3.3 Air Quality and Global Climate Change

This section describes the regulatory and environmental setting associated with the air quality and global climate change impacts that would result from implementation of the Fresno to Bakersfield Section with the Locally Generated Alternative (F-B LGA). Unlike other resource areas, this section addresses the impacts for the entire Fresno to Bakersfield Section alignment. This is because the types of impacts assessed are more appropriately viewed within the context of the San Joaquin Valley Air Basin (SJVAB). Therefore, instead of comparing the F-B LGA to the May 2014 Project, this analysis evaluates the full Fresno to Bakersfield Section, with either the F-B LGA or the May 2014 Project as a component of the full section. The section also evaluates the smaller LGA area for local impacts such as carbon monoxide at intersections and sensitive receptors exposed to air toxics. This section also describes avoidance and minimization measures and mitigation measures that would reduce these impacts. Emission reduction measures identified in the *Fresno to Bakersfield Section California High-Speed Train Final Project Environmental Impact Report/Environmental Impact Statement* (EIR/EIS) (California High-Speed Rail Authority [Authority] and Federal Railroad Administration [FRA] 2014) are incorporated as described in Section 3.3.7, Mitigation Measures and Avoidance and Minimization Measures.

This section summarizes detailed information contained in the *Fresno to Bakersfield Section Draft Supplemental Environmental Impact Report/Environmental Impact Statement Air Quality and Global Climate Change Technical Report* (Authority and FRA 2017).

3.3.1 Regulatory Setting

Federal, state, and local laws, regulations, orders, or plans relevant to air quality and global climate change affected by the project are presented below. National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction. The latest state and federal ambient air quality standards are shown in Table 3.3-1, as identified in Table 3.3-1 of the Fresno to Bakersfield Section Final EIR/EIS (page 3.3-3).

Table 3.3-1 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]		Federal Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
Ozone[h] (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM_{10})[i]	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		–		
Fine Particulate Matter ($PM_{2.5}$)[i]	24-Hour	–	–	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1-Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	–	Non-Dispersive Infrared Photometry (NDIR)
	8-Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	–	

Pollutant	Averaging Time	California Standards[a]		Federal Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–	–	
Nitrogen Dioxide (NO_2)[j]	1-Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	–	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[k]	1-Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	–	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3-Hour	–		–	0.5 ppm (1300 µg/m^3)	
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[i]	–	
	Annual Arithmetic Mean	–		0.030 ppm (for certain areas)[i]	–	
Lead (Pb)[l, m]	30-Day Average	1.5 µg/m^3	Atomic Absorption	–	–	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m^3 (for certain areas)[l]	Same as Primary Standard	
	Rolling 3-Month Average[i]	–		0.15 µg/m^3		
Visibility-Reducing Particles[n]	8-Hour	See footnote n	Beta Attenuation and Transmittance through Filter Tape	No Federal Standards		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[l]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: California Air Resources Board, 2016a (May 4, 2016)

Footnotes continue onto next page.

[a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles) are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The ozone standard is attained when the fourth-highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the USEPA for further clarification and current federal policies.

[c] Concentration is expressed first in the units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] Any equivalent procedure that can be shown to the satisfaction of the California Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.
[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
[g] The reference method as described by the USEPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the USEPA.
[h] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 ppm to 0.070 ppm.
[i] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
[j] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of ppb. California standards are in units of ppm. To directly compare the national standards to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
[k] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
Note that the 1-hour national standard is in units of ppb. California standards are in units of ppm. To directly compare the 1-hour national standards to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
[l] The California Air Resources Board has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
[m] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
[n] In 1989, the California Air Resources Board converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

°C = degrees Celsius
µg/m^3 = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
ppb = parts per billion
ppm = parts per million
USEPA = United States Environmental Protection Agency

3.3.1.1 Federal

The Federal laws, regulations, and guidance applicable to the F-B LGA listed below are discussed in further detail in Section 3.3.2.1 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a).

- National Ambient Air Quality Standards (NAAQS)
- Clean Air Act (CAA) and Conformity Rule
- Mobile Source Air Toxics

3.3.1.2 State

The state laws, regulations, and orders applicable to the F-B LGA listed below are discussed in further detail in Section 3.3.2.2 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-6 through 3.3-8).

- California Clean Air Act
- Asbestos control measures
- GHG regulations
  - Assembly Bill (AB) 1493
  - Executive Order (EO) S-3-05
  - AB 32
  - EO S-01-07
  - Sustainable Communities and Climate Protection Act of 2008 (SB 375)

A number of state initiatives related to GHG have been put in place or built upon since the *Fresno to Bakersfield Section: Air Quality Technical Report* was approved that would apply to the F-B LGA, including:

- Senate Bill (SB) 2X and First Update to the Climate Change Scoping Plan
- EO B-30-15
- SB 32
- Short-Lived Climate Pollutant Reduction Strategy

These regulations are described in more detail below.

SB 2X (2011) and First Update to the Climate Change Scoping Plan

In April 2011, Governor Brown signed SB 2X requiring California to generate 33 percent of its electricity from renewable energy by 2020. In May 2014, the California Air Resources Board (CARB) approved the First Update to the Climate Change Scoping Plan (CARB 2014). This first update defines CARB's climate change priorities for the next five years and sets the groundwork to reach post-2020 goals set forth in EO S-3-05. The update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Climate Change Scoping Plan (CARB 2008). It also evaluates how to align the state's longer-term GHG reduction strategies with other state policy priorities, like those for water, waste, natural resources, clean energy and transportation, and land use (CARB 2014).

EO B-30-15 and SB 350 (2015)

In April 2015, Governor Brown issued EO B-30-15, which expanded the goals of EO S-3-05 by calling for a new target of 40 percent below 1990 levels by 2030. This EO also directed all state agencies with jurisdiction over GHG-emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in EO S-3-05 of reducing emissions 80 percent under 1990 levels by 2050. The new emission reduction target of 40 percent below 1990 levels by 2030 is intended to make it possible to reach the state's ultimate goal set by EO S-3-05.

In October 2015, Governor Brown signed into legislation SB 350, which requires retail seller and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030, with interim goals of 40 percent by 2024, and 45 percent by 2027.

Senate Bill 32

On September 8, 2016 Governor Brown signed into law SB 32, effectively extending California's landmark AB 32 to the year 2030. SB 32 effectively establishes a new greenhouse gas reduction goal for statewide emissions of 40 percent below 1990 levels by 2030. This goal is 40 percent more stringent than the current AB 32 mandated goal of 1990 levels by 2020. In terms of metric tons, this means that statewide, California not only needs to reduce emissions from 441.5 million metric tons (MMT) of carbon dioxide equivalents (CO_2e) in 2014 to 431 MMT CO_2e by 2020, but will now need to cut emissions to 258.6 MMT CO_2e by 2030.

Short-Lived Climate Pollutant Reduction Strategy

SB 605 (Lara, Chapter 523, Statutes of 2014) directed CARB to develop a comprehensive short-lived climate pollutant (SLCP) strategy, in coordination with other state agencies and local air quality management and air pollution control districts. Short-lived climate pollutants include three main components: black carbon, fluorinated gases, and methane. CARB staff released a proposed SLCP Strategy in April 2016. In September 2016, Governor Brown signed SB 1383 (Lara, Chapter 395, Statutes of 2016) mandating CARB to take certain specific actions with regard to the SLCP strategy. SB 1383 identifies specific reduction targets for three SLCPs (i.e., black carbon, fluorinated gases, and methane), which the SLCP Strategy, currently being revised by CARB, will address.

3.3.1.3 Regional and Local

The Fresno to Bakersfield Section is entirely within the San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAPCD is responsible for implementing air quality regulations, including developing plans and control measures for stationary sources of air pollution to meet the NAAQS and California Ambient Air Quality Standards (CAAQS); implementing permit

programs for the construction, modification, and operation of sources of air pollution; and enforcing air pollution statutes and regulations governing stationary sources. The following regulations and guidance that may be relevant to the project, as administered by the SJVAPCD with CARB oversight, were identified and considered for analysis:

- SJVAPCD Rule 2201: New and Modified Stationary Source Review
- SJVAPCD Rule 2280: Portable Equipment Registration
- SJVAPCD Rule 2303: Mobile Source Emission Reduction Credits
- SJVAPCD Rule 4201 and Rule 4202: Particulate Matter Concentration and Emission Rates
- SJVAPCD Rule 4301: Fuel Burning Equipment
- SJVAPCD Rule 8011: General Requirements–Fugitive Dust Emission Sources
- SJVAPCD Rule 9510: Indirect Source Review
- SJVAPCD CEQA Guidelines

These rules are discussed in further detail in Section 3.3.3.3 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-8 through 3.3-10). Rule 2201 was modified in 2016, and the SJVAPCD CEQA Guidelines were updated in 2015 as follows.

SJVAPCD Rule 2201 – New and Modified Stationary Source Review

Rule 2201 applies to new or modified stationary sources and requires that sources not increase emissions above the specified thresholds. If the post-project stationary source potential to emit equals or exceeds the offset threshold levels, offsets will be required (SJVAPCD 2006). Stationary sources at the station (such as natural gas heaters) require permitting by the SJVAPCD and would have to comply with best available control technology requirements. Stationary sources such as exterior washing, welding, material storage, cleaning solvents, abrasive blasting, painting, oil/water separation, and wastewater treatment and combustion would require permits. Permits would need to be obtained for equipment associated with these activities from the SJVAPCD and would need to comply with best available control technology requirements.

SJVAPCD CEQA Guidelines

The SJVAPCD prepared the Draft Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI) to assist lead agencies and project applicants in evaluating the potential air quality impacts of projects in the San Joaquin Valley Air Basin (SJVAPCD 2015a). The GAMAQI provides SJVAPCD-recommended procedures for evaluating potential air quality impacts during the CEQA environmental review process. The GAMAQI provides guidance on evaluating short-term (construction) and long-term (operational) air emissions. The most recent version of the GAMAQI was adopted March 2015 and was used in this evaluation and contains guidance on the following:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact under CEQA
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts
- Methods to mitigate air quality impacts
- Information for use in air quality assessments and environmental documents including air quality data, regulatory setting, climate, and topography

3.3.2 Pollutants for Analysis

Three general classes of air pollutants are of concern for this project: criteria pollutants, toxic air contaminants (TAC), and GHGs. Criteria pollutants are those for which the United States (U.S.) Environmental Protection Agency (USEPA) and the State of California have set ambient air quality standards, or that are chemical precursors to compounds for which ambient standards have been set. TACs of concern for the proposed project are seven Mobile Source Air Toxics (MSAT) identified by the USEPA as having significant contributions from mobile sources: acrolein, benzene, 1,3-butadiene, diesel particulate matter and diesel exhaust organic gases,

formaldehyde, naphthalene, and polycyclic organic matter. GHGs are gaseous compounds that limit the transmission of radiated heat from the earth's surface to the atmosphere. Section 4.0 of the Fresno to Bakersfield Section: Air Quality Technical Report includes additional detailed discussion of air quality impacts on human health (see pages 4-1 through 4-7).

3.3.2.1 Criteria Pollutants

Criteria pollutants applicable to the F-B LGA are listed below. These pollutants are discussed in further detail in Section 3.3.5.1 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-10 through 3.3-12).

- Ozone (O_3)
- Particulate matter
- Carbon monoxide
- Nitrogen dioxide
- Lead
- Sulfur dioxide

3.3.2.2 Toxic Air Contaminants

California law defines a TAC as an air pollutant that "may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health." The USEPA uses the term "hazardous air pollutant" in a similar sense. These TACs are discussed in further detail in Section 3.3.3.2 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-12).

3.3.2.3 Greenhouse Gases

GHGs trap heat in the atmosphere, keeping the earth's surface warmer than it otherwise would be. GHGs are discussed in further detail in Section 3.3.3.3 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-13).

3.3.3 Methods for Evaluating Impacts

The methods for evaluating impacts are intended to satisfy the federal and state requirements, including 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, RTPs 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 RTP 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.

Section 3.3.6 of the Fresno to Bakersfield Final EIR/EIS (Authority and FRA 2014a: pages 3.3-13 through 3.3-36) provides further detail on the methods used for evaluating potential impacts on air

quality, including developing study areas, background review, and establishing a reasonable baseline for analysis.

3.3.3.1 Study Areas for Analysis

Statewide

A statewide study area was identified to evaluate potential changes in air quality from large-scale, non-localized impacts, such as HSR power requirements, changes in air traffic, and project conformance with the State Implementation Plan (SIP).

Regional

The F-B LGA would potentially affect regional air pollutant concentrations in the SJVAB, which contains the F-B LGA. Figure 3.3-1 shows the entire Fresno to Bakersfield alignment as it is situated in the SJVAB, which includes all of Fresno, Kings, and Tulare counties, and a portion of Kern County. The SJVAB, which is approximately 250 miles long and 35 miles wide, is the second-largest air basin in the state. The SJVAB is defined by the mountain ranges of the Sierra Nevada to the east (8,000 to 14,000 feet in elevation), the Coast Range to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 8,000 feet in elevation). To the north, the valley opens to the sea at the Carquinez Strait, where the Sacramento–San Joaquin River Delta empties into San Francisco Bay.

Local

Local study areas are areas of potential major air emission activities along the project alignment, including areas near large construction activities and major traffic pattern changes. Local study areas are generally defined as areas along the alignment, within 1,000 feet of the proposed station, the maintenance of infrastructure facility (MOIF) and affected intersections. Analyses performed by CARB indicate that providing a separation of 1,000 feet from diesel sources and high-traffic areas would substantially reduce diesel particulate matter concentrations, public exposure, and asthma symptoms in children (California Environmental Protection Agency [Cal-EPA] and CARB 2005). Potential impacts from changes in carbon monoxide (CO), particulate matter smaller than or equal to 2.5 microns in diameter ($PM_{2.5}$), and particulate matter smaller than or equal to 10 microns in diameter (PM_{10}) concentrations caused by changes in local traffic conditions were evaluated at sensitive land uses located within 1,000 feet of intersections operating at level-of-service (LOS) D or worse.

3.3.3.2 Statewide and Regional Emission Calculations

The emission burden analysis of a project determines a project's potential overall impact on air quality. The proposed project would affect long-distance, city-to-city vehicular travel along freeways and highways throughout the state, as well as long-distance, city-to-city aircraft take-offs and landings. The project would also affect electrical demand throughout the state.

On-Road Vehicles

A summary of the methodology used to conduct the on-road vehicles analysis is described in Section 3.3.4.2 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-16). The LGA analysis utilized the methodology and results that were generated for the *Fresno to Bakersfield Final EIR/EIS*. As identified in the Fresno to Bakersfield Section Final EIR/EIS, an on-road vehicle emission analysis was conducted using average daily vehicle miles traveled (VMT) estimates and associated average daily speed estimates for each affected county. Emission factors were estimated by using the CARB emission factor program, EMission FACtors 2011 (EMFAC2011) for criteria pollutants and GHG emissions. Parameters were set in the program for each individual county to reflect conditions within the county, and statewide parameters were used to reflect statewide conditions. The analysis was conducted for the future No Project Alternative and HSR alternative for the project's design year, both of which are 2035; the existing condition (2015); and the Existing Condition Plus Project (2015).

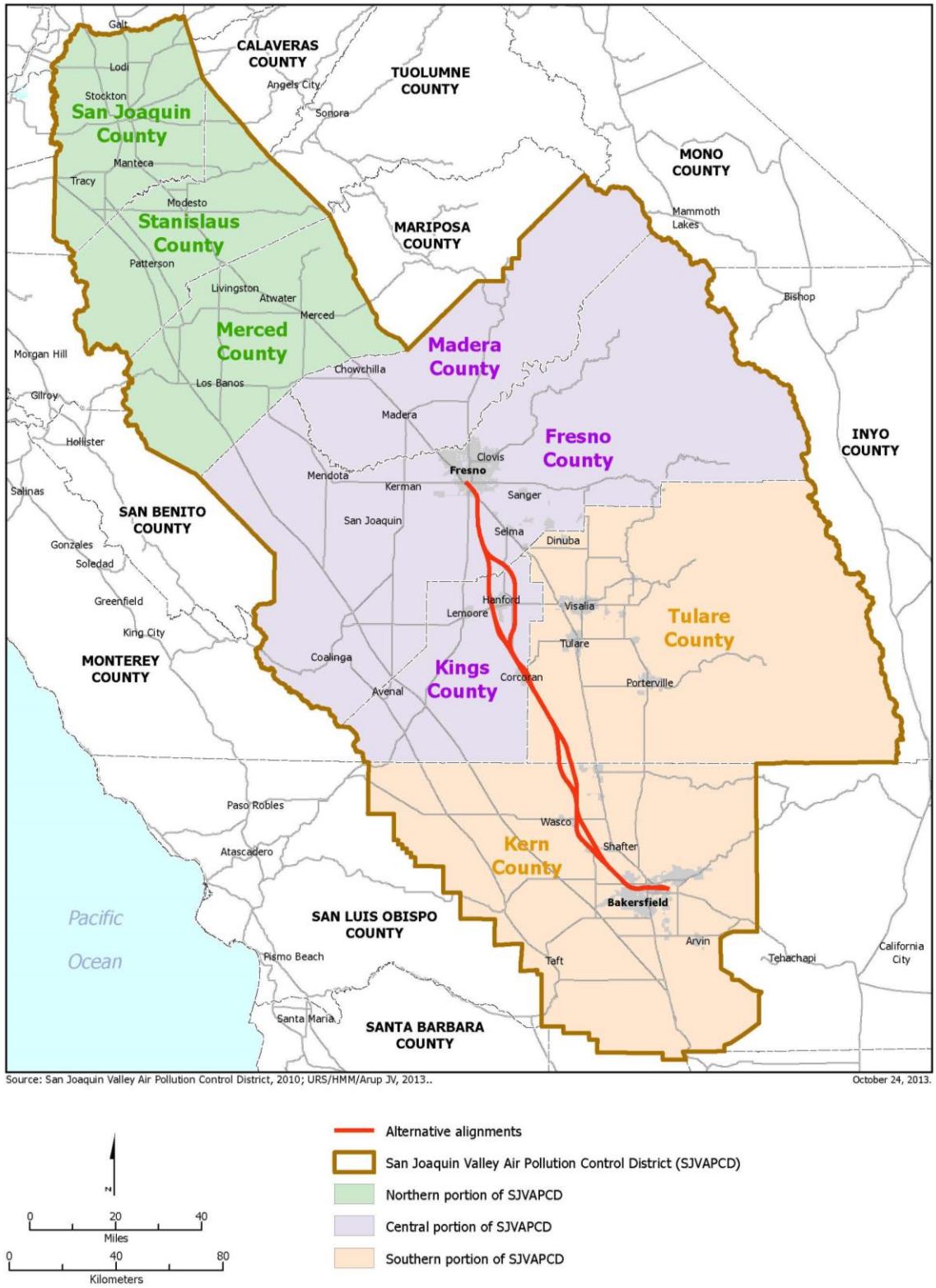

Figure 3.3-1 San Joaquin Valley Air Basin

To determine the overall pollutant burdens generated by on-road vehicles, the estimated VMT were multiplied by the specific pollutant's emission factors, which were based on speed, vehicle mix, and analysis year.

Airport Emissions

The methodology used to conduct the airport emissions analysis is described in Section 3.3.4.2 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-16). As identified in the Fresno to Bakersfield Section Final EIR/EIS, the Federal Aviation Administration's (FAA's) Emission and Dispersion Modeling System (EDMS) Version 5.1.3 (FAA 2009) was used to estimate airplane emissions. EDMS estimates emissions generated from a specified number of landing and take-off cycles. Along with the emissions from the planes themselves, emissions generated from associated ground maintenance requirements are included. Average plane emissions were calculated based on the profile of aircraft currently servicing the San Francisco to Los Angeles corridor. The number of air trips removed because of the HSR was estimated through the travel demand modeling analyses conducted for the project.

Power Plant Emissions

Section 3.3.4.2 of the Fresno to Bakersfield Section Final EIR/EIS provides a summary of the methodology used to conduct the power plant emissions analysis (Authority and FRA 2014a: page 3.3-16). As described in the Fresno to Bakersfield Section Final EIR/EIS, the HSR System, including the propulsion of the trains and the operations of the stations and maintenance facilities, would be powered by the state's electricity grid. Because no dedicated generating facilities are proposed for this project, no source facilities can be identified. Therefore, emission changes from power generation were predicted on a statewide level. In addition, because of the state requirement that an increasing fraction (33 percent by 2020) of electricity generated for the state's power portfolio must come from renewable energy sources, the emissions generated for the HSR System are expected to be lower in the future as compared to emissions estimated for this analysis, which are based on the state's current power portfolio. In addition, the Authority has adopted a goal to purchase the HSR System's power from renewable energy providers.

3.3.3.3 Local Operational Emission Sources at HSR Station

Emissions associated with operation of the proposed F-B LGA HSR station would primarily result from space heating and facility landscaping, energy consumption for facility lighting, indirect emissions associated with water use and solid waste disposal, emergency generator testing, CO emissions from vehicle activity at the parking structures and employee and passenger traffic (refer to Fresno to Bakersfield Section Final EIR/EIS Section 6.2.3). Emissions from deliveries to the HSR stations are considered negligible.

Emissions of criteria pollutants and GHGs were estimated for operation of the Bakersfield HSR station for the design year of 2035. The methodology used to calculate emissions from area and stationary sources, indirect electricity, indirect water indirect solid waste, and emergency generators are described in Section 3.3.4.3 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-16 through 3.3-18). The same methodology was applied to calculate these types of emissions for the F-B LGA.

3.3.3.4 Microscale CO Analysis

CO hot-spot analyses were conducted to evaluate the potential air quality impacts of the F-B LGA-related changes in traffic conditions along heavily traveled roadways, congested intersections, primarily due to changes in intersection traffic volumes based on the change of location for the proposed train station and parking areas. Methodology for the analysis is discussed in Section 3.3.4.4 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-18 through 3.3-20).

CO concentrations were predicted for the existing conditions (2015) and the project's design year (2035). Traffic data for the air quality analysis were derived from traffic counts and other information developed as part of an overall traffic analysis for the project. The microscale CO

analysis was performed based on data from this analysis for the a.m. and p.m. peak traffic periods. These are the periods when maximum traffic volumes occur on local streets and when the greatest traffic and air quality effects of the proposed project are expected.

3.3.3.5 Particulate Matter Hot-Spot Analysis

Although the HSR portion of the project is subject to the general conformity guidelines and not the transportation conformity guidelines, the project vicinity is classified as a nonattainment area for $PM_{2.5}$ and a federal maintenance area for PM_{10}. Therefore, a hot-spot analysis following the USEPA's 2010 *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (USEPA 2010) was conducted for the *Fresno to Bakersfield Section Final EIR/EIS*, which included the May 2014 Project, and for the Fresno to Bakersfield Section including the F-B LGA. The analysis focused on potential air quality concerns under NEPA from project effects on roads and followed the recommended practice in the USEPA's Final Rule regarding the localized or "hot-spot" analysis of $PM_{2.5}$ and PM_{10} (40 Code of Federal Regulations [C.F.R.] Part 93). Specific methodology related to the particulate matter hot-spot analysis is described in Section 3.3.4.5 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-21).

3.3.3.6 Mobile Source Air Toxics Analysis

The methodology for evaluating MSAT is described in Section 3.3.4.6 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-21 through 3.3-23). The project has low potential for MSAT impacts, because the HSR would use electric multiple unit EMUs trains, with the power distributed to each train car via the overhead contact system. Operation of the EMUs would not generate combustion emissions; therefore, no toxic emissions would be expected from operation of the HSR. Additionally, as with the May 2014 Project, the LGA alternative would decrease regional VMT and MSAT emissions compared the existing conditions and No Project Alternative, which would reduce the amount of MSATs emitted from highways and other roadways in the region. Accordingly, a qualitative analysis was used to provide a basis for identifying and comparing the potential differences in MSAT emissions. The qualitative assessment is derived, in part, from a study conducted by the Federal Highway Administration (FHWA) titled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2010).

3.3.3.7 Asbestos

Asbestos minerals occur in rocks and soil as the result of natural geologic processes, and are a known human carcinogen. Asbestos causes cancers of the lung and the lining of internal organs, as well as asbestosis and pleural disease, which inhibit lung function. The USEPA is addressing concerns about potential effects of naturally occurring asbestos (NOA) in a number of areas in California. The methodology used to determine if NOA would be located within the project vicinity was based on a California Department of Conservation, Division of Mines and Geology (CDMG) report titled *A General Location Guide for Ultramafic Rocks in California Areas More Likely to Contain Naturally Occurring Asbestos* (CDMG 2000), as described in Section 3.3.4.7 of the *Fresno to Bakersfield Section Final EIR/EIS* (Authority and FRA 2014a: page 3.3-24).

3.3.3.8 Greenhouse Gas Analysis

The proposed project would reduce long-distance, city-to-city travel along freeways and highways throughout the state, as well as long-distance, city-to-city aircraft take-offs and landings. The project would also increase electrical demand throughout the state. These elements would affect GHG emissions on both a statewide and regional study area level. The following sections discuss the methodology for estimating GHG emissions associated with operation of the project. The methodology for estimating GHG emissions associated with construction is included in Section 3.3.4.10, Construction Phase Analysis, below.

On-Road Vehicles Emissions

On-road vehicle GHG emissions were estimated using the same methodology as described in Section 3.3.3.2, Statewide and Regional Emission Calculations, of this Draft Supplemental EIR/EIS.

Airport Emissions

Plane emissions were calculated by using the fuel consumption factors and emission factors from CARB's *2000–2009 Greenhouse Gas Emissions Inventory Technical Support Document* and the accompanying appendix. The emission factors include both landing/take-off and cruise operations (formula: plane emission per flight = fuel consumption * emission factor; plane emission = flights removed * plane emission per flight). Average plane GHG emissions are calculated based on the profile of the aircraft currently servicing the San Francisco to Los Angeles corridor. The number of air trips removed due to the HSR project was estimated through the travel demand modeling analysis conducted for the project.

Power Plant Emissions

The electrical demands due to propulsion of the trains and operation of the station and maintenance facilities were calculated as part of the project design. An average GHG emission factor of 650 pounds of CO_2e for each megawatt-hour required was provided by CARB. This factor represents the estimated emission rate for a new electrical load on the system. The GHG estimates used in this analysis for the propulsion of the trains include the use of regenerative brake power.

The HSR System will be powered by the state's electric grid. Because no dedicated generating facilities are proposed for this project, no specific source facilities can be identified. GHG emission changes from power generation were therefore predicted on a statewide level. In addition, because of the state requirement that an increasing fraction (33 percent by 2020 and 50 percent by 2030) of electricity generated for the state's power portfolio come from renewable energy sources, the emissions generated for the HSR System are expected to be lower in the future when compared with the emissions estimated for this analysis, which are based on the state's current power portfolio.

3.3.3.9 MOIF Operations Impact Analysis

The F-B LGA would include a MOIF, which would include equipment and supplies for maintaining the HSR infrastructure such as track, traction power, and signal systems. The proposed MOIF would be located in the City of Shafter between Fresno Avenue and Poplar Avenue. The lead tracks for the MOIF extend approximately 300 feet past the northern terminus of the F-B LGA and south of Fresno Avenue. The facility would include heavy-duty equipment (e.g., cranes, backhoes, loaders, and emergency generators) and heavy-duty delivery trucks. Measures would be incorporated to minimize atmospheric emissions from these sources, such as the use of electric yard trains to move train cars and electric locomotives around the site and the use of diesel-retrofits on heavy-duty diesel engines.

3.3.3.10 Construction Phase Analysis

Construction phase emissions were quantitatively estimated for the earthwork and major civil construction activities in the Fresno to Bakersfield Section Final EIR/EIS. The major construction activities would account for the vast majority of earthwork, the largest number of diesel-powered off-road construction equipment, and the majority of material to be hauled along public streets compared to other minor construction activities of the project. Therefore, the regional emissions and localized emissions from these major activities would account for the majority of construction emissions that would be generated by the construction of the proposed project. Regional and localized emissions from minor construction activities, such as mobilization and demobilization, were quantified and would contribute to fewer emissions than the major construction activities listed above. The estimated construction emissions from these major as well as minor activities

were then used to estimate the regional air quality impacts and localized air quality impacts that would occur during the construction phase.

Methodologies and Assumptions

Construction emissions for the F-B LGA were calculated based on the construction emission estimates in the Fresno to Bakersfield Section Final EIR/EIS, with an adjustment factor applied to the number of pieces of equipment to reflect the F-B LGA construction schedule. This approach was taken as construction activities would be very similar to those identified in the Fresno to Bakersfield Final EIR/EIS, with some changes to account for the specific LGA features.

Section 3.3.4.10 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-29 through 3.3-33) further discusses the methodology and assumptions used to analyze construction impacts.

Project information used for the construction emission estimates and details of the construction emission calculations are provided in the F-B LGA: Air Quality Technical Report (Authority and FRA 2016).

Construction Activities

As identified in the Fresno to Bakersfield Section Final EIR/EIS, criteria pollutant and GHG emissions from regional building demolition and construction of the at-grade rail segments, elevated rail segments, retained-fill rail segments, traction power substations, industrial buildings at the heavy maintenance facility (HMF), and HSR stations, including parking garages and platform facilities, were calculated using emission factors from CARB's OFFROAD 2011 and 2007 models. For emission rates not available in OFFROAD 2011, rates from OFFROAD 2007 were conservatively applied. The use of emission rates from the OFFROAD models reflects the recommendation of CARB to capture the latest off-road construction assumptions. OFFROAD 2011 default load factors (the ratio of average equipment horsepower utilized to maximum equipment horsepower) and useful life parameters were used for emission estimates. Mobile-source emission burdens from worker vehicle trips and truck trips were calculated using VMT estimates and appropriate emission factors from EMFAC2011. Fugitive dust emissions from dirt and aggregate handling were calculated using emission factors derived from equations from U.S. EPA's AP-42 (USEPA 2006b).

Construction exhaust emissions from equipment, fugitive dust emissions from earthmoving activities, and emissions from worker vehicle trips, deliveries, and material hauling were calculated and compiled in a spreadsheet tool specific to the HSR project for each year of construction.

The construction of the Fresno to Bakersfield Section, including the F-B LGA, would occur between 2014 to 2023. The 2014 start date for the construction air analysis in this section is to account for the construction of the entire Fresno to Bakersfield alignment, which began in 2014. The construction air analysis includes minor adjustments in quantities due to the F-B LGA alternative. The local analysis focuses on just the F-B LGA study area, since portions of the study area were not evaluated on a microscale level in the Fresno to Bakersfield Section Final EIR/EIS and emission burdens in the previously studied areas are expected to be the same or lower for the F-B LGA.

Section 3.3.4.10 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-29 through 3.3-30) further discusses the methodology and assumptions used to analyze impacts associated with construction activities.

Material Hauling

Emissions from the exhaust of trucks used to haul material (including concrete slabs) to the construction site were calculated using the heavy-duty truck emission factors from EMFAC2011 and anticipated travel distances of haul trucks within the SJVAB. Ballast materials could potentially be hauled by rail within the air basin.

Ballast materials would be potentially transported from locations outside of the SJVAB. For the regional emission analysis, emissions from ballast material hauling were calculated using the

distance traveled within the SJVAB. Emissions from ballast material hauling by trucks and locomotives outside the SJVAB were also estimated based on the travel distances and transportation method (by rail or by truck) from the locations where ballast materials would be available. Locomotive emission factors using U.S. EPA guidance were used to estimate the rail emissions. Other construction materials would likely be delivered from supply facilities within the SJVAB.

Five potential quarries that provide ballast material were identified. Of these, three quarries, including Napa Quarry, Lake Herman Quarry, and San Rafael Rock Quarry, were included in the evaluation because of their proximity to the project construction site. These three quarries are all within 70 miles of the SJVAB border and would have material available for the project construction. The Bangor Rock Quarry Site A was included in the evaluation because it is located within 100 miles of the SJVAB border. In addition, this quarry would have material available for the project needs in quantities that exceed the material quantities available at the closest quarries. The other quarry, Kaiser Eagle Mountain Quarry, which is located 350 miles by rail (250 miles by road) from the border of the SJVAB, was analyzed because the annual production rate at this quarry was sufficient to meet construction material requirements.

The analysis was based on the assumption that ballast would be transferred either by diesel truck from the quarry to rail (if there was no rail head onsite) and then by rail to the border of SJVAB, entirely by rail to the border of the SJVAB (if there was a rail head onsite), or by diesel truck from the quarry to the border of the SJVAB. Emissions could potentially occur in several air basins and air districts outside SJVAB.

Concrete Batch Plants

Concrete would also be required for construction of bridges used to support the elevated sections of the alignment and for construction of the retaining wall used to support the retained-fill sections of the alignment. To provide enough concrete onsite, it is estimated that three batch plants would operate in the project area during construction of the alignment sections. Because the locations of the concrete batch plants are unknown, emissions were estimated based on the total amount of concrete required and emission factors from AP-42 Chapter 11.12–Concrete Batching (USEPA 2006a). Emissions from on-road truck trips associated with transporting material to and from the concrete batch plants were included in material-hauling emissions calculations.

Localized Impacts From Construction

The construction of the F-B LGA has the potential to exceed or contribute to exceedances of the ambient air quality standards and to cause adverse health impacts on nearby sensitive land uses. A detailed air dispersion modeling analysis and a health risk assessment were conducted to determine whether these impacts would be significant under CEQA. Specific details of the model parameters for the localized impacts analyses can be found in the Fresno to Bakersfield Section: Air Quality Technical Report (Authority and FRA 2014).

The U.S. EPA's AERMOD (version 12345) atmospheric dispersion model was used to simulate physical conditions and predict pollutant concentrations at locations near the fence line of construction site types. This allowed for an analysis of impacts at specified distances away from the boundaries of these prototypical construction sites. Guidance from U.S. EPA, state, and local air agencies was followed in conducting the air dispersion analysis. AERMOD is generally applied to estimate impacts from simple point-source emissions from stacks, as well as emissions from volume and area sources such as onsite mobile diesel equipment. The model accepts actual hourly meteorological observations and directly estimates maximum and average concentrations for various time periods.

A prototypical site layout was analyzed to evaluate each construction work area. Pollutant concentrations were estimated near the site boundary and in the surrounding area. The modeled concentrations were compared with the applicable NAAQS, CAAQS, and health-related guidelines to determine the level of impacts. The analysis used available meteorological data from the 5-year period from 2005 through 2009, as compiled by the SJVAPCD.

TAC concentrations at the maximally exposed individual (MEI) sensitive receptor locations were used to estimate the cancer risks and the overall non-cancer chronic and acute hazard index associated with construction emissions, following procedures developed by the California Office of Environmental Health Hazard Assessment (OEHHA) (2015). Details of the risk analysis are in the Fresno to Bakersfield Section: Air Quality Technical Report (Authority and FRA 2014). Cancer risks were compared with the SJVAPCD CEQA threshold of 10 in a million to assess the level of impacts. Chronic and acute hazard indices were compared with the SJVAPCD CEQA threshold of 1 to assess the level of impacts.

Section 3.3.4.10 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-31 through 3.3-32) further discusses the methodology and assumptions used to analyze localized impacts from construction.

3.3.3.11 Significance Thresholds

The following values were used to determine whether estimated project impacts are considered to be significant.

Federal

In the Fresno to Bakersfield Section Final EIR/EIS, analysts applied specified thresholds for each resource topic to assess whether the intensity of each impact is negligible, moderate, or substantial for the Build Alternatives, and provided a conclusion of whether the impact was "significant". Since the Fresno to Bakersfield Section Final EIR/EIS does not evaluate the May 2014 Project as a discrete subsection of the Fresno to Bakersfield Project (as it did for example for the Allensworth Bypass), it does not provide conclusions using intensity thresholds for the May 2014 Project; therefore, intensity thresholds are not used for the F-B LGA. Instead, the evaluation of impacts under NEPA in this Draft Supplemental EIR/EIS focuses on a comprehensive discussion of the project's potential impacts in terms of context, intensity, and duration and provides agency decision makers and the public with an apples-to-apples comparison between the May 2014 Project and the F-B LGA. Per NEPA regulations, regional project emissions are compared with the general conformity (GC) *de minimis* thresholds on a calendar-year basis. If the GC *de minimis* thresholds are exceeded for any calendar year in which emissions occur, a GC determination is required. In addition, project emissions may not cause new violations or exacerbate an existing violation of NAAQS. Table 3.3-2 presents the *de minimis* thresholds applicable to the HSR project.

State

The following CEQA criteria are used to determine whether the HSR project would result in a significant impact on air quality and global climate change:

- Conflict with or obstruct implementation of the applicable air quality plan
- Exceed or contribute to an exceedance of any air quality standard or contribute substantially to an existing or projected air quality violation (see discussion immediately below under "Local")
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for O_3 precursors)
- Expose sensitive receptors to substantial pollutant concentrations
- Create objectionable odors affecting a substantial number of people
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for reducing the emissions of GHG.

Table 3.3-2 General Conformity Thresholds

Pollutant	Federal Attainment Status	Threshold Values (tpy)[1]
NO_2	Attainment	N/A
Ozone precursor (NO_X)[2]	Nonattainment: Extreme	10
Ozone precursor (VOCs)[2]	Nonattainment: Extreme	10
CO[3]	Maintenance	100
SO_x	Attainment	N/A
$PM_{2.5}$	Nonattainment	100
$PM_{2.5}$ precursor (SO_2)[4]	Nonattainment	100
PM_{10}	Maintenance	100
Lead	No designation	N/A

Sources: SJVAPCD, 2013; USEPA, 2016b

1 Thresholds from 40 C.F.R. 51 and 93 (USEPA 2008).

2 Ozone reclassifications were made by the USEPA on May 5, 2010.

3 Only the urban portions of Fresno County and Kern County are maintenance areas for CO.

4 SO_2 has a GC threshold of 100 tpy. Due to the stringent requirement of using ultra-low-sulfur-content diesel in California, emissions of SO_2 anticipated from the project are expected to be negligible compared to the threshold.

C.F.R. = Code of Federal Regulations
CO = carbon monoxide
GC = general conformity
N/A = not applicable
NO_2 = nitrogen dioxide
NO_X = nitrogen oxides
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
SO_x = sulfur oxide
tpy = ton(s) per year
USEPA = U.S. Environmental Protection Agency
VOC = volatile organic compound

Quantitative emission thresholds that can be used to evaluate the significance level of impacts have been developed by SJVAPCD and are discussed in the following section.

Local

The Fresno to Bakersfield Section Final EIR/EIS summarizes the 2012 GAMAQI (SJVAPCD 2012), which contains the emissions thresholds used to evaluate the significance of a project's emissions with regard to air quality standards. The GAMAQI was last updated in 2015. If a project's emissions are below the significance thresholds for construction and operational phases, the impact would be considered less than significant under CEQA and would not lead to a violation of an ambient air quality standard or conflict with an air quality plan. If either the construction- or operational-phase emissions are greater than these values, impacts for that phase would be considered potentially significant unless localized air-dispersion modeling can demonstrate that the emissions would not cause or contribute substantially to an existing or projected air quality violation of an ambient air quality standard.

For nitrogen dioxide (NO_2) and sulfur dioxide (SO_2), the threshold is the ambient air quality standard for each respective pollutant. 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 with the threshold.

Pre-project concentrations of PM_{10} and $PM_{2.5}$ in the SJVAB exceed their respective ambient air quality standards. Therefore, SJVAPCD recommends comparing the incremental increase in PM_{10} concentrations to the applicable significant impact level (SIL) for PM_{10}. For construction, the SJVAPCD-recommended SILs are 10.4 micrograms per cubic meter ($\mu g/m^3$) for the 24-hour average concentration and 2.08 $\mu g/m^3$ for the annual average concentration. SJVAPCD currently recommends that these SILs be used to evaluate construction PM_{10} emissions (SJVAPCD 2015a). For operations, the SJVAPCD-recommended SILs are 5 $\mu g/m^3$ for the 24-hour average concentration and 1 $\mu g/m^3$ for the annual average concentration. These operational SILs are used to evaluate operational PM_{10} and $PM_{2.5}$ emissions. Therefore, an incremental increase that

does not exceed these SILs would not be considered to substantially contribute to further exceedances of the ambient air quality standards.

Additionally, per the SJVAPCD GAMAQI, if a project is individually significant, it is also considered cumulatively significant under CEQA. Therefore, the thresholds listed in Table 3.3-3 are also the cumulative significance thresholds for the project.

Table 3.3-3 SJVAPCD CEQA Construction and Operational Thresholds of Significance

Pollutant/ Precursor	Construction Emission Thresholds (tons/year)	Operational Emissions for Permitted Equipment and Activities (tons/year)	Operational Emissions for Nonpermitted Equipment and Activities (tons/year)
CO	100	100	100
NO_X	10	10	10
ROG	10	10	10
SO_x	27	27	27
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15

Source: SJVAPCD, 2015a
CEQA = California Environmental Quality Act
NO_X = nitrogen oxides
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
ROG = reactive organic gas
SJVAPCD = San Joaquin Valley Air Pollution Control District
tpy = ton(s) per year

The significance of the impacts of the emissions from construction, operational nonpermitted equipment and activities, and operational permitted equipment and activities are evaluated separately. The thresholds of significance are on a calendar year basis. For construction emissions, the annual emissions are evaluated on a rolling 12-month period.

3.3.4 Affected Environment

This section discusses the affected environment related to air quality and global climate change in the F-B LGA and May 2014 Project study areas.

3.3.4.1 Summary of the May 2014 Project Affected Environment

This section provides a summary of the affected environment of the May 2014 Project using information from the Fresno to Bakersfield Section Final EIR/EIS. The May 2014 Project is the comparable portion of the Preferred Alternative used to compare impacts to the F-B LGA. The affected environment would not differ between the May 2014 Project and F-B LGA.

The May 2014 Project is located within the SJVAB. Pollutants of concern within the SJVAB include both criteria pollutants and toxic air contaminants, including: ozone, CO, suspended particulate matter (PM_{10} and $PM_{2.5}$), NO_x, SO_2, TACs, and GHGs. Under the federal criteria, the SJVAB is currently designated as nonattainment for the 8-hour O_3 standard, the 1997 $PM_{2.5}$ standard (annual standard of 15 micrograms/cubic meter [µg/m^3] and 24-hour standard of 65 µg/m^3), and the 2006 24-hour $PM_{2.5}$ standard (35 µg/m^3). The SJVAB is a maintenance area for PM_{10}; and the Fresno and Bakersfield Urbanized Areas are designated as maintenance areas for CO. The SJVAB is in attainment for the NO_2 and SO_2 standard, and unclassified for lead.

Under the state criteria, the SJVAB is currently designated as nonattainment for the 1-hour O_3 and 8-hour O_3, PM_{10}, and $PM_{2.5}$ standards. The SJVAB is an attainment/unclassified area for the state CO standard and an attainment area for the state NO_2, SO_2, and lead standards. The SJVAB is an unclassified area for the state hydrogen sulfide and the visibility-reducing particle standards; it is an attainment area for the sulfates and vinyl chloride standards.

Planning documents for pollutants for which the May 2014 Project study area is classified as a federal nonattainment or maintenance area are developed by the SJVAPCD and CARB and

approved by USEPA. The planning documents relevant to the May 2014 Project's study area include: 1-Hour O_3 Attainment Plan, 8-Hour O_3 Attainment Plan, PM_{10} Maintenance Plan, $PM_{2.5}$ Attainment Plan, and CO Maintenance Plan.

3.3.4.2 Fresno to Bakersfield Locally Generated Alternative

Local Meteorological Conditions

The rate and location of pollutant emissions and the meteorological conditions that influence movement and dispersal of pollutants in the atmosphere affect air quality. The hills and mountains surrounding the San Joaquin Valley restrict air movement through and out of the majority of the basin. The valley's weather conditions include frequent temperature inversions; long, hot summers; and stagnant, foggy winters, all of which are conducive to forming and retaining air pollutants (SJVAPCD 2011). Meteorological and climate conditions of the SJVAB are further described in Section 3.3.5.1 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-36).

Local Monitored Air Quality Data

CARB maintains ambient air monitoring stations for criteria pollutants throughout California. The stations closest to the F-B LGA alignment are the 548 Walker Street station in Shafter, the 2000 S Union Avenue station in Bakersfield, and the 5558 California Avenue station in Bakersfield (Figure 3.3-2). These stations monitor NO_2, O_3, PM_{10}, CO, and $PM_{2.5}$. The land uses in the region range from urban and residential to rural and agricultural, and these stations represent these land use types. Air quality standards, primarily for O_3 and particulate matter, have been exceeded in the SJVAB because of existing industrial, mobile, and agricultural sources. Table 3.3-4 summarizes the results of ambient monitoring at three stations in the vicinity of the F-B LGA from 2013 through 2015. A brief summary of the monitoring data includes the following:

- Monitored data from 2013 through 2015 do not exceed either the state or federal standards for CO or NO_2.
- O_3 values for the region exceed the state and national standards for all stations for years 2013 through 2015.
- The PM_{10} values for the region exceed the state 24-hour PM_{10} standard for the years 2013 through 2015 at the 5558 California Avenue, Bakersfield site; this station exceeded the national standard once in 2014. No measurements were recorded at the S Union Avenue Bakersfield and Shafter sites.
- The 5558 California Avenue, Bakersfield site exceeded the national $PM_{2.5}$ standard for the years 2013 through 2015. The S Union Avenue Bakersfield and Shafter sites did not record $PM_{2.5}$ during this time.
- No SO_2 data were collected in the project vicinity.

Figure 3.3-2 Air Quality Monitoring Stations Closest to Project

Table 3.3-4 Ambient Criterial Pollutant Concentration Data at Air Quality Monitoring Stations Closest to the Project

Air Pollutant	Standard/Exceedance	548 Walker Street, Shafter			2000 S Union Avenue, Bakersfield			5558 California Avenue, Bakersfield		
		2013	2014	2015	2013	2014	2015	2013	2014	2015
Carbon Monoxide (CO)[a]	Year Coverage	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M
	Max. 1-hour Concentration (ppm)	N/M	N/M	N/M	1.8	1.9	1.7	1.8	1.9	1.7
	Max. 8-hour Concentration (ppm)	N/M	N/M	N/M	1.2	1.2	1.0	1.2	1.2	1.0
	# Days > Federal 1-hour Std. of >35 ppm	N/M	N/M	N/M	0	0	0	0	0	0
	# Days > Federal 8-hour Std. of >9 ppm	N/M	N/M	N/M	0	0	0	0	0	0
	# Days > California 8-hour Std. of >9 ppm	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M
Ozone (O_3)	Year Coverage[b]	54%	99%	95%	81%	94%	94%	98%	81%	99%
	Max. 1-hour Concentration (ppm)	0.112	0.100	0.104	0.109	0.108	0.118	0.107	0.102	0.104
	Max. 8-hour Concentration (ppm)	0.096	0.087	0.090	0.102	0.095	0.106	0.099*	0.093*	0.097*
	# Days > Federal 8-hour Std. of >0.075 ppm	5	11	17	23	32	55	22	20	28
	# Days > California 1-hour Std. of >0.09 ppm	1	2	3	6	10	23	3	3	6
	# Days > California 8-hour Std. of >0.07 ppm	19	28	34	81	94	94	47	36	54
Nitrogen Dioxide (NO_2)	Year Coverage	98%	100%	97%	96%	99%	89%	75%	42%	97%
	Max. 1-hour Concentration (ppm)	58.5	58.7	45.4	65.0	64.0	55.0	55.4	60.9	54.5
	Annual Average (ppm)	14	11	9	14	13	12	N/M	N/M	11
	# Days > California 1-hour Std. of >0.18 ppm	0	0	0	0	0	0	0	0	0
Sulfur Dioxide (SO_2)	Year Coverage	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M
	Max. 24-hour Concentration (ppm)	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M
	Annual Average (ppm)	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M
	# Days > California 24-hour Std. of >0.04 ppm	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M

Air Pollutant	Standard/Exceedance	548 Walker Street, **Shafter**			**2000 S Union Avenue, Bakersfield**			**5558 California Avenue, Bakersfield**		
		2013	**2014**	**2015**	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**
Respirable Particulate Matter (PM_{10})	Year Coverage	N/M	N/M	N/M	N/M	N/M	N/M	46%	58%	99%
	Max. 24-hour Concentration (µg/m^3)	N/M	N/M	N/M	N/M	N/M	N/M	120.7	430.1	104.7
	# Days > Federal 24-hour Std. of >150 µg/m^3	N/M	N/M	N/M	N/M	N/M	N/M	0	1	0
	# Days > California 24-hour Std. of >50 µg/m^3	N/M	N/M	N/M	N/M	N/M	N/M	16	69	20
	Annual Average[c] (µg/m^3)	N/M	N/M	N/M	N/M	N/M	N/M	47.0	55.9	44.5
Fine Particulate Matter ($PM_{2.5}$)	Year Coverage	N/M	N/M	N/M	N/M	N/M	N/M	92%	95%	91%
	Max. 24-hour Concentration (µg/m^3)	N/M	N/M	N/M	N/M	N/M	N/M	111.7	101.9	107.8
	State Annual Average (µg/m^3)	N/M	N/M	N/M	N/M	N/M	N/M	N/M	18.6	16.6
	# Days > Federal 24-hour Std. of >35 µg/m^3	N/M	N/M	N/M	N/M	N/M	N/M	44	37	29
	Annual Average[c] (µg/m^3)	N/M	N/M	N/M	N/M	N/M	N/M	19.9	18.5	16.2

Sources: CARB, 2016b and USEPA, 2016b
[a] Data is from the 2000 S Union Avenue, Bakersfield monitoring site.
[b] Coverage is for 8-hour standard.
[c] Coverage is for national standard.
> = greater than
* = Exceeds annual NAAQS
µg/m^3 = micrograms per cubic meter
Max. = maximum
N/M = not monitored
N/A = not available
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
ppm = parts per million
Std. = standard
USEPA = U.S. Environmental Protection Agency

Attainment Status of Study Area

Both the USEPA and CARB designate each county (or portions of counties) within California as attainment, maintenance, or nonattainment based on the area's ability to maintain ambient air concentrations below the air quality standards. Areas are designated as attainment if ambient air concentrations of a criteria pollutant are below the ambient standards. Areas are designated as nonattainment if ambient air concentrations are above the ambient standards. Areas previously designated nonattainment that subsequently demonstrated compliance with the standards are designated as maintenance. In February 2016, CARB submitted a final recommendation to the USEPA with a supporting document indicating that the San Joaquin Valley be designated in attainment of the federal one-hour O_3 standard. The USEPA is expected to act upon this submittal and recommendation within the year. Table 3.3-5 summarizes the current federal (under NAAQS) and state (under CAAQS) attainment status for the basin.

Table 3.3-5 Federal and State Attainment Status

Pollutants	Federal Classification	State Classification
O_3	Nonattainment (Extreme)	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment/Unclassified	Attainment
NO_2	Attainment/Unclassified	Attainment
SO_2	Attainment/Unclassified	Attainment

Source: SJVAPCD 2013
CO = carbon monoxide
NO_x = nitrogen oxide
O_3 = ozone
Pb = lead
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
SO_2 = sulfur dioxide

Air Quality Plans and Programs

State Implementation Plan

Planning documents for pollutants for which the study area is classified as a federal nonattainment or maintenance area are developed by the SJVAPCD and CARB and approved by the USEPA.

Table 3.3-6 summarizes the latest planning documents relevant to the project's study area.

Table 3.3-6 Federal and State Attainment Status

Title	Status
1-Hour O_3 Attainment Plan	On March 8, 2010, the USEPA approved the San Joaquin Valley's 2004 Extreme Ozone Attainment Plan for the 1-hour O_3 standard. However, effective June 15, 2005, the USEPA revoked the federal 1-hour O_3 standard for areas, including SJVAB.[1]. Due to subsequent litigation, the USEPA withdrew its plan approval in November 2012, and the SJVAPCD and CARB withdrew this plan from consideration. SJVAPCD adopted a revised plan in September 2013 and is currently seeking CARB's approval.

Title	Status
8-hour O_3 Attainment Plan	On May 5, 2010, the USEPA reclassified the 8-hour O_3 nonattainment status of San Joaquin Valley from "serious" to "extreme." The reclassification requires the state to incorporate more stringent requirements, such as lower permitting thresholds and implementing reasonably available control technologies at more sources.[1] The 2007 Ozone Plan contained a comprehensive and exhaustive list of regulatory and incentive-based measures to reduce emissions of O_3 and particulate matter precursors throughout the San Joaquin Valley. On December 18, 2007, the SJVAPCD Governing Board adopted the plan with an amendment to extend the rule adoption schedule for organic waste operations. On January 8, 2009, the USEPA found that the motor vehicle budgets for the years 2008, 2020, and 2030 from the 2007 8-hour Ozone Plan were not adequate for transportation conformity purposes.[2]
PM_{10} Maintenance Plan	On September 25, 2008, the USEPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the 2007 PM_{10} Maintenance Plan.[3]
$PM_{2.5}$ Attainment Plan	The 2015 Plan for the 1997 $PM_{2.5}$ Standard, approved by the District Governing Board on April 16, 2015, will bring the San Joaquin Valley into attainment of the USEPA's 1997 $PM_{2.5}$ standard as expeditiously as practicable, but no later than December 31, 2020.[4] The plan provides measures designed to reduce emissions such that the valley will attain the federal standards as soon as possible.
CO Maintenance Plan	On July 22, 2004, CARB approved an update to the State Implementation Plan that shows how 10 areas, including the SJVAB, will maintain the CO standard through 2018. On November 30, 2005, the USEPA approved and promulgated the implementation plans and designation of areas for air quality purposes.[5]

Sources: [1] *San Joaquin Valley Air Pollution Control District (2004)*
[2] *San Joaquin Valley Air Pollution Control District (2007a)*
[3] *San Joaquin Valley Air Pollution Control District (2007b)*
[4] *San Joaquin Valley Air Pollution Control District (2015b)*
[5] *California Air Resources Board 2004*
CARB = California Air Resources Board
CO = carbon monoxide
NAAQS = National Ambient Air Quality Standards
O_3 = ozone
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
SJVAB = San Joaquin Valley Air Basin
SJVAPCD = San Joaquin Valley Air Pollution Control District
USEPA = U.S. Environmental Protection Agency

Transportation Plans and Programs

Regional Transportation Planning Agencies and Metropolitan Planning Organizations within the SJVAB and the study area (for the F-B LGA, the Kern Council of Governments) are responsible for preparing Regional Transportation Plans (RTP). RTPs address a region's transportation goals, objectives, and policies for the next 20 to 25 years, and identify the actions necessary to achieve those goals. Metropolitan Planning Organizations prepare Transportation Improvement Programs, which are five-year programs of proposed projects that incrementally develop the RTP and contain a listing of proposed transportation projects committed for funding. Transportation conformity projects are analyzed for air quality conformity with the State Implementation Plan as components of RTPs and Transportation Improvement Programs.

The RTP/Sustainable Communities Strategy (SCS) establishes a set of regional transportation goals, policies, and actions intended to guide development of the planned multimodal transportation systems in Kern County. The RTP focuses on new efforts to achieve and maintain federal air quality standards and, in doing so, will make significant progress toward state climate change goals. The RTP also includes measures to reduce emissions of $PM_{2.5}$ to achieve attainment plan goals. The SCS is intended to reduce GHG emissions from passenger vehicles and light-duty trucks by 5 percent per capita by 2020 and 10 percent per capita by 2035, as

compared to 2005. GHG emissions and vehicle trip reduction strategies include, but are not limited to, the construction of new transit lines, expanded passenger rail service, increased transit service, and a change in transit fares (Kern Council of Governments 2014). CARB accepted the Kern COG 2014 RTP/SCS determination that the plan, if implemented, would meet the 2020 and 2035 regional GHG reduction targets established by CARB (CARB 2015).

Sensitive Receptors

Within the localized study area, some locations are considered more sensitive to adverse effects from air pollution than others. These locations are termed sensitive receptors, and include schools, daycare facilities, elderly care establishments, medical facilities, and other areas that are populated with people considered more vulnerable to the effects of poor air quality. Analyses performed by CARB indicate that providing a separation of at least 1,000 feet from diesel sources and high-traffic areas would substantially reduce the exposure to air contaminants and decrease asthma symptoms in children (CARB 2005). Table 3.3-7 shows the sensitive receptors within 1,000 feet of the F Street Station.

Table 3.3-7 Distance Between Sensitive Receptors and the F Street Station

Sensitive Receptors	Distance (feet)
Sam Lynn Ball Park	1,000+
Valley Oaks Charter School	575
Westchester Town Homes	250
Single Family Residential on Spruce Street	850

Source: Authority and FRA, 2017

3.3.5 Environmental Consequences

As discussed in Section 1.1.3 of this Draft Supplemental EIR/EIS, the May 2014 Project is a component of the Preferred Alternative that was identified in the Fresno to Bakersfield Section Final EIR/EIS. The May 2014 Project consists of the portion of the BNSF Alternative from Poplar Avenue to Hageman Road and the Bakersfield Hybrid from Hageman Road to Oswell Street. This section summarizes the analysis of air quality impacts for the Fresno to Bakersfield Section with the May 2014 Project as a component and provides the impact analysis relating to air quality for the Fresno to Bakersfield Section with the F-B LGA as a component. Section 3.3.5.1 below provides an overview of impacts described for the Fresno to Bakersfield Section with the May 2014 Project included. Section 3.3.5.2 below characterizes impacts that would occur for the Fresno to Bakersfield Section including the F-B LGA.

3.3.5.1 Summary of Analysis for the May 2014 Project

This section provides a summary of the effects of the May 2014 Project using information from the Fresno to Bakersfield Section Final EIR/EIS.

Construction

Construction phase emissions were quantitatively estimated for the earthwork and major civil construction activities of the following components of the entire Fresno to Bakersfield Section including the May 2014 Project:

- At-grade guideway segments
- Elevated guideway segments
- Retained-fill guideway segments
- Substations
- HMF/maintenance-of-way facility
- HSR stations
- Roadways and roadway overpasses

These major construction activities would account for the vast majority of earthwork, the largest number of diesel-powered off-road construction equipment, and the majority of material to be hauled along public streets compared to other minor construction activities of the project. Therefore, the regional emissions and localized emissions from these major activities would account for the majority of construction emissions that would be generated by the construction of the proposed project. Regional and localized emissions from minor construction activities, such as mobilization and demobilization, were quantified and would contribute to fewer emissions than the major construction activities listed above. The estimated construction emissions from these major as well as minor activities were then used to estimate the regional air quality impacts and localized air quality impacts that would occur during the construction phase.

Criteria pollutant and GHG emissions from regional building demolition and construction of the at-grade rail segments, elevated rail segments, retained-fill rail segments, traction power substations, industrial buildings at the HMF, and HSR stations, including parking garages and platform facilities, were calculated using emission factors from CARB's OFFROAD 2011 and 2007 models (CARB 2011). The OFFROAD 2011 model provided the latest emission factors at the time for construction off-road equipment, and accounts for lower fleet population and growth factors due to the economic recession and updated load factors based on feedback from engine manufacturers (CARB 2010). For emission rates not available in OFFROAD 2011, rates from OFFROAD2007 were conservatively applied. The use of emission rates from the OFFROAD models reflects the recommendation of CARB to capture the latest off-road construction assumptions. OFFROAD 2011 default load factors (the ratio of average equipment horsepower utilized to maximum equipment horsepower) and useful life parameters were used for emission estimates. Mobile-source emission burdens from worker vehicle trips and truck trips were calculated using VMT estimates and appropriate emission factors from EMFAC2011. Fugitive dust emissions from dirt and aggregate handling were calculated using emission factors derived from equations from U.S. EPA's AP-42 (U.S. EPA 2006b).

Results of the analysis indicate construction of the May 2014 Project would have the potential to cause temporary and significant localized air quality impacts, including exceeding the applicable *de minimis* thresholds for specific criteria pollutants. Implementation of impact avoidance and minimization measures and mitigation measures during construction phases could reduce PM_{10} and $PM_{2.5}$ emissions by reducing fugitive dust and exhaust from construction and on-road vehicles. Mitigation measures could also reduce the quantity of other criteria pollutants (NO_X, volatile organic compounds [VOC], and CO) and GHG emissions by controlling exhaust emissions from construction and on-road vehicles. Finally, funding of emissions offsets for certain criteria pollutants would result in further mitigation leading to a "net zero" level of emission for NO_x and VOC.

Operation

Operation of the HSR alternatives including the May 2014 Project would provide a net regional air quality benefit. Operation of all HSR Build Alternatives, including the May 2014 Project would generally reduce regional criteria and GHG pollutant emissions, and would have less than significant impact under CEQA on air quality.

Intersections in the study area assessed for the May 2014 Project would not result in violations of CO NAAQS. Maximum modeled CO concentrations at intersections near the Fresno, Kings/Tulare Regional, and Bakersfield HSR Stations and HMF and parking facilities would be below NAAQS and CAAQS.

The May 2014 Project would provide regional benefits in reducing the area VMT resulting in reduced PM_{10} and $PM_{2.5}$ emissions associated with regional vehicle travel. For purposes of identifying and evaluating potential impacts, a PM hot-spot analysis was prepared for the May 2014 Project. Based on the analysis conducted for the project, the May 2014 Project 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 PM_{10}/$PM_{2.5}$ NAAQS during its operation. Therefore, quantitative $PM_{2.5}$ and PM_{10} 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 Preferred Alternative identified in the

Fresno to Bakersfield Section Final EIR/EIS, which included the May 2014 Project, was found to not likely cause an adverse impact on air quality for PM_{10}/$PM_{2.5}$ standards because, based on these criteria, it is not a project of air quality concern.

3.3.5.2 Fresno to Bakersfield Locally Generated Alternative

Construction Period Impacts

Impact AQ #1—Regional Air Quality Impacts During Construction

Construction of the full Fresno to Bakersfield Section, including the F-B LGA, would occur from 2014 to 2023. The 2014 start date for the construction air analysis in this section is to account for the construction of the entire Fresno to Bakersfield alignment, which began in 2014. The total unmitigated emissions (i.e., the actual estimated amounts/quantities) for construction of the F-B LGA are shown in Table 3.3-8, which include the incorporation of the Avoidance and Minimization Measures for dust control. The F-B LGA emissions were compared to the GC *de minimis* emission thresholds on a calendar-year basis; consequently, thresholds can be exceeded for any calendar year in which emissions occur. Table 3.3-8 provides a comparison of the HSR construction emissions for the F-B LGA over the total construction period for the entire Fresno to Bakersfield alignment and differentiates between the F-B LGA and the May 2014 Project alternatives. Details of emissions from the F-B LGA are presented in Table 3.3-9. Emissions presented include emissions from all construction phases of the HSR and the regional roadway realignment. The emission estimates presented in Table 3.3-9 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 3.3-8.

Table 3.3-8 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

Source: *Authority and FRA, 2017*

[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 PM_{10} 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
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
SO_2 = sulfur dioxide
VOC = volatile organic compound

As with the May 2014 Project, direct emissions from the construction phase of the F-B LGA would exceed the GC applicability thresholds for VOC and NO_X in certain calendar years in which construction would occur (see Table 3.3-9).

Purchase of offset emissions through a Voluntary Emission Reduction Agreement (VERA) with the SJVAPCD (Mitigation Measure AQ-MM#4) for VOC and NO_x would offset and reduce VOC and NO_X emissions to below the GC applicability thresholds.

Table 3.3-9 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 *de minimis* 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

Source: *Authority and FRA, 2017*

[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, SO_2 NO_x, ROG, VOC, PM_{10}, 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 PM_{10} 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] PM_{10} 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
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
ROG = reactive organic gas
SJVAB = San Joaquin Valley Air Basin
SJVAPCD = San Joaquin Valley Air Pollution Control District
SO_2 = sulfur dioxide
VOC = volatile organic compound

Construction emissions would exceed the mass emission SJVAPCD CEQA thresholds for VOC, CO, NO_x, PM_{10}, and $PM_{2.5}$ in some construction years. Therefore, construction emissions of these pollutants may cause significant impacts on air quality under CEQA. There is no mass emission CEQA threshold for SO_2 from SJVAPCD; however, SO_2 emissions are expected to be less than significant based on the emission results as shown in Table 3.3-9.

With onsite mitigation (i.e., AQ MM#1 and #2), VOC, CO, NO_x, PM_{10}, and $PM_{2.5}$ impacts would be reduced, but could remain significant under CEQA. As stated in SJVAPCD 2015 GAMAQI (SJVAPCD 2015), purchase of offset emissions through a Voluntary Emission Reduction Agreement (VERA) with the SJVAPCD (Mitigation Measure AQ-MM#4) for these pollutants would reduce impacts to less than significant after mitigation under CEQA.

Impact AQ #2—Compliance with Air Quality Plans

As with the May 2014 Project, emissions from construction of the F-B LGA would be temporary. However, based on the amount of construction to be completed, construction activities would involve heavy-duty construction equipment and would have the potential to cause adverse air quality impacts.

As with the Fresno to Bakersfield Section including the May 2014 Project and as shown in Table 3.3-9, VOC, CO and NO_X emissions associated with the Fresno to Bakersfield Section including the F-B LGA would exceed the GC applicability thresholds, while PM_{10} and $PM_{2.5}$ emissions would be below the GC applicability thresholds. Emissions above the mass emission thresholds set by the SJVAPCD would have the potential to conflict with or obstruct implementation of the SJVAPCD's air quality plans, which have been prepared to attain federal and state ambient air quality standards. VOC, CO, NO_x, PM_{10}, and $PM_{2.5}$ emissions would exceed the mass emission SJVAPCD thresholds and impede the implementation of the respective air quality plans, including plans prepared to attain federal ambient air quality standards.

As with the May 2014 Project, VOC, NO_x, PM_{10}, and $PM_{2.5}$ emissions associated with the F-B LGA would be greater than applicable mass emission CEQA significance thresholds, which would impede or obstruct implementation of the 8-hour SJVAPCD 2007 Ozone Plan, or the 2013 Plan for the Revoked 1-hour Ozone Standard the 2007 PM_{10} Maintenance Plan, and the 2015 $PM_{2.5}$ Plan. Therefore, this impact would be significant under CEQA for VOC, NO_x, PM_{10}, and $PM_{2.5}$ emissions.

With on-site mitigation (i.e., AQ MM#1 and #2), VOC, CO, NO_x, PM_{10}, and $PM_{2.5}$ impacts would be reduced but could remain significant under CEQA. As stated in the SJVAPCD 2015 GAMAQI (SJVAPCD 2015a), purchase of offset emissions through a VERA with the SJVAPCD (Mitigation Measure AQ-MM#4) for these pollutants would reduce impacts to less than significant after mitigation under CEQA.

Impact AQ # 3—Material-Hauling Emissions Outside of SJVAB

Construction emissions included in the regional impacts analysis (Impact AQ #1) considered emissions within the SJVAB. As with the May 2014 Project, the HSR track bed under the F-B LGA would be constructed using ballast, subballast, and concrete slabs. Subballast and concrete slabs would be available within the SJVAB; however, the ballast could potentially be transported from areas outside the SJVAB. As described in Section 3.3.6.3 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-52), emissions associated with transportation of ballast materials from outside the SJVAB to the border of the air basin were evaluated for five hauling scenarios from five quarries.

The emission results demonstrated that worst-case emissions would be above the GC thresholds for NO_x (25.18 tons per year of NO_x) in the South Coast Air Basin for four of the five scenarios analyzed; in the Salton Sea Air Basin (35.76 tons per year of NO_x) for one of the five scenarios analyzed; and in the Mojave Desert Air Basin (27.20 tons per year of NO_x) for one of the five scenarios analyzed. The emissions of NO_x in the other air basins (Sacramento Valley Air Basin and San Francisco Bay Area Air Basin) would be below the GC thresholds for all scenarios. The

emissions for all other pollutants would be below the GC thresholds for all scenarios in all air basins.

As with the May 2014 Project, emissions associated with material hauling would exceed the CEQA thresholds for NO_x for all scenarios in multiple air quality management districts (AQMD) or air pollution control districts. All other pollutants for these scenarios would be below the CEQA thresholds.

Under CEQA, the material-hauling emissions outside the SJVAB could exceed the South Coast AQMD (which includes both the South Coast Air Basin and Salton Sea Air Basin) CEQA NO_x thresholds in all five scenarios, and could exceed the Bay Area AQMD's CEQA NO_x thresholds for two of the scenarios. The material-hauling emissions could also exceed the Mojave Desert AQMD NO_x CEQA threshold for two of the scenarios.

Therefore, NO_x emissions could have a significant impact in the South Coast AQMD Bay Area AQMD, and Mojave Desert AQMD. Material-hauling emissions would be below the CEQA thresholds for all other air districts and pollutants, and would have insignificant impacts. Mitigation measures to reduce the material-hauling emission impacts are discussed in Section 3.3.7, Mitigation Measures and Avoidance and Minimization Measures (AQ-MM#2 and AQ-MM#5). With mitigation, impacts in these other air basins would be reduced to less than significant under CEQA.

Detailed analysis for the material-hauling emissions for all build options is presented in the Fresno to Bakersfield Section: Air Quality Technical Report (Authority and FRA 2014a). The analysis of hauling emissions is representative of the entire Fresno to Bakersfield Section including the May 2014 Project and the Fresno to Bakersfield Section including the F-B LGA because the estimated quantities of material that would be hauled would be similar for the two alternatives.

Impact AQ #4—Greenhouse Gas Emissions During Construction

As discussed in the Fresno to Bakersfield Section: Air Quality Technical Report (Authority and FRA 2014a), to conservatively estimate the amortized GHG emissions, the HSR project life is conservatively assumed to be only 25 years (although the actual project life would be much longer). The amortized GHG construction emissions for the F-B LGA would be 8,963 metric tons of CO_2e per year, as shown in Table 3.3-10. GHG emissions associated with construction and operation of the F-B LGA would be similar to those estimated for the May 2014 Project. As shown in Table 3.3-10 below, similar to the May 2014 Project, the F-B LGA construction GHG emissions would be offset in less than 12 months of the HSR operations because of car and plane trips removed in the Fresno to Bakersfield area. Additional emission reductions would be achieved statewide due to removed car and plane trips.

The HSR project's GHG emissions conform with AB 32 and SB 32. The scoping plan for AB 32 includes the implementation of the HSR project as a GHG reduction measure, estimating a 2020 reduction of 1 MMT of CO_2e emissions (CARB 2008). Although the current schedule for commencement of operation would not result in GHG emission reductions until approximately 2029, the HSR is still considered to be in conformance with AB 32 because the implementation of HSR is specifically highlighted as a GHG reduction measure in the scoping plan for AB 32. SB 32 effectively establishes a new greenhouse gas reduction goal for statewide emissions of 40 percent below 1990 levels by 2030. If train operations commence in 2029, then operation of HSR would contribute to the SB 32 goal of GHG emissions 40 percent below 1990 levels by 2030 and the EO S-3-05 goal of GHG emissions 80 percent under 1990 levels by 2050, and therefore implementation of the HSR would be considered to be in conformance with SB 32 and EO S-3-05. Therefore, construction GHG emissions associated with F-B LGA would be less than significant under CEQA.

Table 3.3-10 F-B LGA CO_2e Unmitigated Construction Emissions (metric tons/year)[a,b,c]

Year	F-B LGA	May 2014 Project
2014	51,141	51,661
2015	74,838	75,421
2016	51,017	51,561
2017	16,766	16,782
2018	18,509	18,509
2019	498	498
2020	271	271
2021	10,876	10,876
2022	111	111
2023	38	38
Total	**224,065**	**225,728**
Amortized GHG Emissions (averaged over 25 years)		
CO_2e per year	8,963	9,029
Payback of GHG Emissions (months)[d]		
Payback Period	7 or 12 months	7 or 12 months

Source: Authority and FRA, 2017

[a] Emissions represent GHG emissions associated with construction activities within the SJVAB. Emission factors for CO_2 do not account for improvements to technology. Project life is assumed to be 25 years.

[b] According to the USEPA, on average, CO_2 emissions are 95-99% of the total greenhouse gas emissions from a passenger vehicle, after accounting for the global warming potential of all GHGs (USEPA 2014). The remaining 1 to 5% is CH_4, N_2O, and HFC emissions Therefore, to account for the CH_4, N_2O, and HFC emissions, the CO_2 emissions were conservatively increased by 5% to calculate the CO_2e emissions. It was assumed that this approach for passenger vehicles was applicable to construction emissions sources.

[c] Construction emissions are lower from 2019 to 2020 and 2022 to 2023 because it was assumed that hauling would not occur during these periods.

[d] Payback periods were estimated by dividing the GHG emissions during construction years by the annual GHG emission reduction during project operation. See Tables 3.3-17 and 3.3-18 of the *Fresno to Bakersfield Section: Air Quality Technical Report* (California High-Speed Rail Authority and Federal Railroad Administration 2014) for operational GHG emissions reduction data.

CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
F-B LGA = Fresno to Bakersfield Locally Generated Alternative
GHG = greenhouse gas
HFCs = hydrofluorocarbons
HSR = high-speed rail
N_2O = nitrous oxide
RTP = regional transportation plan
SJVAB = San Joaquin Valley Air Basin
USEPA = U.S. Environmental Protection Agency

Local Impacts

Impact AQ #5—Asbestos and Lead-Based Paint Exposure During Construction

The demolition of asbestos-containing materials is subject to the limitations of the National Emissions Standards for Hazardous Air Pollutants regulations and would require an asbestos inspection. Although it is unknown at this time whether any of the buildings that will be demolished contains asbestos, the SJVAPCD's Compliance Division would be consulted before demolition of any structures begins. As described in Section 3.10, Hazardous Materials and Wastes, the project would include strict compliance with existing asbestos regulations as part of project design.

Compliance with existing asbestos regulations would prevent asbestos from being a significant impact under CEQA (SJVAPCD 2015a). Therefore, the localized impacts from asbestos and

lead-based paint exposure would be less than significant under CEQA. Kern County is designated by the CDMG as an area likely to contain NOA. However, the specific locations of the counties where project construction would occur are in areas designated not likely to contain NOA (CDMG 2000). Therefore, NOA would not likely be disturbed during construction.

Buildings in the study area might be contaminated with residual lead, which was used as a pigment and drying agent in oil-based paint until the Lead-Based Paint Poisoning Prevention Act of 1971 prohibited such use. If encountered during structure demolitions and relocations, lead-based paint and asbestos will be handled and disposed of in accordance with applicable standards. Section 3.10, Hazardous Materials and Wastes, discusses potential issues concerning lead-based paint during project construction.

The Authority requires its Design Build contractors to prepare Health and Safety Plans for their projects. The Tutor Perini, Zachry, Parsons Joint Venture submitted a Health and Safety Plan in February 2014. The Plan includes Best Management Practices required to minimize human exposure to asbestos-containing materials. The contracts for Fresno to Bakersfield Section Construction Packages 2, 3, and 4 have the same requirements for a Health and Safety Plan. The Health and Safety Plans are referenced and discussed in Section 3.10, Hazardous Materials and Wastes, and Section 3.11, Safety and Security, of this Draft Supplemental EIR/EIS.

Impact AQ #6—Localized Air Quality Impacts During Guideway/Alignment Construction

Construction emissions have the potential to cause elevated criteria pollutant concentrations. These elevated concentrations may cause or contribute to exceedances of the NAAQS and CAAQS, which are established concentrations of criteria pollutants that provide public health protection. 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 TACs, such as diesel particulate matter, which may present cancer risks. According to the California Office of Environmental Health Hazard Assessment (OEHHA) guidance, cancer risk is defined as the predicted risk of cancer (unitless) over a lifetime based on a long-term (70-year) continuous exposure, and is usually expressed as chances per million persons exposed (OEHHA 2015).

The construction emissions associated with the guideway/alignment construction includes several different phases such as mobilization, demolition, earth moving, land clearing, track construction at grade and elevated structures. These emissions were modeled for the May 2014 Project using USEPA's AERMOD atmospheric dispersion model to predict pollutant concentrations at locations near the construction of the guideway/alignment. Meteorological data from the Fresno County Airport was used since the SJVAPCD Air Dispersion Modeling Guidance indicates that this station has the most conservative wind speeds for the air district (SJVAPCD 2007c). Since it is not practical to model the entire 114-mile HSR segment, a 2-mile section of track was modeled as this was determined to be an appropriate segment length to represent a reasonable work area, and emissions from further away are unlikely to have any appreciable impact to local sensitive receptors. 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 NAAQS and CAAQS. The modeled diesel particulate matter (DPM) concentrations were used to determine the exposure dose and associated health impact following OEHHA 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: Air Quality Technical Report.

The modeling for the May 2014 Project informs the conclusions about construction activities associated with the F-B LGA because construction air emissions are largely a function of alignment length. The Fresno to Bakersfield Section Final EIR/EIS included calculations of the emissions for the 114 miles associated with the May 2014 Project. The construction air quality emission values referenced in Table 3.3-9 represent 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.

According to the construction localized impact air dispersion modeling conducted for the May 2014 Project, construction activities along the guideway/alignment would not exceed the applicable NAAQS and CAAQS or substantially contribute to further exacerbation of exceedances of PM_{10} and $PM_{2.5}$ standards. The health risk assessment concludes that the incremental increase in cancer risk associated with the diesel particulate matter emissions from construction equipment exhaust would not exceed the applicable threshold of 10 in 1 million.

As shown in Table 3.3-9, mass emission generation associated with the F-B LGA would be similar to the emissions evaluated for the May 2014 Project. Therefore, emissions associated with the F-B LGA would also not be expected to exceed NAAQS or CAAQS or substantially contribute to further exacerbation of exceedances of PM_{10} and $PM_{2.5}$ standards due to similar site meteorology of the two alignments. Emissions associated with the F-B LGA would be expected to be lower than those estimated for the May 2014 Project, as shown in Table 3.3-8. Therefore, implementation of the F-B LGA would also not cause or contribute to exceedances of the NAAQS and CAAQS.

Since the construction activities associated with the guideway/alignment would occur near the sensitive receptors for short periods of time, and air dispersion modeling and health risk assessments estimate that concentration levels and health risks would be below applicable thresholds, the localized air quality impacts would be less than significant under CEQA

Impact AQ #7—Localized Air Quality Impacts to Schools and Other Sensitive Receptors During Station Construction

Station construction would take place over a period of four years, and sensitive receptors at schools, residences, and health-care facilities near the station construction areas could potentially be exposed to health impacts from elevated concentrations of criteria pollutants and cancer risks associated with TACs. There are several sensitive receptors located near the proposed F-B LGA station, including residences, schools, and parks. The NAAQS and CAAQS are established concentrations of criteria pollutants that provide public health protection. According to the OEHHA guidance, cancer risk is defined as the predicted risk of cancer (unitless) over a lifetime based on a long-term (70-year) continuous exposure, and is usually expressed as chances per million persons exposed (OEHHA 2015). 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 USEPA'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 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 NAAQS and CAAQS. The modeled DPM concentrations were used to determine the exposure dose and associated health impact following OEHHA 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: Air Quality Technical Report.

The long-term (cancer risk) impacts from TAC emissions associated with station 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 TAC emissions associated with station construction would not result in substantial short-term (acute) impacts.

Impact AQ #8–Localized Air Quality Impacts from Concrete Batch Plants

Construction of the project would require the use of concrete batch plants at various locations along the construction route. The precise locations of the concrete batch plants are unknown at this time. As with the May 2014 Project, the concrete batch plants associated with construction of

the F-B LGA are estimated to generate 7 tons per year of particulate emissions for the at-grade and elevated alignments for each Fresno to Bakersfield Section alternative. It is anticipated that the same number and distribution of concrete batch plans is needed for the Fresno to Bakersfield Section regardless of whether the May 2014 Project or the F-B LGA would be implemented. The concrete generated would include concrete for the elevated structures (elevated rail) and retaining wall (retained-fill rail). The concrete batch plants would be located along the alignment. According to Cal-EPA and CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (Cal-EPA and CARB 2005), emission impacts at receptors would be greatly reduced by locating a facility 1,000 feet from sensitive receptors. The air dispersion modeling and health risk analysis for fugitive dust emissions and their associated TAC constituents indicated that excess cancer risks and noncancer health impacts would not exceed the applicable thresholds, but emissions may contribute to further exacerbation of exceedances of PM_{10} and $PM_{2.5}$ standards. After mitigation, emissions would not substantially contribute to further exceedances of PM_{10} and $PM_{2.5}$ standards (AQ-MM#3).

Based on the air dispersion modeling conducted for the concrete batch plants associated with the HSR project, the localized air quality impacts from concrete batch plants would be significant under CEQA to sensitive receptors within 1,000 feet of the batch plant. Mitigation measure AQ-MM# 3 would reduce the localized air impact to sensitive receptors to a less than significant level by ensuring concrete batch plants are sited at least 1,000 feet from sensitive receptors. AQ-MM#3 would also require the utilization of typical control measures to reduce fugitive dust, which would reduce the PM_{10} and $PM_{2.5}$ concentrations as they relate to the NAAQS and CAAQS, to a less than significant level under CEQA.

Impact AQ #9—Localized Air Quality Impacts from MOIF

Construction Air emissions associated with construction of the MOIF would be small relative to the quantity of emissions from construction of the alignment/guideway. Emissions from MOIF construction would be located in one area. TACs, mostly DPM exhaust from construction equipment, and criteria pollutants would be emitted during construction of the MOIF.

Impacts of construction of the MOIF would be localized; therefore, potential exposure to DPM was evaluated for areas adjacent to the construction site. The majority of the construction emissions would be DPM from diesel construction equipment used for mass site grading, building construction, and the HMF guideway construction. The main health risk concerns of DPM are cancer and chronic risks. Cancer risk from exposure to carcinogens is typically evaluated based on a long-term (70-year) continuous exposure, and chronic risks are also typically evaluated for long-term exposure. The period of construction for the MOIF would be approximately 20 months. This short period and level of exposure is not expected to increase the cancer risk to sensitive receptors in the vicinity of the MOIF construction area. The concentration increase of criteria air pollutants associated with construction of the MOIF would not exceed the applicable thresholds. The incremental increase in cancer risk associated with the DPM emissions from construction equipment would be less than the applicable threshold of 10 in a million.

Under CEQA, the local impact of the MOIF construction would be less than significant because sensitive receptors are not expected to be exposed to long-term DPM emissions during MOIF construction that would cause significant cancer or non-cancer health risks.

Project Operation Impacts

Common Air Quality Impacts

Common benefits to regional air quality would come from a reduction in VMT and airplane emissions, which would reduce criteria pollutants, MSAT, and GHG emissions.

Additionally, the project would have the common benefit of meeting a GHG reduction measure identified in the AB 32 scoping plan. Common air quality impacts that are applicable to the May 2014 Project and the F-B LGA are discussed on page 3.3-57 of the *Fresno to Bakersfield Section Final EIR/EIS*.

Statewide and Regional Impacts

Statewide Emissions

As discussed in Section 3.3.3, in compliance with CEQA, 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. Table 3.3-11 summarizes statewide emission changes for the HSR Build Alternatives in 2035 compared to the No Project Alternative. Implementation of the HSR project with either the May 2014 Project or the F-B LGA would affect long-distance, city-to-city travel along freeways and highways throughout the state, as well as aircraft takeoffs and landings. Both full alignment alternatives would also affect electrical demand throughout the state. The VMT estimates used in the operational analysis presented in Table 3.3-11 were based on the statewide multimodal analysis conducted for the statewide HSR System. The analysis was conducted for the entire section from Fresno to Bakersfield and is representative of all alignment alternatives, including the May 2014 Project and the F-B LGA, as all alternatives would be expected to have similar regional effects with regard to changes in VMT patterns, flight patterns, and power use estimates.

Table 3.3-11 Summary of Estimated 2035 Emission Burden Changes (Project versus No Project 2035) (tons/year)

Project Element	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Roadways	-420 to -280	-10,295.42 to -6,864	-958 to -638	-54 to -36	-586 to -391	-245 to -163
Planes	-124 to -83	-1,677 to -1,124	-1,324 to -887	-159 to -106	-24 to -16	-24 to -16
Energy (power plants)	61 to 40	616 to 411	468 to 312	52 to 35	88 to 59	81 to 54
Total	**-483 to -323**	**-11,356 to -7,576**	**-1,814 to -1,214**	**-160 to -107**	**-522 to -348**	**-188 to -125**

Source: Authority and FRA, 2017
Totals may not add up exactly due to rounding.
Operational emissions reflect refined energy usage estimates for the HSR System, which resulted in lower energy requirements and also reflected updated speed correlations between the No Build and Build 50% scenarios.
CO = carbon monoxide
HSR = high-speed rail
NOx = nitrogen oxide
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
SO_2 = sulfur dioxide
VOC = volatile organic compound

Implementation of the HSR project is predicted to have a beneficial effect on (i.e., reduce) statewide emissions of applicable pollutants. Implementation of the HSR project would be expected to have similar changes in VMT and intrastate air travel, as well as similar increases in electrical demand (required to power the HSR System) with the F-B LGA alternative or the May 2014 Project alternative. Therefore, implementation of the HSR project with either the F-B LGA or the May 2014 Project would have a beneficial effect on (i.e., reduce) statewide emissions of all applicable pollutants, as compared to the no project conditions.

In the Existing Plus Project scenario versus Existing Conditions scenario, the project is also predicted to have a beneficial effect on (i.e., reduce) statewide emissions of all applicable pollutants, compared to the existing conditions scenario (Table 3.3-12). Details of the Existing Condition Plus Project analysis are presented in the *Fresno to Bakersfield Section: Air Quality Technical Report* (Authority and FRA 2014).

Table 3.3-12 Summary of Estimated 2009 Statewide Emission Burden Changes (Existing Plus Project versus Existing Conditions – 2009) (tons/year)

Project Element	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Roadways	-1,458 to -970	-31,267 to -20,813	-3,444 to -2,292	-39 to -26	-444 to -296	-195 to -130
Planes	-72 to -48	-973 to -652	-768 to -514	-92 to -62	-14 to -9	-14 to -9
Energy (power plants)	61 to 40	616 to 411	468 to 312	52 to 35	88 to 59	81 to 54
Total	**-1,469 to -978**	**-31,624 to -21,053**	**-3,744 to -2,495**	**-79 to -53**	**-370 to -246**	**-127 to -85**

Source: Authority and FRA, 2017
Totals may not add up exactly due to rounding.
Operational emissions reflect refined energy usage estimates for the HSR System, which resulted in lower energy requirements and also reflected updated speed correlations between the No Build and Build 50% scenarios.
CO = carbon monoxide
HSR = high-speed rail
NOx = nitrogen oxide
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
SO_2 = sulfur dioxide
VOC = volatile organic compound

Impact AQ #10—Regional Criteria Pollutant Emissions

A summary of the total emission changes due to HSR System operation is included in Table 3.3-13. The F-B LGA would result in similar estimates in terms of ridership, regional vehicle travel, aircraft, and power plants, and direct project operational emissions from HSR stations, maintenance facilities, and train movements. As noted above, the VMT, aircraft, and power plant demands were estimated based on a statewide assessment of the HSR System. VMT estimates, aircraft takeoff and landing estimates, and the electrical demand associated with the Fresno to Bakersfield Section of the statewide analysis are applicable to both the May 2014 Project and the F-B LGA, as the F-B Project would have the same operational emission estimates under the May 2014 Project and the F-B LGA as ridership would be the same for both options. Therefore, operational emissions estimates would be similar to those identified in the Fresno to Bakersfield Section: Air Quality Technical Report (Authority and FRA 2014a). The total emission changes are shown in Table 3.3-13. Emission results indicate the project would result in a net regional decrease in emissions of criteria pollutants. These decreases would be beneficial to the SJVAB and help the basin meet its attainment goals for O_3 and particulates (PM_{10} and $PM_{2.5}$).

Table 3.3-13 Summary of Regional Changes in Operational Emissions in (Project versus No Project 2035) (tons/year)

Activities	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Indirect Emissions						
Changes in VMT emissions	-100.9 to -67.28	-2,539.9 to -1,693.02	-243.4 to -162.21	-13.7 to -9.14	-149.7 to -99.81	-62.1 to -41.40
Changes in airport emissions	-2.3 to -1.5	-31 to -21	-24 to -16	-2.9 to -1.9	-0.44 to -0.29	-0.43 to -0.29
Changes in power plant emissions	8.5 to 5.7	86.3 to 57.6	65.5 to 43.7	7.3 to 4.9	12.4 to 8.3	11.4 to 8.0
Direct Emissions						
Station operation	2.2	144	15.2	0.8	10.7	4.5
HMF/MOIF onsite emissions[d]	0.56	9.0	3.5	0.47	0.13	0.12

Activities	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
HMF/MOIF offsite mobile source emissions[d]	0.24	12	1.8	0.07	1.02	0.44
Maintenance-of-way facility offsite emissions	0.06	4	0.4	0.02	0.30	0.13
HSR operations (fugitive dust)	N/A	N/A	N/A	N/A	29	4.3
Total[a]	-92 to-60	-2,315 to -1,486	-181 to -114	-7.9 to -4.8	-97 to -51	-42 to -24
SJVAPCD significance thresholds	10	N/A	10	N/A	15	15
Exceeds SJVAPCD CEQA thresholds?[b]	No	N/A	No	N/A	No	No
GC thresholds[c]	10	100	10	100	100	100
Exceeds GC thresholds?	No	No	No	No	No	No

Source: Authority and FRA, 2017

[a] The total includes the indirect and direct emissions.

[b] The SJVAPCD has significance thresholds for NO_x and VOC. The district currently does not have thresholds for CO or $PM_{2.5}$. Section 3.3.11 of the Fresno to Bakersfield EIR/EIS summarizes the CEQA significance for these pollutants.

[c] The GC thresholds for criteria pollutants are based on the SJVAB federal attainment status. The SJVAB is considered an extreme nonattainment area for the O_3 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 PM_{10} NAAQS.

[d] The LGA Alternative does not include construction of an HMF facility.

CEQA = California Environmental Quality Act
CO = carbon monoxide
GC = general conformity
HMF = heavy maintenance facility
HSR = high-speed rail
NO_x = nitrogen oxide(s)
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
VMT = vehicle mile(s) traveled
VOC = volatile organic compound

The Fresno to Bakersfield Section of the HSR project would result in a net benefit to regional air quality from operation of the HSR System under CEQA, because of the reduction of emissions in the region.

Impact AQ #11—Greenhouse Gas Analysis During Operation

Guidance for the analysis of GHG emissions is provided at the state, regional, and local levels. This guidance provides a comprehensive and complementary approach for the analysis of the potential effects of GHG emissions. Due to the global nature of GHG emissions and the nature of the electrical grid system, GHGs are examined on a statewide level. However, regional and local guidance will be considered as a component of the overall statewide goal to reduce GHG emissions.

According to the SJVAPCD's guidance document on evaluating GHG emissions, for projects to have a less than significant impact on an individual and cumulative basis under CEQA, the project must comply with an approved Climate Change Action Plan, demonstrate that it would not impede the state from meeting the statewide 2020 GHG emissions target, adopt the SJVAPCD's Best Performance Standards for stationary sources (SJVAPCD 2009). As the F-B LGA is not a stationary source and there is no appropriate Climate Change Action Plan under which to evaluate the project, the F-B LGA would have a less than significant impact related to GHG emissions if the construction and operation of the F-B LGA would not impede the state from meeting statewide GHG emissions targets established by AB 32, SB 2, and EO B-30-15.

The HSR project, which is included in the AB 32 Scoping Plan as Measure #T-9, would help the state meet the GHG emissions reduction goals established by AB 32, SB 32, and EO B-30-15 (CARB 2008).

Table 3.3-13 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-65) summarizes the changes to statewide GHG emissions (expressed in terms of CO_2e) that would result from the project compared to 2035 no project conditions. As shown therein, the project would result in a net statewide GHG reduction of at least 1.7 or 2.5 MMT CO_2e per year (based on HST ticket prices of 83 percent or 50 percent of airfare, respectively) per year compared to the 2035 no project condition. Table 3.3-13 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-65) summarizes the changes to statewide GHG emissions that would result from the project compared to existing no project conditions. As shown therein, the project would result in a net statewide GHG reduction of 1.6 or 2.4 MMT CO_2e per year (based on HST ticket prices of 83 percent or 50 percent of airfare, respectively) compared to existing no project conditions.

Overall, the project's operation would have a net beneficial impact on statewide GHG emissions. Operation of the Fresno to Bakersfield Section with the F-B LGA would result in similar estimates in terms of ridership, regional vehicle travel, aircraft, and power plants, and direct project operational emissions from HSR stations, maintenance facilities, and train movements as operation of the Section with the May 2014 Project. Therefore, operational GHG emissions estimates would be similar to those identified in the Fresno to Bakersfield Section: Air Quality Technical Report (Authority and FRA 2014a) and would have a net beneficial impact on statewide GHG emissions. Therefore, the HSR project would help the state meet the GHG emissions reduction goals established by AB 32, SB 32, and EO B-30-15.

As a result, under CEQA operational air quality impacts would be beneficial because of the reduction in GHG emissions in the state.

Impact AQ #12—Localized Air Quality Impacts During Train Operations

As discussed in Section 3.3.4.6 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-69 through 3.3-70), the HSR project would use EMU trains, with the power distributed through the overhead contact system. Direct emissions from combustion of fossil fuels and associated emissions from HSR trains would not occur. However, trains traveling at high velocities, such as those associated with the proposed HSR, create sideways turbulence and rear wake, which resuspend particulates from the surface surrounding the track, resulting in fugitive dust emissions. Using a friction velocity of 0.19 meter/second (m/s) for disturbed desert soil that could lead to resuspended soils, a HSR passing at 220 mph could resuspend soil particles out to approximately 10 feet from the train (Watson et al.1996). Therefore, all resuspended soil particles would remain within the HSR corridor and sensitive receptors would not be exposed to resuspended particulates. Impacts identified for the F-B Section of the HSR Project would be similar with implementation of the F-B LGA. There are no applicable fugitive dust thresholds, however, based on the analysis, for the F-B LGA as with the May 2014 Project, with implementation of the HSR Project, fugitive dust emissions due to HSR travel are not expected to result in substantial dust that would cause health concerns in the project vicinity. Under CEQA, since fugitive dust would be significantly reduced beyond the right-of-way, fugitive dust would not expose sensitive receptors to substantial pollutant concentrations, therefore, the health concern impacts from dust would be less than significant under CEQA.

A detailed analysis of wind-induced fugitive dust emissions due to HSR travel is discussed in Appendix 3.3-A of the Fresno to Bakersfield Section Final EIR/EIS, Potential Impact from Induced Winds.

Impact AQ #13—Localized Mobile Source Air Toxics Analysis

As described in Section 3.3.4.6 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-70 through 3.3-71), in accordance with the FHWA's *Interim Guidance Update on Air Toxic Analysis in NEPA Documents* (FHWA 2012), a qualitative assessment was derived for the project following a study conducted by FHWA entitled *A Methodology for*

Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives (FHWA 2010). It provided the basis for identifying and comparing the potential differences in MSAT emissions, if any, among the May 2014 Project and the F-B LGA.

Based on the analysis conducted in the Fresno to Bakersfield Section with the May 2014 Project included, there would be no difference in MSAT emissions between the May 2014 Project and the F-B LGA, because the regional change in vehicle emissions would be the same. The MSAT analysis concluded that MSAT emissions in the study area are likely to be lower in the future with the HSR project, including the F-B LGA and would result in a decrease in regional MSAT emissions compared with the No Project Alternative. Therefore, implementation of the F-B LGA would also not result in impacts related to regional MSAT impacts.

Since the MSAT emissions would not increase, the MSAT impact under the F-B LGA would be less than significant under CEQA.

Impact AQ #14—Microscale CO Impact Analysis

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 stations are included in Section 3.3.6.3 of the *Fresno to Bakersfield Section Final EIR/EIS* (Authority and FRA 2014a: pages 3.3-71 through 3.3-79).

The project would not worsen traffic conditions at intersections along the alignment because the alignment and roadways would be grade-separated. Therefore, the CO analysis did not consider intersections along the alignment; instead, the analysis focused on locations near the stations that would experience a change in roadway structure or traffic conditions.

The Fresno to Bakersfield Section Final EIR/EIS indicated that intersections in the project vicinity would not cause violations of CO NAAQS 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 CAAQS and NAAQS for all study intersections.

Since the modeled CO concentrations would be below the CAAQS for the proposed F-B LGA, these impacts would be less than significant under CEQA.

Impact AQ #15—Localized PM_{10}/$PM_{2.5}$ Hot-Spot Impact Analysis

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 (Authority and FRA 2014a: pages 3.3-79 through 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 PM_{10}/$PM_{2.5}$ NAAQS during its operation. Therefore, quantitative $PM_{2.5}$ and PM_{10} 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 PM_{10}/$PM_{2.5}$ standards because, based on these criteria, it is not a project of air quality concern.

Table 3.3-14 Maximum Modeled CO Concentrations at Intersections near the F-B LGA Station

Intersection	Existing Conditions[1]		Existing Plus Project[1]		2035 No Project/No Action[1]		2035 Project[1]	
	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[2]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[2]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[2]	Max 1-Hour CO Concentration (ppm)	Max 8-Hour CO Concentration (ppm)[2]
F-B LGA[a]								
SR 99 SB Ramps/Olive Drive	3.8	2.5	3.9	2.6	4.2	2.7	4.2	2.8
State Road/SR 99 NB Ramps	3.2	2.1	3.2	2.1	2.9	1.9	2.9	1.9
State Road/Olive Drive	3.4	2.3	3.5	2.3	3.5	2.3	3.5	2.3
F Street/SR 204	3.5	2.3	2.9	1.8	4.3	2.9	3.3	2.2
F Street/30th Street	2.4	1.6	2.6	1.7	3.1	2.0	3.5	2.3
F Street/24th Street	3.3	2.2	3.4	2.3	3.9	2.6	3.9	2.6
F Street/23rd23rd Street	3.3	2.2	3.4	2.3	3.8	2.5	3.8	2.5
Chester Avenue/34th Street	2.7	1.8	2.7	1.8	2.8	1.8	2.8	1.8
Chester Avenue/32nd Street	1.9	1.2	2.6	1.7	2.8	1.8	2.7	1.8
Jewett Avenue/34th Street	2.3	1.5	2.3	1.5	2.4	1.6	2.5	1.6
San Dimas Street/34th Street	2.4	1.6	2.4	1.6	2.5	1.6	2.5	1.6
Union Avenue/19th Street	2.8	1.8	2.8	1.8	3.0	2.0	3.1	2.0
Union Avenue/SR 58 WB Ramps	3.0	2.0	3.0	2.0	3.2	2.1	3.2	2.1

Source: Authority and FRA, 2017

1 Concentrations include a predicted 1-hour background concentration of 1.9 ppm and an 8-hour background concentration of 1.2 ppm, representing the second-highest measured CO concentrations in 2012–2014.

2 A persistence factor of 0.7 was used to estimate the 8-hour CO concentrations based on the generalized persistence factor for urban locations in the CO Protocol (California Department of Transportation 1997).

CO = carbon monoxide
Max = maximum
NB = northbound
ppm = part(s) per million
SB = southbound
SR = state route
WB = westbound

As with the May 2014 Project, as discussed in Section 3.3.6.3 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-79 through 3.3-80), implementation of the F-B LGA is unlikely to cause any localized adverse impact on air quality for the PM_{10}/$PM_{2.5}$ NAAQS. Therefore, the PM_{10} hot-spot impact on air quality would be less than significant under CEQA.

Impact AQ#16—Localized Air Quality Impacts to Sensitive Receptors Including Schools

Localized air impacts in relation to sensitive receptors were discussed in Section 3.3.6.3 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-82). As with the May 2014 Project, implementation of the F-B LGA would result in a reduction in annual MSAT emissions impacts to sensitive receptors at schools around the station (see Table 3.3-7) by 83 percent from 2010 to 2050 due to 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, exposure of sensitive receptors including schools under the proposed F-B LGA would have a less than significant impact under CEQA.

Impact AQ #17—Odor Impacts from Operations

As with the May 2014 Project, odors associated with train operations, including those associated with the MOIF, under the F-B LGA are not anticipated. Odors associated with general operations are discussed in Section 3.3.6.3 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: page 3.3-83). The project would likely not create objectionable odors. Therefore, a less than significant impact would occur under CEQA.

Impact AQ #18—Compliance with Air Quality Plans

As with the May 2014 Project, during operation of the F-B LGA, the project would reduce VMT in the region, which would reduce regional O_3 precursor pollutant emissions Compliance with air quality plans would be similar among the alternatives as described in Section 3.3.6.3 of the Fresno to Bakersfield Section Final EIR/EIS. Implementation of the F-B LGA would not result in emissions that would exceed the VOC, NO_X, PM_{10}, and $PM_{2.5}$ thresholds of the SJVAPCD, and therefore would not conflict with or impede the implementation of the respective air quality plans for the attainment of federal air quality standards. As shown in Table 3.3-13, the F-B LGA would also result in VOC, NO_X, PM_{10}, and $PM_{2.5}$ emissions that would be less than applicable significance thresholds, and therefore would not impede implementation of the 8-Hour SJVAPCD 2007 Ozone Plan, the 2004 Extreme Ozone 1-Hour Attainment Demonstration Plan, the 2007 PM_{10} Maintenance Plan, the 2008 $PM_{2.5}$ Plan, the 2012 $PM_{2.5}$ Plan, and the 2015 Plan for the 1997 $PM_{2.5}$ Standard. Therefore, this impact would be less than significant under CEQA.

3.3.6 Compliance with Conformity Rules

Projects requiring approval or funding from federal agencies that are in areas designated as nonattainment or maintenance for the NAAQS are subject to the USEPA's Conformity Rule. The two types of federal conformity are general conformity, which applies to the HSR project due to Federal Railroad Administration (FRA) funding, and transportation conformity, which does not apply at this time but could apply to future actions related to the project's minor expansions or realignments of local roadways.

3.3.6.1 General Conformity

To determine whether projects are subject to the GC determination requirements, the USEPA has established GC threshold values (in tons per calendar year) for each of the criteria pollutants for each type of federally designated nonattainment and maintenance area. If the emissions generated by construction or operation of a project (on an area-wide basis) are less than these threshold values, the GC rule is not applicable, and no additional analyses are required. If the emissions are greater than these values, compliance with the GC rule must be demonstrated.

GC requirements apply only to federally designated maintenance and nonattainment areas. The HSR project study area is in an area federally designated as extreme nonattainment for the 8-hour O_3 standard, nonattainment for $PM_{2.5}$, and maintenance for PM_{10} and CO. The applicable threshold values for this area, according to 40 C.F.R. 93, are 10 tons per year for VOCs, 10 tons per year for NO_X, and 100 tons per year for $PM_{2.5}$, PM_{10}, CO, and SO_2 (Table 3.3-2).

Regional emissions for the applicable pollutants would be the same under the operational phase of the F-B LGA and the May 2014 project. Therefore, since the May 2014 project identified that the pollutants would be lower than for the No Project Alternative (see Table 3.3-13), only emissions generated during the construction phase need to be evaluated to determine whether the GC Rule is applicable. The FRA found the Fresno to Bakersfield Section of the HSR System with the May 2014 Project to be in conformance on June 27, 2014, and issued a conformity determination per its requirements. Construction of the Fresno to Bakersfield Section with the F-B LGA instead of the May 2014 Project, would also exceed the conformity thresholds for certain pollutants, however emissions would be slightly lower than those estimated for the May 2014 Project and would be offset by Voluntary Emission Reduction Agreement (VERA). A VERA agreement with the SJVAPCD would be implemented to offset construction emissions.

The project will commit to reducing construction emissions for NO_x and VOC exceedance years to net zero through the VERA program.

A VERA is a mitigation measure by which the project proponent (the Authority, in this case, in partnership with the FRA) will provide pound-for-pound offsets of emissions that exceed GC thresholds through a process that develops, funds, and implements emissions reduction projects, with the SJVAPCD serving as administrator of the emissions-reduction projects and verifier of the successful mitigation effort.

To implement a VERA, the project proponent and the SJVAPCD will enter into a contractual agreement in which the proponent agrees to mitigate the project's emissions (NO_X and VOCs, in this case, in the years of exceedance) by providing funds for the SJVAPCD's Emission Reduction Incentive Program to fund grants for projects that achieve emission reductions, thus offsetting project impacts on air quality. The SJVAPCD is obligated under the VERA to seek and implement such reductions using the project proponent's funds. The types of projects that have been used in the past to achieve such reductions include electrification of stationary internal combustion engines (such as agricultural irrigations pumps); replacing old trucks with new, cleaner, more efficient trucks; and a host of other emissions-reducing projects.

In implementing a VERA, the SJVAPCD verifies the actual emission reductions that have been achieved as a result of completed grant contracts, monitors the emission reduction projects, and ensures the enforceability of achieved reductions. The initial agreement is generally based on the projected maximum emissions that exceed thresholds as calculated by an SJVAPCD-approved Air Quality Impact Assessment and/or the project's Supplemental EIR/EIS. The agreement then requires the proponent to deposit funds sufficient to offset those maximum emissions exceedances. However, because the goal is to mitigate actual emissions, the SJVAPCD has designed adequate flexibility into these agreements such that the final mitigation is based on actual emissions related to the project, actual equipment used, hours of operation, and so on, which the proponent tracks and reports to the SJVAPCD during construction. After the project is mitigated, the SJVAPCD certifies to the lead agency that the mitigation is completed. Thus, a VERA provides the lead agency with an enforceable mitigation measure that will result in emissions exceedances being fully offset.

According to the SJVAPCD, since 2005 the SJVAPCD has entered into 29 VERAs with project proponents and achieved total emissions reductions of 1,700 tons of NO_X, 200 tons of VOC, and 120 tons of PM_{10} reductions (SJVAPCD 2016). It is the SJVAPCD's experience that implementation of a VERA is a feasible mitigation measure that effectively achieves actual emission reductions and mitigates the project to a net-zero air quality impact.

The Authority has negotiated a VERA with the SJVAPCD for all construction package contracts. Additional VERAs will be negotiated for future construction packages. Final approval and

execution of the VERA by the Authority and the SJVAPCD was given concurrently with the final approval of the GC determination. The SJVAPCD has stated that it is certain there are enough emission-reduction projects within its air basin to fully offset the project's NO_X and VOC exceedances.

Since the modifications to the Fresno to Bakersfield Section associated with F-B LGA result in slightly lower construction emissions compared to those from the Fresno to Bakersfield Section with the May 2014 Project, the final GC determination is still valid and no reevaluation of the Fresno to Bakersfield Section for the F-B LGA is required.

As with the Fresno to Bakersfield Section with the May 2014 Project alignment, the offsets will be accomplished through a VERA among the Authority the project proponent, and the SJVAPCD. The requirement for the VERA would be imposed on the project through implementation of Measure AQ-MM#4.

3.3.6.2 Transportation Conformity

Transportation conformity is an analytical process required for all federally funded highway and transit transportation projects, but it does not apply to this project. Under the 1990 CAA Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve federal highway and transit actions that are not first found to conform to the State Implementation Plan for achieving the goals of the CAA requirements. Transportation conformity with the CAA takes place at both the regional level and the project level.

As discussed in Section 3.3.7.2 of the Fresno to Bakersfield Section Final EIR/EIS (page 3.3-85), the Fresno to Bakersfield Section of the HSR project, including the F-B LGA, is not subject to the transportation conformity rule. However, if the project requires future actions that meet the definition of a project element subject to transportation conformity, additional determinations and associated analysis will be completed as may be required.

3.3.7 Impact Avoidance and Minimization Measures

The Authority and FRA have considered avoidance and minimization measures. Measures considered to be part of the project are summarized in Section 3.3.8 of the Fresno to Bakersfield Section Final EIR/EIS (Authority and FRA 2014a: pages 3.3-85 and 3.3-86). The applicable list is provided in Technical Appendix 2-G, Mitigation Monitoring and Enforcement Plan. Technical Appendix 2-H describes how implementation of these measures reduces adverse effects on air quality. The following Avoidance and Minimization Measures would be applicable to the May 2014 Project as well as the F-B LGA:

- **AQ-AM #1 Truck Equipment:** Covering and washing of trucks and construction equipment to reduce fugitive dust.
- **AQ-AM #2 Fugitive Dust Emissions:** Best management practices implemented to reduce fugitive dust emissions.
- **AQ-AM #3 Trackouts:** Implementation of entrance/exit trackouts that result in vibration and removal of dirt and dust on trucks and construction equipment so as to not track out onto public roadways.
- **AQ-AM #4 Material Selection:** Low or super-compliant VOC (clean air) paints, coatings, and industrial coatings that meet the regulatory limits in South Coast Air Quality Management District Rule 1113 will be used.

3.3.8 Mitigation Measures

3.3.8.1 Mitigation Measures identified in the Fresno to Bakersfield Section Final EIR/EIS

Operation of the HSR project would, in general, improve air quality because of the reduction in regional emissions. Construction of the project, however, would temporarily increase regional emissions and possibly cause or exacerbate an exceedance of an air quality standard. As such,

mitigation measures designed to minimize potential air quality impacts focus on the construction phase of the project. These mitigation measures would go beyond the control measures listed in the *Fresno to Bakersfield Section Mitigation Monitoring and Enforcement Plan* (Authority and FRA 2014b) and the controls required by the SJVAPCD rules. The mitigation measures would be the same regardless of whether the project is compared to the existing conditions as baseline or to the no project conditions as baseline. None of these mitigation measures will result in adverse secondary effects. The mitigation measures identified in Table 3.3-15 would be applicable to the May 2014 Project and the F-B LGA.

Table 3.3-15 Mitigation Measures Applicable to the F-B LGA

Mitigation Measure	Description
AQ-MM#1	This mitigation measure will apply to heavy-duty construction equipment used during the construction phase. All off-road construction diesel equipment will use the cleanest reasonably available equipment (including newer equipment and/or tailpipe retrofits), but in no case less clean than the average fleet mix for the current calendar year, as set forth in California Air Resources Board's (CARB) OFFROAD 2011 database, and no less than a 40 percent reduction compared to a Tier 2 engine standard for nitrogen oxides (NO_X) emissions. The contractor will document efforts undertaken to locate newer equipment (such as, in order of priority, Tier 4, Tier 3, or Tier 2 equipment) and/or tailpipe retrofit equivalents. The contractor will provide documentation of such efforts, including correspondence with at least two construction equipment rental companies. A copy of each unit's certified tier specification and any required CARB or San Joaquin Valley Air Pollution Control District (SJVAPCD) operating permit will be made available at the time of mobilization of each piece of equipment. The contractor will keep a written record (supported by equipment-hour meters, where available) of equipment usage during project construction for each piece of equipment.
AQ-MM#2	This mitigation measure applies to all on-road trucks used to haul construction materials, including fill, ballast, rail ties, and steel. Material-hauling trucks will consist of an average fleet mix of equipment model year 2010 or newer, but no less than the average fleet mix for the current calendar year as set forth in CARB's Emission Factors Model 2011 database. The contractor will provide documentation of efforts to secure such a fleet mix. The contractor will keep a written record of equipment usage during project construction for each piece of equipment.
AQ-MM#3	Concrete batch plants would be sited at least 1,000 feet from sensitive receptors, including daycare centers, hospitals, senior care facilities, residences, parks, and other areas where people may congregate. The concrete batch plant will utilize typical control measures to reduce fugitive dust, such as water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central dust collection systems and other suitable technology, to reduce emissions to be equivalent to the U.S. Environmental Protection Agency (USEPA) AP-42 controlled emission factors for concrete batch plants.
AQ-MM#4	The California High-Speed Rail Authority (Authority) and SJVAPCD will enter into a contractual agreement to mitigate the project's emissions (by offsetting) to net zero the project's actual emissions from construction equipment and vehicle exhaust emissions of volatile organic compounds (VOC), NO_X, particulate matter smaller than or equal to 10 microns in diameter (PM_{10}), and particulate matter smaller than or equal to 2.5 microns in diameter ($PM_{2.5}$). The agreement will provide funds for the SJVAPCD's Emission Reduction Incentive Program[a] (SJVAPCD 2011) to fund grants for projects that achieve emission reductions, with preference given to highly impacted communities, thus offsetting project impacts on air quality. Projects funded in the past include electrification of stationary internal combustion engines (such as agricultural irrigation pumps); replacement of old heavy-duty trucks with new, cleaner, more efficient heavy-duty trucks; and replacement of old farm tractors. The project will commit to reducing construction emissions for NO_X and VOC through the Voluntary Emission Reduction Agreement (VERA) program. To lower overall cost, funding for the VERA program to cover

Mitigation Measure	Description
	estimated construction emissions for any funded construction phase will be provided at the beginning of the construction phase, if feasible. At a minimum, funding shall be provided so that mitigation/offsets will occur in the year of impact, or as otherwise permitted by 40 C.F.R. Part 93 Section 93.163.
AQ-MM#5	This mitigation measure will apply if ballast material is hauled from quarries outside the San Joaquin Valley Air Basin (SJVAB) and the hauling activities result in the exceedance of applicable annual General Conformity (GC) threshold(s) or local air basin California Environmental Quality Act (CEQA) threshold(s) for NO_X. To determine whether an exceedance will occur based on actual hauling activities, the Authority shall at the beginning of each calendar year, or as soon as practicable thereafter, (1) obtain the most up-to-date information based on actual or projected contractor-specific information about hauling in the Mojave Desert Air Quality Management District (AQMD), South Coast AQMD, and Bay Area AQMD; and (2) calculate the expected NO_X emissions from hauling activities in those districts using the same methodology used in this F-B LGA Draft Supplemental Environmental Impact Report/Environmental Impact Statement (EIR/EIS). The analysis methodology shall specify the location, the year in which the emissions would be released, and the quantity of emissions. If, based on that calculation, exceedance of the applicable NO_X threshold(s) is anticipated to occur in that next calendar year, the Authority will secure from the appropriate air district(s) or other appropriate source the production or generation of a sufficient quantity of NO_X offsets for that calendar year necessary to achieve conformity (in the case of exceedance of GC thresholds) and/or to offset NO_X emissions below the applicable CEQA threshold(s). At a minimum, mitigation/offsets will occur in the year of impact, or as otherwise permitted by Code of Federal Regulations (C.F.R.) Title 40, Part 93, Section 93.163. The Mojave Desert AQMD's emission bank has 3,274 tons of NO_X credits (Mojave Desert AQMD 2016); therefore, there should be enough NO_X credits to offset approximately 6 tons per year from this project in the Mojave Desert Air Basin. The exact number of NO_X credits in the South Coast AQMD RECLAIM program is unknown, but 810.5 tons of NO_X credits were traded in 2015 and 43.3 tons of NO_X credits were traded in 2012 (South Coast AQMD 2016). Therefore, there should be enough available NO_X credits in the program to offset approximately 75 tons of NO_X per year from this project in the South Coast AQMD. In the Bay Area AQMD, any material emissions above the district's significance threshold will be mitigated through an off-site emission mitigation program to achieve emission reduction due to material hauling in the Bay Area AQMD. Potential off-site mitigation programs include the Bay Area AQMD's Carl Moyer Memorial Air Quality Standards Attainment Program (CMP) or other air district emission reduction incentive programs. Depending on the final location selected to obtain ballast material, this would amount to a maximum of 3 tons per year of NO_X credits.
AQ-MM#6	This mitigation measure will apply to heavy maintenance facility(HMF)[b]/maintenance of infrastructure facility (MOIF) operation for all site options to ensure that the nearest sensitive receptor has a health risk less than the applicable threshold of 10 in 1 million cancer risk and a hazard index of 1, with final decisions on the range of mitigation measures to achieve emission reductions to meet this standard to be selected before the issuance of the Authority to construct permit for the HMF/MOIF. These measures may include the following options: • Use of electric or hybrid trucks to serve the facility. • Use of an electric or clean switcher locomotive to minimize the emissions from HMF operation. • When advertising for a train set vendor, a preference for the use of highly polished external manufactured aluminum for train sets will be stated in the proposal. • Adjustment of the facility operation and orientation to move emission activities to areas where impacts on the surrounding sensitive areas are lessened, thus reducing localized impacts on surrounding sensitive receptors.

Mitigation Measure	Description
	• A minimum buffer distance of 1,300 feet from sensitive receptors for diesel vehicles, limitations on idling of diesel vehicles at the facility, or preparation of a detailed health risk assessment that shows cancer risk to be less than 10 in 1 million when the site design is refined.

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

[a] San Joaquin Valley Air Pollution Control District, "Grants and Incentives," Website: www.valleyair.org/Grants.

[b] It should be noted that the F-B LGA does not include the development of a heavy maintenance facility site.

Mitigation Measure AQ-MM#1 addresses criteria exhaust emissions from construction equipment. The methodologies used to reduce emissions may result in increased fuel or energy consumption associated with emissions control equipment. The change in fuel consumption would likely be small on a per-equipment basis; however, given the number of equipment pieces and the construction duration, the total fuel consumption would result in a moderate increase in volume, but still a small percentage of the total volume. If aftermarket control devices are used, such as diesel particulate filters, additional waste would be generated associated with the disposal of spent filters. These additional increases would be small in comparison to the scope of the project. Therefore, the impacts of mitigation would be less than significant under CEQA.

Implementation of Mitigation Measure AQ-MM#2 would have no impacts.

Mitigation Measure AQ-MM#3 would reduce potential impacts from concrete batch plants. The control measures utilized at the batch plant may increase water usage and energy consumption and may generate additional waste from consumables used by the control devices. These impacts would be minor in comparison to the project operations as a whole. Therefore, the impacts of mitigation would be less than significant under CEQA.

With AQ-MM#1 and AQ-MM#2, regional construction phase emissions of NO_X, VOCs, PM_{10}, and $PM_{2.5}$ for certain years could still be greater than applicable thresholds. As such, construction phase emissions would be offset per AQ-MM#4.

Mitigation Measure AQ-MM#4 would require offset project construction emissions through an SJVAPCD VERA agreement. The methodologies used to reduce emissions may result in increased fuel or energy consumption associated with emissions control equipment. However, it is also possible that fuel and energy consumption may decrease. The change in fuel consumption would likely be small on a per-equipment basis. If aftermarket control devices are used, such as diesel particulate filters, additional waste would be generated associated with disposal of spent filters. In comparison to the scope of the project, these additional increases would be small. Therefore, the impacts of mitigation would be less than significant under CEQA.

Mitigation Measure AQ-MM#5 would require the purchase of offset and off-site emission mitigation for emissions associated with hauling ballast material. This mitigation measure would have no impacts.

Mitigation Measure AQ-MM#6 is an operational phase measure that would be implemented to reduce emissions from heavy maintenance facility/maintenance of infrastructure facility (HMF/MOIF) operations. The methodologies used to reduce emissions may result in increased fuel or energy consumption associated with emissions control equipment. However, it is also possible that fuel and energy consumption may decrease. The change in fuel consumption would likely be small on a per-equipment basis. Consumables used by the emissions control equipment could result in additional waste that would be generated from disposal of spent consumables. Some emissions control equipment may require water, which may result in increased water consumption and may increase the amount of water that needs treatment. This increase in water consumption and water treatment will be incorporated into the design assumptions and therefore will be addressed, resulting in a small impact. Some emissions control equipment may require additional hazardous chemicals to be used and stored on-site. However, any hazardous chemicals would be subject to applicable hazard control plans and therefore are unlikely to be a

significant concern compared to material that may already be used at the facility. These additional increases would be small in comparison to the scope of the project. Therefore, the impacts of mitigation would be less than significant under CEQA. PM_{10}, $PM_{2.5}$, CO, and SO_2 emissions would be below the GC threshold with the application of mitigation measures and control measures for all years.

Material hauling outside the SJVAB would have impacts of substantial intensity in the South Coast Air Basin, Mojave Desert Air Basin, and Salton Sea Air Basin.[1] Mitigation Measures AQ-MM#2 and AQ-MM#5 would be implemented to reduce NO_X impacts in these air basins.

Similar to the May 2014 Project, the F-B LGA would result in NO_X emissions that would exceed the SJVAPCD CEQA significance thresholds for most of the construction phase, while VOC, PM_{10}, and $PM_{2.5}$ emissions would exceed the SJVAPCD CEQA significance thresholds for some of the construction phase. Therefore, the project may violate an air quality standard and/or contribute substantially to an existing or projected air quality violation for NO_X, VOC, PM_{10}, and $PM_{2.5}$. As such, the project has the potential to result in a significant impact under CEQA. Air dispersion modeling showed that the incremental increase in PM_{10} and $PM_{2.5}$ concentrations is less than the applicable threshold to exacerbate the existing exceedances of the ambient air quality standards and would be considered less than significant after mitigation of the concrete batch plant (AQ-MM#3). These emissions would only last through the project construction period and would be offset through the VERA program (AQ-MM#4). The project would result in reduction in VOC, NO_X, PM_{10}, and $PM_{2.5}$ emissions throughout the operational phase. After mitigation, these impacts would be less than significant under CEQA.

There is no SO_2 threshold from the SJVAPCD CEQA guidance. However, using air dispersion modeling for construction work areas, SO_2 impacts were shown to be less than the ambient air quality standards and would be less than significant. No CO hot-spots are expected to occur during project construction, as demonstrated by the absence of exceedances of ambient air quality standards for CO at the construction work areas modeled. CO impacts are expected to be less than significant under CEQA.

Material hauling in the South Coast AQMD Bay Area AQMD, and Mojave Desert AQMD would have significant impacts under CEQA for NO_X. Mitigation Measure AQ-MM#5 would be implemented to reduce NO_X emissions in these regions (as described in Section 3.3.9 of the Fresno to Bakersfield Section Final EIR/EIS, Mitigation Measures; Authority and FRA 2014a: pages 3.3-86 through 3.3-92). The CEQA impacts after reducing on-road truck exhaust, purchasing NO_X offsets, and implementing off-site mitigation programs would reduce the material hauling emissions to less than significant.

The localized air quality impacts near construction work areas were evaluated through an ambient air quality analysis and a health risk assessment. After mitigation, the localized impacts would be below the applicable significance thresholds. Therefore, the localized impacts due to construction would be less than significant after mitigation under CEQA.

3.3.8.2 Mitigation Measures Specific to the F-B LGA

There are no additional measures specific to the F-B LGA. All measures identified in the May 2014 Project would be applicable to the F-B LGA, and would reduce all impacts to a less than significant level under CEQA.

[1] Both the South Coast and Salton Sea air basins are under the jurisdiction of the South Coast AQMD. Therefore, NO_X credits would be purchased from the South Coast AQMD RECLAIM program.