faults. However, appropriate design standards such as Section 1805.3 of the International Building Code would be implemented as part of the May 2014 Project, in addition to standard safety practices during construction.
- **Land Subsidence and Settlement.** There is existing land subsidence near the May 2014 Project. Specifically, the vicinity of the Kern Lake bed is affected by settlement caused by groundwater overdrafts in the area of Arvin to the southeast of Bakersfield. Subsidence also occurs in small areas south and west of Bakersfield, due to the presence of local oil fields (Kern County Planning Department 2009). The project design incorporates ground improvements and foundations that are resistant to settlement and would meet building code requirements.
- **Accelerated Erosion.** Wind or water erosion of soil could occur during both construction and operation, if ground-disturbing activities result in loose soils that are not stabilized as standard practice. Implementation of standard design measures and best management practices to avoid accelerated erosion would be included as part of the project.
- **Expansive and Corrosive Soils.** The potential for shrink-swell represents a risk of negligible intensity to the operation of the track system and the track right-of-way for long-term operations with the implementation of standard design measures, such as excavating underlying expansive soils and augmenting them with an imported soil base. The May 2014 Project is located in an area of low to moderate corrosivity to concrete and moderate corrosivity to uncoated steel. Standard design measures would include but not be limited to excavating corrosive soils and augmenting them with an imported soil base or using treated materials to reduce the effects of corrosive soils.

Seismic Geologic Hazards

Of the known hazardous fault zones that occur in the project area, those that would pose the greatest hazard to the May 2014 Project are the San Andreas Fault to the west, the Kern Canyon Fault to the east, and the White Wolf and Garlock faults to the south. These faults and the available data pertaining to them indicate that they could be the source of strong ground shaking in the project area.

- **Surface Fault Rupture.** Within the study area of the May 2014 Project, there are several faults including the Premier, New Hope, and Poso Creek-Pond (Smith 1983) that have experienced surface rupture associated with fluid extraction. No faults that have experienced surface rupture are traversed by the May 2014 Project alignment. Surface rupture is thus unlikely.

- **Ground Shaking.** The study area for the May 2014 Project is susceptible to strong ground shaking generated during earthquakes on nearby faults. Peak horizontal acceleration¹¹ ranges from 30–40 percent from Shafter to the north of Bakersfield and from 40–50 percent in Bakersfield. Project facilities would be engineered, designed, and constructed to withstand ground-shaking effects to the extent practicable.

Secondary Seismic Hazards

Secondary hazards include liquefaction, seismically induced slides or slumps, and floods resulting from seismically induced dam failure.

- **Liquefaction.** In general, groundwater in the project area for the May 2014 Project occurs at depths greater than 50 feet below the ground surface. Groundwater may occur at shallower depths where the May 2014 Project crosses stream and/or river channels. At these locations, the potential for liquefaction exists if saturated near-surface soils are loose and cohesionless.
- **Seismically Induced Slides or Slumps.** Ground shaking in the project area may cause slopes to fail, even where liquefaction does not occur. Particularly susceptible areas include natural waterway crossings.
- **Dam Failure.** The May 2014 Project crosses inundation areas of the Lake Isabella Dam. In the unlikely event of seismically induced dam failure, it would take an estimated six to eight hours for escaped water to reach a flooding depth of one foot at the Truxtun Avenue Station (Kern County Planning Department 2009), allowing ample time to evacuate HSR facilities and tracks.
- **Areas of Difficult Excavation.** Areas of difficult excavation may occur due to the presence of hardpan soil or shallow groundwater. Best practice methods would result in less-than-significant impacts under CEQA.
- **Mineral and Energy Resources.** The May 2014 Project crosses three abandoned oil and gas fields: Fruitvale Oil Field approximately 1.5 miles to the west of Bakersfield, the Rosedale Oil Field approximately 6 miles to the west of Bakersfield, and the Seventh Standard Oil Field between Bakersfield and Shafter. The May 2014 Project is not located in or near a geothermal resource area, as classified by the (California) Division of Oil, Gas, and Geothermal Resources (DOGGR), and no known producing or abandoned geothermal wells or geothermal springs are present along the May 2014 Project. There are 90 active, new, idle, or plugged observation, oil and gas, water disposal, or water flood wells within the footprint and a 1,000-foot buffer. The May 2014 Project would not include actions that would adversely affect oil and gas fields.

Comparison between the May 2014 Project and F-B LGA

The F-B LGA would result in impacts associated with geology and paleontology in similar ways to the summary provided above for the May 2014 Project, as shown in Table 8-A-29. There may be site-specific differences in the location of potential impacts due to routing variations included under the F-B LGA; however, the nature and intensity of potential impacts would be comparable.

¹¹ The ground motions induced by a seismic event are characterized by a horizontal peak ground acceleration value that is expressed as a percentage of the acceleration of gravity.

Table 8-A-29 Geology, Soils, Seismicity, and Paleontology Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Ground Shaking potential	PHA 30–40 percent in Shafter and 40–50 percent in Bakersfield	PHA 30–40 percent in Shafter and 40–50 percent in Bakersfield
Earthquake Faults	San Andreas Fault: 37 miles to the west of the Truxtun Avenue Station Kern Canyon Fault: 24 miles to the east of the May 2014 Project White Wolf Fault: 15 miles to southeast of the May 2014 Project Garlock Fault: 35 miles to the southeast of the May 2014 Project	San Andreas Fault: 34 miles to the southwest of F Street Station Kern Canyon Fault: 40 miles to the northeast of the F-B LGA White Wolf Fault: 16 miles to southeast of the F-B LGA Garlock Fault: 33 miles to southeast of the F-B LGA
Wells (active, idle, new, and plugged)	28 total: 9 within permanent footprint (1 active) and 19 within 150 feet of footprint (5 active)	11 total: 3 within permanent footprint (0 active) and 8 within 150 feet of footprint (0 active)
Oil and Gas Fields crossed by alignment	North Shafter Oil Field Rosedale Ranch Oil Field Seventh Standard Oil Field	North Shafter Oil Field Rosedale Oil Field Kern Front Oil Field Fruitvale Oil Field
Paleontological Resources	None identified at this time	None identified at this time

 = least-impact alternative
 F-B LGA = Fresno to Bakersfield Locally Generated Alternative
 PHA = peak horizontal acceleration

The table provides a comparison of differentiating features for this issue area under the May 2014 Project and the F-B LGA.

The ground-shaking potential is the same for both alternatives, with a peak horizontal acceleration 30 to 40 percent in Shafter and 40 to 50 percent in Bakersfield. As with the May 2014 Project, further site-specific, subsurface geotechnical investigations, and design evaluations would be conducted during the final design stages of the F-B LGA, in order to determine where difficult excavations and subsurface hazards may occur, and to plan for working with these sites during construction.

Table 8-A-29 indicates that there are 17 fewer oil and gas wells within the study area (project footprint and 150-foot buffer) for the F-B LGA than the study area for the May 2014 Project. Of these, there are six fewer active wells within the study area for the F-B LGA than the study area for the May 2014 Project (zero versus six). The identification of fewer wells for the F-B LGA indicates that although the F-B LGA would cross through an industrial area avoided by the May 2014 Project, specific well sites are located farther away from the alignment. Under either alternative, all construction and grading work conducted within 100 feet of an oil well site should be coordinated with the DOGGR, and active wells would be capped and abandoned, or relocated.

The May 2014 Project is 16 miles closer to the Kern Canyon Fault than the F-B LGA, but this does not change the nature or intensity of potential impacts associated with the proximity of earthquake faults. There are 17 more oil and gas wells located within the study area for the May 2014 Project than the F-B LGA; however, under either alternative any wells within the footprint would be capped and abandoned or relocated. The F-B LGA would be located closer to oil and gas fields in and near Bakersfield than would the May 2014 Project; however, under either alternative any construction and grading work conducted within 100 feet of an oil well site would be coordinated with the DOGGR. Impact Avoidance and Minimization Measures included under either alternative would minimize or avoid the potential to result in adverse impacts associated

with geology, soils, and seismicity; impacts associated with the F-B LGA and the May 2014 Project are comparable for this issue area.

For both the F-B LGA and the May 2014 Project, no specific paleontological resources have been recorded within the study areas, although five geologic formations that intersect the study area are considered highly sensitive for potentially significant, yet unidentified, paleontological resources. Under both alternatives, the potential for project activities to affect paleontological resources would depend upon the required depth of ground disturbances during construction, and a Paleontological Resource Monitoring and Mitigation Plan would be implemented to address potential impacts. Potential impacts to paleontological resources would be comparable for the F-B LGA and the May 2014 Project.

Hazardous Materials and Wastes

Summary of May 2014 Project Hazardous Materials and Wastes Impacts

Construction and operation of the May 2014 Project could cause ground disturbance (including disturbance of groundwater or surface water) near a known contaminated site or sites, or where contamination could exist in the study area. Construction and operation of the May 2014 Project could also involve the use, storage, and disposal of hazardous materials and wastes in the study area. This section summarizes the potential hazardous materials and waste impacts associated the May 2014 Project.

Methodology

The study area for the May 2014 Project includes the project footprint and a 150-foot buffer to account for hazardous material and waste issues on adjacent properties to either side of the project footprint. To be consistent with ASTM database-search standard practice, database searches for sites of potential environmental concern (PEC) used a one-mile buffer area on either side of the alignment centerline. In addition, schools within 0.25 mile of the May 2014 Project footprint and landfills within 0.25 mile of the footprint were assessed.

Impacts

Sites with Potential Environmental Concerns

Environmental Data Resources, Inc. compiled applicable regulatory agency lists of potential hazardous waste sites; properties or facilities currently under investigation for potential environmental violations; and sites storing or using hazardous materials. As mentioned above and discussed in Section 3.10, Hazardous Materials and Wastes of this Draft Supplemental EIR/EIS, PEC sites were mapped within one mile of the project centerline. Analysts attempted to identify potential large or regionally important PEC sites where the extent of the site or contamination could extend well beyond the mapped address, or from outside the one-mile buffer to extend to locations within the study area; however, the database search results did not identify any such sites. Therefore, in order to provide a comparison between the May 2014 Project and the F-B LGA, the study area of 150 feet from the project footprint was applied to the identified PEC sites. Table 8-A-30 shows that there are two PEC sites within 150 feet of the May 2014 Project footprint.

Landfills

Construction and operation of the May 2014 Project would not include activities in proximity to closed or operating landfill sites between Shafter and Bakersfield. Therefore, no impacts associated with landfill gases would occur.

Oil and Gas Wells

The study area for the May 2014 Project consists of the project footprint plus a 150-foot-wide study area around the footprint. Locations of oil wells (both active and abandoned) were identified from the DOGGR databases (2015). Twenty-eight oil and gas wells (active and abandoned) were identified within the 150-foot-wide study area around the footprint of the May 2014 Project.

Table 8-A-30 Potential Environmental Concerns within 150 Feet of the May 2014 Project Footprint

Name	EDR ID	Address	Status	Priority
Brown and Bryant - Shafter Facility	S100833336	135 Commercial Drive, Shafter, CA 93725	The May 2014 Project runs adjacent to the west side of this facility. Agricultural chemicals are reported to contaminate surface and subsurface soils and soil gas beneath the site. The approximately 15-acre site was used until December 1989 to blend and repackage liquid fertilizers, insecticides, herbicides, fumigants, and defoliants. Department of Toxic Substances Control (DTSC), the lead agency requested the Atchison, Topeka, and Santa Fe Railroad (Santa Fe), (the landowner of 1/3 of the site) to extend the west site fence line farther west to prevent public exposure of offsite soil contamination. The USEPA subsequently issued a 106 Order to Santa Fe requiring the company to assess the site and develop plans to stabilize and winterize the site to prevent further potential for public exposure. During two phases of remedial investigations conducted in 1995 and 1997, subsurface soil and soil gas contamination was discovered at depths of over 200 feet. A draft Remedial Action Plan for the site was published in September 2008. Reportedly, a baseline risk assessment is being finalized and a work plan for the Remedial Action Plan is being prepared. Numerous additional agency violations exist at the site.	High - Based on proximity to the alignment, upgradient position, and unresolved soil and groundwater issues and outstanding violations
Burlington Northern and Santa Fe Railway	S103629745	140 Commercial Drive, Shafter, CA 93725	The BNSF site is associated and co-joined with the Brown and Bryant facility discussed above. BNSF owns a portion of the Brown and Bryant site. No violations were noted.	High - Based on proximity to the alignment, upgradient position, and unresolved soil and groundwater issues and outstanding violations

BNSF = BNSF Railway
 DTSC = Department of Toxic Substances Control
 EDR = Environmental Data Resources, Inc.
 USEPA = U.S. Environmental Protection Agency

Airports/Airstrips/Heliports

There are no airports within two miles of the May 2014 Project, but there are heliports at three hospitals/medical centers in Bakersfield within two miles of the alignment. They are San Joaquin Community Hospital, Kern Medical Center, and Memorial Hospital.

Educational Facilities

The California Public Resources Code requires projects that would be located within 0.25 mile of a school and might be reasonably expected to emit or handle hazardous materials to consult with the school district regarding potential hazards. There are 22 schools within 0.25 mile of the May 2014 Project.

- Bakersfield Adult School
- Bakersfield High School
- Bakersfield Play Center
- Bethel Christian School
- Blanton Education Center
- Country Christian School, Inc.
- Franklin Elementary School
- Free Will Christian Academy
- Fruitvale Junior High School
- Greenacres School
- International College
- Kern County Child Development Centers
- Kern High School District
- Owens Intermediate Elementary School
- Preferred College of Nursing Bakersfield
- Redwood Elementary School
- Richland Junior High
- Rosedale Middle School
- Shafter Kiddie Kollege
- Stockdale Learning Center
- Vista East Continuation School
- Warriors for Christ Academy

Wildlands

Based on statewide fire hazard severity zone maps available from the California Department of Forestry and Fire Protection, there are no portions of the May 2014 Project study area that are generally subject to impacts from wildland fire (CalFire 2007). Parcels of land that were historically developed but are now vacant or fallow farmland were not considered to be “wildlands” for the purpose of this report.


Comparison between the May 2014 Project and F-B LGA

Impacts associated with the May 2014 Project and the F-B LGA are generally comparable for the issue area hazardous materials and wastes, except that substantially more PEC sites are within the study area for the F-B LGA. As discussed above for the May 2014 Project, PEC sites were identified within one mile of the project footprint and assessed for the potential of identified sites to extend into the project alignment; the study area of 150 feet around the project footprint was then applied to both the May 2014 Project and the F-B LGA, with respect to PEC sites.

Differentiating features for the May 2014 Project and the F-B LGA include the number of PEC sites within 150 feet of the project footprint and the number of oil and gas wells within 150 feet of the project footprint. Landfills identified include closed solid waste disposal sites, past burn sites, compost operations, and active waste disposal sites. Table 8-A-31 identifies the total number of sites identified and the number of active waste disposal sites.

Table 8-A-31 Hazardous Materials and Wastes Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
PEC sites within 150 feet of footprint	2 PEC sites within 150 feet of the footprint.	149 PEC sites within 150 feet of the footprint.
Landfills within 0.25 mile of the footprint	There are no active or closed landfills within 0.25 mile of the May 2014 Project footprint between Shafter and Bakersfield.	There are 13 (1 active) landfills within 0.25 mile of the F-B LGA footprint between Shafter and Bakersfield.
Oil and Gas Wells within 150 feet of footprint	28 total: 9 within permanent footprint (1 active) and 19 within 150 feet of footprint (5 active, 5 new)	11 total: 3 within permanent footprint (0 active) and 8 within 150 feet of footprint (0 active)
Educational Facilities within 0.25 mile	There are 22 schools within 0.25 mile.	There are 16 schools within 0.25 mile.

 = least-impact alternative
 F-B LGA = Fresno to Bakersfield Locally Generated Alternative
 PEC = potential environmental concern

Under both the May 2014 Project and the F-B LGA, additional investigation would be required during the final engineering and design phase in order to characterize hazards associated with individual PEC sites and determine how to avoid or mitigate each site prior to project construction to avoid adverse impacts associated with hazardous materials and wastes. There are substantially more PEC sites located within 150 feet of the F-B LGA than the May 2014 Project (149 versus 2), due to the generally more industrial nature of the alignment in Bakersfield and the types of previous and current land uses traversed by the proposed F-B LGA alignment. Potential impacts associated with PEC sites would occur in similar ways under the F-B LGA and the May 2014 Project, although additional investigation would be required under the F-B LGA due to the greater number of PEC sites. With implementation of the required investigation and appropriate avoidance or mitigation measures (to be determined during the final engineering and design phase), potential impacts associated with PEC sites would be comparable between the F-B LGA and the May 2014 Project.

There are no active or closed landfills within 0.25 mile of the May 2014 Project, while there are 13 landfill sites located within 0.25 mile of the F-B LGA footprint; of these, only one is identified as active, and that site is a low-risk inert waste site (Valley Tree & Construction Disposal) located at the edge of the study area. In addition to the Valley Tree & Construction Disposal site, six sites are located (or likely located) within the construction footprint; these sites include: West Oildale Burn Dump; Williams Street Waste Tire Pile; Group Tires; Ceres West Compost Operation; McCoy's Tire; and Kern County Transit Co., Inc. None of these sites have a history of buried waste, and all are classified as having a low potential for methane gas release. For both the F-B LGA and the May 2014 Project, the existing regulatory framework minimizes explosion risk; potential impacts associated with the presence of landfills are therefore comparable between the May 2014 Project and the F-B LGA and would be less than significant under CEQA.

As discussed above under Geology, Soils, Seismicity, and Paleontology, there are 17 more oil/gas wells located within 150 feet of the May 2014 Project footprint than the F-B LGA (28 versus 11). All construction and grading work conducted within 100 feet of an oil/gas well should be coordinated with the DOGGR, and active wells would be capped and abandoned, or relocated. More activities associated with the capping, abandonment, or relocation of oil and gas wells would be required under the May 2014 Project than under the F-B LGA, due to the increased concentration of oil and gas wells. However, due to the same application of well capping/abandonment/relocation activities under either project, potential impacts would occur in the same way under the May 2014 Project and F-B LGA, and the same types of mitigation actions would be required.

In addition, potential impacts associated with the presence of airports/airstrips/heliports, educational facilities, and wildlands are comparable between the F-B LGA and the May 2014 Project, because the same precautions associated with the transport, use, handling, and storage of hazardous materials would be implemented under each, thereby minimizing or avoiding impacts.

Overall, potential impacts related to hazardous wastes and materials are considered relatively comparable between the May 2014 Project and the F-B LGA because, although there are some quantitative differences between the alignments (such as the number of PEC sites), the same pre-project coordination and mitigation efforts would occur under both projects, and ultimately impacts associated with hazardous materials and wastes would be comparable.

Safety and Security

Summary of May 2014 Project Safety and Security Impacts

This section provides details on safety issues related to construction and operation of the May 2014 Project, including the measures and regulations currently in place, or that would be implemented to keep employees, passengers, pedestrians, bicyclists, and motorists safe from activities related to the May 2014 Project. This section also considers security issues that could result from criminal acts that could affect operation and the ability for emergency responders to respond to incidents. The May 2014 Project is the comparable portion of the Preferred Alternative used to compare impacts to the F-B LGA.

Methodology

The study area for direct safety and security effects includes the May 2014 Project right-of-way, areas adjacent to the construction footprint, and the area within a 0.5-mile radius of the Truxtun Avenue Station. The indirect effects study area is made up of parcels (within the F-B LGA Footprint) in the cities of Shafter and Bakersfield, as well as parcels in Kern County between these cities. The safety and security evaluation also includes certain services (e.g., fire departments, police departments, and hospitals) that are not located within the study area but have service boundaries or would provide service within the study area, as well as airports and high-risk facilities within 2 miles of the May 2014 Project footprint.

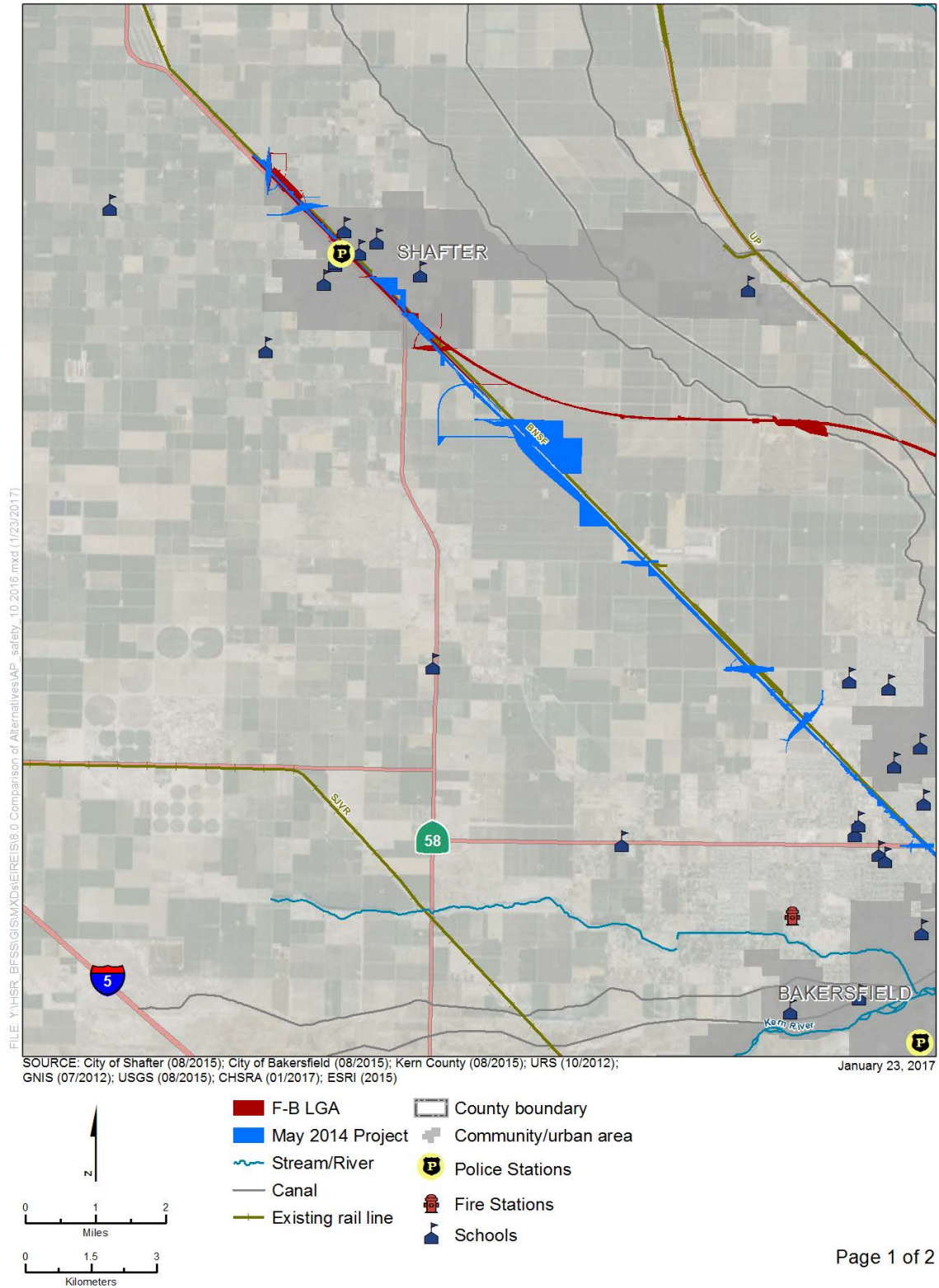
For safety, issues addressed include future rail system operations, such as:

- Train travel
- Vehicle, bicycle, and pedestrian access at the station
- Emergency response by fire, law enforcement, and emergency services to fire, seismic events, or other emergency situations

For security, the analysis evaluates impacts associated with crimes against people and property, including acts of terrorism.

Impacts

Fire departments, police stations, schools, heliports, and hospitals are shown on Figure 8-A-20 and Figure 8-A-21.



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Figure 8-A-20 May 2014 Project and Safety-Related Facilities (Shafter)

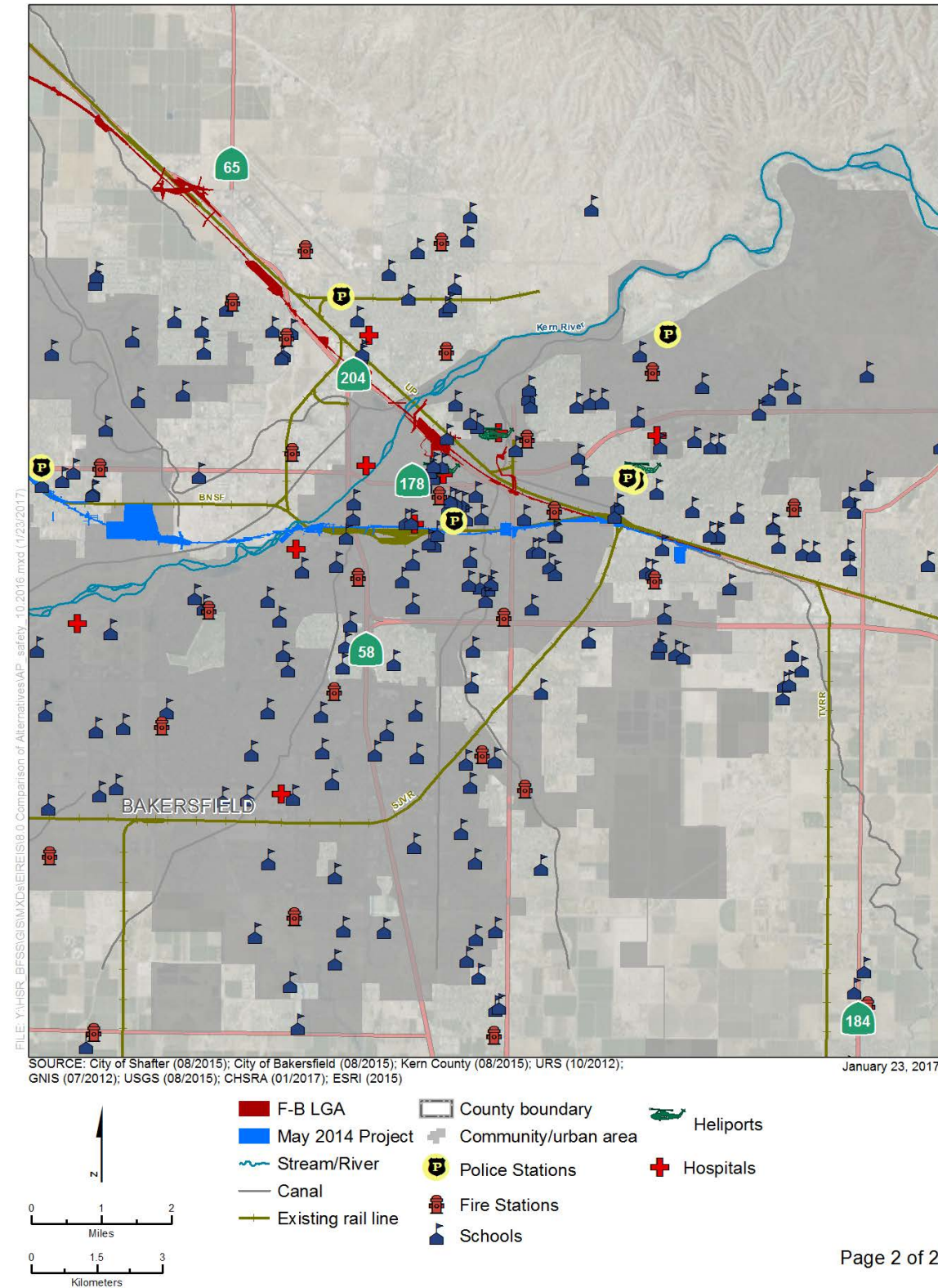


Figure 8-A-21 May 2014 Project and Safety-Related Facilities (Bakersfield)

Fire Departments

Two fire departments serve the region and would provide support to the May 2014 Project: Kern County Fire Department and Bakersfield Fire Department.

Law Enforcement

Three police departments (Shafter Police Department, Kern County Sheriff Department, and Bakersfield Police Department) and 10 law enforcement offices would provide services to the May 2014 Project study area.

Hospitals

Seven hospitals provide emergency medical services to the May 2014 Project study area: Bakersfield Memorial Hospital, Bakersfield Heart Hospital, Healthsouth Bakersfield Rehabilitation Hospital, Kern Medical Center, Mercy Hospital, Mercy Southwest Hospital, and San Joaquin Community Hospital. Two air ambulance services operate in the study area: the San Joaquin Community Hospital and the Kern Medical Center.

Airports and Heliports

No airports are located within 2 miles of the May 2014 Project. However, heliports are located at three hospitals/medical centers in Bakersfield within 2 miles of the May 2014 Project alignment: San Joaquin Community Hospital, Kern Medical Center, and Memorial Hospital.

Vehicular, Rail and Airports, and Pedestrian and Bicycle Safety

Thirty-six at-grade crossings are within the May 2014 Project footprint. Twenty-two accidents/incidents have occurred on these crossings since January 2004 (as of February 9, 2016), resulting in three fatalities and 21 injuries.

Schools

There are 22 schools within 0.25 mile of the May 2014 Project.

- Bakersfield Adult School
- Bakersfield High School
- Bakersfield Play Center
- Bethel Christian School
- Blanton Education Center
- Country Christian School, Inc.
- Franklin Elementary School
- Free Will Christian Academy
- Fruitvale Junior High School
- Greenacres School
- International College
- Kern County Child Development Centers
- Kern High School District
- Owens Intermediate Elementary School
- Preferred College of Nursing Bakersfield
- Redwood Elementary School
- Richland Junior High
- Rosedale Middle School
- Shafter Kiddie Kollege
- Stockdale Learning Center
- Vista East Continuation School
- Warriors for Christ Academy

High-Risk Facilities and Fall Hazards

The following high-risk facilities pose explosion threats along the May 2014 Project alignment:

- Verdugo Ozone Treatment Facility,
- Flying J Refinery,
- Industrial Chemical Storage, and
- GEO Drilling Fluids, Inc.

Tall structures pose a safety hazard because of their potential to topple onto HSR facilities due to accidents, severe weather, or terrorist acts. Tall structures that pose a safety hazard along the May 2014 Project alignment includes:

- Cell tower (Northeastern side of 7th Standard Road and Nord Avenue, Kern County).could increase response times and require new or physically altered government facilities that might impact the environment. As mitigation, emergency response to station and HMF incidents would be monitored, and if determined that the May 2014 Project does result in increased demand, a fair share impact fee to local service providers would be negotiated.
- Water tower (Near D Street and 16th Street, Bakersfield, CA)

As described above, the May 2014 Project could increase demand for local emergency responders around the station due to station activity and associated redevelopment and economic activity. Construction of the May 2014 Project would only contribute a temporary increase in emergency response times and, as part of the project design, the Authority would develop a construction transportation plan with local jurisdictions to minimize project effects on emergency response times.

Avoidance and minimization measures, plans, and protocols developed as part of the May 2014 Project would avoid or minimize most adverse safety and security effects. Mitigation Measure S&S – MM #1 would reduce the impact to a less-than-significant level. Safety and security effects with implementation of the May 2014 Project would be negligible.

Comparison between the May 2014 Project and the F-B LGA

Impacts associated with the May 2014 Project and the F-B LGA are generally comparable for safety and security as shown in Table 8-A-32.

Table 8-A-32 Safety and Security Impact Comparison between the F-B LGA and May 2014 Project

	May 2014 Project	F-B LGA
Fire Departments	There are two fire departments in the region that would provide support to the May 2014 Project.	There are two fire departments in the region that would provide support to the F-B LGA.
Law Enforcement	There are three departments and 10 law enforcement offices that would provide services to the May 2014 Project.	There are three departments and 10 law enforcement offices that would provide services to the F-B LGA.
Hospitals	Seven hospitals provide emergency medical services to the May 2014 Project study area. Two air ambulance services operate in the study area.	Seven hospitals provide emergency medical services to the F-B LGA study area. Two air ambulance services operate in the study area.
Airports and Heliports	In the Bakersfield area, there are heliports at three hospitals/medical centers within 2 miles of the May 2014 Project.	In the Bakersfield area, there are heliports at three hospitals/medical centers within 2 miles of the F-B LGA. The Project is also within 2 miles of a public-services airport
Vehicular, Rail and Airports, and Pedestrian and Bicycle Safety	Nineteen at-grade crossings are located within the Project footprint. Seventeen accidents have occurred on these crossings since January 2004 (as of February 9, 2016), resulting in two fatalities and 18 injuries	Ten at-grade crossings are located within the F-B LGA footprint. Eight accidents have occurred on these crossings since January 2004 (as of February 9, 2016), resulting in two fatalities and forty-one injuries.
Schools	There are 22 schools within 0.25 mile of the May 2014 Project.	There are 16 schools within 0.25 mile of the F-B LGA. Temporary and permanent easements would be required for impacts to Valley Oaks Charter School and Free Will Christian Academy.
High-Risk Facilities and Fall Hazards	There are four high-risk facilities (Verdugo Ozone Treatment Facility, Flying J Refinery, Industrial Chemical Storage, and GEO Drilling Fluids, Inc.) and two tall structures along the May 2014 Project.	There are three high-risk facilities (Halliburton, Rain-for-Rent, and the Gleaners) and 13 tall structures along the F-B LGA.

 = least-impact alternative

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

The fire and law enforcement departments and hospitals that would provide services to the F-B LGA are the same as those for the May 2014 Project. Three heliports are located within 2 miles of both the May 2014 Project and the F-B LGA, and one public-service airport is located within 2 miles of the F-B LGA, whereas no public-service airports are located within 2 miles of the May 2014 Project.

Ten at-grade crossings are located within the F-B LGA footprint. Eight accidents/incidents have occurred on these crossings since January 2004 (as of February 9, 2016), resulting in two fatalities and forty-one injuries. The crossings within the May 2014 Project footprint have resulted in more accidents/incidents but have resulted in the same number of fatalities, but fewer injuries when compared to the F-B LGA. Implementation of the F-B LGA through Shafter would result in the elimination of seven BNSF at-grade crossings as both the HSR and BNSF would be placed on retained fill. Such design would eliminate at-grade crossings resulting in the elimination of pedestrian and vehicle conflicts with BNSF currently experienced throughout the city of Shafter.

Sixteen (16) schools are located within 0.25 mile of the F-B LGA construction footprint. Notably, a portion of the F-B LGA construction footprint would be located on two parcels occupied by Valley Oaks Charter School and Free Will Christian Academy. Temporary construction easements

would more than likely be required for these parcels occupied by these two schools and a permanent easement would be required to accommodate the 34th Street access for Valley Oaks Charter School, which would directly impact one of the school's buildings.

Socioeconomics and Communities

Summary of May 2014 Project Socioeconomics and Communities Impacts

This section provides an examination of the environmental and economic consequences associated with character and cohesion in communities and neighborhoods; acquisition of residential, commercial, industrial, and agricultural property; fiscal implications for school districts and county and city governments; and employment effects related to construction and operation of the May 2014 Project.

Detailed demographic analysis of socioeconomics and communities, including race, ethnicity, income, and housing characteristics, as well as property displacements and relocation impacts for the May 2014 Project is provided in the F-B LGA Draft Community Impact Assessment and Relocation Impact (CIA) Technical Report (Authority and FRA 2017a).

Methodology

The study area for direct and indirect impacts on population and communities is defined as the 0.5-mile radius from the centerline of the May 2014 Project, as well as the 0.5-mile radius around the Truxtun Avenue Station location or access points and around other project facilities.

In order to perform a direct comparison between the May 2014 Project and F-B LGA, displacement data for the segment of the May 2014 Project that spans the area from Shafter to Bakersfield (i.e., the segment between the northern and southern termini of the F-B LGA) was updated to account for any changes that have occurred since the analysis performed for the Fresno to Bakersfield Section: CIA Technical Report (Authority and FRA 2012g). This update includes displacement information for residential units, commercial properties, agricultural land, and community facilities.

Impacts

Potential impacts that would result from the May 2014 Project would include the disruption and division of communities and economic effects. Many of these impacts are related to the displacement and relocation of residences, businesses, agricultural operations, and community facilities as a result of property acquisitions for the May 2014 Project. In the segment of the May 2014 Project that corresponds to the study area for the F-B LGA, the May 2014 Project would result in displacement of 384 homes, 392 businesses, and 11 community facilities as shown in Table 8-A-33.

Table 8-A-33 Displacements under the May 2014 Project

Location	Number of Displacements		
	Residential Units	Businesses	Community Facilities
City of Shafter	4	10	0
City of Bakersfield	143	185	8
Unincorporated Kern County	237	197	3
Total	384	392	11

Sources: Kern County 2015b, Reference USA 2015

Residential Displacements

As shown in Table 8-A-34, the May 2014 Project would result in the displacement of approximately 384 residential units, correlating to an estimated 1,205 residents. The majority of these displacements would occur in unincorporated Kern County, where 237 households and 747 residents would be displaced. A similar number of displacements would occur in the city of

Bakersfield, where 143 units and 443 residents would be displaced. The remaining displacements include 4 units and 15 residents in the city of Shafter. The May 2014 Project does not cross through the community of Oildale, and therefore no displacements would occur in this area.

Table 8-A-34 Residential Displacements under the May 2014 Project

Location	Residential Units Displaced	Estimated Residents to be Relocated
City of Shafter	4	15
City of Bakersfield	143	443
Unincorporated Kern County	237	747
Total	384	1,205

Sources: Kern County 2015b, U.S. Census Bureau 2010

Relocations of Sensitive Populations

The presence of sensitive populations in the vicinity of the May 2014 Project was examined in Section 5.1.1.2 of the *Fresno to Bakersfield Draft Supplemental Community Impact Assessment Technical Report* (F-B LGA CIA; Authority and FRA 2017a). The analysis suggests that displacements in these districts may affect high numbers of sensitive populations, including disabled, female head-of-household populations, and linguistically isolated populations in the Northeast District of Bakersfield. Relocation plans and resources provided would take the special needs of these populations into account, and therefore impacts to sensitive populations would not be substantial.

Business Relocations and Displacements

As shown in Table 8-A-35, the May 2014 Project would require the relocation of approximately 392 commercial-industrial businesses, including the Kern County Mental Health office and the Bakersfield Homeless Center. Bakersfield's Northeast District is home to the Mercado Latino Tianguis, which would be displaced along with all its associated businesses. Four of the businesses in the Northeast District use railroad spurs for access to the BNSF railroad. Therefore, these businesses would require special relocation consideration to ensure continued access to the BNSF in their new locations.

Table 8-A-35 Agricultural Business Impacts under the May 2014 Project

Split Agricultural Parcels	Displaced Facilities (Parcels)	Percent of Annual County Crop Revenue Lost	Estimated Revenue Loss	Number of Jobs Lost
10	1	0.1%	\$3,846,476	16

Sources: Kern County 2015a, U.S. Department of Agriculture 2015.

Agricultural Displacements

Table 8-A-35 shows the estimated number of split agricultural parcels, displaced facilities, and loss in agricultural businesses and associated jobs as a result of the May 2014 Project.

The intensity of effects on agricultural production as a result of land acquisition would be moderate in the short term and negligible in the long term, as farm operations logically reallocate land resources and relocate agricultural facilities.

Community Facilities

As discussed in Section 5.2.5, Community Facilities, of the Fresno to Bakersfield Section: CIA Technical Report (Authority and FRA 2012g) the HSR project alignments considered under all of the alternatives, including the alternatives that included May 2014 Project, would avoid most community facilities and other properties that provide public services, and would not result in

takings of police or fire stations, libraries, post offices, or civic centers. Overall, the May 2014 Project would result in the displacement of eleven community facilities, including the Mercado, Bakersfield Homeless Center, Kern County Mental Health facility, and several businesses and ancillary facilities associated with the Mercy Hospital medical complex. The May 2014 Project would also directly affect two religious facilities in the Bakersfield area. Both of these religious facilities would remain on a parcel that is partially acquired. Section 5.1.1.5, Community Facilities, of the F-B LGA CIA (Authority and FRA 2017a) offers detailed information about specific properties that would be affected by the May 2014 Project.

School District Impacts

School district funding is obtained from property taxes and state aid; however, the amount of funding that is available to the school system is dependent on student attendance, and the relocation of large populations of students outside existing school districts could, therefore, reduce funding for the affected school districts.

The May 2014 Project would result in many residential displacements in the city of Bakersfield and the surrounding areas. The elementary school district with the largest number of displacements would be the Rosedale Elementary School District, with 177 residential relocations and 82 potentially affected students in a school district with 5,397 students enrolled (Table 8-A-36). In the Kern Union High School District, which encompasses the entire study area, the alternative would result in 384 residential relocations and 101 potentially affected students in a school district with 37,318 students enrolled. Table 8-A-36 provides a list of the remaining districts and associated relocations that would potentially occur under the May 2014 Project.

Table 8-A-36 May 2014 Project Residential Displacements by School Districts

School District	Residential Units Relocated	Estimated Students Affected	School District Enrolment (2014—15)
Richland Elementary	8	6	3,530
Norris Elementary	1	1	1,753
Rosedale Elementary	177	82	5,397
Fruitvale Elementary	43	22	3,259
Bakersfield City Elementary	137	70	30,076
Fairfax Elementary	18	8	2,412
Kern Union High	384	101	37,318

Sources: Kern County 2015b, Reference USA 2015, U.S. Census Bureau 2010, California Department of Education 2015, Fresno to Bakersfield Supplemental Community Impact Assessment Technical Report (Authority and FRA 2017a)

As described in Section 5.1.1.1 of the F-B LGA CIA (Authority and FRA 2017a), a suitable amount of vacant replacement housing is available in the vicinity of all anticipated displacements that would occur under this alternative. Students, therefore, would likely have the opportunity to remain in their current school districts, and any effect on school district funding would be small.

Property Tax Effects

Tax Revenue Reductions. Along the May 2014 Project, displacement of residences, businesses, and agricultural lands would result in estimated annual losses of \$4.2 million in property tax revenue to county and city budgets in the region. This estimated amount represents approximately 1.2 percent of the total 2013/14 fiscal year property tax revenue of the county and cities in the study area. The total annual losses in Kern County would be approximately \$3,418,000, while losses in the cities of Shafter and Bakersfield would be approximately \$18,000 and \$715,000, respectively. Property tax losses could be balanced over the long run by the increased property tax revenues associated with the intensification of land uses and ensuing increased property values resulting from the HSR project (F-B LGA CIA [Authority and FRA 2017a]). A complete literature review on the impacts of related transportation projects on property

values is provided in the Fresno to Bakersfield Section: CIA Technical Report (Authority and FRA 2012g).

Sales Tax Revenue Losses Associated with Business Displacements

Table 8-A-37 provides the overall estimated annual sales tax losses associated with business relocations by jurisdiction and the percentage of total jurisdictional sales tax revenue these losses represent. The May 2014 Project would result in a total loss of approximately \$523,000 in annual sales tax revenues to the local jurisdictions impacted by this alternative, amounting to approximately 0.4 percent of the total sales tax collected in these jurisdictions. The largest percentage effect would occur in Shafter, where annual sales taxes revenue losses to the city would amount to approximately \$237,000, or 1.6 percent of the city's total sales tax revenue receipts. This effect is due to potential effects to large industrial companies, including Farm Pump and Irrigation Company Inc., IFCO Systems, Helena Chemical Company, and Wilbur-Ellis Company. Annual sales tax revenue losses in unincorporated Kern County and the city of Bakersfield would be approximately \$108,000 and \$178,000, respectively (F-B LGA CIA [Authority and FRA 2017a]).

These sales tax revenue losses would generally be temporary because they would occur during the time when affected businesses are closed for HSR project construction or while displaced businesses relocate to a new location, in many cases in the same taxing jurisdiction. Once the businesses reopen, sales tax revenue generation would resume. Overall, these percentages would present a small impact, though for jurisdictions confronting revenue shortfalls and budget constraints, even a minor loss of annual revenue could cumulatively have a considerable effect (F-B LGA CIA [Authority and FRA 2017a]).

Table 8-A-37 Estimated Annual Sales Tax Losses by Jurisdiction under the May 2014 Project (in 2015 dollars)

Area	Lost Sales Tax Revenues	Lost Sales Tax Revenues (%)
Unincorporated Kern County	\$107,925	0.24%
City of Shafter	\$236,958	1.60%
City of Bakersfield	\$178,017	0.25%
Total	\$522,900	0.40%

Sources: California State Board of Equalization 2015, City of Bakersfield 2015a, City of Shafter 2015, Kern County 2015a and 2015b, Reference USA 2015, U.S. Census Bureau 2010

Construction-Related Sales Tax Revenue Gains

An estimated increase in sales tax revenues is expected for the counties and cities of the region as a result of spending in the region for HSR project construction. Regional construction expenditures on materials and supplies across the entire Fresno to Bakersfield section of the HSR project are estimated to be around \$773.4 million, with \$343.1 million of this spending attributable to the May 2014 Project. The total local sales tax revenue gains generated from this spending would be approximately \$3.79 million, amounting to average annual gains of \$632,000 per year over the six-year construction period.

The sales tax revenues lost from displaced businesses under this alternative are estimated to be approximately \$523,000 per year. The construction-related sales tax gains would help to offset these losses, reducing them to approximately \$109,000 per year over the construction period (F-B LGA CIA [Authority and FRA 2017a]).

Operation-Related Sales Tax Revenue Gains

Operation of the HSR project under all alternatives, including the May 2014 Project, would result in annual sales tax gains for local jurisdictions in Kern County of approximately \$477,000. Sales tax losses associated with displacements that would occur as a result of the project would begin to decrease as displaced businesses become re-established at new locations and new

businesses move in to replace those that did not reopen. Project operation, therefore, is expected to have an overall positive impact on sales taxes collected by local governments under the May 2014 Project (F-B LGA CIA [Authority and FRA 2017a]).

Regional Job Creation

These long-term employment effects from the HSR project were estimated in a 2010 study conducted by Cambridge Systematics Inc., which found that all of the alternatives studied in the Fresno to Bakersfield Section Final EIR/EIS would result in the creation of approximately the same number of regional long-term jobs (Cambridge Systematics Inc. 2010). For a description of projected long-term job creation related to the HSR project, please see Section 5.1.2.2, Long-term Job Creation and public facilities, of the Fresno to Bakersfield Section: CIA Technical Report (Authority and FRA 2012g). Given that these employment effects are regional, job inducement would be similar under the May 2014 Project and F-B LGA as well. The existing labor force is anticipated to fill the demand. Consequently, the potential physical impacts from the short-term provision of new or altered public services would have no effect.

Comparison between the F-B LGA and the May 2014 Project

Residential Displacements


As the F-B LGA would follow existing and long-established highway and railroad corridors through the urban areas, and would not pass through established neighborhoods, it would cause less disruption than the May 2014 Project, which traverses residential areas in the Northwest District of Bakersfield. Additionally, the F-B LGA would not pass through the community of Crome, where approximately one-third of the homes and the only church in this community would be displaced under the May 2014 Project (Fresno to Bakersfield Supplemental CIA Technical Report [Authority and FRA 2017a]).

Table 8-A-38 shows the relative differences in the number of displacements under each alternative. The F-B LGA would result in fewer residential displacements and fewer community facility displacements than the May 2014 Project, decreasing by a total of 298 homes and 4 facilities. There would also be 15 fewer business displacements under the F-B LGA.

Table 8-A-38 Comparison of Displacements under the May 2014 Project and F-B LGA

Number of Displacements	May 2014 Project	F-B LGA
Residential Units	384	86
Businesses	392	377
Community Facilities	11	7

Sources: Kern County 2015b and Reference USA 2015

 = least-impact alternative

F-B LGA = Fresno to Bakersfield Locally Generated Alternative


In addition to estimating residential displacements associated with each of the alternatives, this analysis provides a summary of the difference in impacts between the two alternatives. Table 8-A-38 shows the relative differences in the estimated number of residential units and associated residents displaced under each alternative.

Table 8-A-39 Comparison of Residential Displacements under the May 2014 Project and F-B LGA

Location	May 2014 Project	F-B LGA	May 2014 Project	F-B LGA
	Residential Units Displaced		Estimated Residents to be Relocated	
City of Shafter	4	3	15	12
Community of Oildale	--	23	--	62
City of Bakersfield	143	29	443	90
Unincorporated Kern County ¹	237	31	747	98
Total	384	86	1,205	262

Sources: Kern County 2015b and Reference USA 2015

¹ This area represents unincorporated Kern County less the portion included in the community of Oildale.

 = least-impact alternative

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

As seen in the table, the F-B LGA would result in 298 fewer residential unit displacements than the May 2014 Project, which amounts to 943 fewer residents being displaced. As discussed above, sufficient residential units are available to accommodate displaced residents under either of the alternatives, and therefore no additional housing would need to be constructed as a result of the HSR project (F-B LGA CIA [Authority and FRA 2017a]).

Relocations of Sensitive Populations

Comparisons suggest that residential displacements from the community of Oildale may include a large percentage of disabled residents and households with a female head of household. As these populations are considered sensitive, relocation plans would take into consideration the provision of additional resources and assistance in terms of relocation services for these individuals. Therefore, under both the F-B LGA and the May 2014 Project, effects to sensitive populations would not be significant.

Business Relocations and Displacements


The relative differences in the estimated number of businesses and associated employees displaced under each alternative are presented in Table 8-A-40.

Table 8-A-40 Comparison of Business Relocations under the May 2014 Project and F-B LGA

Location	May 2014 Project	F-B LGA	May 2014 Project	F-B LGA
	Businesses Relocated		Estimated Employees Relocated	
City of Shafter	10	25	222	317
Community of Oildale	--	42	--	673
City of Bakersfield	185	118	1,590	820
Unincorporated Kern County ¹	197	192	1,044	1,322
Total	392	377	2,857	3,132

Sources: Kern County 2015b, Reference USA 2015

¹ This area represents unincorporated Kern County less the portion included in the community of Oildale.

 = least-impact alternative

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Table 8-A-40 indicates that the F-B LGA would result in the displacement of 15 fewer businesses, but 277 more employees when compared to the May 2014 Project. Many of the business relocations that would occur under the F-B LGA and not under the May 2014 Project are located in the community of Oildale, where the alignment would run through a heavily industrial area that would be avoided by the May 2014 Project. Table 8-A-41 provides a comparison of the types of businesses that would be relocated under the May 2014 Project versus the F-B LGA.

Table 8-A-41 Comparison of Business Sector Relocations under the May 2014 Project and the F-B LGA

Description and NAICS Codes	May 2014 Project	F-B LGA
Agricultural: 11	2	5
Agricultural and Industrial (Construction/ Manufacturing/ Utilities/ Mining): 21, 23, 31-33	47	52
Commercial / Wholesale / Retail / Offices : 42, 44-45, 51-56	195	199
Transportation and Warehousing: 48-49	10	13
Automotive Repair and Services: 811	33	34
Accommodation, food service, other non-automotive services: 61-62, 71-72, other 81 codes, 99	105	74
Total	392	377

Sources: Kern County 2015b, Reference USA 2015

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

NAICS = North American Industry Classification System

As shown in Table 8-A-41, the types of businesses that would be relocated under the May 2014 Project and the F-B LGA are similar. The May 2014 Project and the F-B LGA business relocations would be comparable among the various business sectors, but the biggest difference is in the accommodation, food service, other non-automotive category, which would experience 31 more relocations under the May 2014 Project than the F-B LGA. As discussed, sufficient replacement space for these businesses is available under either of the alternatives. The overall impact of these relocations on business operations, however, would be significant under either alternative.

Agricultural Displacements

The relative differences in the estimated number of split agricultural parcels, displaced facilities, and loss in agricultural businesses and associated jobs under each alternative are presented in the bottom row of Table 8-A-42. Negative values indicate that the F-B LGA has less of an impact than the May 2014 Project.

Table 8-A-42 Comparison of Agricultural Business Impacts under the F-B LGA, relative to the May 2014 Project¹

Alternative	Split Agricultural Parcels	Displaced Facilities (Parcels)	Percent of Annual County Crop Revenue Lost	Estimated Revenue Loss	Number of Jobs Lost
May 2014 Project	10	1	0.1%	\$3,846,476	16
F-B LGA	22	1	0.1%	\$3,709,703	17
Relative Difference	12	0	0.0%	-\$136,772	1

Sources: Kern County 2015a, U.S. Department of Agriculture 2015

¹ Negative values indicate that the F-B LGA has less of an impact than the May 2014 Project.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

As seen in Table 8-A-42, the F-B LGA would result in an additional 12 agricultural parcels being split into two or more pieces by the HSR project footprint, relative to the May 2014 Project. The number of displaced agricultural facilities and the numbers of jobs lost would, however, be consistent between the May 2014 Project and the F-B LGA. Although the F-B LGA would result in a lower impact to agricultural revenues, by approximately \$136,772, the total effect to revenue loss under both alternatives is relatively small, representing approximately 0.1 percent of the County's total annual agricultural production. The total effect of both the May 2014 Project and F-B LGA on agricultural business operations, therefore, would be moderate in the short term and negligible in the long term.

Community Facilities

The total number of community facilities of each type that would be displaced or directly affected under the May 2014 Project and F-B LGA is presented in Table 8-A-43.¹² In total, the F-B LGA would result in four fewer displaced facilities and one fewer directly affected facility when compared to the May 2014 Project.

Table 8-A-43 Comparison of Displaced and Affected Community Facilities under the F-B LGA, relative to the May 2014 Project¹

Alternative	Public Safety	Public Buildings	Schools	Cultural/Community Resources	Medical Facilities	Religious Facilities	Affordable Housing Complex	Total
Displaced Community Facilities								
May 2014 Project	0	3	0	2	3	2	1	11
F-B LGA	0	3	1	3	0	0	0	7
Relative Difference	0	0	1	1	-3	-2	-1	-4
Directly Affected Community Facilities								
May 2014 Project	0	4	0	2	1	2	0	9
F-B LGA	0	5	0	1	1	1	0	8
Relative Difference	0	1	0	-1	0	-1	0	-1

Sources: Kern County 2015a and U.S. Department of Agriculture 2015.

¹ Negative values indicate that the F-B LGA has less of an impact than the May 2014 Project.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Although both alternatives would result in impacts to community facilities, the specific facilities impacted would vary. Common effects between the alternatives are that neither of the alternatives would displace nor directly affect any facilities related to public safety. Both alternatives, however, would result in displacement of the Bakersfield Homeless Center. While the May 2014 Project would result in displacement of the Mercado, the F-B LGA would only affect the north end of the property and would encroach into approximately 45 feet of the building. The F-B LGA would displace two and directly affect an additional three public buildings housing government agencies and would displace one building of a charter school, while the May 2014 Project would not displace or directly affect any schools. The F-B LGA would not result in the displacement of any medical facilities, while the May 2014 Project would displace three. The F-B

¹² Note that the list of affected and displaced community facilities includes only facilities that are partially or fully in the project footprint, (no longer including those that are adjacent or within 100 feet), consistent with the methodology used in the Fresno to Bakersfield Section: Community Impact Assessment Technical Report [(Authority and FRA 2012g)].

LGA would result in direct effects to one fewer cultural/community resource than the May 2014 Project (F-B LGA CIA [Authority and FRA 2017a]).

School District Impacts

Table 8-A-44 shows the relative differences in the estimated number of residential units and associated students displaced in each school district under each alternative.

Table 8-A-44 Comparison of Residential Displacements by School District under the F-B LGA, relative to the May 2014 Project¹

School District	Residential Units Relocated	Estimated Students Affected	School District Enrolment (2014—15)
Richland Elementary	-5	-4	3,530
Rosedale Elementary	-177	-82	5,397
Norris Elementary	-1	-1	4,073
Fruitvale Elementary	-43	-22	3,259
Beardsley Elementary	223	11	1,753
Bakersfield City Elementary	-91	-48	30,076
Fairfax Elementary	-4	-1	2,412
Kern Union High	-298	-79	37,318

Sources: County of Kern 2015b, Reference USA 2015, U.S. Census Bureau 2010, California Department of Education 2015

¹ Negative values indicate that the F-B LGA has less of an impact than the May 2014 Project.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

As seen in the table, the F-B LGA would result in fewer residential unit displacements and associated affected students in six elementary school districts and in the Kern Union High School District. The Beardsley Elementary School District would experience more displacements under the F-B LGA. The total effect of the F-B LGA relative to the May 2014 Project would be a reduction in the number of residential displacements, amounting to 298 units and an associated 147 elementary school students and 79 high school students. Although the F-B LGA would result in fewer displacements and associated affected students, sufficient relocation properties are available under either alternative and the effect on school district funding would be small under both the May 2014 Project and F-B LGA.

Property Tax Effects

The relative differences in the estimated losses in annual property tax revenues under each alternative are presented in Table 8-A-45. Positive values indicate that the F-B LGA would have more of an impact than the May 2014 Project, while negative values indicate that the F-B LGA would have less of an impact than the May 2014 Project.

Table 8-A-45 Comparison of Annual Property Tax Losses by Jurisdiction under the F-B LGA, relative to the May 2014 Project (in 2015 dollars)¹

Area	Lost Property Tax Revenues	Lost Property Tax Revenues (%)
Kern County	-\$471,944	-0.18%
City of Shafter	-\$2,538	-0.24%
City of Bakersfield	-\$98,780	-0.15%
Total	-\$573,261	-0.17%

Sources: California State Board of Equalization 2016, City of Bakersfield 2015a, City of Shafter 2015, County of Kern 2015a, 2015b

¹ Negative values indicate that the F-B LGA has less of an impact than the May 2014 Project.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

As seen in Table 8-A-45, property tax revenues to local jurisdictions would be more heavily impacted by the May 2014 Project than the F-B LGA, with additional losses of approximately \$1,573,000 per year, or 0.2 percent of total property tax receipts by these jurisdictions.

Sales Tax Revenue Losses Associated with Business Developments

The relative differences in the estimated losses in annual sales tax revenues under each alternative are presented in Table 8-A-46. Positive values indicate that the F-B LGA would have more of an impact than the May 2014 Project, while negative values indicate that the F-B LGA would have less of an impact than the May 2014 Project.

Table 8-A-46 Comparison of Annual Sales Tax Losses by Jurisdiction under the F-B LGA, relative to the May 2014 Project (in 2015 dollars)¹

Area	Lost Sales Tax Revenues	Lost Sales Tax Revenues (%)
Unincorporated Kern County	\$216,738	0.49%
City of Shafter	\$8,787	0.06%
City of Bakersfield	-\$95,177	-0.13%
Total	\$130,349	0.10%

Sources: California State Board of Equalization 2015, City of Bakersfield 2015a, City of Shafter 2015, County of Kern 2015a and 2015b, Reference USA 2015, U.S. Census Bureau 2010

¹ Negative values indicate that the F-B LGA has less of an impact than the May 2014 Project.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

The F-B LGA would result in higher losses of sales tax revenues than the May 2014 Project, amounting to a total of approximately \$130,000 (0.1 percent of the total sales tax revenues collected in these jurisdictions) more in losses than the May 2014 Project. Most of these losses are attributed to displacement of businesses in unincorporated Kern County, primarily in the metropolitan area of Bakersfield. The F-B LGA would result in reduced losses of sales tax revenue in the incorporated boundary of Bakersfield, relative to the May 2014 Project.

Construction-Related Sales Tax Revenue Gains

The local construction expenditures on materials and supplies under the May 2014 Project are estimated to be \$343.1 million, while the associated local sales tax revenues generated are estimated to be around \$3.79 million, amounting to an average of \$632,000 annually over the six-year construction period. The sales tax revenues lost from displaced businesses under this alternative are estimated to be approximately \$523,000 per year. The construction-related sales tax gains would help to offset these losses, reducing them to approximately \$109,000 per year over the construction period.

The local construction expenditures on materials and supplies under the F-B LGA are estimated to be \$318.7 million, while the associated local sales tax revenues generated are estimated to be around \$3.54 million, amounting to an average of \$589,000 annually over the six-year construction period. The sales tax revenues lost from displaced businesses under this alternative are estimated to be approximately \$653,000 per year. The sales tax losses from displaced businesses would outweigh sales tax gains from construction activities by \$64,000 per year during the construction period. Construction of the F-B LGA portion of the Fresno to Bakersfield section of HSR project would therefore have an overall negative impact on sales tax revenues collected by local governments during the construction period. However, this net loss in sales tax equates to a 0.05 percent reduction in sales tax collected in the region, which would result in a negligible impact when compared to the total sales tax collected in the region.

Operation-Related Sales Tax Revenue Gains

Operation of the HSR project under all alternatives, including the May 2014 Project and F-B LGA, would result in annual sales tax gains for local jurisdictions in Kern County of approximately \$477,000. Sales tax losses associated with displacements that would occur as a result of the project would begin to decrease as displaced businesses become re-established at new locations

and new businesses move in to replace those that did not reopen. Project operation, therefore, is expected to have an overall positive impact on sales taxes collected by local governments under both the May 2014 Project and F-B LGA.

Regional Job Creation

The relative difference in regional job creation between the May 2014 Project and F-B LGA is shown in Table 8-A-47. Positive values indicate that the May 2014 Project would create more employment opportunities than the F-B LGA.

Table 8-A-47 Comparison of Regional Employment Creation under the F-B LGA, relative to the May 2014 Project (in one-year full-time job equivalents)

Employment	2019	2020	2021	2022	2023	Total
Direct	34	110	157	110	34	445
Indirect and Induced	30	99	142	99	30	400
Total	64	209	299	209	64	845

Sources: Results from Bureau of Economic Analysis RIMS II multiplier analysis using data from the following sources: construction spending estimates for the F-B LGA, U.S. Department of Commerce 2014, U.S. Department of Labor 2016a, 2016b, 2016c, and 2016d
F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Both the May 2014 Project and F-B LGA would result in an increase in construction jobs in Kern County as a result of HSR project construction spending. In total, the May 2014 Project would result in 845 more one-year full-time job equivalents, with 445 of them being direct and 400 being indirect or induced (Table 8-A-47). These jobs are expected to be filled predominantly by local residents, and would not result in an increase in the demand for public services and associated requirements for new or altered government and public facilities.

Impacts associated with the May 2014 Project and the F-B LGA are generally comparable for socioeconomics and communities as shown in Table 8-A-48.

Table 8-A-48 Socioeconomics and Communities Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Residential Displacements	The May 2014 Project would result in displacement of 384 homes.	The F-B LGA would result in displacement of 86 homes.
Relocations of Sensitive Populations	The analysis suggests that displacements in these districts may affect high numbers of sensitive populations, including disabled, female head-of-household populations, and linguistically isolated populations in the Northeast District.	Comparisons suggest that residential displacements from Oildale may include a large percentage of disabled residents and households with a female head of household.
Business Relocations and Displacements	The May 2014 Project would require relocation of 392 commercial-industrial businesses.	The F-B LGA would result in the displacement of 377 businesses.
Agricultural Displacements	The May 2014 Project would result in the split of 10 agricultural parcels into two or more pieces.	The F-B LGA would result in the split of 22 agricultural parcels into two or more pieces.
Community Facilities	The May 2014 Project would displace or directly affect 20 community facilities.	The F-B LGA would displace or directly affect 15 community facilities.
School District Impacts	The May 2014 Project would result in the relocation of 384 residential units and would therefore displace 101 students.	The F-B LGA would displace 86 residential units and would therefore displace 22 students.

	May 2014 Project	F-B LGA
Property Tax Effects	Displacement of residences, businesses, and agricultural lands would result in estimated annual losses of \$4.2 million in property tax revenue to county and city budgets in the region.	Displacement of residences, businesses, and agricultural lands would result in estimated annual losses of \$3.6 million in property tax revenue to county and city budgets in the region.
Sales Tax Revenue Losses Associated with Business Developments	The May 2014 Project would result in a total loss of approximately \$522,900 in annual sales tax revenues to the local jurisdictions impacted by this alternative.	The F-B LGA would result in a total loss of approximately \$653,249 in annual sales tax revenues to the local jurisdictions impacted by this alternative.
Construction-Related Sales Tax Revenue Gains	The May 2014 Project has been estimated to generate \$11.2 million in sales tax revenues for the region over the construction period. Increases in tax revenues for Kern County is estimated to be \$2.8 million.	The local construction expenditures on materials and supplies under the F-B LGA are estimated to be \$318.7 million, while the associated local sales tax revenues generated are estimated to be around \$3.53 million, amounting to an average of \$589,000 annually over the six-year construction period. The sales tax revenues lost from displaced businesses under this alternative are estimated to be approximately \$653,000 per year. The sales tax losses from displaced businesses would outweigh sales tax gains from construction activities by \$64,000 per year during the construction period.
Operation-Related Sales Tax Revenue Gains	Operation of the HSR project under all alternatives, including the May 2014 Project, would result in annual sales tax gains for local jurisdictions in Kern County of approximately \$477,000.	Operation of the HSR project under all alternatives, including the F-B LGA, would result in annual sales tax gains for local jurisdictions in Kern County of approximately \$477,000.
Regional Job Creation	Given that these employment effects are regional, job inducement would be similar under the May 2014 Project and F-B LGA. The existing labor force is anticipated to fill the demand.	Given that these employment effects are regional, job inducement would be similar under the May 2014 Project and F-B LGA. The existing labor force is anticipated to fill the demand.
Cumulative	Construction and operation of the HSR Project and other past, present, and reasonably foreseeable projects would result in a significant cumulative impact under CEQA due to division and/or disruption of communities in the cities of Shafter, and Bakersfield.	Construction and operation of the HSR Project and other past, present, and reasonably foreseeable projects would result in a significant cumulative impact under CEQA due to division and/or disruption of communities in the cities of Shafter and Bakersfield, as well as unincorporated community of Oildale.

 = least-impact alternative
 CEQA = California Environmental Quality Act
 F-B LGA = Fresno to Bakersfield Locally Generated Alternative
 HSR = high-speed rail

Overall, Table 8-A-48 indicates that the F-B LGA would have similar impacts associated to socioeconomics and communities when compared to the May 2014 Project. The F-B LGA would result in fewer impacts to residential displacements, business relocations, community facilities, school districts, and property tax effects whereas the May 2014 Project would result in fewer impacts to agricultural displacements and sales tax revenue losses associated with business developments.

Station Planning, Land Use, and Development

Summary of May 2014 Project Station Planning, Land Use, and Development Impacts

This section identifies the potential effects of the project, both beneficial and adverse, on land use. This analysis focuses on how the project construction and operation would affect adjacent land uses, and the effects on downtown Bakersfield that would result from the construction and operation of the proposed station under the May 2014 Project.

Methodology

This analysis based the compatibility of the HSR alternatives on the potential sensitivity of various land uses to the changes that likely would result from project implementation. It also assesses the potential impact of these changes on the pattern and intensity of existing and planned land uses.

Impacts

Land Conversion

The May 2014 Project would result in permanent conversion of approximately 976 acres of land currently in other uses. The Truxtun Avenue Station would convert commercial, industrial, and community facility uses to transportation uses. The station would not substantially change the pattern and intensity of the use of the land, but it would be incompatible with many adjacent land uses. Overall, the effect of the permanent conversion of land for the May 2014 Project would be significant under CEQA.

For the May 2014 Project, approximately 41 percent of the land that would be used permanently for the HSR tracks and supporting facilities (e.g., traction power and communication systems) is currently in similar uses (i.e., rights-of-way and transportation) or is vacant land; 44 percent is in agricultural uses; and about five percent is in residential, commercial, and industrial uses.

In Shafter, the May 2014 Project would convert commercial and industrial uses adjacent to the BNSF to transportation uses in the project footprint. This conversion would not substantially change the pattern and intensity of the use of the land and would be largely compatible with adjacent land uses and existing plans and policies. The presence of the HSR would not change existing adjacent land uses, because the project would not induce development adjacent to the alignment. Development would be focused around the HSR stations.

In metropolitan Bakersfield, the May 2014 Project follows the BNSF through a densely developed residential area from Hageman Road to Coffee Road, where there is already an incompatibility between the existing freight rail line and residential uses. This incompatibility would be enhanced by the HSR because the May 2014 Project would increase the intensity of land use, and it would be incompatible with adjacent residential land uses. From Coffee Road to SR 99 east of the Kern River, the May 2014 Project would convert industrial and commercial uses to transportation uses. In this area, the project would increase the intensity of land use, but it would be compatible with adjacent land uses and with existing land use plans and policies. East of SR 99 to the project terminus at the Truxtun Avenue Station, the May 2014 Project remains close to the BNSF; but the existing freight rail is incompatible with many adjacent land uses in this area, including the Bakersfield Homeless Center, community facilities flanking Truxtun Avenue, and the partially redeveloped Mill Creek area. The May 2014 Project would enhance this incompatibility by converting residential, commercial, and community facility uses and intensifying the transportation use for the area. East of the Truxtun Avenue Station to Oswell Street, the May 2014 Project would convert residential, commercial, and industrial uses to transportation uses. Conversion of this land would substantially change the pattern and intensity of land use and would be incompatible with adjacent land uses and existing plans and policies. Therefore, the land use effects of the May 2014 Project would be significant under CEQA.

Parking

Bakersfield ridership and parking demand would result in changes in demand for parking during the transition to the full HSR System. The downtown Truxtun Avenue Station would provide up to 4,500 parking spaces after the station is completed, but the full 2035 parking demand is estimated to be 8,100 spaces (Authority and FRA 2014b). It is unknown at this time how the additional parking spaces would be secured. The initial 4,500 spaces would be provided in three or four parking structures. Even though four parking lots are currently located within 0.5 mile from the proposed station location, some parking spaces in these lots are used on a daily basis and are not available for HSR parking. Construction of any new parking garages in most commercial zones would result in land use changes but would not be incompatible because current zoning allows for the development of parking structures. In addition, dispersed parking options at the Truxtun Avenue Station would better encourage transit-oriented development because complementary land uses, rather than large parking structures could be located close to the station. The indirect land use effects of the May 2014 Project would not change the pattern or intensity of adjacent land uses.

Development

The Truxtun Avenue Station area is currently developed with a mix of commercial, community facility, and single family residential uses. The area around the station is developed with viable revenue-generating uses and public amenities including the Rabobank Arena, Theater, and Convention Center, large scale hotels, and the Beale Memorial Library, Bakersfield City Hall and other civic buildings. Approximately 2 percent of the Truxtun Avenue Station study area is currently vacant. Therefore, while the Truxtun Avenue Station would encourage higher-intensity development in the surrounding areas, opportunities for revitalization are limited.

The Truxtun Avenue Station would convert commercial, industrial, and community facility uses to transportation uses. The station would not substantially change the pattern and intensity of the use of the land, but it would be incompatible with the adjacent land uses as stated in Section 3.13.5.3 (page 3.13-46) of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014b). These land uses consist of a mix of light industrial, institutional, commercial, and residential. The determination of incompatibility in the Fresno to Bakersfield Section Final EIR/EIS was based on input from the City of Bakersfield, which noted that the Preferred Alternative alignment identified in the Fresno to Bakersfield Section Final EIR/EIS would severely impact the City's facilities, freeway projects, and businesses, including its Municipal Services Corporation Yard, and Rabobank Arena parking, in addition to private residences, businesses, schools, churches, and medical facilities.

The Truxtun Avenue Station would encourage higher-intensity development in the surrounding areas, but this indirect effect would be consistent with existing urban development and expectations for the types of uses that can be supported in an urban environment. This indirect effect would also be consistent with the Kern Council of Governments and the City of Bakersfield's plans and policies encouraging downtown revitalization (City of Bakersfield 2005).

The Truxtun Avenue Station would be co-located with the existing Amtrak station and downtown transit center, which would expand the use of the existing multi-modal transportation hub, increase efficiency and accessibility regionally and locally, and could potentially increase land use densities in downtown Bakersfield because of its urban location. Increased development density in and around the Truxtun Avenue Station would provide public benefits, including increased employment, increased real estate forces, and the potential for increased retail, dining, and entertainment business opportunities, beyond the access benefits of the system itself.

For a complete discussion of environmental consequences as a result of the May 2014 Project, please refer to Section 3.13.5.3 of the Fresno to Bakersfield Section Final EIR/EIS.

Comparison between the May 2014 Project and the F-B LGA

Table 8-A-49 provides a comparison of the F-B LGA and the May 2014 Project with impacts associated with land conversion, parking and development.

Table 8-A-49 Station Planning, Land Use, and Development Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Land Conversion – existing uses	The May 2014 Project would result in the permanent conversion of more acres of residential, agricultural, commercial, multi-family and single-family residential, and other uses when compared to the F-B LGA.	The F-B LGA would result in the permanent conversion of more acres of industrial, and community facility uses, when compared to the May 2014 Project.
	Single-Family 53 acres	Single-Family 1 acre
	Multi-family 4 acres	Multi-family 2 acres
	Commercial 25 acres	Commercial 20 acres
	Industrial 54 acres	Industrial 115 acres
	Community Facilities ¹ 17 acres	Community Facilities ¹ 76 acres
	Agriculture ² 429 acres	Agriculture ² 323 acres
	Other ³ 394 acres	Other ³ 281 acres
Land Conversion – General Plan Designations	The May 2014 Project would result in the permanent conversion of more acres of land designated for residential, commercial, multi-family and single-family residential and other uses when compared to the F-B LGA.	The F-B LGA would result in the permanent conversion of more acres of land designated for industrial, community facility uses and Specific Plan areas when compared to the May 2014 Project.
	Single-Family 112 acres	Single-Family 6 acres
	Multi-family 39 acres	Multi-family 0 acres
	Commercial 132 acres	Commercial 65 acres
	Industrial 142 acres	Industrial 197 acres
	Community Facilities ¹ 6 acres	Community Facilities ¹ 34 acres
	Agriculture ² 303 acres	Agriculture ² 239 acres
	Other ³ 242 acres	Other ³ 218 acres
	Specific Plan 0 acres	Specific Plan 60 acres
Parking	The total parking count proposed on the site is approximately 4,500 spaces.	The total parking count proposed on the site is approximately 5,200 spaces.
Development	The Truxtun Avenue Station would encourage higher-intensity development in the surrounding areas, and this indirect effect would be incompatible with existing adjacent land uses according to the City of Bakersfield’s determination.	The F Street Station would encourage higher-intensity development in the surrounding areas, but this indirect effect would be consistent with existing urban development and expectations for the types of uses that can be supported in an urban environment.

 =least-impact alternative

Sources: Kern County 2009, City of Shafter 2005, City of Bakersfield and Kern County 2007

Includes all project components. Numbers may vary slightly due to rounding up.

¹Community Facilities includes government and other public and quasi-public agency uses, public parks, and schools

² Agriculture includes mineral and petroleum, resource management areas, and floodplains

³ Other includes right-of-way, transportation, and vacant lands.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Figure 8-A-22 shows the locations of both the May 2014 Project and the F-B LGA alignments and their associated stations.

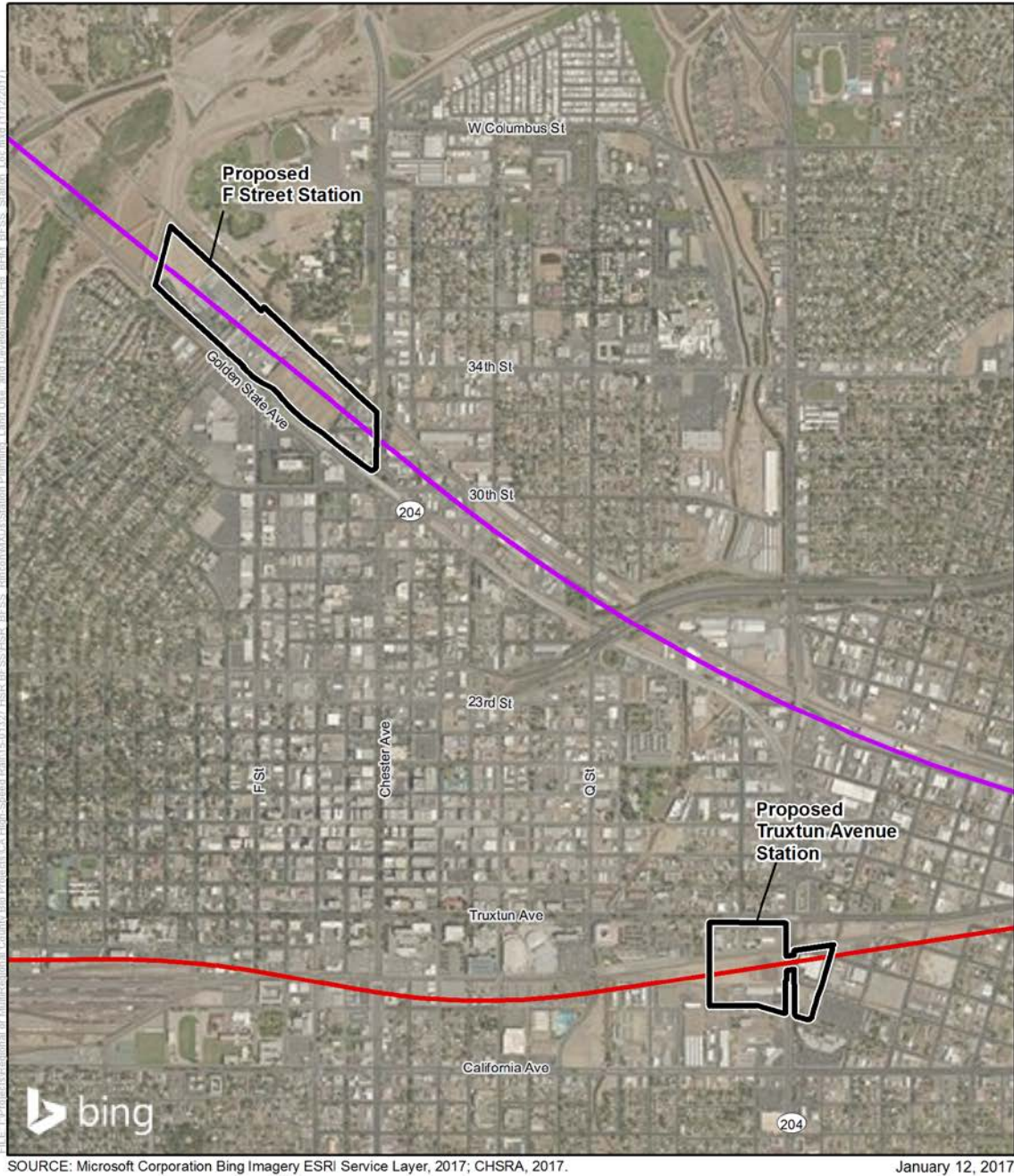


Figure 8-A-22 May 2014 Project and F-B LGA Station Locations

Land Conversion

The F-B LGA would result in permanent conversion of an estimated 819 acres of land currently in other uses to transportation-related uses compared to the 976 acres that would be converted by the May 2014 Project. Approximately, 35 percent of the land that would be permanently used for the HSR tracks and supporting facilities (e.g., traction power and communication systems) is currently in similar uses (i.e., rights-of-way and transportation) or is vacant land. Approximately 39 percent is currently in agricultural uses, nine percent is used for community facilities, and about 16 percent is in residential, commercial, and industrial uses.

Parking

Parking demand and required parking spaces for the F-B LGA would be the same as for the May 2014 Project. The total parking capacity (surface parking lots and parking structures) for the F Street Station site would accommodate parking for 5,200 vehicles. Additional parking areas are being identified in the downtown Bakersfield area to accommodate both passengers and visitors to the station area, and to encourage land uses that would support other development types. The May 2014 Project would provide 4,500 parking spaces at the Truxtun Avenue Station site, or 700 fewer parking spaces than the F Street Station site.

Similar to the May 2014 Project, parking development to meet demand at the Bakersfield F Street Station would be consistent with applicable plans. It would also be compatible with adjacent land uses because current zoning supports parking development as a common use in urban centers.

Development

The HSR tracks and supporting facilities would not inhibit continuation of existing uses on adjacent lands, nor would they induce growth. The station could stimulate residential and commercial development on adjacent land consistent with current uses and land use plans and policies. Similar to the May 2014 Project, the Bakersfield F Street Station would encourage higher-intensity development in the surrounding areas, but this indirect effect would be consistent with existing urban development and expectations for the types of uses that can be supported in an urban environment. Unlike the May 2014 Project, this effect would be consistent with the Kern Council of Governments' and the City of Bakersfield's plans and policies encouraging downtown revitalization (City of Bakersfield 2005, see also discussion in Section 3.13.4.1 of this Draft Supplemental EIR/EIS).

Approximately 3 percent of the F Street Station study area is underutilized or vacant, and surrounding development is characterized as aging, single-story industrial warehouses with large parking areas. Therefore, compared to the Truxtun Avenue Station, the F Street Station presents more opportunities for infill development, revitalization of existing large buildings, new job creation, and transit-oriented housing. As with the May 2014 Project, transit-oriented development associated with the F Street Station would be consistent with the Kern Council of Governments' and City of Bakersfield's plans and policies encouraging downtown revitalization (City of Bakersfield 2005).

While the Truxtun Avenue Station would be located at an existing public transportation center and would be more convenient for Amtrak and bus riders, the HSR Station at F Street would be located near a network of regional highways in an area with no existing train service as well as in proximity to the Kern River Parkway and would provide a direct connection to that facility. While the Truxtun Avenue Station may better promote transit ridership compared to the F Street Station, the opportunities for revitalization at 34th Street and Chester Avenue near the F Street Station would result in overall greater community benefit.

As shown in Table 8-A-49, the F-B LGA would substantially reduce the number of acres of land that would be permanently converted to transportation-related uses compared with the May 2014 Project. The F-B LGA would also reduce impacts associated with meeting parking demand at the station site. Temporary land use impacts during construction would be similar. Overall, land use impacts associated with the F-B LGA would be reduced compared to the May 2014 Project. The F-B LGA would result in the permanent conversion of more acres of commercial, industrial, and

community facility uses, compared with the May 2014 Project; however, the F-B LGA would be considered preferable based on reduced impacts to residential, agricultural and total acres of permanent conversion of land.

Agricultural Land

Summary of May 2014 Project Agricultural Land Impacts

The May 2014 Project would result in impacts associated with temporary use of agricultural lands and permanent conversion of agricultural land to nonagricultural use – including from parcel severance, and effects on land under Williamson Act contracts. The section also assesses indirect impacts to confined animal agriculture and grazing animals from noise and wind, and impacts to irrigation distribution canals.

Methodology

The same methodology was used to evaluate impacts for both the May 2014 Project and F-B LGA. The study area for direct effects on agricultural lands encompasses the entire potential area of disturbance associated with the project construction footprint and noneconomic remnants. Indirect effects include the acreage of Important Farmland within 25 feet of direct permanent conversions, including the project footprint and noneconomic remnants. Indirect effects also include the area 100 feet from the track centerline, based on federal standards for evaluating livestock noise impacts (100 dBA sound exposure level; FRA 2012).

Important Farmland

To calculate the direct permanent conversion of Important Farmlands to nonagricultural use, the acreage for the project footprint was quantified and identified as being permanently converted to transportation use. In addition, impacts on farmland adjacent to, but not in the project footprint were assessed to determine the potential for converting that land to nonagricultural use as a result of project impacts on adjacent farmland. Farmland severance was analyzed in a two-step process and on a parcel-by-parcel basis to identify where severance of a parcel would result in remnants that would be constrained for economical farming (e.g., due to impacts on access, size and shape, location, or overall hardship). Severed parcels determined necessary to convert to nonagricultural use or “noneconomic remnant parcels” were calculated as indirect impacts to Important Farmland. The remnant parcels determined likely to remain in agricultural use were not included in either the indirect or direct Important Farmland totals.

Farmland Conversion Impact Rating

A farmland conversion impact rating was calculated using Natural Resources Conservation Service Form NRCS-CPA-106 in accordance with Federal Farmland Protection Policy Act criteria. The maximum possible score is 260 points. If the score is less than 160 points, no further evaluation is necessary under the Federal Farmland Protection Policy Act. If the score is greater than 160, the Federal Farmland Protection Policy Act requires consideration of alternatives that avoid or minimize farmland impacts.

Williamson Act

Project effects on Williamson Act and Farmland Security Zone contract lands were evaluated on a parcel-by-parcel analysis and using corresponding parcel boundaries. Divided and remnant parcels were evaluated on the basis of whether they met the minimum acreage requirements established by the County of Kern¹³.

¹³ County of Kern's minimum requirement for entering into a new Williamson Act contract is 20 acres of Prime Farmland (Thompson 2015).

Impacts

Temporary Agricultural Land Impacts

Construction of the May 2014 Project would require the temporary use of agricultural land outside the permanent right-of-way, and would result in the disruption of some utilities and infrastructure, the impacts of which are described in the following sections.

Temporary Use of Agricultural Land

The May 2014 Project would temporarily use 337 acres of Important Farmland for construction. This land would be restored and returned to agricultural use after project construction is completed, and would not permanently convert Important Farmland to nonagricultural uses.

Temporary Utility and Infrastructure Interruption

Construction of the May 2014 Project would affect farmland utilities and infrastructure, which could jeopardize farm productivity (Authority 2012a). Utility disruptions would be avoided or resolved, or the land owner would be compensated for losses during the right-of-way acquisition process.

Temporary Noise and Vibration Effects on Adjacent Farm Animals

Construction of the May 2014 Project would generate noise and vibration from construction equipment and vehicles. Vibration impacts on adjacent farm animals would be temporary and would not disrupt the current use. Therefore, noise and vibration would not lead to the permanent conversion of Important Farmland to a nonagricultural use.

Permanent Agricultural Land Impacts

The May 2014 Project would result in the direct, permanent conversion of Important Farmland to nonagricultural use, including potential conversion from parcel severance, permanent access severance, and conflicts with farmland protection contracts (e.g., Williamson Act contracts). As discussed below, the May 2014 Project would not result in additional response times for canal maintenance; would not result in wind induced effects to pollination, additional pesticide drift, or application restrictions; and would not change spraying patterns that would cause conversion of Important Farmland to a nonagricultural use. Noise from operation of the May 2014 Project would not preclude agricultural use and would not result in additional conversion of Important Farmland.

Permanent Conversion of Agricultural Land to Nonagricultural Use

The May 2014 Project would convert Important Farmland to nonagricultural uses. The farmland conversion ratings for the May 2014 Project in Kern County were below the 160-point threshold set by the Natural Resources Conservation Service. Appendix 3.14-A of this Draft Supplemental EIR/EIS provides further detail on these findings.

Effects of Agricultural Land from Parcel Severance

The May 2014 Project alignment would follow existing transportation corridors to the extent possible, but in some cases the alignment would deviate from those corridors and bisect agricultural parcels, creating noneconomic remainder parcels. Although severed parcels under 20 acres determined through a two-step analysis to be converted from agricultural use to nonagricultural use, are included in the permanent conversion data, the Authority has committed to implement a Farmland Consolidation Program as part of the HSR project that will transfer noneconomic remainder parcels to neighboring landowners, whenever possible, to consolidate with adjacent parcels (Authority 2012d). Appendix 3.14-B of this Draft Supplemental EIR/EIS provides the analysis and results of the Remnant Parcel Analysis. In addition, the right-of-way acquisition process provides additional opportunities to reduce hardships caused by parcel severance.

Effects of Land under Williamson Act or Farmland Security Zone Contracts, Local Zoning

The May 2014 Project would require full or partial acquisition of parcels under Williamson Act contract, as discussed in Section 3.14.4.1 of this Draft Supplemental EIR/EIS. Table 8-A-50 lists

the acreage of Williamson Act lands permanently affected by the May 2014 Project, which includes a total of 47 acres of farmland under active Williamson Act contract (i.e., not currently in nonrenewal).

Table 8-A-50 Protected Farmland Permanently Affected by the May 2014 Project

Protected Farmland Classification	Acres ^{1,2}
Williamson Act Land, Prime, Renewal, Less than 20 acres ²	8
Williamson Act Land, Prime, Renewal, 20 acres or greater in size ³	39
Williamson Act Land, Prime, Non-renewal, Less than 20 acres ²	0
Williamson Act Land, Prime, Non-renewal, 20 acres or greater in size ³	0
Williamson Act Land, Non-Prime, 40 acres or greater ³	0
Farmland Security Zone	0
Total	47

¹ Acreages are rounded to the nearest whole number.

² Williamson Act parcel less than 20 acres prior to May 2014 Project, and continues to be less than 20 acres after the May 2014 Project.

³ In Kern County, Prime Farmland under Williamson Act contract is allowed to be on a smaller parcel (20 acres) than non-Prime farmland (40 acres).

Effects on Confined Animal Agriculture

The May 2014 Project's effects on confined animal facilities would not result in Important Farmland conversion, other than as discussed above. In addition, noise levels from HSR operation would not exceed FRA's established threshold for high-speed train noise effects on livestock of 100 dBA sound exposure level (FRA 2012) and, therefore, would not result in noise effects on livestock. Confined animal facilities may be affected by vibration levels, but this impact would not preclude agricultural use and would not result in farmland conversion.

Effects on Irrigation Distribution Canals

According to Section 3.14.5.3 of the Fresno to Bakersfield Section Final EIR/EIS, effects on response times for canal maintenance would not result in the conversion of Important Farmland.

Noise Effects to Grazing Animals

Operation of the May 2014 Project would result in noise effects to grazing lands. The impact would not convert either Important Farmland or Grazing Lands to nonagricultural use.

Wind-Induced Effects

The May 2014 Project would not cause adverse wind effects on adjacent farmland (Authority 2012b) and indirect effects (e.g., interference with insect pollination, additional pesticide drift, or application restrictions) (Authority 2012c) would not result in additional farmland conversions.

Effects on Aerial Spraying

The height of vertical HSR structures, such as poles, radio communication towers, and elevated viaducts, could interfere with aerial spraying of agricultural lands adjacent to the alignment. Construction of these facilities would follow federal, state, and local safety guidelines, and would thus ensure that any tall structures are properly visible to aircraft conducting aerial spraying.

Comparison between the May 2014 Project and F-B LGA

Temporary Agricultural Land Impacts

The F-B LGA would result in impacts associated with temporary agricultural land impacts in similar ways to the summary provided above for the May 2014 Project. The F-B LGA would convert 13 acres of Important Farmland for project construction, compared to 337 acres for the May 2014 Project. Impacts related to temporary utility and infrastructure interruption and temporary noise and vibration effects on adjacent farm animals would be similar for both the May 2014 Project and F-B LGA.

Permanent Agricultural Land Impacts

The F-B LGA would result in reduced impacts associated with permanent agricultural land impacts when compared to the May 2014 Project. Table 8-A-51 provides a direct comparison of differences between the May 2014 Project and the F-B LGA, with regards to permanent agricultural land impacts.

Table 8-A-51 Agricultural Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Important Farmland		
Important Farmland Permanently Affected	The May 2014 Project would convert 485 acres of Important Farmland.	The F-B LGA would convert approximately 372 acres of Important Farmland.
Important Farmland Temporarily Affected	The May 2014 Project would temporarily use 337 acres of Important Farmland for construction.	The F-B LGA would temporarily use 13 acres of Important Farmland for construction.
LESA Scores	The farmland conversion impact rating for the May 2014 Project is 144.	The farmland conversion impact rating for the F-B LGA is 140.
Indirect Impacts to Important Farmland ¹	The May 2014 Project would indirectly impact 36 acres of Important Farmland.	The F-B LGA would indirectly impact 89 acres of Important Farmland.
Construction Noise and Vibration	The Project would have a temporary noise and vibration impact on adjacent farm animals. However, this impact would be less than significant under CEQA.	The Project would have a temporary noise and vibration impact on adjacent farm animals. However, this impact would be less than significant under CEQA.
Williamson Act Land Permanently Affect	The May 2014 Project would result in permanent impacts to 47 acres of Williamson Act lands.	The F-B LGA would result in permanent impacts to 114 acres of Williamson Act lands.
Protected Farmland Reduced to Less Than Williamson Act Minimum Size ²	With the May 2014 Project, three active Williamson Act parcels (8 acres) may be forced into nonrenewal because the project would reduce the size of these parcels below the minimum 20 acres prescribed by the County for the Williamson Act.	With the F-B LGA, three active Williamson Act parcels (17 acres) may be forced into nonrenewal because the project would reduce the size of these parcels below the minimum 20 acres prescribed by the County for the Williamson Act.

 = least-impact alternative

¹ Indirect impacts include noneconomic remnant parcels that meet Step 2 of the remnant parcel analysis (i.e., Important Farmland converted from agricultural to nonagricultural use) and Important Farmland in the 25-foot area. Refer to Section 3.14.2, Methods for Evaluating Impacts, in this Draft Supplemental EIR/EIS for a complete description of the methods used to reach these conclusions.

² These totals reflect only active Williamson Act parcels potentially no longer eligible for Williamson Act contracts because they do not meet the 20-acre minimum.

CEQA = California Environmental Quality Act

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

HSR = high-speed rail

LESA = Land Evaluation and Site Assessment

NEPA = National Environmental Policy Act

Table 8-A-51 indicates that the F-B LGA would result in lesser permanent agricultural land impacts as it would permanently convert fewer acres of Important Farmland to nonagricultural use, and receives an overall lower Land Evaluation and Site Assessment farmland conversion rating. The F-B LGA would also temporarily use fewer acres of protected farmland for construction. The F-B LGA, however, would result in a greater number of indirect impacts to Important Farmland, including non-economic remnant parcels and the 25-foot Important

Farmland buffer adjacent to HSR permanently fenced infrastructure, and would result in greater permanent impacts to protect farmland (i.e., Williamson Act) than the May 2014 project.

The F-B LGA would result in similar impacts to the May 2014 Project for the following issues: effects on confined animal agriculture, effects on irrigation distribution canals, noise effects on grazing animals, wind-induced effects, and effects on aerial spraying. There would be site-specific differences in the location of potential impacts due to routing variations included under the F-B LGA; however, the nature and intensity of potential impacts would be comparable for these issues, and impacts would not be substantially different between the May 2014 Project and the F-B LGA.

In summary, the differences between the May 2014 Project and the F-B LGA relevant to agricultural lands are considerable in regards to permanent conversion of agricultural land to nonagricultural use, temporary agricultural land impacts, and indirect impacts to agricultural lands, with the F-B LGA being preferable to the May 2014 Project. However, the May 2014 Project would result in lesser effects on land under Williamson Act contracts.

Parks, Recreation, and Open Space

Summary of May 2014 Project Parks, Recreation, and Open Space Impacts

This section describes the environmental consequences that would likely result from the project on parks, recreation, and open space all of which vary in size, type, and function.

Methodology

The study area for parks, recreation, and open space is defined as a 1,000-foot-wide buffer on either side of the centerline, and a 0.5-mile-wide buffer around the station area and MOIF. Within this area, the distances to existing parks, recreation, and open space facilities were measured from the centerline, as shown in Table 8-A-52. Construction within 300 feet of a park, recreation, or open space resource or a school district play area and recreation facility would have the greatest impact, depending on the construction type and activity. Parks located more than 300 feet from the centerline are generally considered sufficiently distant to remain unaffected by most project activities. Parks located within 100 feet of the May 2014 Project would experience the most effects.

Table 8-A-52 Parks, Recreation, and Open Space Resources within 1,000 feet of the May 2014 Project Centerline

Resource Name	Owner	Amenities	Size	Distance from Project Centerline
Town Square	City of Shafter	Grass areas, water fountain and special events stage.	0.4 acre	575 feet
Stringham Park	City of Shafter	Grass areas, playground, picnic tables, and benches.	1 acre	910 feet
Kirchenmann Park	City of Shafter	Grass areas and baseball field.	5.5 acres	490 feet
Austin Creek Park	North Bakersfield Parks & Recreation District	Grass area.	9.3 acres	440 feet
Kern River Parkway	City of Bakersfield	32-mile linear community park with bike path, pedestrian and equestrian facilities, fishing pond, fitness par course, horseshoe pit, skate park, and picnic tables.	1,033 acres	0 feet
Yokuts Park	City of Bakersfield	Grassy field and shaded picnic area. Large playground area with equipment.	16.4 acres	840 feet
Jastro Park	City of Bakersfield	Barbeque pits, picnic tables and shelter, amphitheater, 7 tennis courts, horseshoe pits, sandlot playgrounds, restrooms, and spray park.	8.7 acres	585 feet
McMurtrey Aquatic Center	City of Bakersfield	Recreational and competition swimming pools, spray park, water slide.	3.2 acres	130 feet
Bakersfield Amtrak Station Playground	City of Bakersfield	Tot lot with playground equipment.	0.5 acre	240 feet
Mill Creek Linear Park	City of Bakersfield	1.5-mile linear community park with pedestrian path and benches.	8.0 acres	0 feet
Total within 1,000 feet of project centerline				10
Total within 300 feet of project centerline				4
Total within 100 feet of project centerline				2

Impacts

Table 8-A-52 shows the parks, recreation, and open space resources in the study area of the May 2014 Project, including within 1,000 feet of the project centerline.

As shown, there are 10 parks, recreation, and open space resources located within 1,000 feet of the May 2014 Project centerline. Of these, four are located within 300 feet of the centerline and two of those are within 100 feet of the centerline. As noted, resources within 100 feet would experience the most intense effects, largely associated with noise and visual impacts. In addition, three resources are located within 0.5 mile of the Truxtun Avenue Station: Central Park (1,278 feet), Martin Luther King Park (1,700 feet), and Potomac Park (970 feet); none of these resources are located within 300 feet of the station.

Table 8-A-53 shows the school district play areas and recreational facilities within 1,000 feet of the centerline. As noted above, existing resources located within 100 feet of the centerline would be most affected by project activities.

Table 8-A-53 School District Play Areas and Recreation Facilities within 1,000 feet of the Centerline for the May 2014 Project

Resource Name	School District	Amenities	Distance from Project Centerline
Redwood Elementary School / Richland Junior High ¹	Richland School District	Grass fields, basketball courts, playground equipment, swimming pool	770 feet
Free Will Christian Academy	Free Will Baptist Church	Grass field	650 feet
Franklin Elementary School	Bakersfield City Schools	Blacktop area with basketball courts, grass field area, and sandlot playground equipment	570 feet
Bakersfield High School	Kern High School	Football field, youth football and soccer fields, gym, tennis courts, outdoor basketball courts	460 feet
Kelly F. Blanton Education Center	Kern County Superintendent of Schools	Grass areas, benches, tables, running track, and outdoor basketball courts	320 feet
Owens Intermediate School	Bakersfield City Schools	Track, football/baseball fields, basketball courts, and tot lot	360 feet
Ramon Garza Elementary School	Bakersfield City Schools	Grass areas, benches, tables, football/soccer field, running track, outdoor basketball courts, and tot lot	845 feet
Total within 1,000 feet of project centerline			7
Total within 300 feet of project centerline			0
Total within 100 feet of project centerline			0

¹ These are two separate schools but share the same campus and considered one recreational resource.

Seven school district play areas and recreation facilities are within 1,000 feet of the May 2014 Project, including two in Shafter (Redwood Elementary School / Richland Junior High, and Free Will Christian Academy), and five in Bakersfield (Franklin Elementary, Bakersfield High School, Kelly F. Blanton Education Center, Owens Intermediate School, and Ramon Garza Elementary School). In addition, one school district play area/recreation facility is located within 0.5 mile of the Truxtun Avenue Station (Rafer Johnson Elementary School). No school district play areas are located within 300 feet of the May 2014 Project centerline or the Shafter MOIF or Bakersfield passenger station footprints.

While the May 2014 Project would not result in the permanent acquisition of any parkland or school recreation area, it would pass over the Kern River Parkway and Mill Creek Linear Park on an elevated viaduct and would pass within 100 feet of the McMurtrey Aquatic Center. The May 2014 Project would pass above areas of the Kern River Parkway and Mill Creek Linear Park used by pedestrians and recreational users. The elevated viaducts would cross perpendicularly on an elevated structure above the Kern River Parkway bike path and the portion of the Mill Creek Linear Park that straddles Kern Island Canal south of the existing BNSF right-of-way. The areas under the structures would remain open for use, but the operation of the project would result in a periodic noise exposure when trains pass by in addition to changes in visual character of the area.

Adverse effects from construction of the May 2014 Project would include noise and dust exposure. Construction of the May 2014 Project would also necessitate closures for portions of these facilities. However, access to/through the parks would be maintained or alternative access routes or temporary trail rerouting would be provided during construction and the construction activities would not disrupt the functions for which these recreational resources were designed.

Noise from construction activities would be temporary, with a duration of up to six months within the vicinity of the recreation areas. Impacts would also be reduced to a less-than-significant impact with the implementation of noise mitigation measures.

Although the parks are already subject to visual impacts consistent with the urbanized area and existing freight and passenger rail service, the May 2014 Project would change the visual character of the parks in close proximity to the alignment and this impact could not be reduced through implementation of mitigation.

Comparison between the May 2014 Project and F-B LGA

The F-B LGA would result in impacts associated with parks, recreation, and open space in similar ways to the summary provided above for the May 2014 Project. Figure 8-A-23 and Figure 8-A-24 show the parks, recreation, and open space resources in proximity to the May 2014 Project and the F-B LGA, while Table 8-A-54 provides a comparison of differentiating features for this issue area.

Table 8-A-54 Parks and Recreation Impact Comparison between the May 2014 Project and F-B LGA

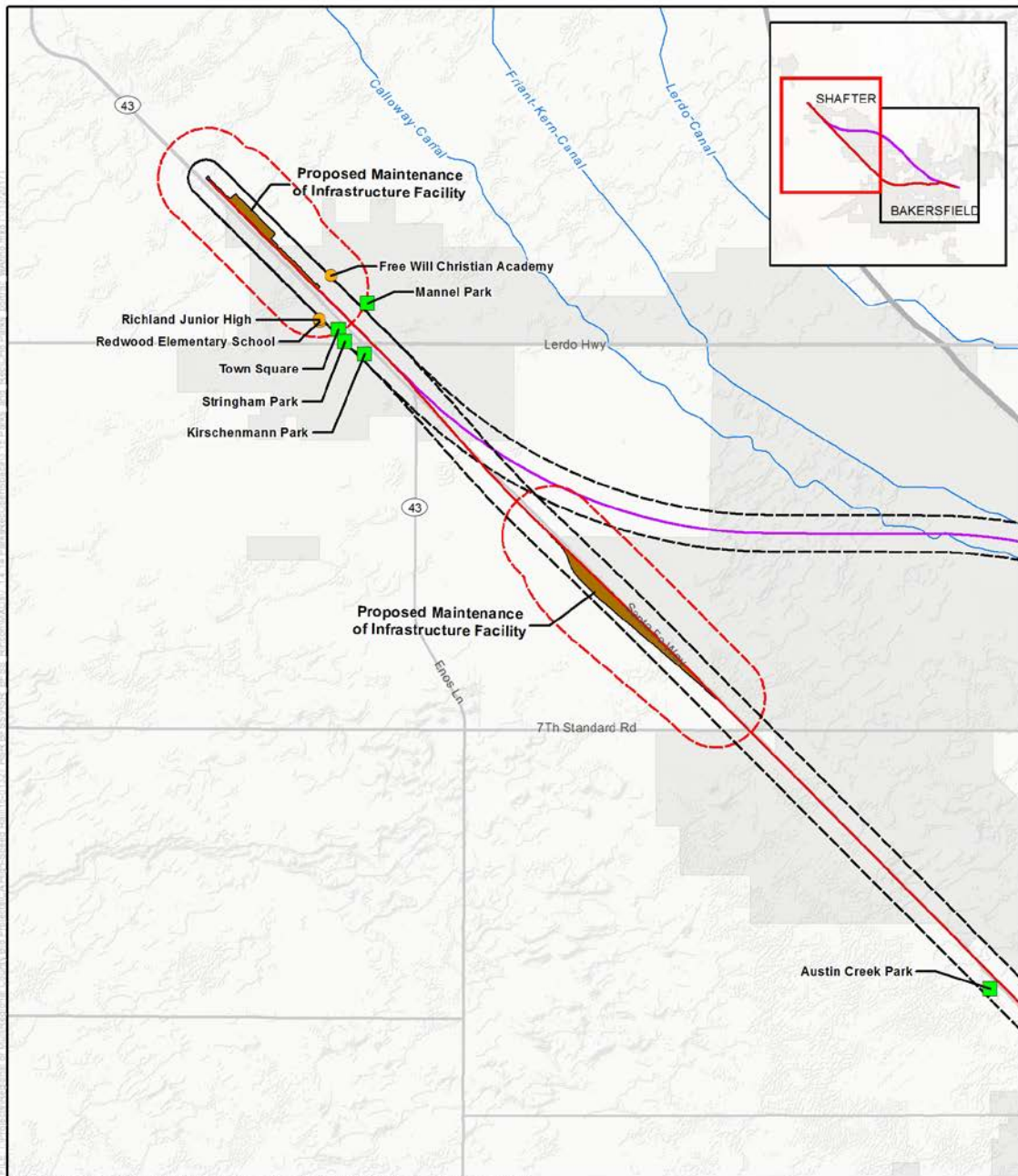
	May 2014 Project	F-B LGA
Parks in proximity to the project centerline	10 parks within 1,000 feet 4 parks within 300 feet 2 parks within 100 feet	10 parks within 1,000 feet 2 parks within 300 feet 2 parks within 100 feet
School District Play Areas and Recreation Facilities in proximity to the project centerline	8 schools within 1,000 feet 0 school within 300 feet 0 school within 100 feet	2 schools within 1,000 feet 0 schools within 300 feet 0 schools within 100 feet
Parks and District Play Areas and Recreation Facilities in proximity to the MOIF and passenger station	2 parks and 2 schools within 0.5 mile of the Shafter MOIF 3 parks and 3 schools within 0.5 mile of Truxtun Avenue Station	2 parks and 2 schools within 0.5 mile of the Shafter MOIF 6 parks and 1 school within 0.5 mile of the Bakersfield F Street Station

 = least-impact alternative
 F-B LGA = Fresno to Bakersfield Locally Generated Alternative
 MOIF = maintenance of infrastructure facility

As shown in Table 8-A-54, there would be two fewer parks located within 300 feet of the centerline of the F-B LGA than the May 2014 Project (two versus five). In addition, more parks would be located within 0.5 mile of the F-B LGA passenger station than the May 2014 Project passenger station (six versus three), but more schools would be located within 0.5 mile of the May 2014 Project passenger station than the F-B LGA passenger station (three versus one). Additionally, six more schools would be located within 1,000 feet of the May 2014 Project centerline than the F-B LGA centerline (eight versus two). This indicates that quantitatively, a fewer number of parks and open space resources (including school recreational resources) would be located within close proximity to the F-B LGA than the May 2014 Project.

As shown in Table 8-A-54, six fewer school recreation facilities are within 1,000 feet of the centerline for the proposed F-B LGA than the May 2014 Project (two versus eight); none of these school recreation facilities would be located within 300 feet of either alignment centerline. Under both the F-B LGA and the May 2014 Project, no school recreation facilities would be located within 300 feet of the proposed centerlines, MOIFs, or stations. This indicates that quantitatively,

a greater number of school recreation facilities would be located within 1,000 feet of the May 2014 Project when compared to the F-B LGA.



SOURCE: City of Bakersfield, 2015; Kern County, 2015; U.S. Census Bureau, 2014; CPAD 2015 - www.calands.org; USGS 30m Hillshade, 2015; National Hydrography Dataset USGS, 2015; ESRI, 2015; CHSRA, 2017.

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Figure 8-A-23 Shafter Area: Parks, Recreation, and Open Space Resources and School District Play Areas and Recreation Facilities in the Project Study Area

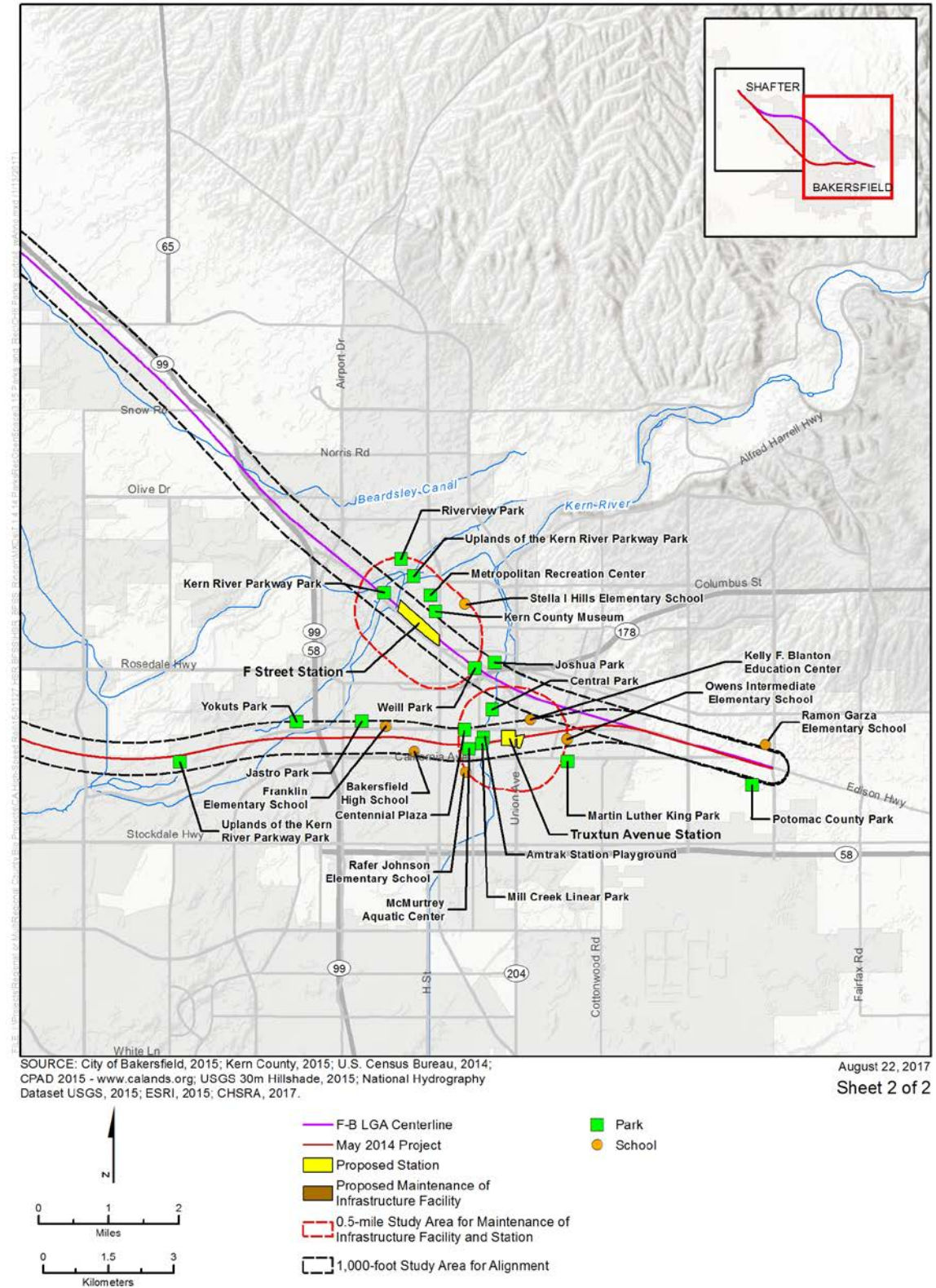


Figure 8-A-24 Bakersfield Area: Parks, Recreation, and Open Space Resources and School District Play Areas and Recreation Facilities in the Project Study Area

Based on the quantitative discussion provided, the F-B LGA appears preferable to the May 2014 Project for parks and open space resources, as well as for school recreation facilities. Overall (considering both parks/open space and school recreation resources), 6 more resources would be located within 1,000 feet of the May 2014 Project than the F-B LGA. Figure 8-A-22 and Figure 8-A-23 show the parks and recreational facilities within Shafter and Bakersfield, respectively that the May 2014 Project and F-B LGA cross. The following discussion provides a qualitative comparison of resources affected under each alternative.

- Of all park and open space resources identified within the study area (1,000 feet from the proposed centerlines), the Kern River Parkway would be affected by both the May 2014 Project and the F-B LGA, while Weill Park would only be affected by the F-B LGA, and Mill Creek Linear Park would only be affected by the May 2014 Project.
- At the Kern River Parkway, the F-B LGA and the May 2014 Project would both result in temporary construction closures, as well as permanent alterations to the visual character of the park; the F-B LGA crossing would primarily affect the existing bike path, while the May 2014 Project would affect the bike path as well as a grassy area with trees that provides the entryway to the Subpark D parking lot. The nature and extent of potential impacts at the Kern River Parkway would be more intense under the May 2014 Project, due to the visual effects associated with both the bike path and the entryway to the Subpark D parking lot.
- At Weill Park, the F-B LGA would introduce noise, vibration, and visual impacts that would not occur under the May 2014 Project. Weill Park is less than two acres in size, consisting of grassy fields, and is not adjacent to residences. Additionally, the proposed F Street Station would include new park space, which would at least partially offset the parkland that would be acquired for construction of the F-B LGA and would provide new parkland in generally the same area as the parkland being acquired. Weill Park would not be affected by the May 2014 Project. Therefore, although impacts to Weill Park would be more intense under the F-B LGA, this is a small park that is considered partially replaced by the new park space included at the proposed F Street Station.
- At Mill Creek Linear Park, the May 2014 Project would introduce a new 90-foot-wide maintenance easement to accommodate the placement of permanent footings for columns that would support the guideway through the portion of the park that straddles Kern Island Canal south of the existing BNSF right-of-way. Mill Creek Linear Park is a discontinuous resource of approximately eight acres in total size. Mill Creek Linear Park would not be affected by the F-B LGA. Therefore, the nature and extent of impacts at Mill Creek Linear Park would be more intense under the May 2014 Project.

The quantitative comparison shown in Table 8-A-54 and qualitative comparison provided in the text indicate that the F-B LGA is preferable to the May 2014 Project. The qualitative comparison provided in the discussion above indicates that the F-B LGA and the May 2014 Project are relatively comparable; however, the F-B LGA is considered preferable due to the lower nature and intensity of impacts to specific resources. Under either alternative, the proposed mitigation requires alternate pedestrian and bicycle access for trails altered during construction and the payment of fees for the acquisition of park property for both alternatives. Overall, potential impacts to parks, recreation, and open space would be less under the F-B LGA than the May 2014 Project due to the fewer number of parks and schools located in the study area, as well as the nature and intensity of anticipated impacts.

Aesthetics and Visual Resources

Summary of May 2014 Project Aesthetics and Visual Resources Impacts

This section compares the impacts of the May 2014 Project and the F-B LGA on aesthetics and visual resources. The Fresno to Bakersfield Section: Aesthetics and Visual Resources Technical Report (Authority and FRA 2011e) includes photographs of existing conditions and simulated views at key locations for the May 2014 Project, and Section 3.16, Aesthetics and Visual Resources of this Draft Supplemental EIR/EIS provides similar information for the F-B LGA.

Methodology

For both the May 2014 Project and the F-B LGA, the assessment methodology for aesthetics and visual resources was conducted according to the Federal Highway Administration Visual Impact Assessment methodology (Federal Highway Administration 1988), particularly as applied under guidelines of the California Department of Transportation Standard Environmental Reference, Chapter 27, Visual and Aesthetics Review (California Department of Transportation 2007), with adaptations for this study by the Authority.

Section 3.16.2 of this Draft Supplemental EIR/EIS explains the methodology for determining the visual resource study area, selecting landscape units and key viewpoints, and assessing visual character and quality. Figure 8-A-25 and Figure 8-A-26 show the landscape units within metropolitan Bakersfield for the May 2014 Project and the F-B LGA, respectively. Although these landscape units differ geographically, the same assessment methodology was applied to evaluate visual impacts within them.

Impacts

Construction Impacts

Construction of the May 2014 Project would result in aesthetic impacts on scenic vistas, visual quality, and light and glare. The temporary decrease in visual quality of a scenic vista of the Kern River and Green Mountains from the Kern River Parkway would result in a less-than-significant impact under CEQA. Clearing, earthmoving, and construction of project facilities also would introduce new lines, forms, and colors that reduce the visual quality of rural landscapes. This reduction in visual quality would result in a potentially significant impact under CEQA.

The May 2014 Project would produce aesthetic impacts by introducing new sources of light and glare. New sources of temporary night lighting during construction would adversely affect nighttime views, but aesthetic effects from lighting would be localized and temporary. Mitigation to shield and direct lighting downward would reduce impacts to a less-than-significant level.

Visual Quality Impacts

In the San Joaquin Valley Rural/Agricultural landscape unit, the May 2014 Project would reduce visual quality near rural residents especially where the elevated viaduct would be located within 0.25 mile of residences and where elevated segments would be located within 0.5 mile of residences. Impacts at residences not adjacent to agri-industrial facilities that are located within 0.5 mile of the elevated viaduct would be significant.

In the Rural Town landscape units, nearby residents, park users, and visitors to the central business districts of Shafter and other towns would experience a decline in visual quality from moderate to moderately low or low. In addition, at 7th Standard Road in Shafter, the at-grade alignment would degrade the visual quality of adjacent rural residences, resulting in a significant impact.

In the Rosedale/Greenacres landscape unit, where residents were determined to have a moderately high viewer response, the elevated viaduct would create very strong declines in intactness and unity at a foreground distance from residences. The May 2014 Project would degrade the visual quality of suburban neighborhoods from moderate to moderately low, creating a significant impact under CEQA. In addition, sound barriers installed next to at-grade segments of the alignment would have a less-than-significant impact under CEQA.



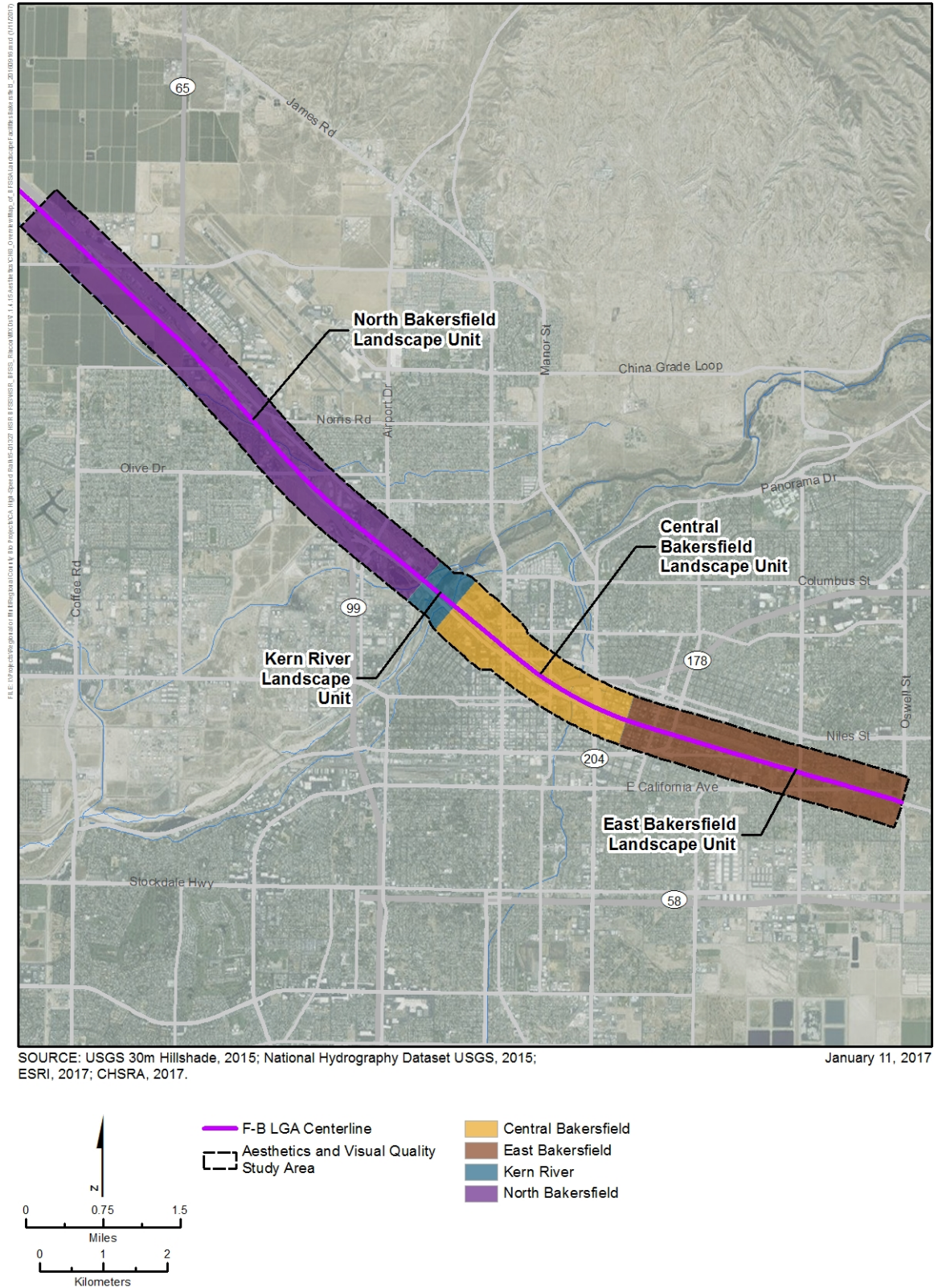


Figure 8-A-26 Landscape Units for the F-B LGA

At the Kern River Parkway, the May 2014 Project would require a prominent river crossing with steel railroad truss structures and large supporting concrete bents. In the context of high viewer responses at the Kern River Parkway, this would result in a significant impact under CEQA. In the Central Bakersfield landscape unit, the May 2014 Project alignment would pass within 150 feet of residences on 16th Street to the north and adjacent to residences to the south across 16th Street. For those living in these residences, the elevated viaduct, removal of existing businesses on the street, right-of-way-clearing, and the introduction of security fencing would decrease visual quality, resulting in a significant impact. Due to the May 2014 Project's distance from Bakersfield High School, impacts on school viewers would be negligible. In downtown Bakersfield, the HSR station and associated streetscape development would improve visual quality, resulting in a beneficial effect for the following reasons:

- The HSR station would be designed with a distinctive and potentially iconic architectural form to create a beneficial change in visual character when viewed from adjacent locations in the Central Bakersfield landscape unit. By introducing a building with distinctive and attractive architecture, the station would substantially enhance the area's vividness as compared to existing commercial development on-site.
- Pursuant to Mitigation Measure AVR-MM#2a, the Authority would work closely with the City of Bakersfield to develop and refine the architecture, site design, and landscape treatments for the station and vicinity in order to enhance the area's character through coherent and unified design and to include features that provide interest and integrate visually with the context of nearby commercial and governmental uses.
- The HSR station would also be expected to have beneficial indirect effects on visual quality in surrounding areas. As discussed on page 3.16-68 in Section 3.16 of the Fresno to Bakersfield Section Final EIR/EIS, the HSR station would increase the potential for economic incentives through new development and redevelopment in nearby areas. This would likely influence development patterns near the station and could result in new project and urban design improvements that would improve the visual character and quality of these areas over time.

In East Bakersfield, the alignment would run adjacent to residences located to the east of Union Avenue near Truxtun Avenue. Adverse effects where residences adjoin the right-of-way would be significant under CEQA.

School Impacts

In general, the May 2014 Project could adversely affect viewers at schools located within a 0.25-mile near-foreground distance of the alignment. At distances greater than approximately 0.25 mile, even major project structures would be likely to cause little change to visual quality and have little visual impact. Within the 0.25-mile zone, potential impacts would depend highly on site-specific factors, such as the visibility of the guideway and the sensitivity of viewers at affected viewpoints. At Warriors for Christ Academy in Rosedale, the May 2014 Project would have a significant impact under CEQA. At Freewill Christian Academy in Shafter, and Owens Middle School, Bethel Christian School, and Ramon Garza Elementary School/Sierra Middle School in Bakersfield, the May 2014 Project would have less-than-significant impacts under CEQA.

Comparison between the May 2014 Project and F-B LGA

Construction Impacts

Overall aesthetic impacts during construction would be the same for both the F-B LGA and the May 2014 Project. Although the F-B LGA would cross the Kern River Parkway Bike Trail at a location farther to the east, HSR construction in this area would still temporarily obstruct scenic views of natural vegetation and landforms, reducing visual quality from moderately high to moderate. Impacts to scenic vistas would be less-than-significant under CEQA. Similarly, construction of both the F-B LGA and the May 2014 Project would result in a significant impact under CEQA on visual quality. There would be a significant impact under CEQA from light and glare.

Visual Quality Impacts

Table 8-A-55 compares the most adverse impacts to visual quality by landscape unit for the May 2014 Project and the F-B LGA.

Table 8-A-55 Aesthetic Impact Comparison between the May 2014 Project and F-B LGA

Landscape Unit	May 2014 Project	F-B LGA
Rural San Joaquin Valley ¹	CEQA: Significant	CEQA: Significant
Shafter Town ²	CEQA: Significant	CEQA: Significant
Rosedale/Greenacres	CEQA: Significant	N/A
North Bakersfield	N/A	CEQA: Significant
Kern River	CEQA: Significant	CEQA: Significant
Central Bakersfield	CEQA: Significant	CEQA: Less than significant
East Bakersfield	CEQA: Significant	CEQA: Significant

¹ This landscape unit is named San Joaquin Valley/Rural Agricultural in the Fresno to Bakersfield Section Final EIR/EIS.

² The Shafter Town landscape unit is part of the larger group of Rural Town landscape units in the Fresno to Bakersfield Section Final EIR/EIS.

CEQA = California Environmental Quality Act F-B LGA = Fresno to Bakersfield Locally Generated Alternative

EIR = environmental impact report N/A = not applicable

EIS = environmental impact statement

As shown in Table 8-A-55, overall impacts to visual quality in the Shafter Town landscape unit would be significant under CEQA under both alternatives. Site-specific impacts in this landscape unit would vary. Because the F-B LGA would shift the HSR elevated viaduct in rural Shafter eastward toward SR 99, it would not pass near rural residents at the intersection of 7th Standard Road and Santa Fe Way and therefore, the F-B LGA would avoid the May 2014 Project's adverse effect to the residents.

The eastward shift of the F-B LGA would also avoid the May 2014 Project's impacts to single-family residential neighborhoods in the Rosedale/Greenacres landscape unit. At-grade and elevated portions of the May 2014 Project would run adjacent to more than one hundred residences in Rosedale/Greenacres and within 500 feet of hundreds more residences. The elevated viaduct would be a prominent foreground feature up to 80 feet high in this area. Figure 8-A-27 and Figure 8-A-28 show photos of representative residential streets adjacent to the May 2014 Project's alignment in Rosedale/Greenacres.

Instead of crossing the Rosedale/Greenacres landscape unit, the F-B LGA would cross the North Bakersfield landscape unit along SR 99. The elevated viaduct would pass within approximately 300 feet of single- and multi-family residences along Norris Road, contrasting with the residential character of the area and reducing visual intactness and unity. Photo 1 in Figure 8-A-29 shows multi-family residences on Norris Road, facing eastward toward the alignment. Because visual quality would decline one level from moderately-low to low in an area with high viewer sensitivity, the F-B LGA would have a significant impact under CEQA. When effects on the Rosedale/Greenacres landscape unit and on the North Bakersfield landscape unit are compared, the number of receptors affected would be substantially less with the F-B LGA than under the May 2014 Project.

Whereas the May 2014 Project would cross an extensive residential area in Rosedale/Greenacres, the F-B LGA would pass through industrial and commercial areas that lack highly sensitive viewers in the North Bakersfield landscape unit. The one exception is in the Norris Road area shown in Figure 8-A-29. Photo 2 in Figure 8-A-29 shows a representative commercial site in North Bakersfield, southwest of the interchange of Olive Drive and SR 99. Figure 8-A-30 shows typical industrial sites near the intersection of Norris and Snow Roads in North Bakersfield.



Photo 1: Single-family residences on Piedmont Avenue, looking west toward May 2014 Project alignment approximately 550 feet away.



Photo 2: Single-family residences on Light Lane at Compass Avenue, looking northwest toward May 2014 Project alignment at a distance of approximately 800 feet.

Figure 8-A-27 Rosedale/Greenacres Landscape Unit: Representative Residential Visual Receptors



Photo 1: Mobile homes in the Lazy H Mobile Ranch community, looking east toward May 2014 Project alignment at a distance of approximately 350 feet.



Photo 2: Single-family houses on Palm Avenue, looking northeast toward May 2014 Project alignment at a distance of approximately 300 feet.

Figure 8-A-28 Rosedale/Greenacres Landscape Unit: Representative Residential Visual Receptors



Photo 1: Multi-family residences on Norris Road, looking east toward Fresno to Bakersfield Locally Generated Alternative at a distance of approximately 500 feet.



Photo 2: Fresno to Bakersfield Locally Generated Alternative at commercial site, looking southeast from Olive Drive overcrossing of State Route 99.

Figure 8-A-29 North Bakersfield Landscape Unit: Representative Residential and Commercial Visual Receptors



Photo 1: Fresno to Bakersfield Locally Generated Alternative at industrial site, looking northwest from Norris and Snow Roads.



Photo 2: Fresno to Bakersfield Locally Generated Alternative at industrial sites south of Norris and Snow Roads.

Figure 8-A-30 North Bakersfield Landscape Unit: Representative Industrial Visual Receptors

As evidenced by the photographs in Figure 8-A-27 through Figure 8-A-30, the May 2014 Project would affect far more residents in Rosedale/Greenacres than would the F-B LGA in North Bakersfield. Therefore, considering these landscape units holistically, the F-B LGA would reduce overall impacts on visual quality from the perspective of residents.

In the Central Bakersfield landscape unit, the F-B LGA would avoid visual impacts in downtown Bakersfield by realigning the HSR elevated viaduct eastward between SR 99 and the Union Pacific Railroad tracks. Because of this realignment, the F-B LGA would not result in an adverse effect from the introduction of an elevated viaduct adjacent to residents on 16th Street that the May 2014 Project would cause. While the location of the HSR station would result in beneficial impacts from the station building itself, associated streetscape improvements and general revitalization in those areas, the existing visual character surrounding the F Street Station would benefit to a greater degree than at the Truxtun Avenue Station.

While the visual character of the F Street Station area is generally industrial in nature, page 3.16-47 of the Fresno to Bakersfield Section Final EIR/EIS describes the visual character of the Truxtun Avenue and Chester Avenue streetscapes near the proposed station site as having moderately high visual quality, influenced by the presence of landscaped medians and distinctive early 20th Century high rise buildings. At Garces Circle, the F-B LGA would introduce an elevated viaduct that intensifies the area's urban character from the perspective of commuters. This visual change at Garces Circle would result in a less-than-significant impact under CEQA.

In the East Bakersfield landscape unit, the F-B LGA would avoid impacts to residences while introducing impacts to a commercial district. The May 2014 Project would have a significant impact under CEQA at adjacent residences east of Union Avenue near Owens Middle School. Instead of impacting these residences, the F-B LGA would introduce an elevated viaduct on straddle bents over Sumner Street near Baker Street, degrading the visual quality of this commercial corridor. Visual impacts would be significant under CEQA. Since the number of sensitive viewers in the commercial corridor would be fewer than in the residential area, the comparable impacts would nevertheless be less desirable under the May 2014 Project than under the F-B LGA.

Both the May 2014 Project and F-B LGA would have approximately the same elevated alignment in the vicinity of Edison Highway. Visual impacts in this area would not be substantially different between the May 2014 Project and F-B LGA.

In the Shafter Town landscape unit, while the May 2014 Project would involve construction of the HSR guideway and associated roadway alterations, the F-B LGA would also elevate the existing at-grade BNSF railroad to a raised embankment with a retaining wall. The BNSF embankment would introduce an additional elevated feature in Shafter, incrementally increasing the intensity of the area's urban character from the perspective of residents and visitors to the downtown center. Both the F-B LGA and May 2014 Project would involve construction of an MOIF in an agricultural area to provide equipment, materials, and replacement parts for the HSR System. The MOIF associated with the F-B LGA would alter the rural visual character of northern Shafter. However, overall visual impacts in the Shafter Town landscape unit would not be substantially different between the May 2014 Project and F-B LGA. These impacts would be significant under CEQA for both the May 2014 Project and F-B LGA.

School Impacts

As with the May 2014 Project, the F-B LGA could adversely affect viewers at schools located within a 0.25-mile near-foreground distance of the alignment. By realigning the HSR elevated viaduct in metropolitan Bakersfield, the F-B LGA would avoid the May 2014 Project's significant impact under CEQA on the Warriors for Christ Academy in Rosedale, as well as its impact on Owens Middle School in Bakersfield. The F-B LGA would be located farther from Bethel Christian School in Bakersfield than the May 2014 Project. However, the F-B LGA would introduce an elevated viaduct within 0.08 mile of Valley Oaks Charter School on Chester Avenue, causing a significant impact under CEQA.

Overall Impacts

The F-B LGA would avoid the May 2014 Project's impacts on visual quality in Rosedale/Greenacres, introduce impacts in North Bakersfield, and reduce impacts in Central Bakersfield. By shifting the HSR alignment eastward to primarily commercial and industrial areas in North and Central Bakersfield, the F-B LGA would substantially reduce the number of adversely affected residential uses. Aesthetic impacts during construction and on schools would be similar. Overall, aesthetic impacts associated with the May 2014 Project and the F-B LGA would be comparable with regards to the impact determinations on the individual landscape units; however, the F-B LGA would be considered preferable based on the reduced impacts to residential uses.

Cultural Resources

Summary of May 2014 Project Alternative Cultural Resources Impacts

This section describes known and potential impacts on cultural resources. Cultural resources include prehistoric archaeological sites, historic-era archaeological sites, traditional cultural properties (TCP), and historic buildings, structures, objects, landscapes, districts, and linear features. The purpose of this section is to describe the potential impacts on cultural resources as a result of the May 2014 Project.

Methodology

Background research and field surveys were conducted to identify archaeological and built environment resources within the May 2014 Project's area of potential effect (APE). The results of this investigation are described in Fresno to Bakersfield Project Section Historic Property Survey Report (Authority and FRA 2012b) and Supplemental Historic Property Survey Report (Authority and FRA 2013a and 2013b) and are summarized below.

The APE is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist (Code of Federal Regulations Title 36, Section 800.16[d]). Two distinct APEs were delineated for the purposes of this undertaking: an Archaeological APE and a Built Environment APE, as defined in detail below:

- **Archaeological APE:** The APE for archaeological properties is the area of ground proposed to be disturbed during construction of the undertaking, including grading, cut-and-fill, easements, staging areas, utility relocation, and biological mitigation areas (i.e., the project footprint).
- **Built Environment APE:** The Built Environment APE includes all legal parcels intersected by the proposed HSR right-of-way for all alternatives, including construction of proposed ancillary features (such as grade separations or maintenance facilities) and construction staging areas.

Impacts

Identified Archaeological Resources

The original Archaeological Survey Report and supplemental Archaeological Survey Reports (Authority and FRA 2011, 2013a, and 2013b) identified two archaeological resources within the Archaeological APE south of Shafter (Table 8-A-56). Of these two resources, one (CA-KER-3072) was exempt from evaluation per the Section 106 Programmatic Agreement and is not considered a historic property or historical resource for purposes of the HSR Project. More research is required to determine if the other resource (CA-KER-2507) qualifies as a historic property or historical resource, as defined in conditions set forth in the Fresno to Bakersfield Section Archaeological Treatment Plan (Authority and FRA 2014d). However, per Stipulation VI.C.1 of the Section 106 Programmatic Agreement and for purposes of this comparison, the resource is presumed to qualify as a historic property (and, as such, a historical resource).

Table 8-A-56 Archaeological Resources: May 2014 Project

Primary Number/ID	Trinomial	Site Type	Description
8.0-A P-15-002507	9.0-A CA-KER-2507	10.0-A Prehistoric archaeological site	11.0-A Ethnographic village site
12.0-A P-15-003072*	13.0-A CA-KER-3072	14.0-A Prehistoric archaeological site	15.0-A Lithic scatter

*This resource is exempt from evaluation per the Section 106 Programmatic Agreement.

Unidentified Archaeological Resources

Most of the May 2014 Project is aligned on landforms that contain very low to moderate sensitivity for encountering buried archaeological deposits; however, the likelihood is very high for encountering buried archaeological deposits along both sides of the Kern River (Authority and FRA 2014d).

Traditional Cultural Properties

TCPs can be defined generally as resources that are eligible for inclusion in the National Register of Historic Places because of their association with cultural practices or beliefs of a living community. One TCP was identified within the May 2014 Project's APE: Sociedad Juarez Mutualista Mexicana TCP. Mitigation measures presented in the Fresno to Bakersfield Section Memorandum of Agreement and further defined in the Built Environment Treatment Plan (Authority and FRA 2014) would ensure that no adverse effects would occur to this TCP from the construction or operation of the May 2014 Project.

Tribal Cultural Resources

Tribal Cultural Resources are defined as a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American tribe, which may include non-unique archaeological resources previously subject to limited review under CEQA. Assembly Bill 52 adds Tribal Cultural Resources to the topic of cultural resources in the CEQA checklist. It requires a lead agency to consult directly with Native Americans on a government-to-government level early in the environmental review process. During consultation, Tribal Cultural Resources will be identified, project impacts will be determined, and feasible mitigation measures will be developed.

For the HSR Project, the FRA initiated government-to-government consultation to all federally-recognized Native American tribes that could be affected by the undertakings. Tribal Representatives were contacted by letter and by telephone. The Authority sent letters to all non-federally-recognized Native American groups to initiate consultation. Tribal Representatives from these groups were also contacted by telephone. No Tribal Cultural Resources were identified within the APE.

Historic Architectural Resources

The May 2014 Project would have an indirect adverse visual effect on one Section 106 historic property and substantial adverse changes to four CEQA historical resources south of Shafter (Table 8-A-57). The substantial adverse changes would include physical alteration and, to one resource, demolition; as well as indirect visual changes to the immediate surroundings of the other resources, and therefore would be significant impacts under CEQA.

Table 8-A-57 Historic Architectural Resources: May 2014 Project

APN	Resource Name / Address	City/County	Description	Effect Finding
00643002, 00643003	Stark/Spencer Residence	Bakersfield, Kern	1898 residence	Adverse Effect - Indirect
00639102	1401-1409 K St.	Bakersfield, Kern	1913 residences	Substantial Adverse Change - Direct
00645002	1323 L St.	Bakersfield, Kern	Ca. 1912-1920 residence	Substantial Adverse Change - Indirect
00644026	1330 L St.	Bakersfield, Kern	1920 residence	Substantial Adverse Change - Indirect
00644025	1326 L St.	Bakersfield, Kern	1920 residence	Substantial Adverse Change - Indirect

¹ This resource is a historic property under Section 106 and historical resource under California Environmental Quality Act.
APN = Assessor's Parcel Number

Overall Impacts

The May 2014 Project has the potential to cause impacts to historic properties and historical resources. Mitigation for these impacts includes implementing the conditions set forth in the Built Environment Treatment Plan for historic architectural resources and treatment set forth for archaeological site CA-KER-2507 in the Archaeological Treatment Plan. These conditions and measures were developed in coordination with the California State Historic Preservation Officer, and complied with the mitigation framework outlined in the programmatic agreement and memorandum of agreement for cultural resources protection that was developed for this project. Even with mitigation, there would be physical impacts, such as demolition or incompatible alteration to historic properties eligible for the National Register of Historic Places and historical resources defined under Section 15064.5 of the CEQA Guidelines. These direct impacts would be significant because loss of the historic property from its local context or a modification that affects the property's integrity would render the historic property incapable of conveying its significance. This would be a significant impact under CEQA.

The May 2014 Project could result in damage to archaeological resources. Additionally, the construction-related cumulative impact of the project and other past, present, and reasonably foreseeable projects on cultural resources could result in significant impacts and the project contribution to this impact would be cumulatively considerable under CEQA.

Operations-related impacts from the May 2014 Project and other past, present, and reasonably foreseeable projects could result in indirect significant cumulative impacts to historic architectural resources; however, the HSR project is not anticipated to result in such impacts and, if later identified, would reduce any such impacts through the Built Environment Treatment Plan. The HSR's contribution would not be significant and would not be cumulatively considerable under CEQA.

Comparison between the May 2014 Project and F-B LGA

Table 8-A-58 compares the adverse cultural resources impacts for the May 2014 Project and the F-B LGA.

Table 8-A-58 Cultural Resources Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Identified Archaeological Resources	One presumed NRHP-eligible archaeological resource identified within the APE.	No archaeological resources identified within the APE.
Unidentified Archaeological Resources	Most of the Project is very low to moderate sensitivity for archaeological deposits; however, the likelihood is very high along both sides of the Kern River.	Most of the Project is very low to moderate sensitivity for archaeological deposits; however, the likelihood is very high along both sides of the Kern River.
Traditional Cultural Properties	The May 2014 Project would result in no direct adverse effects or indirect adverse visual effect on the Sociedad Juarez Mutualista Mexicana TCP with implementation of the conditions described in the Fresno to Bakersfield Section MOA to avoid and minimize potential adverse effects.	The F-B LGA would result in no direct adverse effects or indirect adverse effects on the Noriega Hotel as a TCP.
Tribal Cultural Resources	No TCRs were identified within the APE.	No TCRs were identified within the APE.
Historic Architectural Resources	The May 2014 Project would have an indirect adverse visual effect on one Section 106 historic property and substantial adverse changes to four CEQA historical resources.	The F-B LGA would result in indirect adverse visual effects on four ¹ historic properties (also considered CEQA historical resources) after mitigation.

 = least-impact alternative

¹ Including the Noriega Hotel, which is also considered a TCP.

APE = area of potential effect

CEQA = California Environmental Quality Act

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

MOA = memorandum of agreement

NRHP = National Register of Historic Places

TCP = traditional cultural property

TCR = Tribal Cultural Resources

As shown in Table 8-A-58, the F-B LGA would have no impacts to any known archaeological sites but would result in indirect visual effects on four historic architectural resources, while the May 2014 Project would potentially have a direct adverse effect to archaeological site CA-KER-2507. Overall, impacts to cultural resources associated with the May 2014 Project and the F-B LGA would be comparable with regards to the impact determinations on unidentified archaeological resources and tribal cultural resources.

Regional Growth

Summary of May 2014 Project Regional Growth Impacts

The May 2014 Project could result in impacts associated with short- and long-term growth in the region. Construction of the May 2014 Project would result in new, near-term construction-related employment that may draw additional workers to the region, thereby increasing the population. Operation of the project also has the potential to induce growth in the region as a result of new direct jobs to operate and maintain the HSR project, indirect and induced jobs created to support new operations workers, and additional jobs created as a result of the improved connectivity of the region to the rest of the state, which is anticipated to increase the competitiveness of the region's industries and overall growth in the regional economy.

Methodology

The methodology for calculating construction period short-term job creation considers construction spending for the segment of the May 2014 Project that coincides with the study area for the F-B LGA to provide a basis of comparison between the two alternatives. The methodology used to calculate the anticipated increase in short-term jobs is described in Section 5.1.2, Project Job Creation – Short-Term Jobs, of the F-B CIA (Authority and FRA 2017a).

Because long-term jobs would be generated based on operation of the HSR System as a whole, this analysis considers long-term jobs that would be generated in the region, rather than just considering those that would be associated with the study area. These long-term employment effects were estimated in the growth-inducement study conducted by Cambridge Systematics, Inc., in 2010, which informs this analysis.

This analysis discusses the potential growth-inducing effects of the short- and long-term jobs that would be created as a result of construction and operation of the HSR System. This evaluation is based on employment information available from the U.S. Census Bureau (U.S. Census Bureau 2013).

Impacts

Short-Term Jobs Associated with Project Construction

The approximate number of direct one-year full-time job equivalents that would be created in Kern County as a result of May 2014 Project construction spending over the entire construction period would be 6,233 (Table 8-A-59). The total number of indirect and induced one-year full-time job equivalents that would be created over this period would be approximately 5,647. The total number of one-year full-time job equivalents that would be created in the county over the entire construction period, including direct, indirect, and induced jobs, would be approximately 11,880. During the peak construction year, an additional 4,204 jobs would be created in Kern County, 2,206 of which would be direct.

Annual average unemployment in Kern County was 13.7 percent in 2013, with approximately 85,300 persons out of work (U.S. Census Bureau 2013). As with any large construction project, some influx of population is expected as workers arrive in the area seeking jobs. Given the high level of unemployment in the vicinity of the study area and the large number of construction workers currently on the job market, however, the majority of these new construction jobs would be filled by current residents in the county who possess the necessary construction skills. As a result, construction of additional community facilities would not be required to support this workforce.

Table 8-A-59 Employment Impacts during Construction of May 2014 Project

Year	Direct Employment (annual job years)	Indirect and Induced Employment (annual job years)	Total New Employment (annual job years)
Year 1	350	317	667
Year 2	1,052	953	2,005
Year 3	1,713	1,552	3,265
Year 4	1,713	1,552	3,265
Year 5	1,052	953	2,005
Year 6	350	317	667
Total	6,230	5,644	11,874

Source: California High-Speed Rail Authority and Federal Railroad Administration 2017a

Long-Term Jobs Associated with Project Operation

Long-term job creation during the operation phase of the HSR project would be similar for all HSR project alternatives, including the May 2014 Project. This is because these effects are a result of the operation of the entire HSR System, and are, therefore, regional in nature rather than specific to one alternative.

Operation of the HSR System, including the May 2014 Project, would generate a total of approximately 47,500 jobs in the four-county region by 2035, approximately 17,200 of which would be in Kern County (Cambridge Systematics Inc. 2010). These jobs include direct jobs to

operate and maintain the HSR project, indirect and induced jobs to support new operations workers, and additional jobs created as a result of the improved connectivity of the region and Kern County to the rest of the state. Based on the most recently available 2035 employment projections, which represent employment under the No Project Alternative, these jobs would represent a 4.0 percent increase above the 2035 projections in both the region and the county (Cambridge Systematics Inc. 2010; Kern Council of Governments 2015; Fresno Council of Governments 2012). Given that the unemployment rates in the region and the county have historically been higher than those of the state (refer to Table 3.18-5 in Section 3.18, Regional Growth), the workforce adequate to support the number of jobs created by the HSR project currently exists in the region and Kern County. Jobs created directly and indirectly by operation of the HSR project would, therefore, provide employment opportunities for residents in the area and would not induce substantial growth beyond that already projected for the region and Kern County.

Comparison between the May 2014 Project and the F-B LGA

Short-Term Jobs Associated with Project Construction

The relative difference in job creation in between the May 2014 Project and F-B LGA is shown in Table 8-A-60. Positive values indicate that the May 2014 Project would create more employment opportunities than the F-B LGA.

Table 8-A-60 Comparison of Regional Employment Creation under the F-B LGA, relative to the May 2014 Project (in one-year full-time job equivalents)

Employment	2019	2020	2021	2022	2023	2024	Total
Direct	25	75	122	122	75	25	444
Indirect and Induced	23	68	110	110	68	23	402
Total	48	143	232	232	143	48	846

Source: Authority and FRA 2017a

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Both the May 2014 Project and F-B LGA would result in an increase in construction jobs in Kern County as a result of HSR project construction spending. In total, the May 2014 Project would result in 846 more one-year full-time job equivalents, with 444 of them being direct and 402 being indirect or induced (Table 8-A-60). These jobs are expected to be filled predominantly by local residents, and would not result in an increase in the demand for public services and associated requirements for new or altered government and public facilities.

Long-Term Jobs Associated with Project Operation

The May 2014 Project and F-B LGA would both result in approximately the same length of railroad tracks that would require maintenance, and one train station and one maintenance of infrastructure facility that would require operation and maintenance. Therefore, the number of direct, indirect, and induced jobs generated by operation of the system would be the same for both of the alternatives. The population growth and associated land use consumption that would occur as a result of the HSR System would also be the same for both of the alternatives. As discussed above, due to high unemployment in the region and Kern County, jobs created directly and indirectly by operation of the HSR System would provide employment opportunities for residents in the area and would not induce substantial growth beyond that already projected for the region and county.

Overall Impacts

The May 2014 Project and F-B LGA would have similar impacts to regional growth. Although the May 2014 Project would result in the creation of approximately 844 additional one-year full-time job equivalents in the region and Kern County during the construction period, these jobs would generally be filled by local residents and would not result in a substantial increase in the

population. In terms of long-term jobs and associated growth, both the May 2014 Project and F-B LGA would result in the same level of increase.

Cumulative Impacts

Summary of May 2014 Project Cumulative Impacts

This section presents an analysis of the cumulative effects of implementing the May 2014 Project in combination with other past, present, and reasonably foreseeable future projects.

Methodology

The cumulative impacts discussion for each resource area considers the resource-specific study area, the existing condition of the resource, concurrent construction activities, cumulative effects with the project, and the contribution of the May 2014 Project to those cumulative effects.

For purposes of this analysis, reasonably foreseeable future projects are defined as those that are likely to occur within the 2035 planning horizon for the HSR project and that would contribute to a cumulative impact on a particular resource. Applicable projected growth trends (projections) contained in adopted local, regional, or statewide plans, including general plans and regional transportation plans were also used.

Impacts

Table 8-A-61 summarizes the May 2014 Project's contribution to potential cumulative impacts during construction and operation.

Table 8-A-61 Summary of Cumulative Impacts for the May 2014 Project

Resource	Impact from Construction	Impact from Operations
Transportation	Not Significant	Beneficial (regional level), Not Significant (local level)
Air Quality and Global Climate Change	Not Significant	Beneficial
Noise and Vibration	Significant (Cumulatively Considerable)	Significant (Cumulatively Considerable)
Electromagnetic Fields and Electromagnetic Interference	No Impact	No Impact
Public Utilities	Not Significant	No Impact
Energy	Not Significant	Not Significant
Water Infrastructure and Resources	No Impact	No Impact
Solid Waste/ Recycling Facilities	Not Significant	Not Significant
Biological Resources	Not Significant	Not Significant
Hydrology and Water Resources	Not Significant	Not Significant
Geology, Soils, and Seismicity	Not Significant	Not Significant
Hazardous Materials and Wastes	Not Significant	Not Significant
Safety and Security	Not Significant	Not Significant / Beneficial (travel safety)
Socioeconomics, Communities, and Environmental Justice	Economic and social changes resulting from the project are not treated as significant effects on the environment under CEQA per Section 15064(e) of the CEQA Guidelines; therefore, CEQA determinations are not provided for social and economic impacts. However, CEQA determinations are provided for division and/or disruption of communities (see below).	
Division and/or Disruption of Community	Significant (Cumulatively Considerable)	Significant (Cumulatively Considerable)
Station Planning, Land Use, and Development	Not Significant	Significant (Cumulatively Considerable)
Agricultural Lands	Not Significant	Significant (Cumulatively Considerable)
Parks, Recreation, and Open Space	Not Significant	Not Significant
Aesthetics and Visual Quality	Significant (Cumulatively Considerable) Bakersfield area	Significant (Cumulatively Considerable) Kern County/ Bakersfield area
Cultural and Paleontological Resources	Significant (Cumulatively Considerable)	Significant (Not Cumulatively Considerable) Indirect impacts to historic architectural resources
Section 4(f) and Section 6(f)	FRA is required to conduct an analysis of potential impacts to Section 4(f) and Section 6(f) resources and prepares this analysis as part of the NEPA process; however, since there are no CEQA significance criteria for environmental justice, no CEQA determinations are provided for Section 4(f) and Section 6(f) resources.	

Source: Authority and FRA 2014b
CEQA = California Environmental Quality Act
FRA = Federal Railroad Administration

The resource areas that will have a significant impact from construction are: noise and vibration; socioeconomics and communities (division and/or disruption of community); aesthetics and visual quality; cultural and paleontological resources; and environmental justice.

The resource areas that will have a significant impact from operation are: noise and vibration; socioeconomics and communities (division and/or disruption of community); station planning, land use, and development; agricultural lands; aesthetics and visual quality; and cultural and paleontological resources.

Comparison between the May 2014 Project and F-B LGA

Table 8-A-62 compares the cumulative impacts for the May 2014 Project and the F-B LGA.

Table 8-A-62 Cumulative Impacts for the Comparison between the May 2014 Project and F-B LGA

Resource	May 2014 Project		F-B LGA	
	Impact from Construction	Impact from Operations	Impact from Construction	Impact from Operations
Transportation	Not Significant	Beneficial (regional level), Not Significant (local level)	Not Significant	Beneficial (regional level), Not Significant (local level)
Air Quality and Global Climate Change	Not Significant	Beneficial	Not Significant	Beneficial
Noise and Vibration	Significant (Cumulatively Considerable)	Significant (Cumulatively Considerable)	Significant (Cumulatively Considerable)	Significant (Cumulatively Considerable)
Electromagnetic Fields and Electromagnetic Interference	No Impact	No Impact	No Impact	No Impact
Public Utilities	Not Significant	No Impact	Not Significant	No Impact
Energy	Not Significant	Not Significant	Not Significant	Not Significant
Water Infrastructure and Resources	No Impact	No Impact	No Impact	No Impact
Solid Waste/ Recycling Facilities	Not Significant	Not Significant	Not Significant	Not Significant
Biological Resources	Not Significant	Not Significant	Not Significant	Not Significant
Hydrology and Water Resources	Not Significant	Not Significant	Not Significant	Not Significant
Geology, Soils, and Seismicity ¹	Not Significant	Not Significant	Not Significant	Not Significant
Hazardous Materials and Wastes	Not Significant	Not Significant	Not Significant	Not Significant
Safety and Security	Not Significant	Not Significant / Beneficial (travel safety)	Not Significant	Not Significant / Beneficial (travel safety)

Resource	May 2014 Project		F-B LGA	
	Impact from Construction	Impact from Operations	Impact from Construction	Impact from Operations
Socioeconomics and Communities	FRA is required to conduct an environmental justice analysis for the project as part of the NEPA process; however, since there are no CEQA significance criteria for environmental justice, no CEQA determinations are provided for environmental justice. Environmental Justice cumulative impacts are therefore discussed in Chapter 5 of this Draft Supplemental EIR/EIS and are not applicable for the impacts considered here. Additionally, economic and social changes resulting from the project are not treated as significant effects on the environment under CEQA per Section 15064(e) of the CEQA Guidelines; therefore, CEQA determinations are not provided for social and economic impacts. However, CEQA determinations are provided for division and/or disruption of communities (see below).		FRA is required to conduct an environmental justice analysis for the project as part of the NEPA process; however, since there are no CEQA significance criteria for environmental justice, no CEQA determinations are provided for environmental justice. Additionally, economic and social changes resulting from the project are not treated as significant effects on the environment under CEQA per Section 15064(e) of the CEQA Guidelines; therefore, CEQA determinations are not provided for social and economic impacts. However, CEQA determinations are provided for division and/or disruption of communities (see below).	
Division and/or Disruption of Community	Significant (Cumulatively Considerable)	Significant (Cumulatively Considerable)	Not Significant	Significant (Not Cumulatively Considerable)
Station Planning, Land Use, and Development	Not Significant	Significant (Cumulatively Considerable)	Not Significant	Significant (Not Cumulatively Considerable)
Agricultural Lands	Not Significant	Significant (Cumulatively Considerable)	Not Significant	Significant (Cumulatively Considerable)
Parks, Recreation, and Open Space	Not Significant	Not Significant	Not Significant	Not Significant
Aesthetics and Visual Quality	Significant (Cumulatively Considerable) Bakersfield area	Significant (Cumulatively Considerable) Kern County/ Bakersfield area	Significant (Cumulatively Considerable) Bakersfield area	Significant (Cumulatively Considerable) Kern County/ Bakersfield area
Cultural and Paleontological Resources ²	Significant (Cumulatively Considerable)	Significant (Not Cumulatively Considerable) Indirect impacts to historic architectural resources	Significant (Cumulatively Considerable)	Significant (Not Cumulatively Considerable) Indirect impacts to historic architectural resources

¹ In this Draft Supplemental EIR/EIS, analysis of Paleontological Resources is in this section. In the Fresno to Bakersfield Section EIR/EIS, Paleontological Resources were reviewed in the Cultural Resources Section.

² In this Draft Supplemental EIR/EIS, Cultural Resources have been evaluated in a separate, standalone section. Analysis of Paleontological Resources can be found in Section 3.9.

CEQA = California Environmental Quality Act
EIR = environmental impact report
FRA = Federal Railroad Administration

F-B LGA = Fresno to Bakersfield Locally Generated Alternative
EIS = environmental impact statement
NEPA = National Environmental Policy Act

As shown in Table 8-A-62, when combined with other past, present, and reasonably foreseeable projects, cumulative impacts under the May 2014 Project and the F-B LGA would be comparable. Further, the May 2014 Project and the F-B LGA would have a similar contribution to cumulative effects. In summary, the differences between the May 2014 Project and the F-B LGA relevant to cumulative impacts are not substantial, and there are no significant differentiating features for this issue area.

Section 4(f)-6(f) Evaluation

Summary of May 2014 Project Section 4(f)-6(f) Evaluation Impacts

Section 4(f) protects publicly-owned lands that are parks, recreational areas, and wildlife refuges. Public schools may qualify as a Section 4(f) resource if they include a recreational facility (e.g., playgrounds, ball fields, or open space) that is made available to members of the public. Section 4(f) also protects historic sites of national, state, or local significance that are located on public or private land.

Section 6(f) properties include recreation resources created or improved with funds from the Land and Water Conservation Fund Act. Land purchased with these funds cannot be converted to a non-recreational use without coordination with the Department of the Interior and National Park Service and mitigation that includes replacement of the quality and quantity of land used.

Methodology

In accordance with adopted methodologies, the study area for parks, recreational areas, wildlife refuges, and public schools was defined as the May 2014 Project footprint plus a 1,000-foot buffer on either side of the alignment, and a 0.5-mile buffer around the maintenance sites, station areas, and support facilities for the May 2014 Project. In the study area, only those resources identified as eligible for protection under the requirements of Section 4(f) and Section 6(f), and identified as potentially affected by the May 2014 Project (due to proximity effects and/or property acquisition), were further evaluated.

Impacts

Section 4(f)

None of the schools in the Section 4(f) study area were identified to have a joint use agreement in place and no publicly accessible recreation facilities exist on public school grounds in the Section 4(f) study area. As such, no further evaluation was deemed necessary for schools. Table 8-A-63 shows parks, recreation, and open space properties evaluated for Section 4(f) use.

Table 8-A-63 Park, Recreation, and Open Space Properties Evaluated for Section 4(f) Use by the May 2014 Project

Property Name	Documentation Notes
Town Square	Distance from the May 2014 Project alignment is 774 feet. Determined to be too far from the alternative alignment to potentially be affected.
Stringham Park	Distance from the May 2014 Project alignment is 991 feet. Determined to be too far from the alternative alignment to potentially be affected.
Kirschenmann Park	Distance from the May 2014 Project alignment is 721 feet. Determined to be too far from the alternative alignment to potentially be affected.
Austin Creek Park	Distance from the May 2014 Project alignment is 596 feet. At the time of the Fresno to Bakersfield Section Final EIR/EIS and this Draft Supplemental EIR/EIS, this park not been constructed. However, had it been considered it would have been determined to be too far from the May 2014 Project alignment to be affected.
Kern River Parkway	Direct impacts associated with the May 2014 Project. These included: <ul style="list-style-type: none"> • Visual intrusion from overhead HSR • Temporary construction activities in the park • Temporary construction noise impacts
Jastro Park	Distance from the May 2014 Project alignment is 560 feet. Determined to be too far from the May 2014 Project alignment to potentially be affected.
McMurtrey Aquatic Center	Distance from the May 2014 Project alignment is 37 feet. Indirect impacts to parking were considered in the Fresno to Bakersfield Section Final EIR/EIS. Column placement could result in a loss of up to 11 percent of the parking spaces; however, the Center would still comply with applicable parking requirements.
Bakersfield Amtrak Station Playground	Distance from the May 2014 Project alignment is 199 feet. Indirect impacts to the park were considered in the Fresno to Bakersfield Section Final EIR/EIS. Noise and vibration levels would increase; however, the playground is subject to existing noise levels. Mitigation would reduce the increase to less than significant. The HSR elevated viaduct would be visually dominant; however, in an urbanized area that does not require a high-quality visual setting for the public to use the resource, mitigation measures would be sufficient to reduce the impact to less than significant.
Mill Creek Linear Park	Direct impacts associated with the May 2014 Project alignment to Mill Creek Linear Park were considered in the Fresno to Bakersfield Section Final EIR/EIS. These included: <ul style="list-style-type: none"> • Visual intrusion from overhead HSR • Temporary construction activities in the park • Temporary construction noise impacts
Centennial Plaza	Distance from the May 2014 Project alignment is 904 feet. This park was not considered in the Fresno to Bakersfield Section Final EIR/EIS although it existed at the time. However, had it been included it would have been determined too far from the alternative alignment to potentially be affected.
Central Park	Distance from the May 2014 Project alignment is 1,930 feet. Determined to be too far from the May 2014 Project alignment to potentially be affected.

EIR = environmental impact report
EIS = environmental impact statement
HSR = high-speed rail

Implementation of the May 2014 Project would result in a *permanent 4(f)* impact to the Kern River Parkway and Mill Creek Linear Park. Mitigation would include deliberate placement of abutments and supports, as well as temporary easements for construction, to avoid the primary or secondary floodways and park amenities, to the extent possible and depending on the limits of each

resource verified through coordination with the city of Bakersfield. Any trails impacted would be re-routed and maintained for use during construction, and relocated if needed.

Table 8-A-64 shows historic resources listed in, or determined or recommended as eligible for the National Register of Historic Places within the APE for the May 2014 Project. If the May 2014 Project would permanently incorporate land from the property or result in an adverse temporary occupancy, and would also result in an adverse effect, this impact would constitute a Section 4(f) use. None of the historic resources identified within the APE was determined to have a Section 4(f) use.

Table 8-A-64 Resources Listed in, or Determined or Recommended Eligible for, the National Register of Historic Places under Criteria A-C within the Study Area of the May 2014 Project

Resource Name	Documentation Notes
Santa Fe Depot	This resource was determined to have no 4(f) use under the May 2014 Project alignment.
San Francisco and San Joaquin Valley Railroad Section House	This resource was determined to have no 4(f) use under the May 2014 Project alignment.
Friant-Kern Canal	This resource was determined to have no 4(f) use under the May 2014 Project alignment.
Harvey Auditorium, Bakersfield High School	This resource was determined to have no 4(f) use under the May 2014 Project alignment.
Kern County Civic Administrative Center	This resource was determined to have no 4(f) use under the May 2014 Project alignment.
Stark/Spencer Residence	This resource was determined to have no 4(f) use under the May 2014 Project alignment.
Union Avenue Corridor	This resource was determined to have no 4(f) use under the May 2014 Project alignment.
Salon Juarez	This resource was determined to have no 4(f) use under the May 2014 Project alignment.
1031 E 18th St	This resource was determined to have no 4(f) use under the May 2014 Project alignment.
2509 E California Ave	This resource was determined to have no 4(f) use under the May 2014 Project alignment.

Source: Authority and FRA 2012d

Section 6(f)

No Section 6(f) resources were identified within the May 2014 Project study area.

Comparison between the May 2014 Project and F-B LGA

Table 8-A-65 compares the Section 4(f) and Section 6(f) impacts for the May 2014 Project and the F-B LGA.


Table 8-A-65 Section 4(f) Impact Comparison between the May 2014 Project and F-B LGA

	May 2014 Project	F-B LGA
Park, Recreation, and Open Space Properties		
<i>Town Square</i>	Distance from the May 2014 Project is 774 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.	Distance from the F-B LGA is 560 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.

	May 2014 Project	F-B LGA
<i>Stringham Park</i>	Distance from the May 2014 Project is 991 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.	Distance from the F-B LGA is 895 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.
<i>Kirschenmann Park</i>	Distance from the May 2014 Project and is 721 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.	Distance from the F-B LGA is 480 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.
<i>Austin Creek Park</i>	Distance from the May 2014 Project is 596 feet. At the time of the Fresno to Bakersfield Final EIR/EIS, this park had not been constructed. However, had it been constructed it would have been determined to be too far from the May 2014 Project alignment(s) to be affected.	No Impact
<i>Uplands of the Kern River Parkway</i>	No Impact	Distance from the F-B LGA is 515 feet. Construction activities would not occur in the Uplands of the Kern River Parkway. Determined to be too far from the F-B LGA to potentially be affected.
<i>Kern River Parkway</i>	Distance from the May 2014 Project is 0 feet. Direct impacts include: <ul style="list-style-type: none"> • Visual intrusion from overhead HSR • 0.48 acres permanent impacts from the dual-column supports • 3.28 acres temporary construction impacts to the park • Temporary construction noise impacts Based on the information gathered to date, the analysis supports an FRA finding that the May 2014 Alternative on Kern River Parkway in Bakersfield could result in a <i>de minimis</i> impact, as defined by 49 U.S.C. 303(d). The Authority and FRA have begun conversations with the City of Bakersfield Department of Recreation and Parks with regard to the characterization of effects of the project in the context of this Section 4(f) evaluation, consistent with 49 U.S.C. 303(d)(3)(B).	Distance from the F-B LGA is 0 feet. Direct impacts include: <ul style="list-style-type: none"> • Visual intrusion from overhead HSR • 0.96 acre permanent impacts from the dual-column supports. • 4.4 acres temporary construction impacts to the park • Temporary construction noise impacts Based on the information gathered to date, the analysis supports an FRA finding that the F-B LGA Alternative on Kern River Parkway in Bakersfield could result in a <i>de minimis</i> impact, as defined by 49 U.S.C. 303(d). The Authority and FRA have begun conversations with the City of Bakersfield Department of Recreation and Parks with regard to the characterization of effects of the project in the context of this Section 4(f) evaluation, consistent with 49 U.S.C. 303(d)(3)(B).
<i>Jastro Park</i>	Distance from the May 2014 Project is 560 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.	No Impact
<i>McMurtrey Aquatic Center</i>	Distance from the May 2014 Project is 37 feet. Indirect impacts to parking were considered in the Fresno to Bakersfield Section Final EIR/EIS. Column placement could result in a loss of up to 11 percent	No Impact

	May 2014 Project	F-B LGA
	of the parking spaces; however, the Center would still comply with applicable parking requirements. No Section 4(f) use would occur.	
<i>Bakersfield Amtrak Station Playground</i>	<p>Distance from the May 2014 Project is 199 feet. Indirect impacts to the park were considered in the Fresno to Bakersfield Section Final EIR/EIS. Noise and vibration levels would increase; however, the playground is subject to existing noise levels. Mitigation would reduce the increase to less than significant.</p> <p>The HSR elevated viaduct would be visually dominant; however, in an urbanized area that does not require a high-quality visual setting for the public to use the resource, mitigation measures would be sufficient to reduce the impact to less than significant. No Section 4(f) use would occur.</p>	No Impact
<i>Mill Creek Linear Park</i>	<p>Direct impacts of the May 2014 Project to the park were considered in the Fresno to Bakersfield Section Final EIR/EIS and determined not adverse. These impacts include:</p> <ul style="list-style-type: none"> • Visual intrusion from overhead HSR • 0.23 acres temporary construction impacts to the park • Temporary construction noise impacts <p>Information garnered to date supports a finding that the impacts on the Mill Creek Linear Park from the May 2014 Project are de minimis.</p>	No Impact
<i>Centennial Plaza</i>	<p>Distance from the May 2014 Project is 904 feet. This park was not considered in the Fresno to Bakersfield Section Final EIR/EIS although it existed at the time. However, had it been included it would have been determined too far from the alternative alignment(s) to potentially be affected.</p>	No Impact
<i>Weill Park</i>	No Impact	<p>Distance from the F-B LGA is 0 feet. Direct impacts associated with the F-B LGA to the park were considered in the Draft Supplemental EIR/EIS. These include:</p> <ul style="list-style-type: none"> • Visual intrusion from overhead HSR • 0.07 acre permanent impacts from single-column supports.

	May 2014 Project	F-B LGA
		<ul style="list-style-type: none"> 0.55 acres temporary construction impacts to the park Temporary construction noise impacts <p>Based on the information gathered to date, the analysis supports an FRA finding that the F-B LGA Alternative on Weill Park in Bakersfield could result in a <i>de minimis</i> impact, as defined by 49 U.S.C. 303(d). The Authority and FRA have begun conversations with the City of Bakersfield Department of Recreation and Parks with regard to the characterization of effects of the project in the context of this Section 4(f) evaluation, consistent with 49 U.S.C. 303(d)(3)(B).</p>
<i>Riverview Park</i>	No Impact	Distance from the F-B LGA is 985 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.
<i>Central Park</i>	Distance from the May 2014 Project is 1,930 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.	Distance from the F-B LGA is 920 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.
<i>Metropolitan Recreation Center</i>	No Impact	<p>Distance from the F-B LGA is 615 feet. Transmission line modifications would occur within the park as described in Section 3.6.4. Mitigation Measure PP-MM#1 would be implemented to ensure detour signage and access to alternate park areas. With implementation of PP-MM#1, the F-B LGA would require temporary physical occupation of the Metropolitan Recreation Center but would not result in a use due to temporary occupancy.</p> <p>Based on the information gathered to date, the analysis supports an FRA finding that the F-B LGA Alternative on Metropolitan Recreation Center in Bakersfield would result in a <i>de minimis</i> impact, as defined by 49 U.S.C. 303(d).</p>
<i>Joshua Park</i>	No Impact	Distance from the F-B LGA is 625 feet. Determined to be too far from the alternative alignment(s) to potentially be affected.
Historic Properties	None of the resources identified was determined to have a Section 4(f) use.	None of the resources identified was determined to have a Section 4(f) use.
Section 6(f) properties	There are no Section 6(f) resources within the Project area.	There are no Section 6(f) resources within the Project area.

 = least-impact alternative
 Authority = California High-Speed Rail Authority
 EIR = environmental impact report
 EIS = environmental impact statement
 FB = Fresno to Bakersfield
 F-B LGA = Fresno to Bakersfield Locally Generated Alternative

FRA = Federal Railroad Administration
HSR = high-speed rail
U.S.C. = United States Code

Impacts associated with the May 2014 Project exceed those for F-B LGA for Section 4(f) resources. There are no 6(f) resources in either project area. There are no feasible and prudent alternatives to the use of Section 4(f) properties for the May 2014 Project. Both the May 2014 Project and F-B LGA incorporate measures to minimize harm. However, because the May 2014 Project would result in two permanent Section 4(f) uses, while the F-B LGA would result in *de minimis* Section 4(f) findings, the F-B LGA is determined to be the least environmentally damaging alternative.

Environmental Justice

Summary of May 2014 Project Environmental Justice Impacts

Federal agencies are required to identify and address, as appropriate, the potential disproportionately high and adverse human health and environmental impacts, including interrelated social and economic effects, of their programs, policies, and activities on minority and low-income populations. This section describes the environmental justice impacts that would result from the May 2014 Project.

Methodology

The methodology used to identify minority and low-income populations that may be affected by the May 2014 Project is the same as that used for the *Fresno to Bakersfield Section CIA Technical Report (Fresno to Bakersfield Section CIA)* (Authority and FRA 2012g).

Minority and low-income areas are defined as census block and block group populations that meet either or both of the following criteria:

- The census block contains 50 percent or more minority persons, and/or the census block group contains 25 percent or more low-income persons.
- The percentage of minority and/or low-income persons in any census block or block group is more than 10 percentage points greater than the County average (Authority and FRA 2017a).

The resource study area for environmental justice is located within Kern County and is defined as the Project corridor and the census blocks and block groups that are located completely or partially within a 0.5-mile radius of the project alignment and station location. Figure 8-A-31 provides an overview of the location of minority or low-income populations for the May 2014 Project. Light orange is used to indicate U.S. Census blocks containing minority or low-income populations, and darker orange is representative of minority or low-income blocks with higher population densities. The red dashed lines represent the study area, and the purple line and shaded areas represent the May 2014 Project centerline and the footprint of the proposed station.

To provide comparability between the F-B LGA and the May 2014 Project, this figure was created using current data sources (e.g., the 2010 Census data for minority populations and the 2013 American Community Survey data for poverty status) and at the same scale and level of detail as the mapping prepared for the F-B LGA (see Section 5.4.2 of this Draft Supplemental EIR/EIS). As shown in Figure 8-A-30, minority and low-income populations in the May 2014 Project study area are located primarily in the urban areas of Shafter and Bakersfield. Within Shafter, minority and low-income communities are located primarily to the southwest of May 2014 Project alignment. In Bakersfield, areas with minority and low-income populations are concentrated south of Truxtun Avenue and around the May 2014 Project alignment at its southern terminus near Oswell Street. For a description of minority and low-income areas affected by the May 2014 Project, refer to Section 3.12.6, Affected Environment: Socioeconomics, Communities, and Environmental Justice, of the Fresno to Bakersfield Section Final EIR/EIS (Authority 2014: 3.12-16 through 3.12-42). In comparing this updated figure to Figure 3.12-7 in the Fresno to Bakersfield Section Final EIR/EIS (Authority 2014: 3.12-47), the minority and low-income areas identified for the May 2014 Project have not significantly changed.

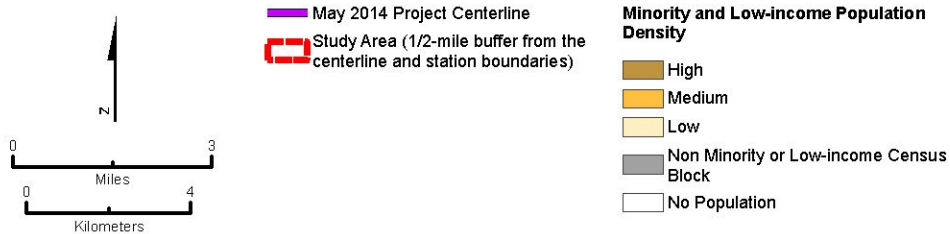
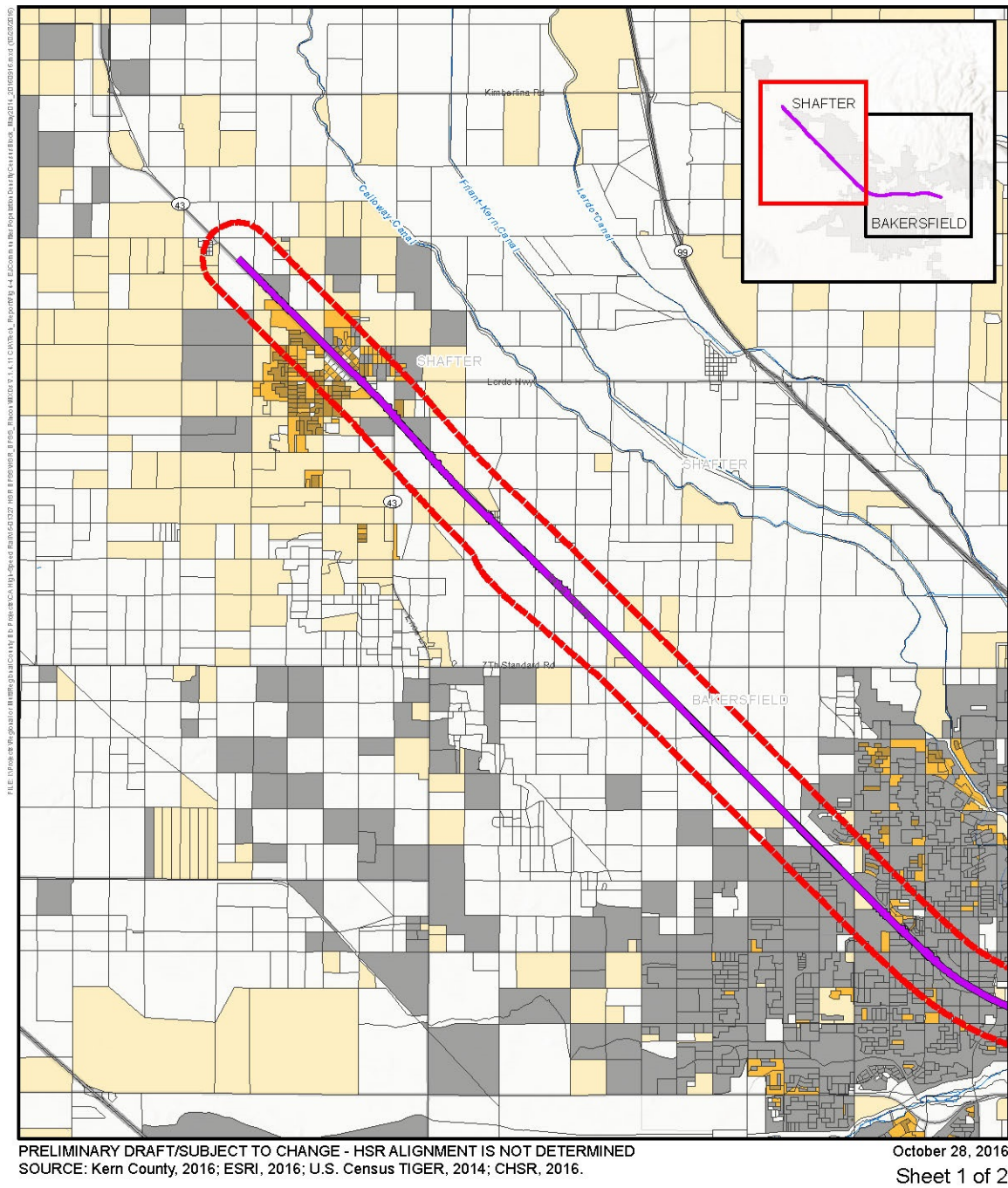
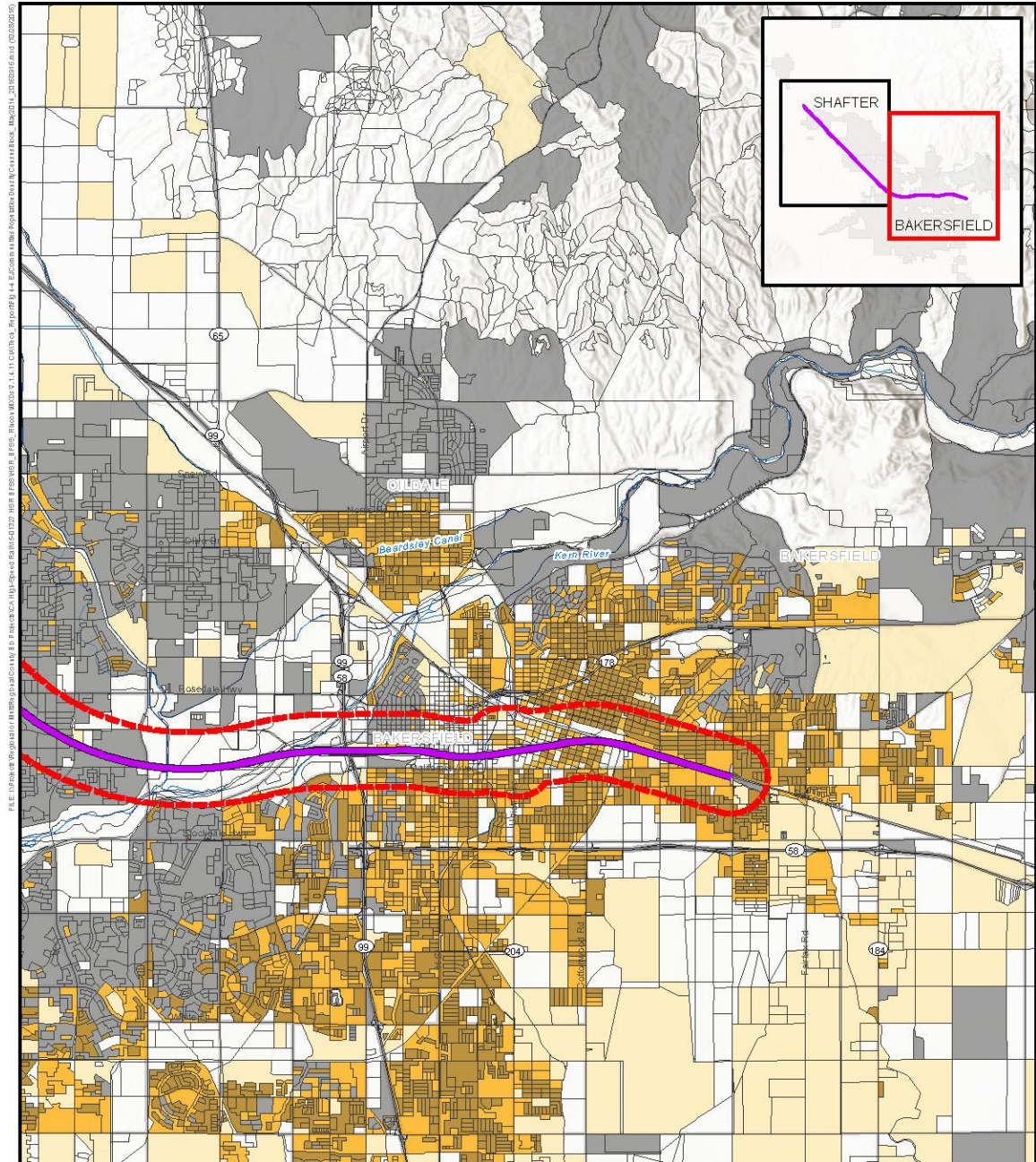


Figure 8-A-31 Minority or Low-Income Communities by Census Block
(Sheet 1 of 2)



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED
SOURCE: Kern County, 2016; ESRI, 2016; U.S. Census TIGER, 2014; CHSR, 2016.

October 28, 2016
Sheet 2 of 2

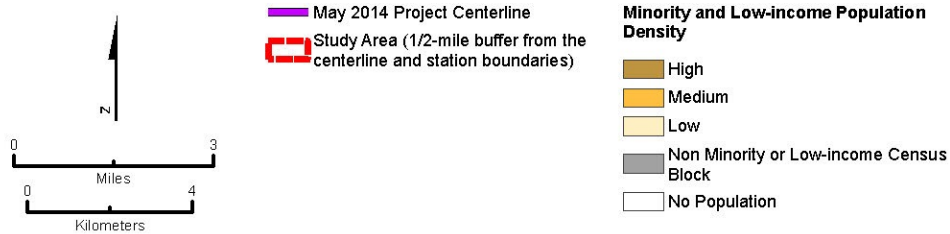


Figure 8-A-31 Minority or Low-Income Communities by Census Block
(Sheet 2 of 2)

Impacts

As described in the Fresno to Bakersfield Section CIA (Authority and FRA 2012g), the May 2014 Project traverses areas with minority and low-income populations and would result in disproportionately high and adverse effects on these populations even with the implementation of mitigation. For a description of minority and low-income areas affected by the May 2014 Project, refer to Section 4.3 of the Fresno to Bakersfield Section CIA (Authority and FRA 2012g: pages 4-30 through 4-39). The project includes mitigation measures that would minimize or avoid most of the impacts associated with project construction and operation. However, where mitigation measures would not completely reduce the impacts in areas with minority and low-income populations, disproportionately high and adverse effects on these populations would occur. Resource areas with disproportionately high and adverse effects on minority and low-income populations are summarized below and include: noise and vibration; socioeconomics and communities; station planning, land use, and development; parks, recreation, and open space; aesthetic and visual resources, and cumulative impacts.

Noise and Vibration

Noise from construction activities would temporarily exceed noise standards evenly along the entire alignment and would affect sensitive receivers. These effects would be significant pursuant to CEQA, but would be reduced to a less-than-significant level with implementation of mitigation measures. Vibrations from construction activities would temporarily exceed vibration standards evenly along the entire alignment and would affect sensitive receivers. These effects would be substantial and significant, but would be reduced to a less-than-significant level with implementation of mitigation measures. The increase in noise and vibration would impact all communities near construction activities, including minority and low-income populations. These effects would be temporary during construction and would be reduced by implementation of the mitigation measures, which would be applied equally throughout the study area. Therefore, construction noise and vibration impacts would not result in disproportionately high and adverse impacts on minority and low-income communities.

Operation of the May 2014 Project would increase ambient noise and vibration levels above standards and would affect sensitive receivers. These effects would be substantial and significant. Noise and vibration impacts would be distributed along the entire alignment, and mitigation measures would be applied as appropriate. Implementation of mitigation measures would reduce many of the impacts to a less-than-significant level. However, 305 sensitive receivers would still experience severe operational noise impacts even with the proposed mitigation. Most of these sensitive receivers are located in densely developed urban areas of Shafter and Bakersfield containing minority and low-income populations. Because the mitigation measures do not eliminate the adverse effects in these areas containing minority and low-income populations, and because these areas are more likely to experience more severe adverse noise impacts resulting from project operation, operational noise would have disproportionately high and adverse effects on minority and low-income populations in these areas.

Community Division and/or Disruption

Operation of the May 2014 Project would divide communities in the Northeast and Northwest neighborhoods in Bakersfield, as well as rural areas such as Crome; remove 384 homes, 392 businesses, and 11 community services or amenities; directly affect an additional 9 community facilities; and permanently alter the character of existing communities or neighborhoods. The displacements and residual community impacts associated with operation of the May 2014 Project would affect the minority and low-income populations in the urban communities, particularly in Bakersfield's Northeast and Northwest districts (as defined in the Fresno to Bakersfield Section CIA), as well as in rural communities, such as Crome. These effects would remain even after the implementation of the proposed mitigation measures. As detailed in the Fresno to Bakersfield Section CIA, high concentrations of residential displacements would occur under the May 2014 Project. The analysis suggests that relocation of residents may affect high numbers of disabled, female heads of households, and linguistically isolated populations.

Important community facilities would also be displaced as a result of project operation. The May 2014 Project would have a substantial effect on Bakersfield High School, which is attended by predominantly minority and low-income students. Further, the May 2014 Project would also displace the Bakersfield Homeless Center, which serves low-income families, as well as the Mercado, which serves a minority community, and several buildings of the Mercy Hospital medical complex, which has programs dedicated to low-income communities. Given that the communities that would be divided by the alignment are predominantly minority or low-income communities and that the project would affect community facilities that primarily serve minority or low-income communities, the May 2014 Project would disproportionately affect minority or low-income communities.

Land Use

Land use impacts would be distributed along the entire study area, but the adverse effects would be highest in places where the project would be incompatible with adjacent land uses, including in urban areas in Bakersfield where the May 2014 Project would enhance the existing incompatibility with adjacent residential and community facility land uses. Many high-density minority and low-income populations are located in Bakersfield. Because the urban areas in Bakersfield containing minority and low-income populations are more likely to experience severe land use impacts resulting from implementation of the May 2014 Project, when compared to the larger reference community, land use conversion would have disproportionately high and adverse effects on minority and low-income communities in Bakersfield.

Parks and Recreation

Impacts on park, recreation, open space resources, and school play areas would occur in Bakersfield, particularly the Kern River Parkway and Mill Creek Linear Park. Mitigation measures would be applied to address these impacts. However, these mitigation measures would not completely reduce the impacts to parks and recreation resources in Bakersfield. The parks that may be affected in Bakersfield are utilized by adjacent minority and low-income populations. Because the mitigation measures do not eliminate the adverse impacts within areas containing minority and low-income populations and these populations would experience greater adverse impacts when compared to the larger reference community, project operation would have disproportionately high and adverse effects on minority and low-income populations in these locations.

Aesthetics

The May 2014 Project would result in aesthetics and visual resources effects during both construction and operation. The visual effects would occur in those areas where the alignment would be elevated, which would occur primarily in urban areas of Shafter and Bakersfield where minority and low-income populations reside. Nighttime lighting would be required, and the construction of the elevated viaducts and the resulting visual impacts could not be mitigated to a less-than-significant level with the proposed mitigation measures. Therefore, the May 2014 Project operation would have a disproportionately high and adverse effect on minority and low-income populations.

Cumulative Impacts

All communities along the May 2014 Project alignment and adjacent to the station would be impacted during project construction. However, in almost all cases, the impacts would not result in disproportionately high and adverse effects to minority and low-income populations since these impacts would not be unique to and would not be borne primarily by these populations. Nevertheless, because many of the minority and low-income populations reside in the urban areas of Shafter and Bakersfield, where other reasonably foreseeable construction projects would also occur, there likely would be disproportionately high and adverse cumulative effects experienced by these populations. Mitigation measures that would be implemented would not completely eliminate the adverse effects to minority and low-income populations, when considered with other reasonably foreseeable projects in the area; therefore, these populations

would likely bear a disproportionate burden of the cumulative impacts associated with project construction.

Project operational impacts disproportionately affecting minority and low-income populations would be concentrated in urban areas along the project area in Shafter and Bakersfield, as well as in rural areas such as Crome. These impacts would include an increase in ambient noise levels above standards, disruption of communities and displacement of residences and community facilities, changes or loss of park resources, decreases in visual quality, and cumulative impacts for noise and vibration, communities, and aesthetics and visual resources.

Benefits

Although this project would result in benefits that would accrue to minority and low-income populations, it is not possible to determine whether these would outweigh the adverse effects of the project for all minority and low-income populations with certainty because the project benefits would accrue differently for households along the project corridor, depending on factors such as proximity to the project, access to station areas, and frequency of use of the HSR System. Moreover, homeownership status could be a crucial determinant of whether a household near a station would benefit from the potential increase in property values resulting from revitalization and economic development. In the absence of strong, affordable housing requirements established by the governing local jurisdiction for new construction, as well as effective rent-control programs, low-income renters could potentially be driven out of the downtown station areas. However, the Authority's Station Area Planning funding aims to promote low-income housing as a part of station area development. Project design features and mitigation measures would reduce the potential project impacts to minority and low-income populations. However, even when applying these mitigation measures, there remains a disproportionately high and adverse impact on minority and low-income populations from construction and operation of the May 2014 Project.

Comparison between the May 2014 Project and the F-B LGA

Table 8-A-66 compares the Environmental Justice impacts for the May 2014 Project and the F-B LGA.

Table 8-A-66 Environmental Justice Impact Comparison between the May 2014 Project and F-B LGA

	F-B LGA	May 2014 Project	Relative Difference
Noise and Vibration	Disproportionately high and adverse effects	Disproportionately high and adverse effects	Lesser impacts would occur under the F-B LGA, as severe noise impacts would affect 152 sensitive receivers compared to 305 sensitive receivers under the May 2014 Project.
Community Division and/or Disruption	Disproportionately high and adverse effects	Disproportionately high and adverse effects	Lesser impacts would occur under the F-B LGA as it follows existing highway and railroad corridors and would not pass through established neighborhoods, while the May 2014 Project would traverse residential areas in the Northwest District of Bakersfield and divide the community of Crome.
Land Use	--	Disproportionately high and adverse effects	The F-B LGA would not result in disproportionately high and adverse effects to minority or low-income communities related to land use conversion and incompatible land uses. Because the F-B LGA follows existing transportation corridors, the conversion of land use would not substantially change the pattern and intensity of the use of the land and would be largely compatible with adjacent land uses and existing plans and policies.
Parks and Recreation	--	Disproportionately high and adverse effects	The F-B LGA would not result in disproportionately high or adverse effects to minority or low-income communities related to parks and recreation.
Aesthetics	Disproportionately high and adverse effects	Disproportionately high and adverse effects	Comparable operational impacts would occur under both alternatives, but the F-B LGA would be considered preferable based on reduced impacts to residential uses; impacts during construction would be the same for both alternatives.
Cumulative Impacts	Disproportionately high and adverse effects	Disproportionately high and adverse effects	Comparable impacts would occur between the two alternatives as they would have similar contributions to cumulative effects.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

Similar to the May 2014 Project, the F-B LGA would result in disproportionately high and adverse effects on minority and low-income populations. When comparing the intensity of these effects under each alternative as they relate to each resource area, four resource areas have lesser or no effects under the F-B LGA, and two have comparable effects. Implementation of mitigation measures would minimize or avoid most of the impacts associated with project construction and operation for all communities along the alignment, including minority and low-income populations. Where mitigation measures would not completely reduce the impacts in areas with minority and low-income populations, disproportionately high and adverse effects on minority and low-income populations would occur. As shown in Table 8-A-66, the May 2014 Project and the F-B LGA would both result in disproportionately high and adverse effects on minority and low-income populations in the following areas: noise and vibration (operational noise); socioeconomic and communities (residential displacement and impacts to community facilities); aesthetics and visual resources (introduction of HSR infrastructure); and cumulative impacts. The May 2014 Project would also result in disproportionately high and adverse effects on minority and low-income populations related to station planning, land use and development; and parks and recreation. Because the F-B LGA largely follows existing transportation corridors and areas with commercial and industrial land uses, it would result in lesser effects to minority and low-income communities compared to the May 2014 Project.

Project Costs and Operations

Summary of May 2014 Project Cost & Operation Impacts

This section discusses the estimated costs for building, operating, and maintaining the May 2014 Project, based on a 15 percent level of design.

Methodology

The approach and details used to prepare the construction cost estimate are provided in the Fresno to Bakersfield Section Cost Estimate Report (Authority and FRA 2013), which is available upon request from the Authority.

Costs are divided into capital cost, which is the total cost associated with the design, management, land acquisition, and construction of the May 2014 Project, and O&M. O&M costs account for staff and supplies required to run the system and keep it properly maintained. O&M costs are estimated based on daily train miles, operation speeds, travel times, station configurations, maintenance and storage facilities, and assumed operating frequencies (Parsons Brinckerhoff 2011).

The apportionment of Fresno to Bakersfield cost estimates identified in the Fresno to Bakersfield Section Final EIR/EIS to the May 2014 Project is proportional to the length of the section.

Impacts

Capital Cost

To help evaluate and compare project construction costs, FRA and the Authority have developed ten main Standardized Capital Cost Categories. The cost per each of these Standardized Capital Cost Categories for the Fresno to Bakersfield Section is provided in Table 8-A-67.

Table 8-A-67 Capital Cost of the Fresno to Bakersfield Section

FRA Standard Cost Categories	Base Year FY 2010 Dollars (millions)
Track Structures & Track	\$2,945
Stations, Terminals, Intermodal	\$283
Support Facilities: Yards, Shops, Admin. Bldgs.	Only item in this category for the Fresno to Bakersfield Section is the HMF if an alternative site in this section is selected. The cost estimate for the HMF is provided below.
Sitework, Right-of- Way, Land, Existing Improvements	\$2,660
Communications & Signaling	\$186
Electric Traction	\$605
Vehicles	Considered a system wide cost and not included as part of individual HSR study alternatives.
Professional Services (applies to Cats. 10–60)	\$777
Unallocated Contingency	\$290
Finance Charges	Estimate to be developed before project construction.
Total	\$7,746

Cats. = categories
FRA = Federal Railroad Administration
FY = fiscal year
HMF = heavy maintenance facility
HSR = high-speed rail

Since the May 2014 Project is 21.15 percent of the length of the Fresno to Bakersfield section, the costs can be estimated to be 21.15 percent of the costs. Table 8-A-68 shows the estimated capital cost for the May 2014 Project. As shown in the table, the total estimated cost is \$2,893.7 million (2010 dollars).

Table 8-A-68 Capital Cost of the May 2014 Project

FRA Standard Cost Categories	Base Year FY 2010 Dollars (millions)
Track Structures & Track	\$1,266.6
Stations, Terminals, Intermodal	\$260.8
Support Facilities: Yards, Shops, Admin. Bldgs., MOWF/MOIF	\$25.8
Sitework, Right-of- Way, Land, Existing Improvements	\$766.8
Communications & Signaling	\$39.0
Electric Traction	\$127.8
Vehicles	Considered a system wide cost and not included as part of individual HSR study alternatives.
Professional Services (applies to Cats. 10–60)	\$297.9
Unallocated Contingency	\$109.0
Finance Charges	Estimate to be developed before project construction.
Total	\$2,893.7

Cats. = categories

FRA = Federal Railroad Administration

FY = fiscal year

HMF = heavy maintenance facility

HSR = high-speed rail

MOWF/MOIF – Maintenance of Way Facility/Maintenance of Infrastructure Facility

Operating and Maintenance Cost

O&M costs for the Fresno to Bakersfield section of the statewide system, on completion of Phases 1 and 2, for the year 2035 are shown in Table 8-A-69.

Table 8-A-69 Annual 2035 Operating and Maintenance Costs Apportioned to the Fresno to Bakersfield Section (2010 \$millions)

Annual O&M Cost	HSR Fares at 50% of Airfare	HSR Fares at 83% of Airfare
Operating & Maintenance of Equipment	\$1,967	\$1,312
Maintenance of Infrastructure	\$165	\$165
Stations	\$101	\$101
Insurance	\$25	\$25
Administration (10% of above)	\$226	\$161
Contingency (10% of above)	\$248	\$176
Total	\$2,732	\$1,940

Source: Authority and FRA 2014b. Table 5.3-2, Page 5-13.

HSR = high-speed train

O&M = operating and maintenance

Since the May 2014 Project is 21.15 percent of the length of the Fresno to Bakersfield section, the costs can be estimated to be 21.15 percent of the costs. Table 8-A-70 shows the estimated costs for the May 2014 Project. As shown in the table, costs for the May 2014 Project range from \$241 million, with higher fares and no HMF, to \$335 million, with lower fares and an HMF facility (2010 dollars).

Table 8-A-70 Annual 2035 Operating and Maintenance Costs Apportioned to the Fresno to Bakersfield Section (2010 \$millions)

Annual O&M Cost	HSR Fares at 50% of Airfare	HSR Fares at 83% of Airfare
Operating & Maintenance of Equipment	\$236	\$158
Maintenance of Infrastructure	\$25	\$25
Stations	\$13	\$13
Insurance	\$3	\$3
Administration (10% of above)	\$28	\$20
Contingency (10% of above)	\$30	\$22
Total	\$335	\$241

Source: Authority and FRA 2014b. Table 5.3-3, Page 5-14.

HSR = high-speed rail

O&M = operating and maintenance

Comparison between the May 2014 Project and F-B LGA

Table 8-A-71 compares the construction and operation costs for the May 2014 Project and the F-B LGA.

Table 8-A-71 Cost and Operation Impact Comparison between the May 2014 Project and F-B LGA (2010 \$millions)

	May 2014 Project	F-B LGA
Capital Cost for Alignment	\$2,893.7	\$2,687.5
O&M Cost	Costs for the May 2014 Project and the F-B LGA are considered to be the same, and range from \$57.7 million, with higher fares, to \$80.7 million, with lower fares (2010 dollars)	

Source: Authority 2016

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

O&M = operating and maintenance

As shown in Table 8-A-71, the May 2014 Project's estimated construction costs are \$206.2 million higher than those estimated for the F-B LGA. The May 2014 Project and the F-B LGA have approximately the same number of trainset miles, stations, and route miles. Therefore, O&M costs for each of these alignments are considered to be the same. The costs associated with "Operation & Maintenance Equipment" for the May 2014 Project and the F-B LGA are apportioned on the basis of trainset miles operated within the May 2014 Project and the F-B LGA. The costs associated with "Maintenance of Infrastructure" of the May 2014 Project and the F-B LGA are apportioned as a ratio of 23 route miles to the 800 total route miles. The costs associated with "Stations" for the May 2014 Project and the F-B LGA are apportioned as a ratio based on 1 of the 24 stations being located in the May 2014 Project and the F-B LGA. The costs of "Administration" and "Contingency" are each calculated to be ten percent of the overall system costs. Operation and maintenance costs for the May 2014 Project and the F-B LGA are considered to be the same.

8-A-3 Summary

This evaluation provides information on the environmental topics where the May 2014 Project and the F-B LGA are substantively different, and does not focus on resource topics where the potential impacts for the alternatives are similar (e.g., air quality and global climate change, safety and security, electromagnetic fields and interference, station planning, and archaeological resources) or were not significant (e.g., hydrology and water resources, public utilities and energy, geology, soils and seismicity, and hazardous materials and waste).

Table 8-A-72 summarizes the potential impacts on natural resources (i.e., impacts on aquatic resources and special-status species) for comparison. Table 8-A-73 summarizes the potential impacts of the project alternatives on community-based resources, including impacts on farmlands, visual impacts, potential displacements, and environmental justice considerations. The shading provided in the tables signifies the alternative with the lesser quantity of impact. The color codes offered the resource specialist a method of integrating a professional, qualitative judgment with the quantity of impacts. When impacts are equal or comparable, no shading has been provided.

Table 8-A-72 Natural Resources Impacts Comparison

Parameter	Alternatives	
	May 2014 Project	F-B LGA
Natural Resources Direct Impacts ¹ (acres)		
Wetlands Impact (Waters of U.S.)	0.51	0.00
Other Waters of the U.S. Impact	19.63	17.14
Total Direct Impacts to Aquatic Resources (Waters of the United States)	20.14	17.14
Direct Impacts to Special-Status Plant Communities (Black Willow Thickets)	1.00	1.54
Direct Impacts to Potentially Suitable Special-Status Plant Species Habitat	112.26	62.13
Direct Impacts to Habitats that Support Special-Status Wildlife Species	1,656.41	989.73

The shading provided in the table signifies the alternative with the lesser quantity of impact.

¹ The acreage impacts include direct permanent impacts.

Impact calculations in this table include project alternatives and station alternatives but do not include heavy maintenance facility alternatives.

All impacts were calculated based on 15 percent engineering design project footprint.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

U.S. = United States

Table 8-A-73 Community Resources Impacts Comparison

Parameter	Alternatives	
	May 2014 Project	F-B LGA
Section 4(f) Properties Impacted by Project	2	0
Transportation and traffic (roadway segments operating below standards – <i>Future [Year 2035] with Project Conditions</i>)	0	1
Transportation and traffic (study intersections operating below standards – <i>Future [Year 2035] with Project Conditions</i>)	11	15
Transportation and traffic (permanent road closures)	14	10
Noise-sensitive receptors affected after mitigation	305	152
Vibration Impacts (number of properties affected)	0	18
Important Farmland (acres)	485	372
Williamson Act lands (acres)	47	114
Parks, recreation, open space: before mitigation	2	2
Visual quality in rural areas adversely affected	Yes	Yes
Visual quality in urban areas adversely affected	Yes	Yes
Number of Section 106 properties affected–direct (indirect)	0(1)	0(4)
Oil wells (active wells within 200 feet of centerline)	2	0
PEC Sites within 150 feet of Footprint	2	149
Key community facilities affected	20	15
Displacement of religious facilities	2	0
Disproportionate effects on minority and low-income communities	Yes	Yes
Impacts on the Environmental Justice Community of Crome	Yes	No
Impacts on the Environmental Justice Community of Oildale	No	Yes
Estimated no. of commercial and industrial businesses displaced	392	377
Estimated no. of housing units displaced	384	86

The shading provided in the table signifies the alternative with the lesser quantity of impact.

Impact calculations in this table include project alternatives and station alternatives but do not include heavy maintenance facility alternatives for the portion of the Fresno to Bakersfield Section between Poplar Avenue and Oswell Street.

All impacts were calculated based on 15 percent engineering design project footprint.

The Fresno to Bakersfield Section Final Environmental Impact Report/Environmental Impact Statement also considered the following parameters which are not applicable to this section: Division of Ponderosa Road/Edna Way community and Division of Newark Ave and 5th Ave/Waukena-Corcoran community.

EJ = Environmental Justice

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

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