Section 4.3

Air Quality

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4.3.1 Introduction

This section of the Supplemental Recirculated Environmental Impact Report (SREIR) evaluates the short- and long-term air quality impacts associated with the implementation of the proposed Grapevine Project (project) that could occur from potentially higher vehicle miles traveled (VMT) than was evaluated in the Draft Environmental Impact Report (DEIR) and Final Environmental Impact Report (FEIR) (collectively, the "2016 EIR") for the project, including the consistency of the project with relevant plans and programs that are applicable to the project area.

The DEIR and FEIR were circulated and publicly reviewed in 2016, and the FEIR was certified by Kern County on December 6, 2016. As discussed in Chapter 2, *Introduction*, the FEIR certification was subsequently rescinded by the Board of Supervisors at a hearing on March 12, 2019, and the County received an application to re-adopt the approvals for the proposed project on March 14, 2019. On April 12, 2019, the County published a Notice of Preparation (NOP) for an SREIR to evaluate potential traffic, air pollution, greenhouse gases (GHG), noise, public health and growth inducing impacts that could occur from lower internal capture rates (ICRs) than considered in the 2016 EIR.

The ICR represents the percentage of trips staying within a community compared to total trips generated by the uses in a community. Residential and mixed-use development, such as the proposed project, generate vehicle trips that begin and end within a project study area. These are called "internal" trips. Trips that end or begin outside the project study area are called "external" trips. If a project area uses generate an average daily total of 1,000 trips, for example, and 500 trips begin and end within the community, the average daily ICR would be 50 percent. Traffic trip volumes are highest during "peak" morning (AM) and evening (PM) periods. If a project generates 300 trips during the AM peak period, and 100 of these trips begin and end within the project, the AM peak hour ICR would be 33.3 percent. External trips are generally longer and result in higher vehicle miles travelled (VMT) than internal trips. A project's ICRs change as land uses and transportation patterns, which are affected by transit options and technologies, change over time. An ICR analysis generally reflects and considers ICRs and transportation patterns that exist at a specific a point in time of the project buildout process.

The original DEIR (2016) used projections for the internal capture rates (ICRs) as peak period traffic impacts generated from the Kern County Council of Governments (Kern COG) 2014 Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) Travel Demand Model (Kern COG model). The analysis considered the ICR rates for home to work trips ("Home-Based Work" trips) and home to school, shopping, recreational and other non-work related trips ("Home-Based Other/Non-Home-Based" trips). The Kern COG model projected that, for all trips combined, at buildout the project would have an AM peak period ICR of 72.2 percent and a PM peak period ICR of 71.4 percent.

During the DEIR (2016) comment period, the California Department of Transportation (Caltrans) requested that Fehr & Peers, the project's traffic consultants, conduct a review of Home-Based Work ICRs in certain other California locations. The review found that the average Home-Based Work ICR for the California communities was 57.4 percent and based on this information Caltrans requested that the project analysis utilize a Home-Based Work ICR of 28.7 percent, 50 percent lower than the results of the review.

As a result, the DEIR (2016) traffic analysis was revised in the Final EIR (2016) to incorporate the 28.7 percent Home-Based Work trip ICR requested by Caltrans. When combined with the Kern COG model ICRs for non-work Home-Based Other/Non-Home-Based trips, the ICRs for all project trips considered in the FEIR (2016) were 59.8 percent in the AM peak period and 64.2 percent in the PM period. These results are lower than the 72.2 percent AM peak period and 71.4 percent PM peak period ICRs analyzed in the DEIR (2016). The Final EIR (2016) revised the project's mitigation measures and considered the significance of all significant impacts that were determined to potentially occur using the lower AM and PM peak period ICRs.

The purpose of the SREIR is to evaluate the potential impacts that could occur from lower ICRs than evaluated in the FEIR (2016). To perform this evaluation, it was determined that a variety of scenarios needed to be developed for modeling that could show what would happen if the projected mix of residential, commercial and industrial development did not build out as proposed. To identify a range of potential scenarios that could result in higher VMT compared to the project, a total of 22 Screening Scenarios were developed by the project traffic consultant to evaluate how daily, AM, and PM peak hour trip generation rates and VMT could vary with ICRs that were 10 and 20 percent lower than used in the 2016 EIR or from other identified development patterns, such as primarily residential or commercial/light industrial development, that could also affect the project's VMT. As described in the *Supplemental Recirculated Transportation Impact Study Technical Report for the Grapevine Specific Plan And Community Plan Project*, dated May 31, 209, and prepared by Fehr and Peers and included as Appendix E.2 in Volume 4 of this SREIR (2019 Traffic Study), none of the scenarios were found to generate a greater amount of daily average than identified in the 2016 EIR and five of the scenarios were found to generate higher levels of VMT than in the 2016 EIR. Vehicular emissions are partially dependent on project VMT, so these five Reduced ICR Scenarios with higher VMT are evaluated in this section. The five Reduced ICR scenarios are presented below consistent with their introduction in Chapter 3, *Project Description*, and consist of the following:

- **Scenario A.** Proposed project development of 12,000 dwelling units and 5,100,000 square feet of commercial/light industrial uses at 100 percent of full buildout with a 10 percent reduction in the daily and peak hour ICRs used in the 2016 EIR (Screening Scenario 1 and Scenario 1 in the 2019 Traffic Study, Volume 4, Appendix E.2).
- **Scenario B.** Proposed project development of 12,000 dwelling units and 5,100,000 square feet of commercial/light industrial uses at 100 percent of full buildout with a 20 percent reduction in the daily and peak hour ICRs used in the 2016 EIR (Screening Scenario 2 and Scenario 2 in the 2019 Traffic Study, Volume 4, Appendix E.2).
- **Scenario C.** Proposed project development of 12,000 dwelling units and 5,100,000 square feet of commercial/light industrial uses at 75 percent of full buildout (9,000 dwelling units and 3,185,000 square feet of commercial/light industrial uses) with a 20 percent reduction in the daily and peak hour ICRs used in the 2016 EIR (Screening Scenario 4 and Scenario 4 in the 2019 Traffic Study, Volume 4, Appendix E.2).
- **Scenario D.** Development of 14,000 dwelling units and schools and parks as required by applicable land use laws and regulations, with no complementary commercial/light industrial

amenities or on-site employment-generating land uses (Screening Scenario 9 and Scenario 9 in the 2019 Traffic Study, Volume 4, Appendix E.2).

- **Scenario E.** Development of 12,000 dwelling units and schools and parks as required by applicable land use laws and regulations, with no complementary commercial/light industrial amenities or on-site employment-generating land uses (Screening Scenario 10 and Scenario 10 in the 2019 Traffic Study, Volume 4, Appendix E.2).

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The national and California standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include ozone (O_3), nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and lead. Pollutants evaluated herein include reactive organic gases (ROGs; also referred to as volatile organic compounds [VOCs])[1] and oxides of nitrogen (NO_X), which are important because they are precursors to O_3, as well as sulfur oxides (SO_X), PM_{10}, and $PM_{2.5}$.

This section of the SREIR includes the following:

- Environmental and regulatory settings for air quality and health risk analysis, including detail on criteria air pollutants and regulatory standards. Section 4.3 of the DEIR (2016), the FEIR (2016), and associated traffic and transportation and air quality appendices of the 2016 EIR are included in Volumes 5 to 15; the 2019 Traffic Study (Fehr & Peers 2019) and 2019 Air Study (Dudek 2019a) are included in Volume 4 and Volume 2 of this SREIR, respectively, and incorporated herein.
- Presentation of the five Reduced ICR Scenarios for potential buildout which result in greater VMT and potentially greater air quality and public health impacts.
- Discussion of updates to the air quality model to incorporate the latest version of the accepted air emissions model for SREIR analysis.
- Review of additional mitigation incorporated in the project air modeling for analysis of post-mitigation air emissions.
- Modeling of air pollutant emissions and discussion of the potential significant impacts related to criteria air pollutant emissions from land use operations (i.e., non-permitted activities) and stationary sources (i.e., permitted equipment and activities) that could occur with project buildout and other potential lower ICR and higher VMT scenarios, such as residential-only development, that would result in lower peak ICRs and higher weekday VMT than considered in the FEIR (2016).

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1 The *Kern County CEQA Implementation Document* (June 2004) states the equivalence of ROG and VOC. The San Joaquin Valley Air Basin threshold is set for ROG. ROG and VOC are used interchangeably in this analysis.

- Discussion of potential CO hotspot impacts, and potential health risk from the Interstate 5 (I-5) freeway and local roadways from the project based on traffic volume and trip distribution associated with each of the potential Reduced ICR Scenarios evaluated herein.
- Identification of air and health impact mitigation measures for the project to reduce potentially significant impacts.

Information in this section is based on the Air Quality and Greenhouse Gas Emissions Analysis Technical Report for the Grapevine Specific and Community Plan Project Supplemental Recirculated Environmental Impact Report, dated July 2019, and prepared by Dudek in March (2019 Air Study). Section 4.3 of the DEIR (2016), the FEIR (2016), and associated traffic and transportation and air quality appendices of the 2016 EIR are included in Volumes 5 through 15. The 2019 Traffic Study and 2019 Air Study, are included in Volume 4 and 2, respectively, of this SREIR and incorporated herein.

4.3.2 Environmental Setting

The California Air Resources Board (CARB) has divided California into regional air basins according to topographic drainage features. The project site is located in the San Joaquin Valley Air Basin (SJVAB) and is under the jurisdiction of the SJVAPCD. The SJVAB, which is approximately 250 miles long and 35 miles wide, is the second-largest air basin in the state.

Topography and Meteorology

Air pollution, especially the dispersion of air pollutants, is directly related to a region's topographic features. The SJVAB is defined by 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). The valley opens to the sea at the Carquinez Strait where the San Joaquin–Sacramento Delta empties into San Francisco Bay.

Localized air quality can be greatly affected by elevation and topography. For the majority of the San Joaquin Valley, air movement through and out of the SJVAB is restricted by the hills and the mountains surrounding it. Although marine air generally flows into the SJVAB from the San Joaquin–Sacramento Delta, the Coast Range hinders wind movement into the SJVAB from the west, the Tehachapi Mountains prevent the southerly passage of airflow, and the Sierra Nevada is a significant wind barrier to the east. These topographic features result in weak airflow into the valley, which becomes vertically blocked by high barometric pressure over the SJVAB. As a result, the majority of the SJVAB is highly susceptible to pollutant accumulation over time. Furthermore, most of the surrounding mountains are above the normal height of the summer inversion layer.

Wind speed and direction play an important role in the dispersion and transport of air pollutants. O_3 and inhalable particulates (PM_{10} and $PM_{2.5}$) are classified as regional pollutants because they can be transported away from the emission source before concentrations peak. In contrast, local pollutants, such as CO, tend to have their highest concentrations near the source of emissions and dissipate easily; therefore, their highest concentrations occur during low wind speeds.

Wind speed and direction data indicate that during the summer, winds usually originate at the north end of the SJVAB and flow in a south/southeasterly direction through the Tehachapi Pass and into the Southeast Desert Air Basin. During the winter, winds occasionally originate from the south end of the SJVAB and flow in a north/northwesterly direction. Also, during winter, the SJVAB experiences light, variable winds, typically less than 10 miles per hour. Low wind speeds, combined with low inversion layers in the winter, create a climate that is conducive to high CO and inhalable PM_{10} concentrations.

The vertical mixing of air pollutants is limited by the presence of persistent temperature inversions. Inversions may be either at ground level or elevated. Ground-level inversions occur frequently during fall and early winter (i.e., October through January). High concentrations of primary pollutants, which are those emitted directly into the atmosphere (e.g., CO), may be found during these times. Elevated inversions act as a lid over the basin and limit vertical mixing. Severe air stagnation occurs as a result of these inversions. Elevated inversions contribute to the occurrence of high levels of O_3 during the summer months.

The SJVAB enjoys an inland Mediterranean climate, averaging more than 260 sunny days per year. The valley floor is characterized by warm, dry summers and cooler winters. Average daily temperatures in the basin range from 41.7 degrees Fahrenheit (°F) in December to 98.7°F in July. Summer highs often exceed 100°F, averaging in the low 90s in the northern valley and high 90s to the south. Although the SJVAB enjoys a high percentage of sunshine, a reduction in sunshine occurs during December and January because of fog and intermittent stormy weather. Nearly 90 percent of the annual precipitation falls in the six months between October and May. Precipitation is low because the mountains to the west and south produce a rain shadow effect by intercepting prefrontal, moisture-laden western and southern winds. The southern valley receives precipitation primarily from cold, unstable, northwesterly flows that usually follow a frontal passage.

Sensitive Receptors

Some people are considered more sensitive to air pollutants than others, including those with pre-existing health problems, those who are close to an emissions source, or those who are exposed to air pollutants for long periods of time. The SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts*, revised March 19, 2015 (GAMAQI), defines sensitive receptors as those that are more susceptible to the effects of air pollution than the population at large and include "facilities that house or attract children, the elderly, and people with illnesses, hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors" (SJVAPCD, 2015). Land uses such as primary and secondary schools, hospitals, and convalescent homes are considered to be relatively sensitive because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality–related health problems than the general public. Residential areas are considered sensitive to poor air quality because people in residential areas are often at home for extended periods. Recreational land uses are moderately sensitive to air pollution because vigorous exercise associated with recreation places a high demand on the human respiratory function.

The closest existing off-site schools are approximately four to five miles from the project site; thus, they would not be considered sensitive receptors that would be affected by the project's construction or operation. No existing residential structures have been identified in the vicinity of the project (i.e., within 2,000 meters).

As the project builds out, residential units, schools, and a hospital will be constructed and inhabited. Residences, schools, and/or parks are proposed within Plan Areas 1, 2, 3, 4, 5a, 5b, and 6a. The approximate location of the proposed residences, schools, and parks on the project site, as zoned for these land uses, is presented in the land use plan. A 300,000-square-foot medical center is proposed to be located in Plan Area 2 within the area designated for office/research and development uses. At this time, the locations of childcare centers, retirement homes, or other sensitive receptors are not known.

Potential impacts on these receptors were analyzed for the project. Results of the analysis are presented in Section 4.3.4, *Impacts and Mitigation Measures*.

National and State Ambient Air Quality Standards

Both the state of California and the Federal government have established ambient air quality standards for several different criteria air pollutants, a summary of which is shown in Table 4.3-1. For some pollutants, separate standards have been set for different time periods. Most standards have been set to protect public health. For other pollutants, standards have been based on some other value (such as protection of crops, protection of materials, or avoidance of nuisance conditions).

Table 4.3-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary[c,d]*	*Secondary[c,e]*
O_3	1 hour	0.09 ppm (180 μg/m^3)	—	Same as Primary Standard[f]
	8 hours	0.070 ppm (137 μg/m^3)	0.070 ppm (137 μg/m^3)[f]	
NO_2[g]	1 hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)	
CO	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
SO_2[h]	1 hour	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3)	—
	3 hours	—	—	0.5 ppm (1,300 μg/m^3)
	24 hours	0.04 ppm (105 μg/m^3)	0.14 ppm (for certain areas)[g]	—
	Annual	—	0.030 ppm (for certain areas)[g]	—
PM_{10}[i]	24 hours	50 μg/m^3	150 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 μg/m^3	—	
$PM_{2.5}$[i]	24 hours	—	35 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3
Lead[j,k]	30-day Average	1.5 μg/m^3	—	—
	Calendar Quarter	—	1.5 μg/m^3 (for certain areas)[k]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 μg/m^3	
Hydrogen sulfide	1 hour	0.03 ppm (42 μg/m^3)	—	—
Vinyl chloride[j]	24 hours	0.01 ppm (26 μg/m^3)	—	—
Sulfates	24 hours	25 μg/m^3	—	—

Table 4.3-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary*[c,d]	*Secondary*[c,e]
Visibility reducing particles	8 hour (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%	—	—

Source: Dudek 2019a, Table 2.2-1

Notes: ppm = parts per million by volume; μg/m³ = micrograms per cubic meter; mg/m³= milligrams per cubic meter.

a California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, 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 O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 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 micrograms per cubic meter (μg/m³) is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

c Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon 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 (parts per million) in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

d National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

e National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

f On October 1, 2015, the primary and secondary National Ambient Air Quality Standards (NAAQS) for O_3 were lowered from 0.075 ppm to 0.070 ppm

g 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 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare the national 1-hour standard 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.

h 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 of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

i On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 μg/m³ to 12.0 μg/m³. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 μg/m³, as was the annual secondary standard of 15 μg/m³. The existing 24-hour PM_{10} standards (primary and secondary) of 150 μg/m³ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

j CARB has identified lead and vinyl chloride as toxic air contaminants (TACs) 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.

k The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 μg/m³ 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.

Local Standards

San Joaquin Valley Air Basin

CARB operates the local meteorological and air quality monitoring stations in the vicinity of the project site. Table 4.3-2 lists the air quality attainment status for the SJVAB. Pursuant to the methodologies prescribed by the SJVAPCD's GAMAQI, the analysis within this section models and analyzes primarily ROG, NO_X, CO, PM_{10}, and sulfur oxides SO_X. In accordance with the January 2015 GAMAQI technical guidance document, the SJVAPCD no longer monitors lead in the ambient air of the SJVAB because the use of leaded fuel has been mostly phased out. Hydrogen sulfide (H_2S) is associated with geothermal activities, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations; however, CARB does not have a measuring method to accurately designate areas in the state (i.e., attainment or nonattainment). Sulfate data collected in the SJVAB demonstrate sulfate levels that are significantly less than the health standards.

Areas can be classified as being in attainment (air pollutant levels consistently below the standard) or as nonattainment (levels of air pollutant consistently violate the standard). Areas that do not meet the standards shown in Table 4.3-1 are classified as nonattainment areas. The determination of whether an area meets the state and National standards is based on air quality monitoring data. Some areas are unclassified, which means that not enough data available to determine whether the standard is exceeded in an area. Unclassified areas are typically treated as being in attainment. Because the attainment/nonattainment designation is pollutant specific, an area may be classified as a nonattainment area for one pollutant and an attainment area for another. Similarly, because the state and National standards differ, an area could be classified as an attainment area for the National standards of a pollutant and as a nonattainment area for the state standards of the same pollutant.

As presented in Table 4.3-2, the SJVAB is currently in extreme nonattainment for the 8-hour National O_3 standard and nonattainment for the National $PM_{2.5}$ standard.

Table 4.3-2. San Joaquin Valley Air Basin (Kern County) Attainment Status

Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
Ozone (O_3) – 1-hour	No federal standard[1]	Nonattainment/Severe
Ozone (O_3) – 8-hour	Nonattainment/Extreme[2]	Nonattainment
Nitrogen dioxide (NO_2)	Unclassifiable/attainment	Attainment
Carbon monoxide (CO)	Unclassifiable/attainment	Attainment
Sulfur dioxide (SO_2)	Unclassifiable/attainment	Attainment
Respirable particulate matter (PM_{10})	Attainment (Maintenance)[3]	Nonattainment
Fine particulate matter ($PM_{2.5}$)	Nonattainment[4]	Nonattainment
Lead (Pb)[5]	Unclassifiable/attainment	Attainment
Sulfates (SO_4)	No federal standard	Attainment
Hydrogen sulfide (H_2S)	No federal standard	Unclassified
Vinyl chloride[5]	No federal standard	No designation
Visibility-reducing particles	No federal standard	Unclassified

Sources: SJVAPCD 2019; EPA 2018 (federal); CARB 2018 (state).
Notes: Attainment = meets the standards; Attainment (maintenance) = achieve the standards after a nonattainment designation; Nonattainment = does not meet the standards; Unclassified or unclassifiable = insufficient data to classify; Unclassifiable/attainment
= meets the standard or is expected to be meet the standard despite a lack of monitoring data.
1 Effective June 15, 2005, the EPA revoked the federal 1-hour ozone standard, including associated designations and classifications. EPA
had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment
Demonstration Plan (SJVAPCD 2004) on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour
ozone nonattainment areas continue to apply to the SJVAB.
2 Though the San Joaquin Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved San
Joaquin Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).

Table 4.3-2. San Joaquin Valley Air Basin (Kern County) Attainment Status		
Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
3 On September 25, 2008, EPA re-designated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan. 4 The San Joaquin Valley is designated nonattainment for the 1997 PM2.5 NAAQS. EPA designated the San Joaquin Valley as nonattainment for the 2006 $PM_{2.5}$ NAAQS on November 13, 2009 (effective December 14, 2009). 5 CARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined.		

To reach attainment for the state and National ambient air quality standards, the Extreme Ozone Attainment Demonstration Plan (Extreme OADP) was published by the SJVAPCD and approved by CARB and U.S. Environmental Protection Agency (EPA). The Extreme OADP was prepared to fulfill the requirements of the Federal Clean Air Act (CAA) and attain the National 1-hour O_3 ambient air quality standards in the SJVAB by November 15, 2010. It identifies control measures needed to reduce emissions and projects future air quality impacts with implementation of those controls. The SJVAPCD and CARB implement control measures needed to achieve emission reductions, with the SJVAPCD implementing some of the measures listed in the Extreme OADP as rules.

South Coast Air Basin

The criteria air pollutant attainment classifications for the South Coast Air Basin (SCAB) are outlined in Table 4.3-3. Project-related vehicular trips are anticipated to occur within the SCAB (e.g., to the Santa Clarita area), although the project itself is located miles away from the SCAB.

Table 4.3-3 South Coast Air Basin Attainment Status

Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
Ozone (O_3) – 1-hour	No federal standard[1]	Nonattainment
Ozone (O_3) – 8-hour	Nonattainment/Extreme	Nonattainment
Nitrogen dioxide (NO_2)	Attainment (Maintenance)	Attainment
Carbon monoxide (CO)	Attainment (Maintenance)	Attainment
Sulfur dioxide (SO_2)	Unclassifiable/attainment	Attainment
Respirable particulate matter (PM_{10})	Attainment (Maintenance)	Nonattainment
Fine particulate matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Lead (Pb)[1,2]	Attainment	Attainment
Sulfates (SO_4)	No federal standard	Attainment
Hydrogen sulfide (H_2S)	No federal standard	Unclassified
Vinyl chloride[1]	No federal standard	No designation
Visibility-reducing particles	No federal standard	Unclassified

Sources: Dudek, 2019a.

Notes:

Attainment = meets the standards; Attainment (maintenance) = achieve the standards after a nonattainment designation; Nonattainment = does not meet the standards; Unclassified or unclassifiable = insufficient data to classify; Unclassifiable/attainment = meets the standard or is expected to be meet the standard despite a lack of monitoring data.

1 CARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined.

2 Los Angeles County is designated as nonattainment with the federal lead standard.

Mojave Desert Air Basin

The Mojave Desert Air Basin (MDAB) includes desert areas in Los Angeles, San Bernardino and Kern Counties. Project-related vehicular trips are anticipated to occur within the MDAB (e.g., to the Lancaster/Palmdale area), although the project itself is located miles away from the MDAB.

The criteria air pollutant attainment classifications for the Los Angeles County and San Bernardino County portion of the MDAB are outlined in Table 4.3-4.

Table 4.3-4. Mojave Desert Air Basin (Los Angeles and San Bernardino Counties) Attainment Status

Pollutant	Designation/Classification[1]	
	Federal Standards	*State Standards*
Ozone (O_3) – 1-hour	No federal standard	Nonattainment
Ozone (O_3) – 8-hour	Nonattainment (Severe 15)	Nonattainment
Nitrogen dioxide (NO_2)	Unclassifiable/attainment	Attainment
Carbon monoxide (CO)	Unclassifiable/attainment	Attainment
Sulfur dioxide (SO_2)	Unclassifiable/attainment	Attainment
Respirable particulate matter (PM_{10})	Unclassifiable/attainment – Los Angeles Nonattainment (Moderate) – San Bernardino	Nonattainment
Fine particulate matter ($PM_{2.5}$)	Unclassifiable/attainment	Unclassified
Lead (Pb)[2]	Unclassifiable/attainment	Attainment
Sulfates (SO_4)	No federal standard	Attainment
Hydrogen sulfide (H_2S)	No federal standard	Nonattainment – Searles Valley Unclassified
Vinyl chloride[2]	No federal standard	No designation
Visibility-reducing particles	No federal standard	Unclassified

Sources: Dudek, 2019a

Notes:

1 Unless otherwise noted, the attainment status applies to Los Angeles and San Bernardino Counties.

2 CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined.

The criteria air pollutant attainment classifications for the Kern County portion of the MDAB are outlined in Table 4.3-5.

Table 4.3-5. Mojave Desert Air Basin (Kern County) Attainment Classification

Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
Ozone (O_3) – 1-hour	No federal standard	Nonattainment
Ozone (O_3) – 8-hour	Nonattainment (Moderate)	Nonattainment
Nitrogen dioxide (NO_2)	Unclassifiable/attainment	Attainment
Carbon monoxide (CO)	Unclassifiable/attainment	Unclassified
Sulfur dioxide (SO_2)	Unclassified	Attainment
Respirable particulate matter (PM_{10})	Nonattainment (Serious) – Northwest portion of East Kern County Attainment (Maintenance) – Indian Wells Valley planning area Unclassifiable/attainment	Nonattainment
Fine particulate matter ($PM_{2.5}$)	Unclassifiable/attainment	Unclassified
Lead (Pb)[1]	Unclassifiable/attainment	Attainment

Table 4.3-5. Mojave Desert Air Basin (Kern County) Attainment Classification		
Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
Sulfates (SO_4)	No federal standard	Attainment
Hydrogen sulfide (H_2S)	No federal standard	Unclassified
Vinyl chloride[1]	No federal standard	No designation
Visibility-reducing particles	No federal standard	Unclassified

Sources: Dudek 2019a
Note:
1 CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined.

Regional Air Quality

The SJVAPCD is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the SJVAB, where the project area is located. The SJVAPCD jurisdiction includes all of Merced, San Joaquin, Stanislaus, Madera, Fresno, Kings, and Tulare Counties, and the San Joaquin Valley portion of Kern County.

The SJVAPCD's GAMAQI considers construction emissions and operational emissions as separate and distinct in that construction emissions are considered short-term impacts and temporary in nature, while operational and area-source emissions are considered long term.

The SJVAPCD has set up the Indirect Source Review (ISR) program to address new development projects. The ISR program is based on SJVAPCD Rules 9510 and 3180, which provide a methodology for assessing air quality impacts created by new development; regulations to limit the emission of pollutants during the construction process; and the option of on-site emission-reduction measures and off-site emission reduction through fees, which are used to fund off-site emission-reduction projects, or some combination of both options.

Local Air Quality

Under authority and oversight from the EPA pursuant to 40 Code of Federal Regulations (CFR) Part 58, the SJVAPCD and CARB maintain ambient air quality monitoring stations throughout the SJVAB, with eight sites in Kern County (Arvin-DiGiorgio, Bakersfield [two sites], Edison, Lebec, Maricopa, Oildale, and Shafter). Not all air pollutants are monitored at each station; thus, data from the closest representative station that monitors a specific pollutant are summarized. The closest CARB ambient air quality monitoring stations to the project site are the Arvin–Di Giorgio, Bakersfield–Municipal Airport, Maricopa–Stanislaus, and Bakersfield–California Avenue stations.

The Lebec monitoring station, located at 1277 Beartrap Road in Lebec, is the closest monitoring station to the project, located approximately 9 miles southwest of the project site at 3,500 feet elevation; however, as it monitors $PM_{2.5}$ only for non-regulatory purposes, the values from that station are not included.

The Arvin–Di Giorgio station, located at 19405 Buena Vista Boulevard in Arvin, is approximately 21 miles north–northeast of the project site; it measures O_3.

The Maricopa–Stanislaus station, located at 755 Stanislaus Street in Maricopa, is approximately 28 miles west–northwest of the project site; it measures O_3.

The Bakersfield–Municipal Airport station, located at 2000 South Union Avenue in Bakersfield, is approximately 26 miles north–northwest of the project site; it measures O_3, NO_2, and CO.

The Bakersfield–California Avenue station, located at 5558 California Avenue in Bakersfield, is approximately 29 miles north–northwest of the project site; it measures O_3, NO_2, PM_{10}, $PM_{2.5}$, and lead.

The Fresno–Garland monitoring station located at 3727 North First Street in Fresno, approximately 135 miles north–northwest of the project site, is the only station within the SJVAB that currently monitors SO_2.

The most recent background ambient air quality data from 2015 to 2017 and the days exceeding the ambient air quality standards are presented in Table 4.3-6.

Table 4.3-6. Existing CARB Air Quality Monitoring Data in Project Vicinity

Pollutant and Monitoring Station Location	Maximum Concentration			Days Exceeding Standard		
	2015	2016	2017	2015	2016	2017
O_3 – 1-hour CAAQS (0.09 ppm)						
Bakersfield-5558 California Ave.	0.104	0.092	0.122	6	0	11
Bakersfield – Municipal Airport	0.118	0.102	0.118	23	8	9
Arvin–Di Giorgio	0.124	0.108	0.107	16	21	13
Maricopa–Stanislaus	0.094	0.092	0.117	0	0	1
O_3 – 8-hour CAAQS (0.07 ppm)						
Bakersfield-5558 California Ave.	0.097	0.086	0.104	54	63	87
Bakersfield – Municipal Airport	0.106	0.093	0.101	73	66	57
Arvin–Di Giorgio	0.101	0.092	0.089	55	82	81
Maricopa–Stanislaus	0.088	0.087	0.094	32	55	42
O_3 – 8-hour NAAQS (0.070 ppm)						
Bakersfield-5558 California Ave.	0.096	0.085	0.104	52	60	85
Bakersfield – Municipal Airport	0.106	0.093	0.101	69	63	55
Arvin–Di Giorgio	0.101	0.091	0.088	53	78	73
Maricopa–Stanislaus	0.087	0.087	0.093	32	50	38
PM_{10} – 24-hour CAAQS (50 µg/m^3)[a]						
Bakersfield-5558 California Ave.	103.6	92.2	143.6	121.4 (20)	121.4 (21)	98.7 (16)
PM_{10} – 24-hour NAAQS (150 µg/m^3)[a]						
Bakersfield-5558 California Ave.	104.7	90.9	138.0	0.0 (0)	0.0 (0)	0.0 (0)
PM_{10} – annual CAAQS (20 µg/m^3)						
Bakersfield-5558 California Ave.	44.1	40.9	42.6	*	*	*
$PM_{2.5}$ - 24-hour NAAQS (35 µg/m^3)[a]						
Bakersfield – 5558 California Ave.	107.8	66.4	101.8	32.3 (29)	25.5 (23)	30.2 (28)
$PM_{2.5}$ - annual CAAQS (12 µg/m^3)						
Bakersfield – 5558 California Ave.	16.6	16.0	15.9	*	*	*
$PM_{2.5}$ - annual NAAQS (12 µg/m^3)						
Bakersfield – 5558 California Ave.	16.2	14.7	15.9	*	*	*
CO - 1-Hour CAAQS (20 ppm) & NAAQS (35 ppm)						
Bakersfield Municipal Airport	1.7	1.4	1.8	0	0	0
CO - 8-Hour CAAQS & NAAQS (9.0 ppm)						
Bakersfield Municipal Airport	1.0	1.1	1.2	0	0	0
NO_2 - 1-Hour CAAQS (0.18 ppm)						
Bakersfield – 5558 California Ave.	0.054	0.058	0.066	0	0	0
Bakersfield Municipal Airport	0.055	0.058	0.062	0	0	0

Table 4.3-6. Existing CARB Air Quality Monitoring Data in Project Vicinity

Pollutant and Monitoring Station Location	Maximum Concentration			Days Exceeding Standard		
	2015	2016	2017	2015	2016	2017
NO_2 - 1-Hour NAAQS (0.10 ppm)						
Bakersfield – 5558 California Ave.	0.0545	0.0581	0.0660	0	0	0
Bakersfield Municipal Airport	0.0550	0.0581	0.0625	0	0	0
SO_2 - 1-Hour NAAQS (0.075 ppm)						
Fresno – First Street	0.011	0.008	0.007	0	0	0
SO_2 - 24-Hour NAAQS (0.14 ppm)						
Fresno – First Street	0.002	0.002	0.002	0	0	0
SO_2 - annual NAAQS (0.030 ppm)						
Fresno – First Street	0.0005	0.0005	0.0006	*	*	*
Pb - Maximum 30-Day Concentration CAAQS (1500 ng/m^3)						
Bakersfield - 5558 California Ave	0.009	0.018	0.013	*	*	*

Source: CARB 2019; EPA 2019
ppm= parts per million
[a] Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.
* Not applicable.

Tejon Ranchcorp established an air quality monitoring station from 2013 to 2015 south of the Rose Well aqueduct and approximately 500 yards east of I-5. Data collection began in November 2013 and data are collected continuously and averaged over 15- and 60-minute periods. Monitors at the station measure the atmospheric concentrations of O_3, NO_2, PM_{10}, $PM_{2.5}$ and the difference between PM_{10} and $PM_{2.5}$, the particulate matter coarse fraction (PMc). The station also includes a meteorological tower, which monitors 10-meter horizontal wind speed and direction, 10-meter wind direction standard deviation, ambient temperature at 2 and 10 meters, and solar radiation. PM_{10} and $PM_{2.5}$ are monitored using two Met One BAM-1020 beta-attenuation mass monitors. These monitors are designated as equivalent methods for monitoring PM_{10} and $PM_{2.5}$ by the EPA. NO_2 is monitored using a Teledyne Advanced Pollution Instrumentation Model T200 chemiluminescence analyzer, which is an EPA-designated reference method for NO_2 measurement. O_3 is measured using a Teledyne Advanced Pollution Instrumentation Model T400 UV absorption analyzer, which is designated by the EPA as an equivalent method for measuring O_3. The Grapevine station ambient air quality data from 2013 to 2015 are presented in Table 4.3-7.

Table 4.3-7. Existing Grapevine Air Quality Monitoring Data

Pollutant (standard)	Maximum Concentration			Percent of Standard (%)		
	2013	2014	2015	2013	2014	2015
O_3 – 1-hour CAAQS (0.09 ppm)	0.063	0.113	0.116	70%	126%	129%
O_3 – 8-hour CAAQS (0.07 ppm)	0.053	0.100	0.098	76%	142%	140%
O_3 – 8-hour NAAQS (0.075 ppm)	0.053	0.100	0.098	71%	133%	130%
PM_{10} – 24-hour CAAQS (50 µg/m^3)	105	415	91	209%	829%	182%
PM_{10} – 24-hour NAAQS (150 µg/m^3).	105	415	91	70%	276%	61%
PM_{10} – annual CAAQS (20 µg/m^3)	41	43	32	206%	215%	158%
$PM_{2.5}$ - 24-hour NAAQS (35 µg/m3)	108	152	73	309%	435%	208%
$PM_{2.5}$ - annual CAAQS & NAAQS (12 µg/m^3)	21	15	15	173%	124%	124%
PMc - 24-hour (µg/m3)	78.2	340	73	--	--	--
PMc - annual (µg/m3)	21	28	17	--	--	--
NO2 - 1-Hour CAAQS (0.18 ppm)	0.066	0.076	0.066	36%	42%	36%
NO2 - 1-Hour NAAQS (0.10 ppm)	0.066	0.076	0.066	66%	76%	66%
NO2 - annual CAAQS (0.03 ppm)	0.02	0.012	0.098	67%	40%	33%

Table 4.3-7. Existing Grapevine Air Quality Monitoring Data

Pollutant (standard)	Maximum Concentration			Percent of Standard (%)		
	2013	2014	2015	2013	2014	2015
NO2 - annual NAAQS (0.053 ppm)	0.02	0.012	0.098	38%	23%	19%
Nitric Oxide (NO) – 1-Hour	0.087	0.60	0.058	--	--	--
Nitrogen Oxides (NO_X) – 1-hour	0.137	0.112	0.102	--	--	--

Source: Dudek, 2016b.
ppm= parts per million
* There was insufficient (or no) data available to determine the value.

Criteria Air Pollutants

The following is a general description of the physical and health effects from the regulated air pollutants shown in Table 4.3-1.

Ozone (O3)

O_3 occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. Here, at ground level, tropospheric, or "bad," O_3 is an air pollutant that damages human health, vegetation, and many common materials. It is a key ingredient of urban smog. The troposphere extends to a level about 10 miles up where it meets the second layer, the stratosphere. The stratospheric, or "good," O_3 layer extends upward from about 10 to 30 miles and protects life on earth from the sun's harmful ultraviolet rays.

"Bad" O_3 is what is known as a photochemical pollutant. It needs ROG and NO_X, known as O_3 precursors, and sunlight. ROG and NO_X are emitted from various sources throughout Kern County. Significant O_3 formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. To reduce O_3 concentrations, it is necessary to control the emissions of these O_3 precursors.

O_3 is a regional air pollutant. It is generated over a large area and transported and spread by the wind. As the primary constituent of smog, O_3 is the most complex, difficult to control, and pervasive of the criteria pollutants. Unlike other pollutants, it is not emitted directly into the air by specific sources but is created by sunlight acting on other air pollutants (the precursors), specifically NO_X and ROG. Sources of precursor gases number in the thousands and include common sources such as consumer products, gasoline vapors, chemical solvents, and combustion byproducts of various fuels. Originating from gas stations, motor vehicles, large industrial facilities, and small businesses such as bakeries and dry cleaners, the O_3-forming chemical reactions often take place in another location, catalyzed by sunlight and heat. Thus, high O_3 concentrations can form over large regions when emissions from motor vehicles and stationary sources are carried hundreds of miles from their origins.

Health Effects

While O_3 in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground-level O_3 can adversely affect the human respiratory system. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high O_3 levels. O_3 also damages natural ecosystems, such as forests and foothill communities, agricultural crops, and some human-made materials, such as rubber, paint, and plastic. High levels of O_3 may negatively affect immune systems, making people more susceptible to respiratory illnesses, including bronchitis and pneumonia. O_3 also accelerates aging and exacerbates pre-existing asthma and bronchitis. Evidence has linked the onset of asthma to exposure to elevated O_3 levels in exercising children (McConnell et al., 2002). Active people who work or play outdoors appear to be more at risk from O_3 exposure than those with a low level of activity. In addition, the elderly and those with respiratory disease are also considered sensitive populations for O_3.

O_3 is a powerful oxidant and can be compared to household bleach, which can kill living cells (such as germs or human skin cells) upon contact. O_3 can damage the respiratory tract, causing inflammation and irritation, and induce symptoms such as coughing, chest tightness, shortness of breath, and worsening of asthmatic symptoms. O_3 in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. Exposure to levels of O_3 above the current ambient air quality standard leads to lung inflammation, lung tissue damage, and a reduction in the amount of air inhaled into the lungs. Elevated O_3 concentrations also reduce crop and timber yields, damage native plants, and damage materials such as rubber, paints, fabric, and plastics (CARB and American Lung Association of California, 2007).

Reactive Organic Gases (ROG) and Volatile Organic Compounds (VOC)

Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases, including VOCs and ROGs, which include all hydrocarbons except those exempted by CARB. Therefore, ROGs are a set of organic gases based on state rules and regulations. VOCs are similar to ROGs in that they include all organic gases except those exempted by Federal law. The list of compounds exempt from the definition of a VOC is presented in District Rule 1102.

Both VOCs and ROGs are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels. Combustion engine exhaust, oil refineries, and oil-fueled power plants are the primary sources of hydrocarbons. Another source of hydrocarbons is evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint.

Health Effects

The primary health effects related to hydrocarbons stem from O_3 (see discussion above). High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. There are no separate national or California ambient air quality standards for ROG. Carcinogenic forms of ROG are considered toxic air contaminants (TACs). An example is benzene, which is a carcinogen. The health effects of individual ROGs are described under “Toxic Air Contaminants” below.

Carbon Monoxide (CO)

CO is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. CO is an odorless, colorless, poisonous gas that is highly reactive.

CO is a byproduct of motor vehicle exhaust, which contributes more than 66 percent of all CO emissions nationwide. In cities, automobile exhaust can cause as much as 95 percent of all CO emissions. These emissions can result in high concentrations of CO, particularly in local areas with heavy traffic congestion. Other sources of CO emissions include industrial processes and fuel combustion in sources such as boilers and incinerators. Despite an overall downward trend in concentrations and emissions of CO, some metropolitan areas still experience high levels of CO.

Health Effects

CO enters the bloodstream and binds more readily to hemoglobin, the oxygen-carrying protein in blood, than oxygen, thereby reducing the oxygen-carrying capacity of blood and reducing oxygen delivery to organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease. Healthy individuals are also affected but only at higher levels of exposure. Exposure to CO can cause chest pain in heart patients, headaches, and reduced mental alertness. At high concentrations, CO can cause heart difficulties in people with chronic diseases and can impair mental abilities. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, difficulty performing complex tasks, and, with prolonged enclosed exposure, death.

The adverse health effects associated with exposure to ambient and indoor concentrations of CO are related to the concentration of carboxyhemoglobin in the blood. Health effects observed may include an early onset of cardiovascular disease; behavioral impairment; decreased exercise performance of young, healthy men; reduced birth weight; sudden infant death syndrome; and increased daily mortality rate (Fierro et al., 2001).

Most of the studies that evaluate the adverse health effects of CO on the central nervous system examine high-level poisoning. Such poisoning results in symptoms ranging from common flu and cold symptoms (shortness of breath on mild exertion, mild headaches, and nausea) to unconsciousness and death.

Oxides of Nitrogen

NO_X is a family of highly reactive gases that are primary precursors to the formation of ground-level O_3; they react in the atmosphere to form acid rain. NO_X is emitted from solvents and combustion processes in which fuel is burned at high temperatures, principally motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers. A brownish gas, NO_X is a strong oxidizing agent that reacts in the air to form corrosive nitric acid as well as toxic organic nitrates.

NO_X is an O_3 precursor that combines with ROG to form O_3 (see the discussion of O_3 above for the health effects of O_3).

Health Effects

Direct inhalation of NO_X can also cause a wide range of health effects. NO_X can irritate the lungs, cause lung damage, and lower resistance to respiratory infections such as influenza. Short-term exposures (e.g., less than 3 hours) to low levels of NO_2 may lead to changes in airway responsiveness and lung function in individuals with pre-existing respiratory illnesses. These exposures may also increase respiratory illnesses in children. Long-term exposures to NO_2 may lead to increased susceptibility to respiratory infection and may cause irreversible lung damage. Other health effects are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure may lead to eye and mucus membrane aggravation, along with pulmonary dysfunction. NO_X can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals due to the production of particulate nitrates. Airborne NO_X can also impair visibility.

NO_X contributes to a wide range of environmental effects both directly and indirectly when combined with other precursors in acid rain and O_3. Increased nitrogen inputs to terrestrial and wetland systems can lead to changes in plant species composition and diversity. Similarly, direct nitrogen inputs to aquatic ecosystems such as those found in estuarine and coastal waters can lead to eutrophication (a condition that promotes excessive algae growth, which can lead to a severe depletion of dissolved oxygen and increased levels of toxins that are harmful to aquatic life). Nitrogen, alone or in acid rain, also can acidify soils and surface waters. Acidification of soils causes the loss of essential plant nutrients and increased levels of soluble aluminum, which is toxic to plants. Acidification of surface waters creates low pH conditions and levels of aluminum that are toxic to fish and other aquatic organisms. NO_X also contributes to visibility impairment.

Sulfur Dioxide

SO_2 is a colorless, irritating gas with a "rotten egg" smell that is formed primarily by the combustion of sulfur-containing fossil fuels. Historically, SO_2 was a pollutant of concern in Kern County, but with the successful implementation of regulations, the levels have been reduced significantly.

Health Effects

High concentrations of SO_2 can result in temporary breathing impairment for asthmatic children and adults who are active outdoors. Short-term exposures of asthmatic individuals to elevated SO_2 levels during moderate activity may result in breathing difficulties that can be accompanied by symptoms such as wheezing, chest tightness, or shortness of breath. Other effects that have been associated with longer term exposures to high concentrations of SO_2 in conjunction with high levels of particulate matter include aggravation of existing cardiovascular disease, respiratory illness, and alterations in the lungs' defenses. SO_2 also is a major precursor to $PM_{2.5}$, which is a significant health concern and a main contributor to poor visibility. (See also the discussion of the health effects of particulate matter below.)

SO_2 not only has a bad odor, it can irritate the respiratory system. Exposure to high concentrations for short periods of time can constrict the bronchi and increase mucous flow, making breathing difficult. SO_2 can also irritate the lung and throat at concentrations greater than 6 parts per million (ppm) in many people, impair the respiratory system's defenses against foreign particles and bacteria when exposed to concentrations less than 6 ppm for longer time periods, and enhance the harmful effects of O_3 (combinations of the two gases at concentrations occasionally found in the ambient air appear to increase airway resistance to breathing).

SO_2 tends to have more toxic effects when acidic pollutants, liquid or solid aerosols, and particulates are also present. Effects are more pronounced among "mouth breathers" (e.g., people who are exercising or who have head colds). SO_2 easily injures many plant species and varieties, both native and cultivated. Some of the most sensitive plants include various commercially valuable pines, legumes, red and black oaks, white ash, alfalfa, and blackberry. Increases in SO_2 concentrations accelerate the corrosion of metals, probably through the formation of acids. SO_2 is a major precursor to acidic deposition. Sulfur oxides may also damage stone and masonry, paint, various fibers, paper, leather, and electrical components. Increased SO_2 also contributes to impaired visibility. Particulate sulfate, much of which is derived from SO_2 emissions, is a major component of the complex total suspended particulate mixture.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter pollution consists of very small liquid and solid particles floating in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particulate matter is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. PM_{10} refers to particles less than or equal to 10 microns in aerodynamic diameter. $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in aerodynamic diameter and are a subset of PM_{10}.

In the western United States, there are sources of PM_{10} in both urban and rural areas. PM_{10} and $PM_{2.5}$ are emitted from stationary and mobile sources, including diesel trucks and other motor vehicles; power plants; industrial processes; wood-burning stoves and fireplaces; wildfires; dust from roads, construction, landfills, and agriculture; and fugitive windblown dust. Because particles originate from a variety of sources, their chemical and physical compositions vary widely.

Health Effects

PM_{10} and $PM_{2.5}$ particles are small enough to be inhaled and lodged in the deepest parts of the lung where they evade the respiratory system's natural defenses. Health problems begin as the body reacts to these foreign particles. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases; heart and lung disease; and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. PM_{10} and $PM_{2.5}$ can aggravate respiratory disease and cause lung damage, cancer, and premature death. Sensitive populations, including children, the elderly, exercising adults, and those suffering from chronic lung disease such as asthma or bronchitis are especially vulnerable to the effect of PM_{10}. Non-health-related effects include reduced visibility and soiling of buildings.

Attaining the California particulate matter standards would annually prevent about 6,500 premature deaths, or 3 percent of all deaths. These premature deaths shorten lives by an average of 14 years. This is roughly equivalent to the same number of deaths (4,200 to 7,400) linked to secondhand smoke in 2000. In comparison, motor vehicle crashes caused 3,200 deaths, and 2,000 deaths resulted from homicide. Attaining the California particulate matter and O_3 standards would annually prevent 4,000 hospital admissions for respiratory disease, 3,000 hospital admissions for cardiovascular disease, and 2,000 asthma-related emergency room visits. Exposure to diesel particulate matter (DPM) causes about 250 excess cancer cases per year in California (CARB and American Lung Association of California, 2007).

A recent study provides evidence that exposure to particulate air pollution is associated with lung cancer. This study found that residents who live in an area that is severely affected by particulate air pollution are at risk of lung cancer at a rate comparable to nonsmokers exposed to secondhand smoke. This study also found an approximately 16 percent excess risk of dying from lung cancer due to fine-particulate air pollution (Pope et al., 2002). Another study shows that individuals with existing cardiac disease can be in a potentially life-threatening situation when exposed to high levels of ultrafine air pollution. Fine particles can penetrate the lungs, cause the heart to beat irregularly, or cause inflammation, which could lead to a heart attack (Peters et al., 2001). Currently, 57 percent of California's population lives in areas that exceed the National $PM_{2.5}$ air standard, while 90 percent lives in areas that exceed California's $PM_{2.5}$ air standard (CARB and American Lung Association of California, 2007).

Sulfates

Sulfates (SO_4^{2-}) are particulate products from combustion of sulfur-containing fossil fuels. When sulfur monoxide or SO_2 is exposed to oxygen, it precipitates out into sulfates (SO_3 or SO_4). Data collected in Kern County identified sulfate levels that are significantly less than the applicable health standards.

Sulfates are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California because of regional meteorological features.

Health Effects

CARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in oxygen intake, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility and, because they are usually acidic, can harm ecosystems, and damage materials and property (CARB, 2009).

Lead

Lead is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Historically, lead was used to increase the octane rating in automobile fuel. However, because gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels and that use has been mostly phased out, the ambient concentrations of lead have dropped dramatically. Kern County no longer monitors lead in the ambient air of the SJVAB.

Health Effects

Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food, water, soil, or dust. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children, resulting in learning deficits and lowered IQ. Recent studies also show that lead may be a factor in high blood pressure and subsequent heart disease. Lead can also be deposited on the leaves of plants, presenting a hazard to grazing animals and humans through ingestion (USEPA, 2011).

Hydrogen Sulfide

H_2S is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations.

Health Effects

Exposure to low concentrations of H_2S may cause irritation to the eyes, nose, or throat. It may also cause difficulty in breathing for some asthmatics. Exposure to higher concentrations (above 100 ppm) can cause olfactory fatigue, respiratory paralysis, and death. Brief exposures to high concentrations of H_2S (greater than 500 ppm) can cause a loss of consciousness. In most cases, the person appears to regain consciousness without any other effects. However, in many individuals, there may be permanent or long-term effects such as headaches, poor attention span, poor memory, and poor motor function. No health effects have been found in humans exposed to typical environmental concentrations of H_2S (0.00011–0.00033 ppm). Deaths due to breathing in large amounts of H_2S have been reported in a variety of different work settings, including sewers, animal processing plants, waste dumps, sludge plants, oil and gas well drilling sites, and tanks and cesspools.

Vinyl Chloride

Vinyl chloride monomer is a sweet-smelling colorless gas at ambient temperature. Landfills, publicly owned treatment works, and polyvinyl chloride (PVC) production are the major identified sources of vinyl chloride emissions in California. PVC can be fabricated into several products, such as pipes, pipe fittings, and plastics. In humans, epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers. There are currently no adopted ambient air standards for vinyl chloride.

Health Effects

Short-term exposure to vinyl chloride has been linked with the acute health effects listed below (Agency for Toxic Substances and Disease Registry, 2010; U.S. Department of Health and Human Services, 2006).

- Acute exposure of humans to high levels of vinyl chloride via inhalation in humans has resulted in effects on the central nervous system, such as dizziness, drowsiness, headaches, and giddiness.
- Vinyl chloride is reported to be slightly irritating to the eyes and respiratory tract in humans. Acute exposure to extremely high levels of vinyl chloride has caused loss of consciousness, lung and kidney irritation, inhibition of blood clotting in humans, and cardiac arrhythmias in animals.
- Tests involving acute exposure of mice have shown vinyl chloride to have high acute toxicity from inhalation exposure.
- Long-term exposure to vinyl chloride concentrations has been linked with the chronic health effects listed below (Agency for Toxic Substances and Disease Registry, 2010; U.S. Department of Health and Human Services, 2006; USEPA, 2000a).
- Liver damage may result in humans from chronic exposure to vinyl chloride through both inhalation and oral exposure.

A small percentage of individuals occupationally exposed to high levels of vinyl chloride in the air have developed a set of symptoms termed “vinyl chloride disease,” which is characterized by Raynaud’s phenomenon (fingers blanch and numbness and discomfort are experienced upon exposure to the cold), changes in the bones at the end of the fingers, joint and muscle pain, and scleroderma-like skin changes (thickening of the skin, decreased elasticity, and slight edema).

Central nervous system effects (including dizziness, drowsiness, fatigue, headache, visual and/or hearing disturbances, memory loss, and sleep disturbances) as well as peripheral nervous system symptoms (peripheral neuropathy, tingling, numbness, weakness, and pain in fingers) have also been reported in workers who are exposed to vinyl chloride.

Several reproductive/developmental health effects from vinyl chloride exposure have been identified and are listed below (Agency for Toxic Substances and Disease Registry, 2010; U.S. Department of Health and Human Services, 2006).

Several case reports suggest that male sexual performance may be affected by vinyl chloride. However, these studies are limited by lack of quantitative exposure information and possible co-occurring exposure to other chemicals.

Several epidemiological studies have reported an association between vinyl chloride exposure in pregnant women and an increased incidence of birth defects, while other studies have not reported similar findings.

Epidemiological studies have suggested an association between men occupationally exposed to vinyl chloride and miscarriages during their wives' pregnancies, although other studies have not supported these findings.

Long-term exposure to vinyl chloride has also been identified as a cancer risk (Agency for Toxic Substances and Disease Registry, 2010; U.S. Department of Health and Human Services, 2006; USEPA, 2000a). Inhaled vinyl chloride has been shown to increase the risk of a rare form of liver cancer (angiosarcoma) in humans. Animal studies have also shown that vinyl chloride, via inhalation, increases the incidence of angiosarcoma.

Visibility-Reducing Particles

The California Ambient Air Quality Standards (CAAQS) for visibility-reducing particles (VRPs), as shown in Table 4.3-1, is a measure of visibility. CARB does not have a measuring method with enough accuracy or precision to designate areas in the state as attainment or nonattainment areas with respect to visibility. The entire state is labeled as unclassified.

Toxic Air Contaminants (TAC)

"Hazardous air pollutants" (HAPs) is the term used by the Federal CAA to describe a variety of pollutants generated or emitted by industrial production activities. Called TACs under the California Clean Air Act of 1988 (CCAA), ten have been identified through ambient air quality data as posing the most substantial health risk in California (see discussion of each below). Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to the brain and nervous system, and respiratory disorders.

TACs do not have ambient air quality standards because no safe levels can be determined. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. The requirements of the Air Toxic "Hot Spots" Information and Assessment Act (Assembly Bill [AB] 2588) apply to facilities that use, produce, or emit toxic chemicals. Facilities that are subject to the toxic emission inventory requirements of the act must prepare and submit toxic emission inventory plans and reports and periodically update those reports.

A brief discussion of the characteristics and health effects of each TAC is provided below.

Acetaldehyde

Acetaldehyde is both emitted into the atmosphere directly and formed in the atmosphere from photochemical oxidation. Sources include combustion processes such as exhaust from mobile sources and fuel combustion from stationary internal combustion engines, boilers, and process heaters. Approximately 76 percent of acetaldehyde emissions are from mobile sources, with area sources such as residential wood combustion accounting for approximately 17 percent of total emissions.

Health Effects

Acetaldehyde is classified as a Federal HAP and as a California TAC. Acetaldehyde is a carcinogen that also causes chronic non-cancer toxicity in the respiratory system. The primary acute effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans. At higher exposure levels, erythema, coughing, pulmonary edema, and necrosis may also occur (USEPA, 2000b).

Benzene

Benzene is highly carcinogenic and occurs throughout California. Approximately 84 percent of the benzene emitted in California comes from motor vehicles, including evaporative leakage and unburned fuel exhaust; currently, the benzene content of gasoline is less than one percent.

Health Effects

Benzene also has non-cancer health effects. Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness (USEPA, 2000h). Exposure to liquid and vapor may irritate the skin, eyes, and upper respiratory tract in humans. Redness and blisters may result from dermal exposure.

1,3-Butadiene

The majority of 1,3-butadiene emissions comes from incomplete combustion of gasoline and diesel fuels. Mobile sources account for 83 percent of total statewide emissions. Area-wide sources such as agricultural waste burning and open burning contribute to approximately 13 percent of statewide emissions. Approximately 67 percent of 1,3-butadiene emissions are from mobile sources.

Health Effects

In California, 1,3-butadiene has been identified as a carcinogen. Butadiene vapors cause neurological effects at very high levels such as blurred vision, fatigue, headache, and vertigo. Dermal exposure of humans to 1,3-butadiene causes a sensation of cold, followed by a burning sensation, which may lead to frostbite (USEPA, 2009).

Carbon Tetrachloride

The primary sources of carbon tetrachloride in California include chemical and allied product manufacturers and petroleum refineries.

Health Effects

In California, carbon tetrachloride has been identified as a carcinogen. Carbon tetrachloride is also a central nervous system depressant and mild eye and respiratory tract irritant. EPA has classified carbon tetrachloride as a Group B2 probable human carcinogen (USEPA, 2000c).

Chromium, Hexavalent

Chromium plating and other metal finishing processes are the primary sources of hexavalent chromium emissions in California. Approximately 65 percent of hexavalent chromium emissions are from stationary sources, such as electrical generation facilities, aircraft and parts manufacturing plants, and fabricated-metal manufacturing facilities.

Health Effects

In California, hexavalent chromium has been identified as a carcinogen. There is epidemiological evidence that exposure to inhaled hexavalent chromium may result in lung cancer. The principal acute effects are renal toxicity, gastrointestinal hemorrhage, and intravascular hemolysis (USEPA, 2000d).

Para-Dichlorobenzene

The primary sources of para-dichlorobenzene include consumer products such as non-aerosol insect repellents and solid/gel air fresheners. These sources contribute 99 percent of the statewide para-dichlorobenzene emissions.

Health Effects

In California, para-dichlorobenzene has been identified as a carcinogen. Acute exposure to 1,4-dichlorobenzene via inhalation results in irritation to the eyes, skin, and throat in humans. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans (e.g., cerebellar ataxia, dysarthria, weakness in limbs, and hyporeflexia) (USEPA, 2000e).

Formaldehyde

Formaldehyde is both emitted into the atmosphere directly and formed in the atmosphere as a result of photochemical oxidation. Formaldehyde is a product of incomplete combustion. One of the primary sources of formaldehyde is vehicular exhaust. Formaldehyde is also used in resins, many consumer products (as an antimicrobial agent), and fumigants and soil disinfectants. Approximately 68 percent of formaldehyde emissions in the SJVAB are from mobile sources.

Health Effects

The major toxic effects caused by acute formaldehyde exposure via inhalation are eye, nose, and throat irritation and effects on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains, and bronchitis. In California, formaldehyde has been identified as a carcinogen (USEPA, 2000f).

Methylene Chloride

Methylene chloride is used as a solvent, a blowing and cleaning agent in the manufacture of polyurethane foam and plastic, and a solvent in paint-stripping operations. Paint removers account for the largest use of methylene chloride in California (approximately 82 percent).

Health Effects

Case studies of methylene chloride poisoning during paint-stripping operations have demonstrated that inhalation exposure to extremely high levels can be fatal to humans. Acute inhalation exposure to high levels has resulted in effects on the central nervous system, including decreased visual, auditory, and psychomotor functions, but these effects are reversible once exposure ceases. The major effects from chronic inhalation exposure are effects on the central nervous system, such as headaches, dizziness, nausea, and memory loss. California considers methylene chloride to be carcinogenic (USEPA, 2000g).

Perchloroethylene

Perchloroethylene is used as a solvent, primarily in dry cleaning operations; it is also used in degreasing operations, paints and coatings, adhesives, aerosols, specialty chemical production, printing inks, silicones, rug shampoos, and laboratory solvents.

Health Effects

In California, perchloroethylene has been identified as a carcinogen. Perchloroethylene vapors are irritating to the eyes and respiratory tract. Following chronic exposure, workers have shown signs of liver toxicity as well as kidney dysfunction and neurological disorders (USEPA, 2012).

Diesel Particulate Matter

DPM is emitted from both mobile and stationary sources. In California, onroad diesel-fueled engines contribute approximately 24 percent of the statewide total, with an additional 71 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources contribute about 5 percent of total DPM.

Health Effects

Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde, and nickel) have the potential to contribute to mutations in cells that can lead to cancer. Long-term exposure to diesel exhaust particles poses the highest cancer risk of any TAC evaluated by the California Office of Environmental Health Hazard Assessment (OEHHA). CARB estimates that about 70 percent of the cancer risk that the average Californian faces from breathing toxic air pollutants stems from diesel exhaust particles.

Diesel engines are a major source of fine-particle pollution. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children. In California, diesel exhaust particles have been identified as a carcinogen (California OEHHA and the American Lung Association, 2005; CARB, 2008).

Airborne Fungus (Valley Fever)

Valley Fever, or coccidioidomycosis, is caused by the microscopic fungus coccidioides immitis (*C. immitis*), which grows in arid soil in parts of Kern County and other parts of America. Infection occurs when the spores of the fungus become airborne and are inhaled. The fungal spores become airborne when contaminated soil is disturbed by human activities, such as construction and agricultural activities, and by natural phenomenon, such as wind storms, dust storms, and earthquakes.

Health Effects

Approximately 60 percent of infected persons have no symptoms. The remainder develop flu-like symptoms that can last for a month and tiredness that can sometimes last for several weeks. A small percentage of infected persons (less than one percent) can develop disseminated disease that spreads outside the lungs to the brain, bone, and skin. Without proper treatment, Valley Fever can lead to severe pneumonia, meningitis, and even death. Symptoms may appear between one and four weeks after exposure (County of Los Angeles, 2004).

A diagnosis of Valley Fever is made through a sample of blood or other body fluid or biopsy of the affected tissue. It is treatable with anti-fungal medicines and is not contagious. Once recovered from the disease, the individual is protected against further infection. Persons at highest risk from exposure are those with compromised immune systems, such as those with HIV, and those with chronic pulmonary disease. Farmers, construction workers, and others who engage in activities that disturb the soil are at highest risk for Valley Fever. Infants, pregnant women, diabetics, people of African, Asian, Latino, or Filipino descent, and the elderly may be at increased risk for disseminated disease. Historically, people at risk for infection are individuals not already immune to the disease and whose jobs involve extensive contact with soil dust, such as construction or agricultural workers and archeologists (County of Los Angeles, 2004). The disease also has been known to infect animals. Infections occur most often in summer.

It is thought that during drought years the number of organisms competing with *C. immitis* decreases, and the *C. immitis* remains alive but dormant. When rain finally occurs, the arthrocondia germinate and multiply more than usual because of a decreased number of other competing organisms. Later, the soil dries out in the summer and fall, and the fungi can become airborne and potentially infectious (Kirkland and Fierer, 1996).

Persons at risk for Valley Fever should avoid exposure to dust and dry soil in areas where Valley Fever is common. Areas with high Valley Fever rates are called hyper-endemic. Approximately 10–50 percent of people living in endemic disease regions are seropositive and considered immune. In any given year, about 3 percent of people who live in an area where coccidiodomycosis is common will develop an infection (County of Los Angeles, 2004). The areas of Kern County that have the most incidents of Valley Fever exposure are northeast Bakersfield, Lamont-Arvin, Taft, and Edwards Air Force Base. The Valley Fever fungus has been identified in soil samples taken near the California State University, Bakersfield campus.

Asbestos

Ultramafic serpentinized rock is closely associated with asbestos and composed of the following minerals:

- Antigorite: (Mg, Fe)3Si2O5(OH)4;
- Clinochrysotile: Mg3Si2O5(OH)4;
- Lizardite: Mg3Si2O5(OH)4;

- Orthrochrysotile: Mg3Si2O5(OH)4; and
- Parachrysotile: (Mg, Fe)3Si2O5(OH)4.

Chrysotile minerals are more likely to form serpentinite asbestos; however, serpentinite is uncommon to sedimentary soil found in the project area. Asbestos occurs in certain geologic environments, none of which are common in the project area.

Health Effects

Asbestos can adversely affect humans only in its fibrous form, and these fibers must be broken and dispersed into the air and then inhaled. During geological processes, the asbestos mineral can be crushed, causing it to become airborne. It also enters the air or water from the breakdown of natural deposits. Constant exposure to asbestos at high levels on a regular basis may cause cancer in humans. The two most common forms of cancer are lung cancer and mesothelioma, a rare cancer of the lining that covers the lungs and stomach.

4.3.3 Regulatory Setting

In California, air quality is regulated by several agencies, including EPA, CARB, and local air districts such as the SJVAPCD. Each of these agencies develops rules and/or regulations to attain the goals or directives imposed upon them through legislation. Although EPA regulations may not be superseded, some state and local regulations may be more stringent than Federal regulations. The project site is located in the SJVAB and is under the jurisdiction of the SJVAPCD.

Federal

U.S. Environmental Protection Agency (EPA)

The 1977 Federal CAA and 1990 revisions required EPA to identify National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare (see Table 4.3-1). In June of 1997, EPA adopted new PM_{10} National standards and an additional standard for suspended particulate matter at or below PM_{10} to $PM_{2.5}$.

On March 12, 2008, EPA implemented an 8-hour standard for O_3. On October 1, 2015, the EPA Administrator signed the notice for the final rule to revise the primary and secondary NAAQS for O_3 of both primary and secondary standards from 0.075 ppm to 0.070 ppm, and retaining their indicators (O_3), forms (fourth-highest daily maximum, averaged across three consecutive years) and averaging times (eight hours). On April 12, 2010, EPA implemented a 1-hour standard for NO_2 of 100 parts per billion (ppb).

Pursuant to the 1990 CAA Amendments (CAAA), EPA classified air basins (or portions thereof) as either attainment or nonattainment areas for each criteria air pollutant based on whether or not the NAAQS have been achieved. The CAA also required each state to prepare an air quality control plan (State Implementation Plan [SIP]). The 1990 amendments additionally required states containing areas that violate NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. EPA has the responsibility to review all SIPs to determine if they conform to the mandates of the CAAA and will achieve air quality goals when implemented.

Regulation of TACs (HAPs under Federal regulations) is achieved through Federal and state controls on individual sources. Federal law defines HAPs as non-criteria air pollutants with short-term (acute) and/or long-term (chronic or carcinogenic) adverse human health effects. The 1977

CAA required EPA to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare.

The 1990 CAAA offer a technology-based approach to reducing air toxics. Since the CAAA were approved, 188 chemicals have been designated as HAPs and are regulated under a two-phase strategy. The first phase involves requiring facilities to install Maximum Achievable Control Technology (MACT), which includes measures, methods, and techniques—such as material substitutions, work practices, and operational improvements—aimed at reducing toxic air emissions. MACT is the lowest emission rate, or highest level of control demonstrated, on average by the top performing companies (top 12 percent) in the source category. MACT standards already exist for the 174 source categories: 166 major sources and eight area sources. Under the air toxics program, facilities having similar operating processes are grouped into categories. These MACTs were promulgated in four "bins" of years: 1992, 1994 (39 categories), 1997 (62 categories), and 2000 (67 categories). MACT standards for municipal solid waste landfills were promulgated on May 23, 2002. As of August 2003, MACT standards have been made for 174 source categories and their subcategories.

State

California Air Resources Board

CARB, a department of the California Environmental Protection Agency (Cal/EPA), oversees air quality planning and control throughout California by administering the SIP. Its primary responsibility lies in ensuring implementation of the 1989 amendments to the CCAA as well as responding to the Federal CAA requirements and regulating emissions from motor vehicles sold in California. It also sets fuel specifications to reduce vehicular emissions further.

The amendments to the CCAA establish the CAAQS and a legal mandate to achieve these standards by the earliest practical date. These standards apply to the same criteria pollutants as the Federal CAA; they also include sulfate, VRPs, H_2S, and vinyl chloride. They are also more stringent than the National standards. The SJVAB is designated as a nonattainment area for the state O_3 and PM_{10} standards. Concentrations of all other pollutants meet state standards.

CARB is also responsible for regulations pertaining to TACs. AB 2588 was enacted in 1987 as a means to establish a formal air toxics emission inventory risk quantification program. AB 2588, as amended, establishes a process that requires stationary sources to report information regarding the types and quantities of certain substances that their facilities routinely release into the SJVAB. Each air pollution control district ranks the data into high, intermediate, and low priority categories. When considering the ranking, the potency, toxicity, quantity, volume, and proximity of the facility to receptors are given consideration by an air district.

CARB also has on- and off-road engine emission-reduction programs that would indirectly affect the project's emissions through the phasing in of cleaner on- and off-road engines. In addition, CARB has a Portable Equipment Registration Program that allows owners or operators of portable engines and associated equipment to register their units under a statewide program, with specified emission requirements, without having to obtain individual permits from local air districts.

The state recently enacted a new regulation for the reduction of DPM and criteria pollutant emissions from in-use off-road diesel-fueled vehicles (13 CCR Article 4.8, Chapter 9, Section 2449). This regulation provides target emission rates for particulate matter and NO_X emissions for owners of fleets of diesel-fueled off-road vehicles. It applies to equipment fleets of three specific sizes, and the target emission rates are reduced over time.

Title V and Extreme Designation

Title V of the CAA, as amended in 1990, creates an operating permits program for certain defined sources. In general, owner/operators of defined stationary sources that emit more than 25 tons per year of NO_X and ROG must possess a Title V permit. Title V is a federally enforceable state operating permit that is required under 40 CFR, Part 70. The Title V programs are developed at the state or local level, as outlined in 40 CFR 70.

Under the extreme definition, the definition of a major source subject to Title V permitting changes from 25 to 10 tons per year, which results in more businesses having to comply with Title V permitting requirements under the extreme nonattainment designation.

Title V does not impose any new air pollution standards, require installation of any new controls on the affected facilities, or require reductions in emissions. Title V does enhance public and EPA participation in the permitting process and requires additional recordkeeping and reporting by businesses, which results in significant administrative requirements.

Within the entire SJVAB, which includes eight counties, the SJVAPCD estimated that the reclassification to extreme nonattainment, added 150 businesses (excluding agricultural facilities) for a total of 420 facilities currently subject to Title V. These numbers compare to a total of approximately 7,000 facilities that are under permit with the SJVAPCD basin-wide.

California Code of Regulations Title 24

Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. Part 6 of Title 24 specifically established Building Energy Efficiency Standards that are designed to ensure new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality. These energy efficiency standards are reviewed every few years by the Building Standards Commission and the California Energy Commission (CEC) (and revised if necessary) (PRC Section 25402[b][1]). The regulations have the overall goal of "reducing of wasteful, uneconomic, inefficient, or unnecessary consumption of energy" (PRC Section 25402). These regulations are analyzed for technological and economic feasibility (PRC Section 25402[d]) and cost effectiveness (PRC Sections 25402[b][2] and [b][3]). These building code standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and reduce air pollutant emissions either by reducing the quantity of energy required by the building (e.g., with water conservation measures that reduce water use and thus the quantity of water requiring emission-causing transportation and treatment, or with energy efficiency standards such as enhanced insulation that reduce the need for heating, ventilation, and air conditioning (HVAC) and likewise result in less energy consumption and air emissions from these HVAC uses).

The current Title 24 standards are the 2016 Title 24 Building Energy Efficiency Standards, which became effective January 1, 2017. The 2019 Title 24 Building Energy Efficiency Standards, which will be effective January 1, 2020, will further reduce energy used and associated GHG emissions compared to current standards. In general, single-family residences built to the 2019 standards are anticipated to use approximately 7 percent less energy due to energy efficiency measures than those built to the 2016 standards; further, as newly mandated state standards requiring rooftop solar electricity generation is factored in, single-family residences built under the 2019 standards will use approximately 53 percent less energy than those built under the 2016 standards (CEC, 2018). Nonresidential buildings built to the 2019 standards are anticipated to use an estimated 30 percent less energy than those built to the 2016 standards (CEC, 2018). The 2016 EIR did not include the reduced energy consumption or corresponding reduced air pollutant emissions from compliance with the 2019 Building Code, which become effective on January 1, 2020, or the newly mandated state standards requiring rooftop solar electricity generation.

Assembly Bill 617

AB 617 (August 2017) directs CARB and all local air districts to take measures to protect communities disproportionately impacted by air pollution. The primary components of AB 617 include (1) community-level air monitoring; (2) a state strategy and community specific emission reduction plans; (3) accelerated review of retrofit pollution control technologies on industrial facilities subject to Cap-and-Trade; (4) enhanced emission reporting requirements; and (5) increased penalty for polluter violations. Additionally, CARB may direct additional grant funding communities determined to have the highest air pollution burden.

In response to Assembly Bill 617, CARB established the Community Air Protection Program (CAPP or Program). The Program's focus is to reduce exposure in communities most impacted by air pollution. CARB staff has already begun working closely with local air districts, community groups, community members, environmental organizations, and regulated industries to develop a new community-focused action framework for community protection

Local

Kern County General Plan (KCGP)

The policies, goals, and implementation measures in the Kern County General Plan (KCGP) applicable to air quality as related to the project are provided below. The KCGP contains other policies, goals, and implementation measures that are more general in nature and not specific to development such as the project. Therefore, they are not listed below.

Chapter 1. Land Use, Open Space, and Conservation Element

Section 1.10.2 Air Quality

<u>Goal</u>

- **Goal 1.** Ensure that the County can accommodate anticipated future growth and development while maintaining a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.

<u>Policies</u>

- **Policy 18.** The air quality implications of new discretionary land use proposals shall be considered in approval of major developments. Special emphasis will be placed on minimizing air quality degradation in the desert to enable effective military operations and in the valley region to meet attainment goals.

- **Policy 19.** In considering discretionary projects for which an Environmental Impact Report must be prepared pursuant to the California Environmental Quality Act (CEQA), the appropriate decision-making body, as part of its deliberations, will ensure that:
    1. All feasible mitigation to reduce significant adverse air quality impacts have been adopted; and
    2. The benefits of the project outweigh any unavoidable significant adverse effects on air quality found to exist after inclusion of all feasible mitigation. This finding shall be made in a statement of overriding considerations and shall be supported by factual evidence to the extent that such a statement is required pursuant to the CEQA.
- **Policy 20.** The County shall include fugitive dust control measures as a requirement for discretionary projects and as required by the adopted rules and regulations of the San Joaquin Valley Unified Air Pollution Control District (SJVAPCD) and the Eastern Kern Air Pollution Control District (EKAPCD) on ministerial permits.
- **Policy 21.** The County shall support air districts' efforts to reduce PM_{10} and $PM_{2.5}$ emissions.
- **Policy 22.** Kern County shall continue to work with the SJVAPCD and the EKAPCD toward air quality attainment with Federal, state, and local standards.
- **Policy 23.** The County shall continue to implement the local government control measures in coordination with the Kern Council of Governments and the SJVAPCD.

Implementation Measures

- **Implementation Measure F.** All discretionary permits shall be referred to the appropriate air district for review and comment.
- **Implementation Measure H.** Discretionary projects may use one or more of the following to reduce air quality effects:
    1. Pave dirt roads within the development.
    2. Pave outside storage areas.
    3. Provide additional low ROG-producing trees on landscape plans.
    4. Use of alternative fuel fleet vehicles or hybrid vehicles.
    5. Use of emission control devices on diesel equipment.
    6. Develop residential neighborhoods without fireplaces or with the use of EPA certified, low emission natural gas fireplaces.
    7. Provide bicycle lockers and shower facilities on-site.
    8. Increasing the amount of landscaping beyond what is required in the Zoning Ordinance (Chapter 19.86).
    9. The use and development of park and ride facilities in outlying areas.
    10. Other strategies that may be recommended by the local air pollution control districts.
- **Implementation Measure J.** The County should include PM_{10} control measures as conditions of approval for subdivision maps, site plans, and grading permits.

San Joaquin Valley Air Pollution Control District

The GAMAQI is an advisory document that provides lead agencies, consultants, and project applicants with analysis guidance and uniform procedures for addressing air quality in environmental documents. Local jurisdictions are not required to use the methodology outlined therein. The GAMAQI describes the criteria that the SJVAPCD uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds for determining whether projects would have significant adverse environmental impacts, identifies methods for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts. The GAMAQI includes guidance for analysis for criteria pollutants, particulates, HAPs, and odors for both construction and operations of a project. An update to the GAMAQI was approved on March 19, 2015, and was used as a guidance document for this analysis (SJVAPCD, 2015).

There are currently multiple different attainment plans for the SJVAB. These are described in the sections that follow.

1-hour Extreme Ozone Attainment Demonstration Plan (Extreme OADP)

In 2013, the SJVAB had zero violations of the 1-hour O_3 standard established by EPA under the CAA. The SJVAB now meets the 1-hour O_3 standard based on the most recent three-year period air monitoring data (2011-2013). On May 6, 2014, the SJVAPCD submitted a formal request that the EPA determine that the SJVAB has attained the federal 1-hour O_3 standard. In accordance with federal requirements, the SJVAPCD's submittal includes a clean data finding and a finding that attainment is due to permanent and enforceable emissions reductions.

The SJVAPCD developed a 2013 Plan for the Revoked 1-Hour O_3 Standard, which it adopted in September 2013. The modeling confirms that the SJVAB will attain the revoked 1-hour O_3 standard by 2017.

8-Hour Ozone Attainment Demonstration Plan

The SJVAB is designated as an extreme O_3 nonattainment area for the EPA 2008 8-hour O_3 standard of 75 ppb. The SJVAPCD is currently in the process of developing an O_3 plan to address EPA's 2008 8-hour O_3 standard, with attainment required by 2032. Because the SJVAB naturally has high background O_3 levels and O_3 transport, SJVAPVD faces a regulatory challenge to meet the 2008 8-hour O_3 standard.

SJVAPCD adopted the 2007 8-Hour Ozone Plan in April 2007. This plan addresses EPA's 8-hour O_3 standard of 84 ppb, which was established by EPA in 1997.

In June 2016, the SJVAPCD adopted the 2016 Plan for the 2008 8-Hour Ozone Standard. This plan demonstrates the practicable and expeditious attainment of the 75 parts PPB 8-hour O_3 standard.

2009 RACT SIP

On April 16, 2009, the Governing Board adopted the Reasonably Available Control Technology Demonstration for Ozone State Implementation Plans (2009 RACT SIP) (SJVAPCD, 2009). In part, the 2009 RACT SIP satisfied the commitment by the SJVAPCD for a new RACT analysis for the 1-hour O3 plan (see discussion of the EPA withdrawal of approval in the Extreme 1-Hour Ozone Attainment Demonstration Plan summary above) and was intended to prevent all sanctions that could be imposed by EPA for failure to submit a required SIP revision for the 1-hour O3 standard.

With respect to the 8-hour standard, the plan also assesses the SJVAPCD's rules based on the adjusted major source definition of 10 tons per year (due to the SJVAB's designation as an extreme O_3 nonattainment area), evaluates SJVAPCD rules against new Control Techniques Guidelines promulgated since August 2006, and reviews additional rules and rule amendments that had been adopted by the Governing Board since August 17, 2006, for RACT consistency.

2013 Plan for the Revoked 1-Hour Ozone Standard

The SJVAPCD developed a plan for EPA's revoked 1-hour O_3 standard after the EPA withdrew its approval of the 2004 Extreme 1-Hour Ozone Attainment Demonstration Plan as a result of litigation. As a result of the litigation, the EPA reinstated previously revoked requirements for 1 hour O_3 attainment plans. The 2013 plan addresses those requirements, including a demonstration of implementation of Reasonably Available Control Measures and a demonstration of a rate of progress averaging 3 percent annual reductions of ROG or NO_X emissions every 3 years. The 2013 Plan for the Revoked 1-Hour Ozone Standard was approved by the Governing Board on September 19, 2013 (SJVAPCD, 2013). Based on implementation of the ongoing control measures, preliminary modeling indicates that the SJVAB will attain the 1-hour O_3 standard by 2017, before the final attainment year of 2022 and without relying on long-term measures under CAA Section 182(e)(5) ("black box reductions").

2014 RACT SIP

On June 19, 2014, the SJVAPCD adopted the 2014 Reasonably Available Control Technology Demonstration for the 8-Hour Ozone State Implementation Plan (SJVAPCD, 2014). This RACT SIP includes a demonstration that the SJVAPCD rules implement RACT. The plan reviews each of the NO_X reduction rules and concludes that they satisfy requirements for stringency, applicability, and enforceability and meet or exceed RACT. The plan's analysis of further ROG reductions through modeling and technical analyses demonstrates that added ROG reductions will not advance SJVAB's O_3 attainment. Each ROG rule evaluated in the 2009 RACT SIP, however, has been subsequently approved by the EPA as meeting RACT within the last 2 years. The O_3 attainment strategy, therefore, focuses on further NO_X reductions.

PM_{10} Attainment Demonstration Plan

A PM_{10} plan has been adopted and submitted to EPA for review. The 2006 PM_{10} Plan is a continuation of the SJVAPCD's strategy for achieving the NAAQS for PM_{10}. It is the SIP revision required as a condition of EPA approval of the 2003 PM_{10} Plan, which became effective June 25, 2004. The SJVAB was recently designated as an attainment area for PM_{10} under the NAAQS.

On May 19, 2005, the SJVAPCD adopted amendments to the plan to update schedules and emission reductions and align the contingency measure discussion with National requirements. In addition to meeting the requirements of the CAA and containing measures needed to attain the NAAQS at the earliest possible date, this SIP revision is to include an evaluation of the modeling from the California Regional Particulate Air Quality Study and the latest technical information, including inventory and monitoring data.

In September 2007, the SJVAPCD approved a request to redesignate the SJVAB to attainment of the PM_{10} NAAQS and approve the 2007 PM_{10} Maintenance Plan. The maintenance plan and request for redesignation was approved by CARB on October 27, 2007, and submitted to EPA for approval. EPA redesignated the SJVAB to attainment of the PM_{10} NAAQS and approved the 2007 PM_{10} Maintenance Plan on September 19, 2008.

$PM_{2.5}$ Attainment Planning

Based on the health studies conducted, $PM_{2.5}$ is considered to be more adverse to human health than other pollutants. In July 1997, EPA set two $PM_{2.5}$ standards: a 24-hour standard set at 65 µg/m^3 to protect against short-term health impacts and a 12-month (annual) standard set at 15 µg/m^3 to protect against longer term impacts. The SJVAB has been designated a nonattainment area for the $PM_{2.5}$ standards.

The SJVAPCD Governing Board adopted the 2008 $PM_{2.5}$ Plan on April 30, 2008. This plan is designed to assist the SJVAB in attaining all $PM_{2.5}$ standards, including the 1997 federal standards, the 2006 federal standards, and the state standard, as soon as possible. On July 13, 2011, the EPA issued a rule partially approving and disapproving the 2008 $PM_{2.5}$ Plan. Subsequently, on November 9, 2011, the EPA issued a final rule approving most of the plan with an effective date of January 9, 2012. However, the EPA disapproved the plan's contingency measures because they would not provide sufficient emission reductions.

Approved by the Governing Board on December 20, 2012, the 2012 $PM_{2.5}$ Plan addresses attainment of EPA's 24-hour PM2.5 standard of 35 micrograms per cubic meter (µg/m^3) established in 2006. In addition to reducing direct emissions of $PM_{2.5}$, this plan focuses on reducing emissions of NO_X, which is a predominant pollutant in the formation of $PM_{2.5}$ in the SJVAB. The plan relies on a multilevel approach to reducing emissions through SJVAPCD efforts (industry, the general public, employers, and small businesses) and state/federal efforts (passenger vehicles, heavy-duty trucks, and off-road sources), as well as SJVAPCD and state/federal incentive programs to accelerate replacement of on- and off-road vehicles and equipment. Through compliance with this attainment plan, the SJVAB would achieve attainment of the federal $PM_{2.5}$ standard by the attainment deadline of 2019, with the majority of the SJVAB actually experiencing attainment well before the deadline. The EPA lowered the $PM_{2.5}$ standard again in 2012 and is in the process of completing attainment designations.

The Governing Board adopted the 2015 Plan for the 1997 $PM_{2.5}$ Standard on April 16, 2015. This plan addresses the EPA's annual $PM_{2.5}$ standard of 15 micrograms per cubic meter (µg/m^3) and 24-hour $PM_{2.5}$ standard of 65 µg/m^3 established in 1997. While nearly achieving the 1997 standards, the SJVAB experienced higher $PM_{2.5}$ levels in winter 2013–2014 due to the extreme drought, stagnation, strong inversions, and historically dry conditions; thus, the SJVAPCD was unable to meet the attainment date of December 31, 2015. Accordingly, this plan also contains a request for a one-time extension of the attainment deadline for the 24-hour standard to 2018 and the annual standard to 2020. The plan builds on past development and implementation of effective control strategies. Consistent with EPA regulations for $PM_{2.5}$ plans to achieve the 1997 standards, the plan contains Most Stringent Measures, Best Available Control Measures, additional enforceable commitments for further reductions in emissions, and ensures expeditious attainment of the 1997 standard.

The Governing Board adopted the 2016 Moderate Area Plan for the 2012 $PM2_{.5}$ Standard on September 15, 2016. This plan addresses the EPA federal annual $PM_{2.5}$ standard of 12 µg/m^3, established in 2012. This plan includes an attainment impracticability demonstration and request for reclassification of the San Joaquin Valley Air Basin (SJVAB) from Moderate nonattainment to Serious nonattainment. Finally, the Governing Board adopted the 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards on November 15, 2018. This plan addresses the EPA federal 1997 annual $PM_{2.5}$ standard of 15 µg/m^3 and 24-hour $PM_{2.5}$ standard of 65 µg/m^3; the 2006 24-hour $PM_{2.5}$

standard of 35 μg/m³; and the 2012 annual $PM_{2.5}$ standard of 12 μg/m³. This plan demonstrates attainment of the federal $PM_{2.5}$ standards as expeditiously as practicable.

Applicable Non-Stationary Source Regulations

The SJVAPCD's primary means of implementing air quality plans are by adopting and enforcing rules and regulations. Stationary sources within the jurisdiction are regulated by the SJVAPCD's permit authority over such sources and through its review and planning activities. Unlike stationary source projects, which encompass very specific types of equipment, process parameters, throughputs, and controls, air emissions sources from land use development projects such as Grapevine are mainly mobile sources (traffic) and area sources (small dispersed stationary and other non-mobile sources), including exempt (i.e., no permit required) sources such as consumer products, landscaping equipment, furnaces, and water heaters. Mixed-use land development projects may include nonexempt sources including devices such as charbroilers, small to large boilers, stationary internal combustion engines, gas stations, or asphalt batch plants.

Notwithstanding nonexempt stationary sources, which would be permitted on a case-by-case basis, SJVAPCD Regulations VIII and IX generally apply to land use development projects and are described below:

SJVAPCD Regulation VIII—Fugitive PM_{10} Prohibitions.

Rules 8011–8081 are designed to reduce PM_{10} emissions (predominantly dust/dirt) generated by human activity, including construction and demolition, road construction, bulk materials storage, use of paved and unpaved roads, and carryout and trackout. Among the Regulation VIII rules applicable to the project are the following:

Rule 8011—General Requirements;

Rule 8021—Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities;

Rule 8031—Bulk Materials;

Rule 8041—Carryout and Trackout;

Rule 8051—Open Areas;

Rule 8061—Paved and Unpaved Roads; and

Rule 8071—Unpaved Vehicle/Equipment Traffic Areas.

Regulation IX – Mobile and Indirect Sources

Rule 9110 General Conformity

Rule 9120 Transportation Conformity

Rule 9410 Employer Based Trip Reduction

Rule 9510 Indirect Source Review (ISR)

Rule 9510 (Indirect Source Review, Adopted December 15, 2005)

The purpose of the ISR is to reduce emissions of NO_X and PM_{10} from new development projects. Rule 9510 places application and emission-reduction requirements on certain development projects to reduce emissions through on-site mitigation, off-site SJVAPCD-administered projects, or a combination of the two. Each project proponent is required to submit an air impact assessment application concurrent with the last discretionary approval by the County pursuant to Rule 9510's requirements.

Although compliance with Rule 9510 is separate from the CEQA process, control measures used to comply with the Rule 9510 are considered mitigation to a less-than-significant impact under CEQA.

Indirect Source Mitigation Fee

Indirect sources are land uses that attract or generate motor vehicles trips. Indirect source emissions contain many pollutants, principally PM_{10}, ROG, and NO_X. The SJVAPCD included a requirement in the adopted 2003 PM_{10} Plan to develop and implement an ISR rule by July 2004, with implementation to begin in 2005. The ISR rule went into effect in March 2006. SB 709 required the SJVAPCD to adopt by regulation a schedule of fees to be assessed on area-wide and indirect sources of emissions. After public hearings, the district adopted Rule 9510 on December 15, 2005.

The purpose of Rule 9510 is to reduce emissions of NO_X and PM_{10} from new development projects. The rule applies to development projects that, upon full buildout, seek to gain discretionary approval for any one of the following: 50 residential units, 2,000 square feet of commercial space, 25,000 square feet of light industrial space, 20,000 square feet of medical or recreational space, 39,000 square feet of general office space, 100,000 square feet of heavy industrial space, 9,000 square feet of educational space, 10,000 square feet of government space, or 9,000 square feet of any land use not identified above. Several sources are exempt from the rule, including transportation projects and transit projects (exempt only from Rule 9510 Section 6.2 and Section 7.1.2), reconstruction projects that result from a natural disaster, and development projects whose primary sources of emissions are subject to SJVAPCD Rules 2201 and 2010, which address stationary sources. Any development project that has a mitigated baseline of less than 2 tons per year for NO_X and PM_{10} is also exempted from the mitigation requirements of the rule. Developers are encouraged to reduce as much air pollution as possible through on-site mitigation or the incorporation of air-friendly designs and practices into the project. Some examples include bike paths and sidewalks; traditional street design; medium- to high-density residential developments; locating near bus stops and bike paths; locating near different land use zones, such as commercial; and increasing energy efficiency. If these practices do not completely meet the required reductions (under the rule), new development projects are required to mitigate the remainder of their emissions by contributing to a mitigation fund that would be used to pay for the most cost-effective projects to reduce emissions. Examples include projects to retire or crush polluting cars, replace older diesel engines, and replace gas-powered lawnmowers with electric lawnmowers.

The ISR requires developers to reduce 20 percent of construction-exhaust NO_X, 45 percent of construction-exhaust PM_{10}; 33 percent of operational NO_X over 10 years; and 50 percent of operational PM_{10} over 10 years. The SJVAPCD estimates that the potential reductions from this program in 2010 will be 11.5 tons per day (4,197.5 tons per year) of PM_{10} and 4.1 tons per day (1,496.5 tons per year) of NO_X.

Development Mitigation Contract (DMC) Agreements

A development mitigation contract (DMC) is an air quality mitigation measure by which a developer enters into a contractual agreement with the district to reduce a development project's impact on air quality beyond that achieved by compliance with District Rule 9510. Implementation of the DMC is comparable to implementation of the ISR; project emissions are characterized, funds are paid to the district, and the district administers the funds to secure the required emission-reduction projects. For projects subject to Rule 9510, the DMC must exceed the air quality benefits from compliance with the ISR. Therefore, applicants that enter into a DMC are considered in compliance with District Rule 9510. Examples of emission-reduction projects include projects to retire or crush polluting cars, replace older diesel engines, and replace gas-powered lawnmowers with electric lawnmowers. The SJVAPCD's 2008 annual report on the district's ISR program (June 19, 2008) includes the projects and reductions attributable to Rule 9510, including DMC agreements for combined on- and off-site emission reductions, totaling 2,078 tons of NO_X and 1,087 tons of PM_{10}.

Local Control Measures

The SJVAPCD requires all local governments within its eight-county jurisdiction to adopt resolutions as part of the Extreme OADP that must be approved by EPA. The resolutions describe the reasonably available control measures that each jurisdiction will implement to reduce O_3-causing emissions into the air from transportation sources. Local jurisdictions are also required to adopt best available control technology (BACT) measures to reduce particle emissions as part of the PM_{10} Area Attainment Demonstration Plan. This process is coordinated and assisted by regional transportation planning agencies, such as the Kern Council of Governments (Kern COG).

The Kern County Board of Supervisors adopted a resolution on March 12, 2002, that committed the County to implementing several measures to reduce O_3-causing emissions. Among the measures are cost incentives for road contractors to minimize land closures, transit-oriented land use planning, and measures to encourage County employees and other motorists to restrict driving on days with high O_3 levels as well as continuing efforts to convert County vehicles to low-emission compressed natural gas and gasoline/electric hybrid engines. Many of these measures have been incorporated as general plan update policies.

The Kern County Board of Supervisors adopted a resolution on January 7, 2003, that committed the County to implementing several measures aimed at reducing PM_{10} emissions from County roadways. Among the measures are plans to determine the feasibility of paving the County's unpaved roads, which are lightly traveled, paving the shoulders of the most heavily traveled paved County roads as funding allows, and purchasing two PM_{10}-compliant street sweepers as funding allows. The resolution also committed the County to imposing tougher rules for cancelling road improvements on large rural parcels; requiring public and private access roads for new commercial and industrial development to be paved; evaluating the adverse air quality impacts of new development and, where appropriate, requiring mitigation measures; implementing policies that require developers to control and abate dust during grading and construction operations; and, to receive a permit for expansion or a significantly altered use, requiring unpaved parking and storage areas of commercial and agricultural operations in County areas to be paved. These measures are being implemented through the Kern County Land Division Ordinance, Zoning Ordinance, and KCGP Update.

Applicable Stationary Source Regulations

The SJVAPCD has primary responsibility for regulating stationary sources of air pollution situated within its jurisdictional boundaries. To this end, the SJVAPCD implements air quality programs required by state and Federal mandates, enforces rules and regulations based on air pollution laws, and educates businesses and residents about its role in protecting air quality. The SJVAPCD is also responsible for managing and permitting existing, new, and modified sources of air emissions within the SJVAB and establishing the following rules and regulations to ensure compliance with local, state, and National air quality regulations.

Rule 2010 (Permits Required)

Rule 2010 requires that an Authority to Construct permit (a new source review permit) and a Permit to Operate be obtained prior to constructing, altering, replacing, or operating any device that emits or may emit air contaminants.

Rule 2020 (Exemptions)

Rule 2020 specifies criteria that emission units must meet to be exempt from SJVAPCD permit requirements. The rule also specifies the recordkeeping requirements to verify the exemption and outlines the compliance schedule for emission units that lose the exemption after installation. Rule 2020 applies to any source that emits or may emit air contaminants.

Rule 2070 (Standards for Granting Applications)

Rule 2070 sets forth the standards that must be met for a permit to be issued by the SJVAPCD. The rule applies to any activity required to obtain a permit according to Rule 2010 (Permits Required).

Rule 2201 (New and Modified Stationary Source Review Rule)

The stated purpose of Rule 2201 is to provide for the review of new and modified stationary sources of air pollution and to provide mechanisms, including emission trade-offs, by which authority to construct such sources may be granted without interfering with the attainment or maintenance of ambient air quality standards. The SJVAPCD new source review rule applies to all new stationary sources and all modifications to existing stationary sources that are subject to SJVAPCD permit requirements. The rule generally requires that new or modified equipment include BACT and that emission increases above specified thresholds be offset (Dudek, 2016b).

Rule 2520 (Title V Federally Mandated Operating Permits)

Rule 2520 serves as the SJVAPCD's mechanism for issuing, renewing, revising, revoking, and terminating operating permits for sources of air contaminants in accordance with the requirements of Title 40, Part 70, of the Code of Federal Regulations (CFR). This rule defines the sources that require federally mandated operating permits, as well as the content of these permits. Federally mandated operating permits are required for all major sources of air pollutants, as well as other sources listed in Section 2.0 of the rule. Generally, the federally mandated operating permits include emission limitations and standards for federal criteria pollutants (ROG, NO_X, CO, SO_X, PM10, PM2.5, and lead), new source performance standards, and recordkeeping and reporting requirements. This rule requires that the SJVAPCD combine all federal and state applicable standards into one permit for each facility, and that the permit indicate where state standards exceed federal standards.

SJVAPCD Rule 2520 applies to major stationary sources of air contaminants and to major sources of HAPs. A major source of air contaminants is any regulated pollutant that has the potential to emit more than the major source thresholds, as described in Table 3-3 of Rule 2201, and ranges from 20,000 to 200,000 pounds per year (i.e., 10 to 100 tons per year). To be considered major for HAPs, a source must emit 10 tons per year or more of a single HAP or 25 tons per year or more of HAPs in aggregate.

Rule 2530 (Federally Enforceable Potential to Emit)

The purpose of Rule 2530 is to restrict a stationary source's potential to emit so that a source may be exempt from the requirements of Rule 2520 (Federally Mandated Operating Permits). This rule applies to any stationary source that is a major source of regulated air pollutants or of hazardous air pollutants but with limitations would be exempt from Rule 2520. This exemption provides stationary sources in the SJVAPCD with a separate option to comply with air quality restrictions. Rule 2530 also includes recordkeeping and reporting requirements. Rule 2530 allows a facility with potential emissions exceeding a major source threshold to be exempt from the Title V program (see Rule 2520) if the source's actual emissions are below half the major source threshold, based on a 12-month rolling period.

Rule 2550 (Federally Mandated Preconstruction Review for Major Sources of Air Toxics)

Rule 2550 provides an administrative mechanism for applying the requirements of 40 CFR 63.40–63.44 at major sources of hazardous air pollutants that have Authority to Construct permits for new construction or reconstruction. Rule 2550 requires that new or reconstructed sources use Toxic Best Available Control Technology, with some exceptions.

Rule 4001 (New Source Performance Standards)

Rule 4001 codifies the SJVAPCD's adoption and incorporation of the New Source Performance Standards as set forth in 40 CFR 60. New Source Performance Standards apply to a variety of different types of stationary sources, including asphalt plants. The regulation imposes emissions standards for certain pollutants and requires that specified emission control equipment and monitoring devices be installed at all new, modified, or reconstructed facilities to limit emissions. The regulation also includes test methods and procedures, as well as monitoring, notification, and recordkeeping requirements.

Rule 4002 (National Emission Standards for Hazardous Air Pollutants)

Rule 4002 incorporates the National Emission Standards for Hazardous Air Pollutants (NESHAPs) as set forth in 40 CFR 61, and the NESHAPs for source categories as set forth in 40 CFR 63. 40 CFR 61 includes emission standards for several known toxic air pollutants, such as beryllium, mercury, and vinyl chloride. 40 CFR 63 regulates the NESHAP by source categories. Both regulations also include test methods and procedures, as well as monitoring, notification, and recordkeeping requirements.

Rule 4101 (Visible Emissions)

Rule 4101 prohibits the emissions of visible air contaminants to the atmosphere. The rule applies to any source operation that emits or may emit air contaminants.

Rule 4102 (Public Nuisance)

The purpose of Rule 4102 is to protect the health and safety of the public. The rule applies to any source operation that emits or may emit air contaminants or other materials and prohibits from any source whatsoever the discharge emissions of air contaminants or other materials that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or that endanger the comfort, repose, health, or safety of any such person or the public or that cause or have a natural tendency to cause injury or damage to business or property.

Rule 4201 (Particulate Matter Concentration)

Rule 4201 establishes a particulate matter emission standard and applies to any source operation that emits or may emit dust, fumes, or total suspended particulate matter. The rule prohibits the release or discharge into the atmosphere from any single source operation, dust, fumes, or total suspended particulate matter emissions in excess of 0.1 grain per cubic foot of gas at dry standard conditions.

Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations)

The purpose of this rule is to reduce VOC emissions from asphalt and paving installation and maintenance activities by restricting the application and manufacturing of certain types of asphalt for paving and maintenance operations.

Rule 4692 (Commercial Charbroiling)

The purpose of this rule is to reduce VOC and PM_{10} emissions from commercial charbroiling (e.g., charbroiled grilled food at restaurants) by setting performance standards and related requirements for the operation of non-exempt commercial charbroiling equipment.

Rule 4801 (Sulfur Compounds)

Rule 4801 limits the emission of sulfur compounds and applies to any discharge to the atmosphere of sulfur compounds that would exist as a liquid or a gas at standard conditions. The rule prohibits the discharge of sulfur compounds into the atmosphere in concentrations greater than 2,000 ppm by volume as SO_2 on a dry basis averaged over 15 consecutive minutes.

Rule 9410 (Employer Based Trip Reduction)

The purpose of this rule, colloquially known as the eTrip rule, is reduce VMT from private vehicles used by employees to commute to and from their worksites to reduce emissions of NO_X, VOC, and particulate matter. The eTrip rule requires large employers to establish an Employer Trip Reduction Implementation Plan (eTrip) to encourage employees to reduce single-occupancy vehicle trips, thus reducing pollutant emissions associated with work commutes.

Air Quality Conformity Determination for Transportation Plans and Programs

The CAA amendments of 1990 require a finding to be made stating that any project, program, or plan subject to approval by a metropolitan planning organization conforms to air plans for attainment of air quality standards. Kern COG is designated the Regional Transportation Planning Agency and Metropolitan Planning Organization for Kern County. In that capacity, Kern COG models air quality projections on population projections in conjunction with current general plan designations and estimated vehicle miles as well as the current RTP and the Federal transportation plan for Kern County. These results are compared to pollutant budgets for each basin approved by EPA in the 1999 base year. Kern County is contained within two air basins: SJVAB and the Mojave Desert Air Basin. Each air basin has its own plans and pollutant budgets. Kern COG makes conformity findings for each air basin.

Kern County recently prepared a draft 8-hour O_3 air quality conformity analysis to analyze Kern County's Federally approved Federal Transportation Improvement Program (FTIP) and the Destination 2030 RTP. Changes to the National air quality standards for O_3 from a 1-hour measurement to an 8-hour measurement have triggered the need for this analysis. The FTIP for the Kern County region is a 6-year schedule of multimodal transportation improvements, and the RTP is a long-range, 26-year transportation plan. The conformity findings conclude that the FTIP and RTP result in emissions that are less than the emission budgets of baseline emissions for CO, ROG, NO_X, and PM_{10} (Kern COG, 2005).

4.3.4 Supplemental Recirculated EIR (SREIR) New and Updated Analysis

Methodology

CalEEMod Version 2016.3.2

At the time the 2016 EIR was prepared and certified, the current version of the California Emissions Estimator Model (CalEEMod) software was CalEEMod Version 2013.2.2. Subsequently, various model and emission factor updates and bug fixes occurred when updating CalEEMod from Version 2013.2.2 to Version 2016.3.2. Of particular importance, CalEEMod Version 2016.3.2 assumes development compliance with 2016 Title 24, Part 6, Building Energy Efficiency Standards, identified different consumer product ROG emission factors for parking lots and parks, updated mobile source emission factors, updated the global warming potential values, and fixed a software bug that did not calculate all mobile source mitigation measures. CalEEMod Version 2016.3.2 was used for this supplemental air quality analysis, as discussed further in Section 2.5.2 of the 2019 Air Study, and consistent with the direction of the SJVAPCD in scoping comments submitted in response to the NOP in May 2019.

Since the 2016 EIR was certified, additional mitigation measures were identified as feasible emission reduction strategies and are incorporated into the project to reduce potential air quality and GHG emissions impacts, as described herein and in Section 2.5.3 of the 2019 Air Study. To the extent these modified and/or additional mitigation measures are quantifiable using CalEEMod, the emission reductions associated with the amended and/or additional mitigation measures have been included in the quantified supplemental analysis (i.e., MM-4.3-4 [Developer Mitigation Contract], MM-4.3-5 [Energy Plan, and MM-4.3-9 [Internet Infrastructure and Telecommuting]). However, no reductions to estimated emissions were made due to new or updated regulations adopted after certification of the 2016 EIR, although such reductions may be included in future versions of CalEEMod. In addition, the fleet mix in CalEEMod was tailored by land use to reflect the anticipated motor vehicle characteristics associated with the land use development mix (e.g., greater proportion of automobiles and light-duty vehicles for residential uses and a greater proportion of heavy-duty trucks for industrial uses), as discussed in the 2019 Air Study.

Due to the emission estimator model updates and identification of additional mitigation measures, the emissions estimated in the 2016 EIR do not represent an appropriate comparison to the emissions estimated for the project assuming reduced ICR or higher VMT levels. To provide an apples-to-apples comparison between the project as evaluated in the 2016 EIR, on the one hand, and the five additional Reduced ICR Scenarios, on the other hand, the Updated 28.7% HBW ICR scenario for the project was modeled. The Updated 28.7% HBW ICR analysis is the project as analyzed in the 2016 EIR, but using CalEEMod Version 2016.3.2 and updating it consistent with the other Reduced ICR Scenarios analyzed herein. The Updated 28.7% HBW ICR is further explained in Sections 2.5 and 3.5 of the 2019 Air Study.

Operational criteria air pollutant emissions associated with implementation of the Updated 28.7% HBW ICR were estimated for the following four emission sources: area, energy, mobile, and stationary, as discussed in detail in Section 2.5.4 of the 2019 Air Study. Emissions were first calculated under the current CalEEMod model without quantified reductions from any mitigation measures, and then calculated following application of quantified emission reduction mitigation measures, specifically MM-4.3-4, MM-4.3-5 and MM-4.3-10. Section 2.5.4 of the 2019 Air Study describes in detail the methodology used to estimate the SREIR analysis's unmitigated and mitigated operational criteria air pollutant impacts.

Reduced ICR Scenarios with Higher VMT

This section considers the potential project air quality impacts that could be associated with lower ICR and higher VMT levels than considered in the 2016 EIR, as described in the NOP. To identify a range of potential scenarios that could result in lower ICRs and higher VMT compared to the project, a total of 22 screening scenarios were developed by the project traffic consultant, Fehr & Peers, to evaluate how daily, AM, and PM peak hour trip generation rates and VMT could vary with ICRs that were 10 and 20 percent lower than used in the 2016 EIR or from other identified development patterns, such as primarily residential or commercial/light industrial development, that could also affect project VMT. As described in the 2019 Traffic Study, none of the scenarios were found to generate a greater amount of daily average and peak hour trips than identified in the Updated 28.7% HBW ICR and five of the scenarios were found to generate higher levels of VMT than the Updated 28.7% HBW ICR analysis. Vehicular emissions are partially dependent on project VMT, so these five Reduced ICR Scenarios with higher VMT are evaluated in this section. The five Reduced ICR Scenarios with higher VMT assessed quantitatively in this section, include Scenarios A through E, as previously introduced.

This supplemental air quality analysis considers the potential significant impacts related to criteria air pollutant emissions from land use operations (i.e., non-permitted activities) and stationary sources (i.e., permitted equipment and activities) that could occur with project buildout and other potential scenarios, such as residential-only development, that would result in lower ICR and higher VMT than considered in the 2016 EIR. This section also considers potential CO hotspot impacts, and potential health risk from the I-5 freeway and local roadways from the project based on traffic volume and trip distribution associated with each of the potential Reduced ICR Scenarios evaluated herein.

In regards to criteria air pollutant emissions, project-generated emission sources are grouped into the following emission source categories, as explained in more detail in Section 2.5.4 of the 2019 Air Study: area, energy, mobile, and stationary. The five Reduced ICR Scenarios with higher VMT only affect the mobile source emission quantification. However, due to CalEEMod updates (discussed in Section 2.5.2 of the 2019 Air Study) and incorporation of additional mitigation measures (discussed in Section 2.5.3 of the 2019 Air Study), area and energy source emission estimates also changed for the Updated 28.7% HBW ICR and the Reduced ICR Scenario analyses. In addition, the land use changes (i.e., type and/or amount of each land use) associated with the Scenarios C, D, and E result in changes in estimated emissions for all emission sources (i.e., area, energy, mobile and stationary). While not as substantial of a variable, the land use inputs for the Updated 28.7% HBW ICR, Scenario A, and Scenario B are slightly different than assumed for the 2016 EIR to provide a consistent land use mix and amount as assumed in the 2019 Traffic Study.

Specifically, as detailed in Sections 2.5.2 and 2.5.4 of the 2019 Air Study, area source emissions calculations changed compared to the 2016 EIR as a result of CalEEMod updates, including consumer product ROG emission factors. For energy sources, updates in CalEEMod default values and modifications to MM-4.3-5, Energy Plan (MM-4.7-4, Energy Conservation), results in changes to the energy source emissions calculations. Two of the Reduced ICR Scenarios (i.e., Scenarios A and B) do not include changes to project land use buildout; as such, estimated area and energy source emissions are the same as the Updated 28.7% HBW ICR and the only change in emissions was related to mobile sources. Three Reduced ICR Scenarios (i.e., Scenarios C, D, and E) do change the project land use buildout, either by reducing buildout (i.e., Scenario C) or eliminating commercial/industrial uses and completing only residential and related uses (i.e., Scenarios D and E), and therefore, result in changes to estimated area and energy source emissions, in addition to mobile source emissions.

For mobile source emissions, the updated mobile source emission factors (as discussed in Sections 2.5.1 and 2.5.2 of the 2019 Air Study) results in either decreases and increases in emissions depending on the pollutant, emissions process (e.g., running, idling, and starting), and vehicle class. See Appendix B of the 2019 Air Study for a comparison of the CalEEMod Version 2013.2.2 and Version 2016.3.2 mobile source emission factors as derived from EMFAC Version 2007 and EMFAC Version 2014, respectively. The estimated VMT for each scenario also results in different mobile source emission estimates. In addition, because the land use changes, specifically in Scenarios C, D, and E, the fleet mix was also tailored by land use to reflect the anticipated motor vehicle characteristics associated with the land use development mix. For example, Scenarios D and E include residential development only and therefore, would consist of a greater proportion of passenger vehicles and light-duty trucks compared to the Updated 28.7% HBW ICR and Scenarios A, B, and C, which include commercial and light industrial uses that would include heavy-duty trucks. CalEEMod Version 2013.2.2 did not allow the user to input a project-specific fleet mix by land use, which is an option in CalEEMod 2016.3.2 and which was appropriate to use for this analysis to capture the changes in land use mix and associated motor vehicle characteristics. Further, the addition of MM-4.3-9, Internet Infrastructure and Telecommuting, would result in minor additional VMT reductions compared to the 2016 EIR estimates.

Stationary source emission calculations were performed outside of CalEEMod and no additional mitigation measures related to stationary sources have been identified; however, because the land use inputs (type of land use and amount) changed for Scenarios C, D, and E, estimated stationary source emissions are provided herein. As with area and energy source emissions, because Scenarios A and B do not result in a different land use buildout, no changes to stationary source emissions would occur compared to the Updated 28.7% HBW ICR. Accordingly, criteria air pollutant emissions associated with operation of the Updated 28.7% HBW ICR and five Reduced ICR Scenarios with higher VMT were estimated for the following four emission sources: area, energy, mobile, and stationary, as discussed in detail in Section 2.5.4 of the 2019 Air Study.

Thresholds of Significance

As discussed in the NOP, the County determined that the thresholds of significance used in the 2016 EIR do not require modification to address the 2018 revisions to CEQA Appendix G. Accordingly, this supplemental analysis addresses the following thresholds of significance to assess whether the project would:

- Violate any air quality standard as adopted in Kern County Environmental Checklist (c) i or (c) ii, or as established by EPA or air district or contribute substantially to an existing or projected air quality violation; or

- 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 which exceed quantitative thresholds for O_3 precursors).

In addition, this analysis addresses the potential for the project to result in CO hotspot impacts and the potential for the project to expose future sensitive receptors to TACs associated with I-5, which are under the following threshold:

- Expose sensitive receptors to substantial pollutant concentrations.

The potential for the project to expose sensitive receptors to substantial pollutant concentrations, including CO hotspots and TAC emissions associated with I-5, as well as a discussion of health effects associated with criteria air pollutants, is addressed in this supplemental analysis and in Section 2.8 of the 2019 Air Study.

The supplemental air quality analysis herein does not address the following thresholds, which are not relevant to the updated criteria air pollutant emissions estimates from the five Reduced ICR Scenarios with higher VMT:

- Create objectionable odors affecting a substantial number of people.

The following air quality analysis topics that were addressed in the 2016 EIR, but would not change as a result of this supplemental analysis and are therefore not considered herein, include, but are not limited to, the following:

- Evaluation of the potential to conflict with or obstruct implementation of the applicable air quality plan
- Construction emissions, including construction ambient air quality analysis and construction health risk assessment (HRA)
- Stationary source ambient air quality analysis
- Stationary source HRA
- Valley fever exposure

Project Impacts

Impact 4.3-1: The Project Would Conflict with or Obstruct Implementation of an Applicable Air Quality Plan.

Impacts related to conflicts or obstruction of implementation of an applicable air quality plan for each of the Reduced ICR Scenarios would be the same as the impacts considered in FEIR (2016) analysis.

Mitigation Measures

MM 4.3-1 **Comply with Applicable Law.** The project is required to comply with applicable state and federal air pollution control laws and regulations, and with applicable rules and regulations of the San Joaquin Valley Air Pollution Control District (SJVAPCD) during construction and operations.

MM 4.3-2 **Fugitive Dust Control.** Prior to issuance of grading or building permit, the project proponent shall submit a Fugitive Dust Control Plan to San Joaquin Valley Air Pollution Control District (SJVAPCD) for review and approval. The Fugitive Dust Control Plan shall reduce emissions, during construction of particulate matter that is 10 microns or less and 2.5 microns or less in diameter (PM_{10} and $PM_{2.5}$). The Fugitive Dust Control Plan shall include:

1. Name(s), address(es), and phone number(s) of person(s) responsible for the preparation, submission and implementation of the plan.
2. Description and location of operation(s).
3. Listing of all fugitive dust emissions sources included in the operation.
4. The following dust control measures shall be implemented:
   a) All on-site unpaved roads shall be effectively stabilized use water or chemical soil stabilizers that can be determined to be as efficient as or more efficient for fugitive dust control than California Air Resources Board approved soil stabilizers, and that shall not increase any other environmental impacts included loss of vegetation.
   b) All material excavated or graded will be sufficiently watered to prevent excessive dust. Watering will occur as needed with complete coverage of disturbed areas. The excavated soil piles will be watered as needed to limit dust emissions to less than 20 percent opacity or covered with temporary coverings.
   c) Construction activities that occur on unpaved surfaces will be discontinued during windy conditions when winds exceed 25 miles per hour and those activities cause visible dust plumes. Construction activities may continue if dust suppression measures are used to minimize visible dust plumes.
   d) Track-out debris onto public paved roads shall not extend 50 feet or more from an active operation and track-out shall be removed or isolated such as behind a locked gate at the conclusion of each workday.
   e) All hauling materials should be moist while being loaded into dump trucks.
   f) All haul trucks hauling soil, sand and other loos materials on public roads shall be covered (e.g., with tarps or other enclosures that would reduce fugitive dust emissions).
   g) Soil loads should be kept below six inches or the freeboard of the truck.
   h) Drop heights should be minimized when loaders dump soil into trucks.
   i) Gate seals should be tight on dump trucks.
   j) Traffic speeds on unpaved roads shall be limited to a maximum of 25 miles per hour.

k) All grading activities shall be suspended when visible dust emissions exceed 20 percent.

l) Other fugitive dust control measures as necessary to comply with San Joaquin valley Air Pollution Control District Rules and Regulations.

m) Disturbed areas should be minimized.

MM 4.3-3 **Off-road Equipment Engines.** For off-road equipment with engines rated at 75 horsepower or greater, no construction equipment will be used that is less than Tier 2 at the commencement of construction (2016), less than Tier 3 starting in construction year 5 (2020), less than Tier 4 Interim starting in construction year 10 (2025), and Tier 4 Final starting in construction year 15 (2030). An exemption from these requirements may be granted by Kern County in the event that the project proponent documents that (1) equipment with the required tier is not reasonably available (e.g., reasonability factors to be considered include those available within Kern County within the scheduled construction period), and (2) corresponding reductions in criteria pollutant emissions are achieved from other construction equipment.

MM-4.3-4 **Developer Mitigation Contract.** The Project proponent shall enter into a Developer Mitigation Contract (DMC) with the San Joaquin Valley Air Pollution Control District (SJVAPCD) to reduce emissions of reactive organic gases (ROGs), oxides of nitrogen (NOx), and particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) to achieve emission reductions for projected construction and operational related emissions of ROG, NOx and PM10 (inclusive of particulate matter with an aerodynamic diameter less than or equal to 2.5 microns [$PM_{2.5}$]). The DMC shall require full offsets of these pollutants, for construction and operational emissions, except to the extent that offsets equal to or greater than these full offsets are separately required under the District's stationary source permit requirements. The Project proponent shall report annually through the Mitigation Monitoring and Reporting program on compliance with the DMC. Additionally, no later than prior to recordation of a final tentative tract map, prior to approval of a grading permit for commercial/industrial site plan, the Project proponent shall submit to the Kern County Planning and Natural Resources Department documentation confirming compliance with the DMC. The document entitled the "Voluntary Emission Reduction Agreement" that was executed by the SJV APCD and applicant in February 2016, and was included as Exhibit H to Appendix E.1 of the EIR, serves as the DMC for this project.

The Internalization Rate Report required under Mitigation Measure 4.16-9, below, shall include as an appendix an updated quantification of ROGs, NOx, and PM10 for prior and estimated future Project construction and operational emissions of these criteria pollutants, to demonstrate whether past and estimated future project criteria pollutant emissions remain below the quantified emissions included in the DMC. If the Internalization Rate Reports required under MM 4.16-9 estimates quantities of future Project emissions of ROGs, NOx, or PM10 in excess of the quantities of these emissions identified in the DMC, then the Project Proponent shall either:

(a) propose, for review and approval by the County and SJVAPCD, implementation of trip reduction measures or other measures to avoid exceeding the criteria emission quantities identified in the DMC;

(b) enter into a new or amended DMC with SJVAPCD to fully offset the exceedance of the criteria emission quantities identified in the DMC; or

(c) a combination of (a) and (b) herein.

MM-4.3-5 **Energy Plan.** Concurrent with the submittal of the first application for a tentative tract map, parcel map (excluding financing map), or commercial site plan review, the Project proponent shall submit to the Kern County Planning and Natural Resources Department an Energy Plan documenting compliance with all applicable energy conservation requirements of applicable Title 24 standards. The Energy Plan shall also confirm that a menu of energy efficiency design elements, along with other design considerations and options, has been made available by the Project proponent to builders, developers, and property owners as part of the internal design review process. Each developer, builder, or property owner shall incorporate the design elements required to comply with then-applicable Title 24 requirements and select from the menu or implement other available technologies as may be needed to reduce energy consumption 15% below 2016 Title 24 requirements. Implementation of the energy efficiency requirements in the approved Energy Plan shall be included as conditions of approval for any commercial/industrial site plan, final subdivision map, or parcel map (except financing map).

MM 4.3-6 **Valley Fever.** Prior to ground disturbance activities, the project proponent shall implement the following Valley Fever Provisions

1. Provide evidence to the Kern County Planning and Natural Resources Department that the project operator and/or construction manager has developed a “Valley Fever Training Handout”, training, and schedule of sessions for education to be provided to all construction personnel. All evidence of the training session materials, handout(s) and schedule shall be submitted to the Kern County Planning and Natural Resources Department within 24 hours of the first training session. Multiple training sessions may be conducted if different work crews will come to the site for different stages of construction; however, all construction personnel shall be provided training prior to beginning work. The evidence submitted to the Kern County Planning and Natural Resources Department regarding the “Valley Fever Training Handout” and Session(s) shall include the following:

   a) A sign-in sheet (to include the printed employee names, signature, and date) for all employees who attended the training session.

   b) Distribution of a written flier or brochure that includes educational information regarding the health effects of exposure to criteria pollutant emissions and Valley Fever.

c) Training on methods that may help prevent Valley Fever infection.

d) A demonstration to employees on how to use personal protective equipment, such as respiratory equipment (masks), to reduce exposure to pollutants and facilitate recognition of symptoms and earlier treatment of Valley Fever. Where respirators are required, the equipment shall be readily available and shall be provided to employees for use during work. Proof that the demonstration is included in the training shall be submitted to the county. This proof can be via printed training materials/agenda, DVD, digital media files, or photographs.

2. The project proponent also shall consult with the County Health Services Department to develop a Valley Fever Dust Management Plan that addresses the potential presence of the Coccidioides spore and mitigates for the potential for Coccidioidomycosis (Valley Fever). Prior to issuance of permits, the project operator shall submit the Plan to the Kern County Public Health Department for review and approval. The Plan shall include a program to evaluate the potential for exposure to Valley Fever from construction activities and to identify appropriate safety procedures that shall be implemented, as needed, to minimize personnel and public exposure to potential Coccidioides spores. Measures in the Plan shall include the following:

   a) Provide High-Efficiency Particulate Air (HEPA) filters for heavy equipment equipped with factory enclosed cabs capable of accepting the filters. Require contractors utilizing applicable heavy equipment to furnish proof of worker training on proper use of applicable heavy equipment cabs, such as turning on air conditioning prior to using the equipment.

   b) Provide communication methods, such as two-way radios, for use in enclosed cabs.

   c) Require National Institute for Occupational Safety and Health (NIOSH)-approved half-face respirators equipped with minimum N-95 protection factor for use during worker collocation with surface disturbance activities, as required per the hazard assessment process.

   d) Cause employees to be medically evaluated, fit-tested, and properly trained on the use of the respirators, and implement a full respiratory protection program in accordance with the applicable California Occupational Safety and Health Administration Respiratory Protection Standard (8 CCR 5144).

   e) Provide separate, clean eating areas with hand-washing facilities.

   f) Install equipment inspection stations at each construction equipment access/egress point. Examine construction vehicles and equipment for excess soil material and clean, as necessary, before equipment is moved off-site.

   g) Train workers to recognize the symptoms of Valley Fever, and to promptly report suspected symptoms of work-related Valley Fever to a supervisor.

h) Work with a medical professional to develop a protocol to medically evaluate employees who develop symptoms of Valley Fever.

i) Work with a medical professional, in consultation with the County Health Services Department, to develop an educational handout for on-site workers and surrounding residents within three miles of the project site, and include the following information on Valley Fever: what are the potential sources/ causes, what are the common symptoms, what are the options or remedies available should someone be experiencing these symptoms, and where testing for exposure is available. Prior to construction permit issuance, this handout shall have been created by the project operator and reviewed by the project operator and reviewed by the County. No less than 30 days prior to any work commencing, this handout shall be mailed to all existing residences within three miles of the project boundaries.

j) When possible, position workers upwind or crosswind when digging a trench or performing other soil-disturbing tasks.

k) Prohibit smoking at the worksite outside of designated smoking areas; designated smoking areas will be equipped with handwashing facilities.

l) Post warnings on-site and consider limiting access to visitors, especially those without adequate training and respiratory protection.

m) Audit and enforce compliance with relevant California Occupational Safety and Health Administration health and safety standards on the jobsite.

MM 4.3-7

A. **Sensitive Uses and High Volume Internal Roadways**. Prior to County approval of a tentative tract map that includes residential units or other sensitive uses, the applicant shall submit to the County and San Joaquin Valley Air Pollution Control District (SJVAPCD) a health risk assessment (HRA). The HRA shall be completed in accordance with the methodological requirements of the SJVAPCD, and shall include a cumulative assessment if or as directed by SJVAPCD. The HRA shall consider TAC emissions from mobile sources from I-5 within the prescribed distances of 3,100 feet east of Interstate-5 or within 4,500 feet west of Interstate-5, or within 500 feet of the project's higher volume Freeway Connection and Major Arterial/Collector, which are the only internal project roadway street types that have the potential for exceeding 50,000 trips per day at project buildout. If the HRA identifies any sensitive receptor exposure that equals or exceeds 20 in 1 million for cancer risk or 1.0 for non-cancer indices (or future more stringent thresholds as may be adopted by the District and implemented by the County for use on projects subject to the County's lead agency authority under the California Environmental Quality Act) (District TAC Thresholds), the applicant shall submit a Toxic Air Contaminant (TAC) Emission Reduction Plan to the SJVAPCD for review and concurrence. Following SJVAPCD review and concurrence, a copy of the TAC Emission Reduction Plan, confirming that no sensitive receptors on the project site will be exposed to TAC risks in excess of District TAC Thresholds, shall be provided to the Kern County Planning and Natural Resources Department, prior to County approval of the tentative tract map. In the TAC Emission Reduction Plan, TAC exposure measures shall be implemented to assure that no sensitive receptors are exposed to TAC-related health impacts that equal or exceed the SJVAPCD thresholds. TAC exposure reduction measures include, but are not limited to, setbacks; vegetative barriers; heating, ventilation, and air conditioning (HVAC) system filtration technologies; etc., and shall be required as a condition of approval for the tentative tract map, and/or required as a condition prior to issuance of a building permit approval for future sensitive use(s) included in the tentative tract map.

MM 4.3-8 As part of the submittal packet for any proposed Special Use Permit with the potential to generate noxious odors. The project proponent shall be required to prepare an Odor Minimization and Complaint Management Plan. The Odor Minimization and Compliant Management Plan shall include provisions necessary to reduce odors generated from the proposed use. At minimum, the Odor Minimization and Complaint Management Plan shall include the following:

a. Name and telephone number of contact person(s) at the facility responsible for logging in and responding to odor complaints.

b. Policy and procedure describing the actions to be taken when an odor complaint is received, including the training provided to staff on how to respond.

c. Description of potential odor sources at the facility.

d. Description of potential methods for reducing odors, including minimizing idling of delivery and service trucks and buses, process changes, facility modifications, and/or feasible add-on air pollution control equipment, including a description of the specific measures to be implemented at the building design stage, the equipment installation and maintenance stage, and the operations management stage, to avoid or minimize adverse odor impacts.

e. Contingency measures to curtail emissions in the event of a public nuisance odor complaint.

MM-4.3-9 **Internet Infrastructure and Telecommuting.** Each application for a tentative tract map, parcel map (excluding financing map), and commercial site plan review shall include telecommunications infrastructure to provide broadband service (internet) for all occupied structures, and to provide a community intranet with access for homeowners associations, interest groups, and residents, employers and employees; the intranet shall include information regarding scheduled local events, schools, library, carpool and transit services; and other on-site entertainment and amenities.

An application for a building permit shall include broadband internet infrastructure to encourage telecommuting and working from home and in satellite offices. The intranet shall also provide education about greenhouse gas (GHG) emissions; GHG reduction opportunities; energy and water conservation opportunities; financial incentives (e.g., rebates and low-interest loans) for energy-efficiency improvements; and energy-efficiency technology systems, including those suitable for large commercial and industrial users.

MM-4.3-10 **Mobility Plan.** Concurrent with the initial application for a tentative tract map, parcel map (excluding financing map), or commercial site plan review, the applicant shall submit a Mobility Plan, which describes the system of sidewalks, greenway trails, community trails, a dedicated transit easement, and two transit hubs to serve as alternative means of transportation on the Project site. The Mobility Plan shall also require, consistent with MM 4.16-2 and the requirement to form a Transportation Management Association (TMA), the ongoing operation of the TMA to implement ongoing transportation improvements and programs. Implementation of the approved Mobility Plan shall be required for each subsequent tentative tract map, parcel map (excluding financing map), and commercial site plan review.

The Mobility Plan shall:

- Through the TMA, provide future residents, visitors, and employees with information on multiple modes of transit/non-single occupancy vehicle (non-SOV) accessibility for internal and external trips.
- Through the TMA, provide options to reduce vehicle trips and emissions by linking effective travel demand management with transportation systems and parking policies.
- Through the TMA, provide residents and employees on the Project site with multiple modes of transportation options (e.g., walk, bike, public transit, private auto, car share, bike share).
- Provide for 50% on average of residential units (single family and multi-family) to be located within 0.5 miles of a village center that includes retail and service uses.
- Provide parks within a 10-minute walk (0.5 miles) of 80% of all residential units.
- Provide a transit route easement no less than 25 feet wide to provide for a dedicated bus lane and bus pull-outs from the dedicated transit centers to the primary village mixed use center areas on the east and west sides of Interstate (I) 5.
- Through the TMA, work with automotive dealers to help promote electric, compressed natural gas (CNG), hybrid electric vehicles, and vehicles using future zero or low emission technologies approved for use in California by the California Air Resources Board (CARB-approved zero and low emission vehicles)

- Through the TMA, engage in outreach and education for agencies and businesses located on the site, and project residents, about CARB-approved zero and low emission vehicles, which help attain that would help achieve California's air quality, greenhouse gas, and climate change mandates, and which could potentially meet the performance and affordability needs of Project employers, employees and residents.

- Require TMA implementation of a combination of measures to provide adequate temporary bike or personal electric vehicle (e.g., scooter) parking during large public events conducted at civic center, large amphitheaters, fairgrounds or athletic stadium uses that may be permitted, temporarily permitted, or conditionally permitted on the Project site pursuant to the Specific Plan. Such measures may include, but are not limited to, providing valet bike parking, temporarily anchored bike parking racks, or a secured temporary bike parking enclosure.

If approved by the California Department of Transportation (Caltrans) for use on State Roads and the County, and where maintenance and durability costs are comparable to traditional materials, the applicant shall use "cool pavement materials to reduce heat island effects. The location of proposed cool pavement materials shall be specified in applications for tentative tract maps, parcel maps (excluding financing maps), and commercial site plan reviews. Installation of approved cool building materials shall be required as conditions of project approvals for such tentative tract maps, parcel maps (excluding financing maps), and commercial site plan reviews.

MM 4.3-11 **Transportation Demand Management (TDM).** Each component of the Mobility Plan shall incorporate TDM features to reduce dependence on the automobile and provide for a more efficient use of transportation resources among Project occupants, thereby reduce pollutant emissions. Related to this is the requirements of MM 4.16-2, which requires the creation and ongoing operation of a Transportation Management Association (TMA) to coordinate and support the operation of ongoing transportation programs, including but not limited to transit and on-demand services. The following are key TDM elements that are inherent in the overall Mobility Plan:

- Sidewalks, greenway trails, and community trails that link residential, schools, shopping, and employment areas

- Small- to medium-sized streets and blocks that allow for shorter walking distances to retail, parks, schools, and other destinations

- Pedestrian environments incorporated with public streets

- Transit route easement connecting the residential and commerce areas

- Parking behind buildings to encourage walking in retail areas along street frontage

- Provide bus shelters

MM 4.3-12 **Locker/Shower Facilities.** Applications for commercial site plan review and building permits for non-residential buildings shall include lockers and showers to encourage active transportation such as biking and walking to and at work in lieu of motorized vehicle. Proof of compliance shall be provided to the County prior to the issuance of occupancy permits.

For buildings with over 10 tenant-occupants, changing/shower facilities shall be provided as follows: for 11 to 50 tenant-occupants, one shower and two 2-tier lockers; for 51 to 100 tenant-occupants, one shower and three 2-tier lockers; for 101 to 200 tenant-occupants, two showers and four 2-tier lockers; and for over 200 tenant-occupants, two additional showers for each 200 additional tenant-occupants and one 2-tier locker for each 50 additional tenant-occupants.

MM 4.3-13 **Preferential Parking and Electric Vehicle Charging for Nonresidential Buildings.**

(a) Applications for commercial site plan review and building permits for non-residential buildings shall include preferential parking for electric cars, low emission vehicles, and carpools/vanpools to encourage use of such vehicles. Proof of compliance shall be provided to the County prior to the issuance of occupancy permits. Preferential parking for such vehicles shall include two spaces for non-residential lots containing 10 to 25 spaces; four spaces for 26 to 50 space lots; six spaces for 51 to 75 space lots; nine spaces for 76 to 100 space lots; eleven spaces for 101 to 150 space lots; 18 spaces for 151 to 200 space lots; and at least 10% of total spaces for lots with more than 200 spaces.

(b) (1) Applications for commercial site plan review and building permits for non-residential buildings shall include Electric Vehicle (EV) Charging Spaces (EV space). Electrical infrastructure shall be installed to support future installation of Electric Vehicle Supply Equipment (EVSE) chargers, at each nonresidential building with 10 or more parking spaces, in the following ratios:

Total Number of Actual Parking Spaces	Tier 1 Number of Required EV Spaces
0–9	0
10–25	2
26–50	3
51–75	5
76–100	7
101–150	10
151–200	14
>200	8% of total spaces rounded up to nearest whole number

(2) For parking lots requiring multiple EV spaces under subsection (b), the application for commercial site plan review and building permit shall include the location(s) and type of EVSE, raceway method(s), wiring schematics and electrical calculations to verify that the electrical system has sufficient capacity to charge simultaneously all the electric vehicles (EV) at all designated EV spaces at their full rated amperage.

(3) Proof of compliance with subsections (1) and (2) shall be provided to the County prior to the issuance of occupancy permits.

(4) Changes to EVSE parking shall be allowed to the extent allowed under state law, and the duration of vehicular occupancy of EV spaces may be restricted as authorized by state law to allow charging of multiple vehicles each day. Demand for EV space facilities shall be monitored biennially by the Transportation Management Association (TMA), and additional EV parking spaces shall be made available at lots where demand exceeds supply. The TMA biennial survey shall also consider future transportation technology and practices, including for example changes in vehicular electric charging technology, other Future Vehicle Fleet changes, or other transportation practices and services changes (e.g., with lower automobile ownership rates leading to reduced parking demand and/or reduced private ownership of vehicles requiring daily electric charging).

MM 4.3-14 **Multi-Family Residential and Park/Trail Parking.** Applications for a tentative tract map, parcel map (excluding financing map), or commercial site plan review, that include parking structures, parking lots with 20 or more parking spaces that serve uses other than residential or nonresidential buildings (e.g., trailhead, park), and parking structures and parking lots that serve multifamily residential buildings with 15 or more multifamily units, shall include the following:

- A minimum of 5% of preferentially located parking spaces shall be reserved for electric vehicles.
- 5% of the total number of parking spaces provided in the parking facility, but in no case less than one, shall be Electric Vehicle Parking Spaces (EV spaces. Calculations for the required number of EV spaces shall be rounded up to the nearest whole number and the design and installation of each EV space shall be consistent with Section A4.106.8.2, Residential Voluntary Measures, and Section 4.106.4.2, of the CALGreen Code as follows:

Single Charging Space Requirements. When only a single EV space is required, install a listed raceway capable of accommodating a dedicated branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall be securely fastened at the main service or subpanel and shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box, or enclosure.

Multiple Charging Spaces Required. When multiple EV spaces are required, plans shall include the location(s) and type of EVSE, raceway method(s), wiring schematics, and electrical calculations to verify that the electrical system has sufficient capacity to charge simultaneously all the electric vehicles at all designated EV spaces at their full rated amperage. Plan design shall be based on Level 2 EVSE at its maximum operating ampacity. Only underground raceways and related underground equipment are required to be installed at the time of construction.

- For multifamily residential parking facilities, bicycle parking shall be provided as specified in Section A4.106.9, Residential Voluntary Measures, of the CALGreen Code, which requires provision of on-site bicycle parking for at least one bicycle per every two dwelling units.

Any establishment with 25 or more full-time equivalent employees shall provide Class 1 bicycle parking at a minimum ratio of one space per 20 vehicle spaces plus 1 bicycle rack for each 25 employees; for uses with no employees a minimum of one bicycle rack shall be provided. Short-term bicycle parking spaces shall be at least 10% of the number of required automobile parking spaces.

MM 4.3-15 **Residential Parking.** Applications for building permits submitted to County by Project Applicant/Developer shall include plans and specifications County demonstrating that the following features have been incorporated into the building designs or specifications for multifamily residential buildings:

- Visitor parking shall include preferentially located parking spaces for electric vehicles.
- Bicycle parking shall be provided as specified in Section A4.106.9, Residential Voluntary Measures, of the California Green Building Standards (CALGreen) Code or as required by County Code Section 22.52.1225B, whichever is more stringent.

MM 4.3-16 **Electric Vehicle Charging and Incentive.** Applications for building permits submitted to County by Project Applicant/Developer shall include plans and specifications demonstrating to the County that one 208/240 volts of alternating current (VAC) receptacle for charging electric vehicles shall be installed in each detached and attached single-family residence in a manner consistent with 2016 California Green Building Standards (CALGreen) Code Voluntary Tier 1 Section A4.106.4.1. The installation shall comply with requirements of the 2016 CALGreen Code Section 4.106.4.1, or the most applicable code at the time of construction. The Project applicant/developer shall offer a further credit of $500 to 50% of future homeowners (as requested by homeowner) to pay for the type of charging device then in use for electric vehicles or, with County approval, to pay for other energy conservation uses. The availability of this electric vehicle (EV) incentive benefit shall be disclosed and promoted at the time of initial sale of single-family homes and shall thereafter be promoted by the Transportation Management Association (TMA) on its website.

MM 4.3-17 **Electric Vehicles.** The Project applicant/developer shall provide site plans and building and design specifications to the County demonstrating compliance with the Electric Vehicle Supply (EVS) charging station measures specified in MM-4.3-13. If and to the extent subsequently approved by the County, compliant with state laws, and resulting in no new significant impacts to the environment following County review and approval, EVS charging stations may be replaced by "alternative energy fueling stations," which may include other types of electric vehicle charging technology (e.g., operating at higher or lower voltages), or alternative vehicular fuel technology that results in zero or near zero (as defined by California Air Resources Board [CARB]) greenhouse gas (GHG) emission such as hydrogen fuel cells, biofuels, or other qualifying fuel technologies. An electric charging station shall allow for simultaneous charging of two electric vehicles.

- Business Park and Institutional land use designations shall provide a minimum of one EVS on site for the first 50,000 square feet of usable floor space and additional alternative energy vehicle fueling stations for each additional 50,000 square feet of usable floor space thereafter.
- Multifamily residential buildings of at least 15 residential units shall provide a minimum of one EVS for the first 15 residential units and an additional EVS for each additional 15 residential units thereafter.
- Each village center shall provide a minimum of one EVS.
- The two primary transit centers on either side of I-5 shall provide a minimum of one EVS.

Level of Significance after Mitigation

Impacts would be less than significant with implementation of MM-4.3-1, MM-4.3-2, MM-4.3-3, MM-4.3-4, and MM-4.3-5.

Impact 4.3-2: The Project Would Violate Any Air Quality Standard as Adopted in Kern County Environmental Checklist (c) i or (c) ii, or as Established by the U.S. Environmental Protection Agency or an Air District or Contribute Substantially to an Existing or Projected Air Quality Violation.

Operational criteria air pollutant emissions associated with implementation of the SREIR analysis were estimated for the following four emission sources: area, energy, mobile, and stationary, as discussed in detail in Section 2.5.4 of the 2019 Air Study. Emissions were first calculated under the current CalEEMod model without quantified reductions from any mitigation measures (unmitigated emissions), and then calculated following application of quantified emission reduction mitigation measures (mitigated emissions). Potential impacts associated with implementation of the Updated 28.7% HBW ICR are discussed in detail in Section 2.5 of the 2019 Air Study.

Unmitigated Emissions

Estimated annual unmitigated operational criteria air pollutant emissions associated with implementation of the Updated 28.7% HBW ICR are presented in Table 4.3-8.

Table 4.3-8. Updated 28.7% HBW ICR Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Area	123.76	5.51	90.84	0.03	0.86	0.86
Energy	1.94	16.81	8.85	0.11	1.34	1.34
Mobile	39.38	214.93	569.76	3.41	411.01	110.68
Total Annual Emissions	165.08	237.25	669.45	3.55	413.21	112.88
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes

Source: Dudek 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAPCD = San Joaquin Valley Air Pollution Control District.

As shown in Table 4.3-8, estimated annual unmitigated operational criteria air pollutant emissions from implementation of the Updated 28.7% HBW ICR would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$.

Estimated annual unmitigated operational mobile source emissions by air basin for the Updated 28.7% HBW ICR are presented in Table 4.3-9. To estimate the criteria air pollutant emissions by air basin, the unmitigated mobile source emissions shown were apportioned to each air district according to the relative average weekday VMT as estimated by Fehr & Peers. The emissions occurring in the SJVAPCD jurisdiction would occur in the SJVAB. The emissions occurring in the SCAQMD jurisdiction would occur in the SCAB. The emissions occurring in the Antelope Valley Air Quality Management District jurisdiction, and Eastern Kern Air Pollution Control District jurisdiction would occur in the MDAB; thus, the sum of the emissions in those air districts are the emissions in the MDAB.

Table 4.3-9. Updated 28.7% HBW ICR Estimated Annual Unmitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin

Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	27.66	150.97	400.20	2.40	288.69	77.74
MDAB	3.47	18.91	50.14	0.30	36.17	9.74
SCAB	8.25	45.05	119.42	0.71	86.15	23.20

Source: Dudek 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model (CalEEMod) does not include year 2036.
All scenarios assume the project-specific vehicle fleet mix and default CalEEMod vehicle emission factors for the Kern County portion of the SJVAB.

Regarding stationary source emissions, emissions associated with implementation of the Updated 28.7% HBW ICR would result in the same estimated annual unmitigated stationary source emissions as estimated in the EIR and summarized in Table 4.3-10.

Table 4.3-10. Updated 28.7% HBW ICR Estimated Annual Unmitigated Operational Stationary Source Criteria Air Pollutant Emissions

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Total Annual Emissions	25.2	2.3	16.1	0.4	2.2	2.1
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	No	No	No	No	No

Source: Dudek 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAPCD = San Joaquin Valley Air Pollution Control District.

As shown in Table 4.3-10, estimated stationary source emissions would exceed the SJVAPCD ROG threshold for permitted equipment and activities but would not exceed the SJVAPCD thresholds for NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

Mitigated Emissions

A summary of the mitigation measures quantified in CalEEMod for this supplemental analysis is set forth in Table 2.5-9 of the 2019 Air Study, and include MM-4.3-4, MM-4.3-5, and MM-4.3-9.

Notably, there are a number of additional mitigation measures that pertain to supporting alternative fueled and electric vehicle (EV) use in the project area, including MM-4.3-10 (Mobility Plan), MM-4.3-13 (Preferential Parking and Electric Vehicle Charging for Nonresidential Buildings), MM-4.3-14 (Multi-Family Residential and Park/Trail Parking), MM-4.3-15 (Residential Parking), MM-4.3-16 (Electric Vehicle Charging and Incentive), and MM-4.3-17 (Electric Vehicles). Research has shown that consumer incentives and the availability of EV infrastructure (i.e., public charge points and workplace charging) are linked to the uptake of EVs (International Council on Clean Transportation 2017). The mitigation measures identified in Section 4.3.4 for the project support these critical linkages for the usage of EVs. Increased EV usage would decrease both the exhaust criteria air pollutants and GHGs generated by the combustion of fossil fuels for on-road vehicle operation. However, reductions associated with these measures were not quantified, and therefore, the mitigated emissions inventory is considered a conservative estimate.

The 2016 EIR quantified emission reductions for MM 4.3-4, which requires the project proponent to enter into the DMC to fully offset emissions of ROGs, NO_X, and PM_{10}. The required DMC was executed in 2016 and is known as the Verified Emission Reduction Agreement (VERA). The 2016 DMC is included as Appendix A to the 2019 Air Study for reference. Per the 2016 VERA, the project proponent would mitigate the project's ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) emissions from construction and operation by achieving surplus, quantifiable, and enforceable emission reductions; "surplus" emission reductions are reductions that are not otherwise required by existing laws or regulations. Stationary-source emissions of ROGs, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would also be fully mitigated under SJVAPCD permit requirements and the 2016 VERA. The 2016 VERA includes both designated quantities of emission reductions amounts for ROGs, NO_X, and PM_{10}, consistent with emission quantities included in the 2016 DEIR (2016), as well as procedural steps for timely mitigation and verification of required emission reductions.

Estimated annual mitigated operational criteria air pollutant emissions resulting from implementation of the Updated 28.7% HBW ICR are presented in Table 4.3-11. As that table shows, MM-4.3-4, as presented and the 2016 EIR, and the 2016 VERA would reduce project-generated operational emissions of ROG and NO_X are estimated to be below the SJVAPCD thresholds for the Updated 28.7% HBW ICR; however, PM_{10} would be above the SJVAPCD threshold with implementation of the Updated 28.7% HBW ICR. Accordingly, MM-4.3-4 is recommended to be revised to ensure that emissions of ROG, NO_X, and specifically, PM_{10}, would be reduced to zero, which would also require an amended DMC. The revised MM-4.3-4 provides that, if an Internalization Rate Report prepared pursuant to traffic mitigation measure MM-4.16-9 demonstrates that estimated future project emissions of ROG, NO_X, or PM_{10} are in excess of the quantities of the emissions identified in the 2016 VERA, then the project proponent shall either: (1) propose, for review and approval by the County and SJVAPCD, to implement further trip reduction measures or other measures to avoid exceeding the criteria emission quantities identified in the 2016 VERA; (2) enter into a new DMC with SJVAPCD to fully offset any exceedance of the criteria emission quantities identified in the 2016 VERA; or (3) a combination of (1) and (2). Accordingly, estimated annual mitigated operational criteria air pollutant emissions for the Updated 28.7% HBW ICR are presented in Table 4.3-11 under the following headings: (a) Without MM-4.3-4, Revised MM-4.3-5, or the 2016 VERA, (b) With MM-4.3-4 and the 2016 VERA, and (c) With MM-4.3-4 and the Amended DMC.

Table 4.3-11. Updated 28.7% HBW ICR Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Without MM-4.3-4, Revised MM-4.3-4, or 2016 VERA						
Area	123.76	5.51	90.84	0.03	0.86	0.86
Energy	1.70	14.75	7.74	0.09	1.18	1.18
Mobile	37.17	204.35	524.11	3.12	374.94	100.97
Total Annual Emissions	162.63	224.61	622.69	3.24	376.98	103.01
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes
With MM-4.3-4 and 2016 VERA						
Maximum Annual Emissions	162.63	224.61	622.69	3.24	376.98	103.01
MM-4.3-4 and DMC Reductions for Maximum Annual Emissions	(345.91)	(554.55)	n/a	n/a	(363.16)	(109.23)[a,b]
Net Annual Emissions with Incorporation of MM-4.3-4 and DMC Reductions	0.00	0.00	622.69	3.24	13.82	0.00
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	No	No
With Revised MM-4.3-4 and Amended DMC						
Maximum Annual Emissions	162.63	224.61	622.69	3.24	376.98	103.01
Revised MM-4.3-4 and Amended DMC Reductions for Maximum Annual Emissions	(162.63)	(224.61)	n/a	n/a	(376.98)	(103.01)[a]
Net Annual Emissions with Incorporation of	0.00	0.00	622.69	3.24	0.00	0.00

Table 4.3-11. Updated 28.7% HBW ICR Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions						
Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Revised MM-4.3-4 and Amended DMC Reductions						
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	No	No

Source: Dudek 2019a, Appendix D.

Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; VERA = Voluntary Emissions Reduction Agreement; SJVAPCD = San Joaquin Valley Air Pollution Control District; DMC = Developer Mitigation Contract; n/a = not applicable.

[a] $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD, 2016).

[b] While the 2016 VERA did not specifically include offset requirements for $PM_{2.5}$, because $PM_{2.5}$ emissions are a subset of PM_{10} emissions, the estimated project-generated mitigated emissions of $PM_{2.5}$ in the 2016 EIR are assumed for this comparison.

As shown in Table 4.3-11, estimated annual mitigated operational criteria air pollutant emissions for the Updated 28.7% HBW ICR without MM-4.3-4 and the 2016 VERA would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$. With implementation of MM-4.3-4, as it appears in the 2016 EIR, and with implementation of the 2016 VERA, emissions associated with implementation of the Updated 28.7% HBW ICR would not exceed the thresholds for ROG, NO_X, SO_X, PM_{10}, or $PM_{2.5}$, but it would exceed the threshold of CO. In addition, the Updated 28.7% HBW ICR not fully offset project operational emissions of CO, SO_X, or PM_{10}. However, with implementation of the revised MM-4.3-4, and with an amended DMC, the Updated 28.7% HBW ICR would fully offset operational PM_{10} emissions, but would still exceed the CO threshold with mitigation.

Estimated annual mitigated operational mobile source emissions by air basin for the Updated 28.7% HBW ICR without implementation of MM-4.3-4 and the 2016 VERA are presented in Table 4.3-12.

Table 4.3-12. Updated 28.7% HBW ICR Estimated Annual Mitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin (without Emission Reductions from MM-4.3-4 and 2016 VERA)

Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	26.11	143.54	368.13	2.19	263.36	70.92
MDAB	3.27	17.98	46.12	0.27	32.99	8.89
SCAB	7.79	42.83	109.85	0.65	78.59	21.16

Source: Dudek 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model (CalEEMod) does not include year 2036.
All scenarios assume the project-specific vehicle fleet mix and default CalEEMod vehicle emission factors for the Kern County portion of the SJVAB.
[a] $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD, 2016).

Table 4.3-13 presents the estimated annual mitigated stationary source emissions with implementation of MM-4.3-4 and the 2016 VERA.

Table 4.3-13. Updated 28.7% HBW ICR Estimated Annual Mitigated Operational Stationary Source Criteria Air Pollutant Emissions with MM-4.3-4 and 2016 VERA

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Maximum Annual Stationary Source Emissions	25.2	2.3	16.1	0.4	2.2	2.1
VERA Reductions for Maximum Annual Emissions	(25.2)	(2.3)	0.00	0.00	(2.2)	(2.1)[a]
Net Annual Emissions with Incorporation of VERA Reductions	0.00	0.00	16.1	0.4	0.00	0.00
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	No	No	No	No

Source: Dudek 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; VERA = Voluntary Emissions Reduction Agreement; SJVAPCD = San Joaquin Valley Air Pollution Control District.
[a] $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD, 2016).

Stationary sources that may result from project implementation are speculative, as it is not presently known what stationary sources will locate within the project's non-residential areas. However, new stationary sources will be required to obtain applicable SJVAPCD permits with required permit terms and conditions that are part of the SJVAPCD's overall plan to attain ambient air quality standards (AAQS) and thus, include both emission reduction mandates (e.g., the SJVAPCD rules noted above including the new rule reducing commercial charcoal broiler emissions) as well as other permit requirements. Nonetheless, as shown in Table 4.3-13, implementation of MM-4.3-4 and the DMC would fully mitigate emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) associated with stationary sources to the extent they are not otherwise required to obtain offsets under SJVAPCD Rule 2201. Accordingly, net stationary source emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would be reduced to zero. Emissions of SO_X and CO would not be mitigated; however, such emissions would be below the SJVAPCD's thresholds.

Summary

As explained above and in Section 2.5.1 of the 2019 Air Study, the 2016 EIR and Updated 28.7% HBW ICR emissions were modeled using different CalEEMod versions, methodology, and mitigation measures; therefore, they do not present an apples-to-apples comparison. Nonetheless, for informational purposes both the 2016 EIR and the Updated 28.7% HBW ICR calculations are presented, as is the net change between the 2016 EIR and Updated 28.7% HBW ICR, in Table 4.3-14.

Table 4.3-14. Comparison of 2016 EIR and Updated 28.7% HBW ICR Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated						
2016 EIR	346.25	557.57	1,694.65	7.13	363.40	109.47
Updated 28.7% HBW ICR	165.08	237.25	669.45	3.55	413.21	112.88
Net Change (Updated 28.7% HBW ICR – 2016 EIR)	(181.17)	(320.32)	(1,025.20)	(3.58)	49.81	3.41
Mitigated (Without MM-4.3-4 and 2016 VERA)						
2016 EIR	345.91	554.56	1,693.01	7.11	363.16	109.23
Updated 28.7% HBW ICR	162.63	224.61	622.69	3.24	376.98	103.01
Net Change (Updated 28.7% HBW ICR – 2016 EIR)	(183.28)	(329.95)	(1,070.32)	(3.87)	13.82	(6.22)
Mitigated (With MM-4.3-4 and 2016 VERA)						
2016 EIR	0.00	0.00	1,693.01	7.11	0.00	0.00
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	13.82	0.00
Net Change (Updated 28.7% HBW ICR – 2016 EIR)	0.00	0.00	(1,070.32)	(3.87)	13.82	0.00
Mitigated (With Revised MM-4.3-4 and Amended DMC)						
2016 EIR	0.00	0.00	1,693.01	7.11	0.00	0.00
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	0.00	0.00
Net Change (Updated 28.7% HBW ICR – 2016 EIR)	0.00	0.00	(1,070.32)	(3.87)	0.00	0.00

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; 2016 EIR = Draft Environmental Impact Report; SREIR = Supplemental Environmental Impact Report; VERA = Voluntary Emissions Reduction Agreement; DMC = Developer's Mitigation Contract
Numbers in parenthesis represent a negative number.

As shown in Table 4.3-14, the Updated 28.7% HBW ICR under unmitigated and mitigated conditions would result in a reduction in emissions of ROG, NO_X, CO, and SO_X compared to the 2016 EIR; under the mitigated scenario, the Updated 28.7% HBW ICR would also result in a reduction in $PM_{2.5}$.

Table 4.3-15 presents a comparison of the 2016 EIR and Updated 28.7% HBW ICR stationary source emissions. However, since the 2016 EIR and Updated 28.7% HBW ICR are assumed to include the same stationary sources, no changes in the calculation methodology occurred, and the estimated criteria air pollutant emissions are thus the same.

Table 4.3-15. Comparison of 2016 EIR and Updated 28.7% HBW ICR Estimated Annual Unmitigated and Mitigated Operational Stationary Source Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated						
2016 EIR	25.2	2.3	16.1	0.4	2.2	2.1
Updated 28.7% HBW ICR	25.2	2.3	16.1	0.4	2.2	2.1
Net Change (Updated 28.7% HBW ICR – 2016 EIR)	0.00	0.00	0.00	0.00	0.00	0.00
Mitigated (Without MM-4.3-4 and 2016 VERA)						
2016 EIR	25.2	2.3	16.1	0.4	2.2	2.1
Updated 28.7% HBW ICR	25.2	2.3	16.1	0.4	2.2	2.1
Net Change (Updated 28.7% HBW ICR – 2016 EIR)	0.00	0.00	0.00	0.00	0.00	0.00
Mitigated (With MM-4.3-4 and 2016 VERA)						
2016 EIR	0.00	0.00	16.1	0.4	0.00	0.00
Updated 28.7% HBW ICR	0.00	0.00	16.1	0.4	0.00	0.00
Net Change (Updated 28.7% HBW ICR – 2016 EIR)	0.00	0.00	0.00	0.00	0.00	0.00

Source: Dudek 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; 2016 EIR = Draft Environmental Impact Report; SREIR = Supplemental Recirculated Environmental Impact Report; VERA = Voluntary Emissions Reduction Agreement.

Reduced ICR Scenario Analysis

This section discusses the Reduced ICR Scenarios with higher VMT analysis developed in the 2019 Air Study and 2019 Traffic Study to consider potential criteria pollutant emission impacts from project development that could occur under lower ICR conditions than considered in the 2016 EIR.

Reduced ICR Scenario Development

To identify a range of potential scenarios that could result in greater VMT compared to the project, the 2019 Traffic Study developed a total of 22 Screening Scenarios to evaluate how daily AM, and PM peak hour trip generation rates and VMT could vary with ICRs that were 10 and 20 percent lower than those used in the 2016 EIR or from other identified development patterns, such as primarily residential or commercial/light industrial development, that could also affect project

VMT. As described in the 2019 Traffic Study, none of the scenarios were found to generate a greater amount of daily average and peak hour trips than identified in the 2016 EIR or this supplemental analysis. Five of the Screening Scenarios were found to generate higher levels of VMT than in the 2016 EIR and the Updated 28.7% HBW ICR analysis. Vehicular emissions evaluated herein are partially dependent on project VMT, so these five Reduced ICR Scenarios with higher VMT were also evaluated in the 2019 Air Study. Lower VMT scenarios, such as partial buildout of only a portion of the project (e.g., 3,000, 6,000, or 9,000 units), were not quantified in the 2019 Air Study because such partial buildout scenarios would result in lower VMT, and thus criteria pollutant emissions that are lower than those calculated in the 2016 EIR. The five Reduced ICR Scenarios with higher VMT identified in the 2019 Traffic Study, and assessed quantitatively in this report, include Scenarios A through E, as previously introduced.

The scope of this scenario analysis is to provide a comparison of potential impacts under CEQA that would potentially change as a result of the higher projected VMT for the five Reduced ICR scenarios, and associated changes to mobile source emissions. Accordingly, this evaluation estimates operational criteria pollutant emissions from land use operation (i.e., non-permitted activities) and stationary sources (permitted equipment and activities) associated with each of the five Reduced ICR Scenarios with higher VMT included in the 2019 Traffic Study and 2019 Air Study. The scope of the analysis is further defined in Sections 2.4 of the 2019 Air Study.

See Section 1.5 of the 2019 Air Study for a detailed discussion of each of the five scenarios analyzed herein, including two lower ICR scenarios (i.e., Scenarios A and B) for buildout of the proposed project, and three lower ICR scenarios assuming buildout of only a portion of the project (i.e., Scenarios C, D, and E). Because CalEEMod emission calculations are driven by land use types, an overview of the two most significand land use categories in each of the five scenarios evaluated is presented in Table 4.3-16

Table 4.3-16. Scenario Overview

Scenario	Total Residential (Units)	Total Non-Residential (Square Feet)
Scenario A	12,000	5,100,000
Scenario B	12,000	5,100,000
Scenario C	9,000	3,825,000
Scenario D	14,000	0
Scenario E	12,000	0

Source: 2019 Traffic Study.
Notes:
Full buildout in year 2036 assumed.

As discussed, the primary purpose of this supplemental analysis is to evaluate the potential changes in emissions associated with changes in project-generated VMT under different buildout scenarios. As mobile source running exhaust emissions, as well as PM_{10} and $PM_{2.5}$ emissions from break and tire wear and running loss ROG emissions, are estimated in grams of pollutant per VMT, estimated VMT directly effects the estimated mobile source emissions. Accordingly, a summary of the estimated VMT by scenario and the Updated 28.7% HBW ICR is presented in Table 4.3-17, which shows the estimated weekday VMT estimated by the 2019 Traffic Study and the estimated mitigated and unmitigated annual VMT calculated in CalEEMod. See Table 2.5-9 of the 2019 Air Study for a list of the mitigation assumed in the mitigated annual VMT estimate. The estimated VMT for the 2016 EIR analysis is also presented in Table 4.3-17 for disclosure.

Table 4.3-17. Vehicle Miles Traveled Overview			
Scenario	2019 Traffic Study Estimated Unmitigated Weekday VMT	CalEEMod Calculated Unmitigated Annual VMT	CalEEMod Calculated Mitigated Annual VMT
2016 EIR	2,595,690	891,723,339	843,410,997
Updated 28.7% HBW ICR	3,114,939	1,085,502,495	990,274,668
Scenario A	3,881,511	1,355,360,536	1,236,583,830
Scenario B	4,587,395	1,604,111,279	1,463,584,876
Scenario C	3,440,599	1,203,085,012	1,097,690,044
Scenario D	4,336,327	1,561,843,760	1,435,264,903
Scenario E	3,716,852	1,338,723,784	1,230,227,560
Notes: VMT = vehicle miles traveled; 2016 EIR = Draft Environmental Impact Report; SREIR = Supplemental Recirculated Environmental Impact Report.			

As shown in Table 4.3-17, the estimated weekday and annual VMT for the 2016 EIR was less than the Updated 28.7% HBW ICR and all Reduced ICR scenarios analyzed herein. However, when taking into account CalEEMod software updates (as discussed in Section 2.5.2 of the 2019 Air Study), incorporation of additional mitigation measures (as discussed in Section 2.5.3 of the 2019 Air Study), emission calculation methodology updates (as discussed in Section 2.5.4 of the 2019 Air Study), and, for some scenarios, changes to land use mix (further explained in Sections 2.6.4 through 2.6.6 of the 2019 Air Study), an increase in VMT does not automatically result in an increase in all criteria air pollutant emissions. The estimated emissions by scenario are assessed in this section to evaluate how changes in land use buildout would result in changes in estimated emissions when considering differences in VMT and other key variables previously discussed.

Scenario A

Scenario A assumes that the project will be entitled for the development of 12,000 dwelling units and 5.1 million square feet of nonresidential land uses with a 10 percent reduction in internalized trips. Scenario A involves the same land use breakdown as the Updated 28.7% HBW ICR, but with this different ICR assumption, which results in higher VMT and associated mobile source emissions. The land use inputs for Scenario A that were modeled in CalEEMod are shown in Table 2.6-3 of the 2019 Air Study. The Scenario A criteria pollutant emissions calculation methodology is described in Section 2.6.2.2 of the 2019 Air Study.

Estimated Unmitigated Emissions – Scenario A

Estimated annual unmitigated operational criteria air pollutant emissions for Scenario A are presented in Table 4.3-18.

Table 4.3-18. Scenario A Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions						
Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Area	123.76	5.51	90.84	0.03	0.86	0.86
Energy	1.94	16.81	8.85	0.11	1.34	1.34
Mobile	45.27	238.59	697.51	4.16	512.90	138.07
Total Annual Emissions	170.97	260.91	797.20	4.30	515.10	140.27

Table 4.3-18. Scenario A Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions						
Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAPCD = San Joaquin Valley Air Pollution Control District.

As shown in Table 4.3-18, estimated annual unmitigated operational criteria air pollutant emissions for Scenario A would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$.

Estimated annual unmitigated operational mobile source emissions by air basin for Scenario A are presented in Table 4.3-19.

Table 4.3-19. Scenario A Estimated Annual Unmitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin						
Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	31.63	166.70	487.35	2.91	358.36	96.47
MDAB	4.03	21.26	62.15	0.37	45.70	12.30
SCAB	9.61	50.63	148.01	0.88	108.84	29.30

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model (CalEEMod) does not include year 2036.
All scenarios assume the project-specific vehicle fleet mix and default CalEEMod vehicle emission factors for the Kern County portion of the SJVAB.

Regarding stationary source emissions, Scenario A would result in the same estimated annual unmitigated stationary source emissions as estimated in the 2016 EIR.

Estimated Mitigated Emissions – Scenario A

Estimated annual mitigated operational criteria air pollutant emissions for Scenario A, with and without MM-4.3-4 and the 2016 VERA and with implementation of revised MM-4.3-4 and the amended DMC, are presented in Table 4.3-20. See Table 2.5-9 of the 2019 Air Study for a summary of the quantified mitigation measures in CalEEMod.

Table 4.3-20. Scenario A Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions						
Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Without MM-4.3-4, Revised MM-4.3-4, or 2016 VERA						
Area	123.76	5.51	90.84	0.03	0.86	0.86
Energy	1.70	14.75	7.74	0.09	1.18	1.18
Mobile	42.54	225.90	640.71	3.80	467.93	125.97
Total Annual Emissions	168.00	246.16	739.29	3.92	469.97	128.01
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes

Table 4.3-20. Scenario A Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
With MM-4.3-4 and 2016 VERA						
Maximum Annual Emissions	168.00	246.16	739.29	3.92	469.97	128.01
MM-4.3-4 and VERA Reductions for Maximum Annual Emissions	(345.91)	(554.55)	n/a	n/a	(363.16)	(109.23)[a,b]
Net Annual Emissions with Incorporation of MM-4.3-4 and VERA Reductions	0.00	0.00	739.29	3.92	106.81	18.78
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	Yes	Yes
With Revised MM-4.3-4 and Amended DMC						
Maximum Annual Emissions	168.00	246.16	739.29	3.92	469.97	128.01
Revised MM-4.3-4 and Amended DMC Reductions for Maximum Annual Emissions	(168.00)	(246.16)	n/a	n/a	(469.97)	(128.01)[a]
Net Annual Emissions with Incorporation of Revised MM-4.3-4 and Amended DMC Reductions	0.00	0.00	739.29	3.92	0.00	0.00
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	No	No

Source: Dudek 2019a, Appendix D.

Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; VERA = Voluntary Emissions Reduction Agreement; SJVAPCD = San Joaquin Valley Air Pollution Control District; D = Developer's Mitigation Contract

[a] $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD, 2016).

[b] While the 2016 VERA did not specifically include offset requirements for $PM_{2.5}$, because $PM_{2.5}$ emissions are a subset of PM_{10} emissions, the estimated project-generated mitigated emissions of $PM_{2.5}$ in the 2016 EIR are assumed for this comparison.

As shown in Table 4.3-20, estimated annual mitigated operational criteria air pollutant emissions for Scenario A without the DMC would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$. With implementation of revised MM-4.3-4 and the amended DMC, the project proponent will mitigate the project's emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$); however, emissions of CO would still exceed the SJVAPCD's threshold.

Estimated annual mitigated operational mobile source emissions by air basin for Scenario A are presented in Table 4.3-21.

Table 4.3-21 Scenario A Estimated Annual Mitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin

Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	29.72	157.84	447.66	2.66	326.94	88.02
MDAB	3.79	20.13	57.09	0.34	41.69	11.22
SCAB	9.03	47.94	135.96	0.81	99.29	26.73

Source: Dudek, 2019a, Appendix D.

Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.

Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model does not include year 2036.

Regarding stationary source emissions, Scenario A would result in the same estimated annual mitigated stationary source emissions as estimated in the 2016 EIR.

Emissions Comparison – Updated 28.7% HBW ICR and Scenario A

Table 4.3-22 presents a comparison of unmitigated and mitigated operational annual criteria air pollutant emissions between the Updated 28.7% HBW ICR and Scenario A. Because the Updated 28.7% HBW ICR and Scenario A include the same land use buildout, the difference in estimated emissions is associated with the higher VMT (and lower capture rate) used in Scenario A.

Table 4.3-22. Comparison of Updated 28.7% HBW ICR and Scenario A Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated						
Updated 28.7% HBW ICR	165.08	237.25	669.45	3.55	413.21	112.88
Scenario A	170.97	260.91	797.20	4.30	515.10	140.27
Net Change (Scenario A – Updated 28.7% HBW ICR)	5.89	23.66	127.75	0.75	101.89	27.39
Mitigated (Without MM-4.3-4 and 2016 VERA)						
Updated 28.7% HBW ICR	162.63	224.61	622.69	3.24	376.98	103.01
Scenario A	168.00	246.16	739.29	3.92	469.97	128.01
Net Change (Scenario A – Updated 28.7% HBW ICR)	5.37	21.55	116.60	0.68	92.99	25.00
Mitigated (With MM-4.3-4 and 2016 VERA)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	13.82	0.00
Scenario A	0.00	0.00	739.29	3.92	106.81	18.78
Net Change (Scenario A – Updated 28.7% HBW ICR)	0.00	0.00	116.60	0.68	92.99	18.78

Table 4.3-22. Comparison of Updated 28.7% HBW ICR and Scenario A Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions						
Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Mitigated (With Revised MM-4.3-4 and Amended DMC)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	0.00	0.00
Scenario A	0.00	0.00	739.29	3.92	0.00	0.00
Net Change (Scenario A – Updated 28.7% HBW ICR)	0.00	0.00	116.60	0.68	0.00	0.00

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; MM = Mitigation Measure; VERA = Voluntary Emissions Reduction Agreement; DMC = Developer's Mitigation Contract

As shown in Table 4.3-22, Scenario A under unmitigated and mitigated (without MM-4.3-4 or DMC) conditions would result in greater emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ compared to the Updated 28.7% HBW ICR (increase in emissions between approximately 3 and 25 percent). With implementation of the recommended modifications to MM-4.3-4 (DMC requirement) and the amended DMC, Scenario A operational emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would be fully offset with required emission reductions.

As the SREIR and Scenario A would include the same stationary sources and no changes in the calculation methodology occurred, the estimated criteria air pollutant emissions from stationary sources are the same.

Scenario B

Scenario B assumes that the project will be entitled for the development of 12,000 dwelling units and 5.1 million square feet of nonresidential land uses with a 20 percent reduction in internalized trips. Scenario B involves the same land use breakdown as the SREIR, but with this different ICR assumption, which results in higher VMT and associated mobile source emissions. The land use inputs for Scenario B that were modeled in CalEEMod are shown in Table 2.6-11 of the 2019 Air Study. The Scenario B criteria pollutant emissions calculation methodology is described in Section 2.6.3.2 of the 2019 Air Study.

Estimated Unmitigated Emissions – Scenario B

Estimated annual unmitigated operational criteria air pollutant emissions for Scenario B are presented in Table 4.3-23.

Table 4.3-23. Scenario B Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions						
Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Area	123.76	5.51	90.94	0.03	0.86	0.86
Energy	1.94	16.81	8.85	0.11	1.34	1.34
Mobile	50.69	260.28	815.24	4.85	606.81	163.31
Total Annual Emissions	176.39	282.60	915.03	4.99	609.01	165.51

Table 4.3-23. Scenario B Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions						
Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAPCD = San Joaquin Valley Air Pollution Control District.

As shown in Table 4.3-23, estimated annual unmitigated operational criteria air pollutant emissions for Scenario B would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$.

Estimated annual unmitigated operational mobile source emissions by air basin for Scenario B are presented in Table 4.3-24.

Table 4.3-24. Scenario B Estimated Annual Unmitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin						
Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	35.28	181.15	567.41	3.38	422.34	113.66
MDAB	4.56	23.40	73.29	0.44	54.55	14.68
SCAB	10.85	55.73	174.54	1.04	129.92	34.96

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since CalEEMod does not include year 2036.
All scenarios assume the project-specific vehicle fleet mix and default CalEEMod vehicle emission factors for the Kern County portion of the SJVAB.

Regarding stationary source emissions, Scenario B would result in the same estimated annual unmitigated stationary source emissions as estimated in the EIR.

Estimated Mitigated Emissions – Scenario B

Estimated annual mitigated operational criteria air pollutant emissions for Scenario B, with and without MM-4.3-4 and the 2016 VERA and with implementation of revised MM-4.3-4 and the amended DMC, are presented in Table 4.3-25.

Table 4.3-25. Scenario B Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions						
Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Without MM-4.3-4, Revised MM-4.3-4, and 2016 VERA						
Area	123.76	5.51	90.94	0.03	0.86	0.86
Energy	1.70	14.75	7.74	0.09	1.18	1.18
Mobile	47.48	245.64	748.13	4.44	553.63	149.00
Total Annual Emissions	172.94	265.90	846.81	4.56	555.67	151.04
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes

Table 4.3-25. Scenario B Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
With MM-4.3-4 and 2016 VERA						
Maximum Annual Emissions	172.94	265.90	846.81	4.56	555.67	151.04
MM-4.3-4 and VERA Reductions for Maximum Annual Emissions	(345.91)	(554.55)	n/a	n/a	(363.16)	(109.23)[a,b]
Net Annual Emissions with Incorporation of MM-4.3-4 and VERA Reductions	0.00	0.00	846.81	4.56	192.51	41.81
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	Yes	Yes
With Recommended Modified MM-4.3-4 and Amended DMC						
Maximum Annual Emissions	172.94	265.90	846.81	4.56	555.67	151.04
Revised MM-4.3-4 and Amended DMC Reductions for Maximum Annual Emissions	(172.94)	(265.90)	n/a	n/a	(555.67)	(151.04)[a]
Net Annual Emissions with Incorporation of Revised MM-4.3-4 and Amended DMC Reductions	0.00	0.00	846.81	4.56	0.00	0.00
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	No	No

Source: Dudek, 2019a, Appendix D.

Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; VERA = Voluntary Emissions Reduction Agreement; SJVAPCD = San Joaquin Valley Air Pollution Control District; n/a = not applicable; DMC = Developer's Mitigation Contract

[a] $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD 2016).

[b] While the 2016 VERA did not specifically include offset requirements for $PM_{2.5}$, because $PM_{2.5}$ emissions are a subset of PM_{10} emissions, the estimated project-generated mitigated emissions of $PM_{2.5}$ in the 2016 EIR are assumed for this comparison.

As shown in Table 4.3-25, estimated annual mitigated operational criteria air pollutant emissions for Scenario B would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$. With implementation of MM-4.3-4 and the DMC, the project proponent will mitigate the project's emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$); however, emissions of CO would still exceed the SJVAPCD's threshold.

Estimated annual mitigated operational mobile source emissions by air basin for Scenario B are presented in Table 4.3-26.

Table 4.3-26. Scenario B Estimated Annual Mitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin (without Developer's Mitigation Contract)

Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	33.05	170.97	520.70	3.09	385.33	103.70
MDAB	4.27	22.08	67.26	0.40	49.77	13.40
SCAB	10.17	52.59	160.17	0.95	118.53	31.90

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since CalEEMod does not include year 2036.

Regarding stationary source emissions, Scenario B would result in the same estimated annual mitigated stationary source emissions as estimated in the 2016 EIR.

Emissions Comparison – Updated 28.7 HBW ICR and Scenario B

Table 4.3-27 presents a comparison of unmitigated and mitigated operational annual criteria air pollutant emissions between the Updated 28.7 HBW ICR and Scenario B. Because the Updated 28.7% HBW ICR and Scenario B include the same land use buildout, the difference in estimated emissions is associated with the higher VMT (and lower capture rate) used in Scenario B.

Table 4.3-27. Comparison of Updated 28.7% HBW ICR and Scenario B Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated						
Updated 28.7% HBW ICR	165.08	237.25	669.45	3.55	413.21	112.88
Scenario B	176.39	282.60	915.03	4.99	609.01	165.51
Net Change (Scenario B – Updated 28.7% HBW ICR)	11.31	45.35	245.58	1.44	195.8	52.63
Mitigated (Without MM-4.3-4 and 2016 VERA)						
Updated 28.7% HBW ICR	162.63	224.61	622.69	3.24	376.98	103.01
Scenario B	172.94	265.90	846.81	4.56	555.67	151.04
Net Change (Scenario B – Updated 28.7% HBW ICR)	10.31	41.29	224.12	1.32	178.69	48.03
Mitigated (With MM-4.3-4 and 2016 VERA)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	13.82	0.00
Scenario B	0.00	0.00	846.81	4.56	192.51	41.81
Net Change (Scenario B – Updated 28.7% HBW ICR)	0.00	0.00	224.12	1.32	178.69	41.81

Table 4.3-27. Comparison of Updated 28.7% HBW ICR and Scenario B Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions						
Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Mitigated (with Modified MM-4.3-4 and Amended DMC)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	0.00	0.00
Scenario B	0.00	0.00	846.81	4.56	0.00	0.00
Net Change (Scenario B – Updated 28.7% HBW ICR)	0.00	0.00	224.12	1.32	0.00	0.00

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; DMC = Developer's Mitigation Contract.

As shown in Table 4.3-27, Scenario B under unmitigated and mitigated (without MM-4.3-4 or DMC) conditions would result in greater emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ compared to the Updated 28.7% HBW ICR (increase in emissions between approximately 6 and 47 percent). With implementation of revised MM-4.3-4 (DMC requirement) and the amended DMC, Scenario B operational emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would be fully offset with required emission reductions.

As the Updated 28.7% HBW ICR and Scenario B would include the same stationary sources and no changes in the calculation methodology occurred, the estimated criteria air pollutant emissions from stationary sources are the same.

Scenario C

Scenario C assumes that the project will be entitled for the development of 9,000 dwelling units and 3.825 million square feet of nonresidential land uses with a 20 percent reduction in internalized trips. Scenario C involves less residential and nonresidential development than the Updated 28.7% HBW ICR, and this different ICR assumption, which results minimally greater mobile source emissions. The land use inputs for Scenario C that were modeled in CalEEMod are shown in Table 2.6-19 of the 2019 Air Study. The Scenario C criteria pollutant emissions calculation methodology is described in Section 2.6.4.2 of the 2019 Air Study.

Estimated Unmitigated Emissions – Scenario C

Estimated annual unmitigated operational criteria air pollutant emissions for Scenario C are presented in Table 4.3-28.

Table 4.3-28. Scenario C Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions						
Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Area	98.82	4.14	68.13	0.03	0.64	0.64
Energy	1.45	12.61	6.64	0.08	1.00	1.00
Mobile	38.01	195.21	611.43	3.64	455.11	122.48
Total Annual Emissions	138.28	211.96	686.20	3.75	456.75	124.12

Table 4.3-28. Scenario C Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAPCD = San Joaquin Valley Air Pollution Control District.

As shown in Table 4.3-28, estimated annual unmitigated operational criteria air pollutant emissions for Scenario C would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$.

Estimated annual unmitigated operational mobile source emissions by air basin for Scenario C are presented in Table 4.3-29.

Table 4.3-29. Scenario C Estimated Annual Unmitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin

Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	26.45	135.87	425.56	2.53	316.76	85.25
MDAB	3.42	17.55	54.97	0.33	40.91	11.01
SCAB	8.14	41.79	130.91	0.78	97.44	26.22

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model (CalEEMod) does not include year 2036.
All scenarios assume the project-specific vehicle fleet mix and default CalEEMod vehicle emission factors for the Kern County portion of the SJVAB.

Regarding stationary source emissions, it is estimated that Scenario C would result in a 25 percent reduction in industrial land use square footage compared to the Updated 28.7% HBW ICR. Therefore, to calculate potential annual stationary source criteria air pollutant emissions from Scenario C, the estimated stationary source emissions for the Updated 28.7% HBW ICR was reduced by 25 percent, as shown in Table 4.3-30.

Table 4.3-30. Scenario C Estimated Annual Unmitigated Operational Stationary Source Criteria Air Pollutant Emissions

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Total Annual Emissions	18.9	1.7	12.1	0.3	1.7	1.6
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	No	No	No	No	No

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAPCD = San Joaquin Valley Air Pollution Control District.

As shown in Table 4.3-30, estimated unmitigated stationary source emissions for Scenario C would exceed the SJVAPCD ROG threshold for permitted equipment and activities, but would not exceed the SJVAPCD thresholds for NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

Estimated Mitigated Emissions – Scenario C

Estimated annual mitigated operational criteria air pollutant emissions for Scenario C, with and without MM-4.3-4 and the 2016 VERA and with implementation of revised MM-4.3-4 and the amended DMC, are presented in Table 4.3-31.

Table 4.3-31. Scenario C Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Without MM-4.3-4, Revised MM-4.3-4, or 2016 VERA						
Area	98.82	4.14	68.13	0.03	0.64	0.64
Energy	1.28	11.06	5.80	0.07	0.88	0.88
Mobile	35.61	184.23	561.10	3.33	415.22	111.75
Total Annual Emissions	135.71	199.43	635.03	3.43	416.74	113.27
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes
With MM-4.3-4 and 2016 VERA						
Maximum Annual Emissions	135.71	199.43	635.03	3.43	416.74	113.27
MM-4.3-4 and VERA Reductions for Maximum Annual Emissions	(345.91)	(554.55)	n/a	n/a	(363.16)	(109.23)[a,b]
Net Annual Emissions with Incorporation of MM-4.3-4 and VERA Reductions	0.00	0.00	635.03	3.43	53.58	4.04
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	Yes	No
With Revised MM-4.3-4 and Amended DMC						
Maximum Annual Emissions	135.71	199.43	635.03	3.43	416.74	113.27
Revised MM-4.3-4 and Amended DMC Reductions for Maximum Annual Emissions	(135.71)	(199.43)	n/a	n/a	(416.74)	(113.27)[a]
Net Annual Emissions with Incorporation of Revised MM-4.3-4 and Amended DMC Reductions	0.00	0.00	635.03	3.43	0.00	0.00
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	No	No

Source: Dudek, 2019a, Appendix D.

Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; VERA = Voluntary Emissions Reduction Agreement; SJVAPCD = San Joaquin Valley Air Pollution Control District, n/a = not applicable; DMC = Developer's Mitigation Contract

[a] $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD 2016).

[b] While the 2016 VERA did not specifically include offset requirements for $PM_{2.5}$, because $PM_{2.5}$ emissions are a subset of PM_{10} emissions, the estimated project-generated mitigated emissions of $PM_{2.5}$ in the 2016 EIR are assumed for this comparison.

As shown in Table 4.3-31, estimated annual mitigated operational criteria air pollutant emissions for Scenario C would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$. With implementation of modified MM-4.3-4 and the amended DMC, the project proponent will mitigate the project's emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$); however, emissions of CO would still exceed the SJVAPCD's threshold.

Estimated annual mitigated operational mobile source emissions by air basin for Scenario C are presented in Table 4.3-32.

Table 4.3-32. Scenario C Estimated Annual Mitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin (without Developer's Mitigation Contract)

Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	24.78	128.22	390.53	2.32	288.99	77.78
MDAB	3.20	16.56	50.44	0.30	37.33	10.05
SCAB	7.62	39.44	120.13	0.71	88.90	23.93

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model (CalEEMod) does not include year 2036.

Table 4.3-33 presents the estimated annual mitigated stationary source emissions with implementation of MM-4.3-4 and the DMC.

Table 4.3-33. Scenario C Estimated Annual Mitigated Stationary Source Emissions with Developer's Mitigation Contract

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Maximum Annual Stationary Source Emissions	18.9	1.7	12.1	0.3	1.7	1.6
DMC Reductions for Maximum Annual Emissions	(18.9)	(1.7)	n/a	n/a	(1.7)	(1.6)[a]
Net Annual Emissions with Incorporation of DMC Reductions	0.00	0.00	12.1	0.3	0.00	0.00
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	No	No	No	No

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; DMC = Developer's Mitigation Contract; SJVAPCD = San Joaquin Valley Air Pollution Control District; n/a = not applicable.
[a] $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD 2016).

As shown in Table 4.3-33, implementation of revised MM-4.3-4 and the amended DMC would fully mitigate emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) associated with stationary sources to the extent they are not otherwise required to obtain offsets under SJVAPCD Rule 2201. Accordingly, net stationary source emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would be reduced to zero. Emissions of SO_X and CO would not be mitigated; however, their emissions were found to be below the SJVAPCD's thresholds.

Emissions Comparison – Updated 28.7% HBW ICR and Scenario C

Table 4.3-34 presents a comparison of unmitigated and mitigated operational annual criteria air pollutant emissions between the Updated 28.7% HBW ICR and Scenario C.

Compared to the Updated 28.7% HBW ICR, Scenario C would result in less area and energy source emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. As shown in Table 4.3-17, Scenario C would result in greater VMT compared to the Updated 28.7% HBW ICR. Regarding mobile source emissions, Scenario C would result in slightly fewer emissions of ROG and NO_X, though greater emissions of CO, SO_X, PM_{10}, and $PM_{2.5}$, compared to the Updated 28.7% HBW ICR. The mix of estimated Scenario C mobile source emissions increasing or decreasing depending on pollutant is anticipated to be associated with the fleet mix and assignment of VMT by land use for the Updated 28.7% HBW ICR and Scenario C.

Table 4.3-34. Comparison of Updated 28.7% HBW ICR and Scenario C Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated						
Updated 28.7% HBW ICR	165.08	237.25	669.45	3.55	413.21	112.88
Scenario C	138.28	211.96	686.20	3.75	456.75	124.12
Net Change (Scenario C –Updated 28.7% HBW ICR)	(26.80)	(25.29)	16.75	0.20	43.54	11.24
Mitigated (Without MM-4.3-4 and 2016 VERA)						
Updated 28.7% HBW ICR	162.63	224.61	622.69	3.24	376.98	103.01
Scenario C	135.71	199.43	635.03	3.43	416.74	113.27
Net Change (Scenario C – Updated 28.7% HBW ICR)	(26.92)	(25.18)	12.34	0.19	39.76	10.26
Mitigated (With MM-4.3-4 and 2016 VERA)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	13.82	0.00
Scenario C	0.00	0.00	635.03	3.43	53.58	4.04
Net Change (Scenario C – Updated 28.7% HBW ICR)	0.00	0.00	12.34	0.19	39.76	4.04
Mitigated (With Revised MM-4.3-4 and Amended DMC)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	0.00	0.00
Scenario C	0.00	0.00	635.03	3.43	0.00	0.00
Net Change (Scenario C – Updated 28.7% HBW ICR)	0.00	0.00	12.34	0.19	0.00	0.00

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns.
Numbers in parenthesis represent a negative number.

As shown in Table 4.3-34, Scenario C under unmitigated and mitigated (without MM-4.3-4 or DMC) conditions would result in less emissions of ROG and NO_X compared to the Updated 28.7% HBW ICR (decrease in emissions between approximately 11 and 17 percent). Under unmitigated and mitigated conditions, Scenario C would result in greater emissions of CO, SO_X, PM_{10}, and $PM_{2.5}$ compared to the Updated 28.7% HBW ICR (increase in emissions between approximately 2 and 11 percent). With implementation of the recommended modifications to MM-4.3-4 (DMC requirement) and the amended DMC, Scenario C operational emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would be fully offset with required emission reductions.

Table 4.3-35 presents a comparison of the Updated 28.7% HBW ICR and Scenario C stationary source emissions.

Table 4.3-35. Comparison of Updated 28.7% HBW ICR and Scenario C Estimated Annual Unmitigated and Mitigated (without Developer's Mitigation Contract) Operational Stationary Source Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated and Mitigated (without DMC)						
Updated 28.7% HBW ICR	25.2	2.3	16.1	0.4	2.2	2.1
Scenario C	18.9	1.7	12.1	0.3	1.7	1.6
Net Change (Scenario C – Updated 28.7% HBW ICR)	(6.3)	(0.6)	(4.0)	(0.1)	(0.5)	(0.5)

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; DMC = Developer's Mitigation Contract.
Numbers in parenthesis represent a negative number.

As shown in Table 4.3-35, Scenario C would result in less emissions from stationary sources of all criteria air pollutants compared to the Updated 28.7% HBW ICR (decrease in emissions of 25 percent).

Scenario D

Scenario D assumes that the project will be entitled for the development of 14,000 dwelling units with no commercial development. The land use inputs for Scenario D that were modeled in CalEEMod are shown in Table 2.6-30 of the 2019 Air Study. The Scenario D criteria pollutant emissions calculation methodology is described in Section 2.6.5.2 of the 2019 Air Study.

Estimated Unmitigated Emissions – Scenario D

Estimated annual unmitigated operational criteria air pollutant emissions for Scenario D are presented in Table 4.3-36.

Table 4.3-36. Scenario D Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Area	117.00	6.43	105.92	0.04	1.00	1.00
Energy	1.81	15.47	6.84	0.10	1.25	1.25
Mobile	42.90	156.67	758.95	4.18	588.40	158.03
Total Annual Emissions	161.71	178.57	871.71	4.32	590.65	160.28

Table 4.3-36. Scenario D Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAPCD = San Joaquin Valley Air Pollution Control District.

As shown in Table 4.3-36, estimated annual unmitigated operational criteria air pollutant emissions for Scenario D would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$.

Estimated annual unmitigated operational mobile source emissions by air basin for Scenario D are presented in Table 4.3-37.

Table 4.3-37. Scenario D Estimated Annual Unmitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin

Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	29.68	108.40	525.12	2.89	407.11	109.34
MDAB	3.91	14.27	69.14	0.38	53.60	14.40
SCAB	9.31	34.00	164.69	0.91	127.68	34.29

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model (CalEEMod) does not include year 2036.
All scenarios assume the project-specific vehicle fleet mix and default CalEEMod vehicle emission factors for the Kern County portion of the SJVAB.

Regarding stationary source emissions, because Scenario D would not include development of industrial land uses, no stationary source are anticipated. Accordingly, no stationary source emissions are estimated to result with implementation of Scenario D.

Estimated Mitigated Emissions – Scenario D

Estimated annual mitigated operational criteria air pollutant emissions for Scenario D, with and without MM-4.3-4 and the 2016 VERA and with implementation of revised MM-4.3-4 and the amended DMC, are presented in Table 4.3-38.

Table 4.3-38. Scenario D Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Without MM-4.3-4, Revised MM-4.3-4, or 2016 VERA						
Area	117.00	6.43	105.92	0.04	1.00	1.00
Energy	1.59	13.61	6.01	0.09	1.10	1.10
Mobile	40.26	147.63	709.53	3.85	540.72	145.23
Total Annual Emissions	158.85	167.67	821.46	3.98	542.82	147.33
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes

Table 4.3-38. Scenario D Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
With MM-4.3-4 and 2016 VERA						
Maximum Annual Emissions	158.85	167.67	821.46	3.98	542.82	147.33
MM-4.3-4 and VERA Reductions for Maximum Annual Emissions	(345.91)	(554.55)	n/a	n/a	(363.16)	(109.23)[a,b]
Net Annual Emissions with Incorporation of MM-4.3-4 and VERA Reductions	0.00	0.00	821.46	3.98	179.66	38.10
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	Yes	Yes
With Revised MM-4.3-4 and Amended DMC						
Maximum Annual Emissions	158.85	167.67	821.46	3.98	542.82	147.33
Revised MM-4.3-4 and Amended DMC Reductions for Maximum Annual Emissions	(158.85)	(167.67)	n/a	n/a	(542.82)	(147.33)[a]
Net Annual Emissions with Incorporation of Revised MM-4.3-4 and Amended DMC Reductions	0.00	0.00	821.46	3.98	0.00	0.00
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	No	No

Source: Dudek, 2019a, Appendix D.

Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; VERA = Voluntary Emissions Reduction Agreement; SJVAPCD = San Joaquin Valley Air Pollution Control District, n/a = not applicable; DMC = Developer's Mitigation Contract

[a] $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD 2016).

[b] While the 2016 VERA did not specifically include offset requirements for $PM_{2.5}$, because $PM_{2.5}$ emissions are a subset of PM_{10} emissions, the estimated project-generated mitigated emissions of $PM_{2.5}$ in the 2016 EIR are assumed for this comparison.

As shown in Table 4.3-38, estimated annual mitigated operational criteria air pollutant emissions for Scenario D would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$. With implementation of revised MM-4.3-4 and the amended DMC, the project proponent will mitigate the project's emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$); however, emissions of CO would still exceed the SJVAPCD's threshold.

Estimated annual mitigated operational mobile source emissions by air basin for Scenario D are presented in Table 4.3-39.

Table 4.3-39. Scenario D Estimated Annual Mitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin (without Developer's Mitigation Contract)						
Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	27.86	102.15	490.92	2.66	374.12	100.48
MDAB	3.67	13.45	64.64	0.35	49.26	13.23
SCAB	8.74	32.04	153.97	0.84	117.34	31.51

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model does not include year 2036.

As explained previously, Scenario D would not include development of industrial land uses and therefore, no associated stationary source emissions are estimated to result with implementation of Scenario D.

Emissions Comparison – Updated 28.7% HBW ICR and Scenario D

Table 4.3-40 presents a comparison of unmitigated and mitigated operational annual criteria air pollutant emissions between the Updated 28.7% HBW ICR and Scenario D.

Table 4.3-40. Comparison of Updated 28.7% HBW ICR and Scenario D Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions						
Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated						
Updated 28.7% HBW ICR	165.08	237.25	669.45	3.55	413.21	112.88
Scenario D	161.71	178.57	871.71	4.32	590.65	160.28
Net Change (Scenario D – Updated 28.7% HBW ICR)	(3.37)	(58.68)	202.26	0.77	177.44	47.40
Mitigated (Without MM-4.3-4 and 2016 VERA)						
Updated 28.7% HBW ICR	162.63	224.61	622.69	3.24	376.98	103.01
Scenario D	158.85	167.67	821.46	3.98	542.82	147.33
Net Change (Scenario D – Updated 28.7% HBW ICR)	(3.78)	(56.94)	198.77	0.74	165.84	44.32
Mitigated (With MM-4.3-4 and 2016 VERA)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	13.82	0.00
Scenario D	0.00	0.00	821.46	3.98	179.66	38.10
Net Change (Scenario D – Updated 28.7% HBW ICR)	0.00	0.00	198.77	0.74	165.84	38.10

Table 4.3-40. Comparison of Updated 28.7% HBW ICR and Scenario D Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Mitigated (With Revised MM-4.3-4 and Amended DMC)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	0.00	0.00
Scenario D	0.00	0.00	821.46	3.98	0.00	0.00
Net Change (Scenario D – Updated 28.7% HBW ICR)	0.00	0.00	198.77	0.74	0.00	0.00

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; Updated 28.7% HBW ICR = Supplemental Recirculated Environmental Impact Report.
Numbers in parenthesis represent a negative number.

As shown in Table 4.3-40, Scenario D under unmitigated and mitigated (without MM-4.3-4 or DMC) conditions would result in less emissions of ROG and NO_X compared to the Updated 28.7% HBW ICR (decrease in emissions between approximately 2 and 25 percent). Under unmitigated and mitigated conditions, Scenario D would result in greater emissions of CO, SO_X, PM_{10}, and $PM_{2.5}$ compared to the Updated 28.7% HBW ICR (increase in emissions between approximately 22 and 44 percent). With implementation of the recommended modifications to MM-4.3-4 (DMC requirement) and the amended DMC, Scenario D operational emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would be fully offset with required emission reductions.

Table 4.3-41 presents a comparison of the Updated 28.7% HBW ICR and Scenario D stationary source emissions.

Table 4.3-41. Comparison of Updated 28.7% HBW ICR and Scenario D Estimated Annual Unmitigated and Mitigated (without Developer's Mitigation Contract) Operational Stationary Source Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated and Mitigated (without DMC)						
Updated 28.7% HBW ICR	25.2	2.3	16.1	0.4	2.2	2.1
Scenario D	0.0	0.0	0.0	0.0	0.0	0.0
Net Change (Scenario D – Updated 28.7% HBW ICR)	(25.2)	(2.3)	(16.1)	(0.4)	(2.2)	(2.1)

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; Updated 28.7% HBW ICR = Supplemental Environmental Impact Report; DMC = Developer's Mitigation Contract
Numbers in parenthesis represent a negative number.

As shown in Table 4.3-41, because Scenario D would not result in stationary source emissions, it would result in less emissions of all criteria air pollutants compared to the Updated 28.7% HBW ICR (decrease in emissions of 100 percent).

Scenario E

Scenario E assumes that the project will be entitled for the development of 12,000 dwelling units with no commercial development. The land use inputs for Scenario E that were modeled in CalEEMod are shown in Table 2.6-39 of the 2019 Air Study. The Scenario E criteria pollutant emissions calculation methodology is described in Section 2.6.6.2 of the 2019 Air Study.

Estimated Unmitigated Emissions – Scenario E

Estimated annual unmitigated operational criteria air pollutant emissions for Scenario E are presented in Table 4.3-42.

Table 4.3-42. Scenario E Estimated Annual Unmitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Area	100.29	5.51	90.79	0.03	0.86	0.86
Energy	1.55	13.26	5.86	0.08	1.07	1.07
Mobile	36.77	134.20	659.10	3.59	504.34	135.45
Total Annual Emissions	138.61	152.97	755.75	3.70	506.27	137.38
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAPCD = San Joaquin Valley Air Pollution Control District.

As shown in Table 4.3-42, estimated annual unmitigated operational criteria air pollutant emissions for Scenario E would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$.

Estimated annual unmitigated operational mobile source emissions by air basin for Scenario E are presented in Table 4.3-43.

Table 4.3-43. Scenario E Estimated Annual Unmitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin

Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	25.44	92.85	456.03	2.48	348.95	93.72
MDAB	3.35	12.23	60.04	0.33	45.95	12.34
SCAB	7.98	29.12	143.02	0.78	109.44	29.39

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model (CalEEMod) does not include year 2036.
All scenarios assume the project-specific vehicle fleet mix and default CalEEMod vehicle emission factors for the Kern County portion of the SJVAB.

Regarding stationary source emissions, because Scenario E would not include development of industrial land uses, no stationary source are anticipated. Accordingly, no stationary source emissions are estimated to result with implementation of Scenario E.

Estimated Mitigated Emissions – Scenario E

Estimated annual mitigated operational criteria air pollutant emissions for Scenario E, with and without MM-4.3-4 and the 2016 VERA and with implementation of modified MM-4.3-4 and the amended DMC, are presented in Table 4.3-44.

Table 4.3-44. Scenario E Estimated Annual Mitigated Operational Criteria Air Pollutant Emissions

Emission Source	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Without MM-4.3-4, Revised MM-4.3-4, or 2016 VERA						
Area	100.29	5.51	90.79	0.03	0.86	0.86
Energy	1.36	11.69	5.15	0.07	0.94	0.94
Mobile	34.51	126.54	608.16	3.30	463.47	124.48
Total Annual Emissions	136.16	143.74	704.10	3.40	465.27	126.28
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	Yes	Yes	Yes	No	Yes	Yes
With MM-4.3-4 and 2016 VERA						
Maximum Annual Emissions	136.16	143.74	704.10	3.40	465.27	126.28
MM-4.3-4 and VERA Reductions for Maximum Annual Emissions	(345.91)	(554.55)	n/a	n/a	(363.16)	(109.23)[a,b]
Net Annual Emissions with Incorporation of MM-4.3-4 and VERA Reductions	0.00	0.00	704.10	3.40	102.11	17.05
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	Yes	Yes
With Revised MM-4.3-4 and Amended DMC						
Maximum Annual Emissions	136.16	143.74	704.10	3.40	465.27	126.28
Revised MM-4.3-4 and Amended DMC Reductions for Maximum Annual Emissions	(136.16)	(143.74)	n/a	n/a	(465.27)	(126.28)[a]
Net Annual Emissions with Incorporation of Revised MM-4.3-4 and Amended DMC Reductions	0.00	0.00	704.10	3.40	0.00	0.00
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Threshold Exceeded?	No	No	Yes	No	No	No

Source: Dudek, 2019a, Appendix D.

Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; VERA = Voluntary Emissions Reduction Agreement; SJVAPCD = San Joaquin Valley Air Pollution Control District, n/a = not applicable; DMC = Developer's Mitigation Contract.

[a] $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD 2016).

[b] While the 2016 VERA did not specifically include offset requirements for $PM_{2.5}$, because $PM_{2.5}$ emissions are a subset of PM_{10} emissions, the estimated project-generated mitigated emissions of $PM_{2.5}$ in the 2016 EIR are assumed for this comparison.

As shown in Table 4.3-44, estimated annual mitigated operational criteria air pollutant emissions for Scenario E would exceed the SJVAPCD thresholds for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$. With implementation of modified MM-4.3-4 and the amended DMC, the project proponent will mitigate the project's emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$); however, emissions of CO would still exceed the SJVAPCD's threshold.

Estimated annual mitigated operational mobile source emissions by air basin for Scenario E are presented in Table 4.3-45.

Table 4.3-45. Scenario E Estimated Annual Mitigated Operational Mobile Source Criteria Air Pollutant Emissions by Air Basin (without Developer's Mitigation Contract)

Mobile Source Location	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAB	23.88	87.55	420.79	2.28	320.67	86.13
MDAB	3.14	11.53	55.4	0.3	42.22	11.34
SCAB	7.49	27.46	131.97	0.72	100.57	27.01

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; SJVAB = San Joaquin Valley Air Basin; MDAB = Mojave Desert Air Basin; SCAB = South Coast Air Basin.
Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since California Emissions Estimator Model does not include year 2036.

As explained previously, Scenario E would not include development of industrial land uses and therefore, no associated stationary source emissions are estimated to result with implementation of Scenario E.

Emissions Comparison – Updated 28.7% HBW ICR and Scenario E

Table 4.3-46 presents a comparison of unmitigated and mitigated operational annual criteria air pollutant emissions between the Updated 28.7% HBW ICR and Scenario E.

Table 4.3-46. Comparison of Updated 28.7% HBW ICR and Scenario E Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated						
Updated 28.7% HBW ICR	165.08	237.25	669.45	3.55	413.21	112.88
Scenario E	138.61	152.97	755.75	3.70	506.27	137.38
Net Change (Scenario E – Updated 28.7% HBW ICR)	(26.47)	(84.28)	86.3	0.15	93.06	24.5
Mitigated (Without MM-4.3-4 and DMC)						
Updated 28.7% HBW ICR	162.63	224.61	622.69	3.24	376.98	103.01
Scenario E	136.16	143.74	704.10	3.40	465.27	126.28
Net Change (Scenario E – Updated 28.7% HBW ICR)	(26.47)	(80.87)	81.41	0.16	88.29	23.27
Mitigated (With MM-4.3-4 and 2016 VERA)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	13.82	0.00
Scenario E	0.00	0.00	704.10	3.40	102.11	17.05
Net Change (Scenario E – Updated 28.7% HBW ICR)	0.00	0.00	81.41	0.16	88.29	17.05

Table 4.3-46. Comparison of Updated 28.7% HBW ICR and Scenario E Estimated Annual Unmitigated and Mitigated Operational Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Mitigated (With Revised MM-4.3-4 and Amended DMC)						
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	0.00	0.00
Scenario E	0.00	0.00	704.10	3.40	0.00	0.00
Net Change (Scenario E – Updated 28.7% HBW ICR)	0.00	0.00	81.41	0.16	0.00	0.00

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; Updated 28.7% HBW ICR = Supplemental Recirculated Environmental Impact Report.
Numbers in parenthesis represent a negative number.

As shown in Table 4.3-46, Scenario E under unmitigated and mitigated (without MM-4.3-4 or DMC) conditions would result in less emissions of ROG and NO_X (decrease in emissions between approximately 16 and 36 percent). However, Scenario E would result in greater emissions of CO, SO_X, PM_{10}, and $PM_{2.5}$ compared to the Updated 28.7% HBW ICR, under unmitigated and mitigated conditions (increase in emissions between approximately 4 and 23 percent). With implementation of the recommended modifications to MM-4.3-4 (DMC requirement) and the amended DMC, Scenario E operational emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would be fully offset with required emission reductions.

Table 4.3-47 presents a comparison of the Updated 28.7% HBW ICR and Scenario E stationary source emissions.

Table 4.3-47. Comparison of Updated 28.7% HBW ICR and Scenario E Estimated Annual Unmitigated and Mitigated (without Developer's Mitigation Contract) Operational Stationary Source Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated and Mitigated (Without DMC)						
Updated 28.7% HBW ICR	25.2	2.3	16.1	0.4	2.2	2.1
Scenario E	0.0	0.0	0.0	0.0	0.0	0.0
Net Change (Scenario E – Updated 28.7% HBW ICR)	(25.2)	(2.3)	(16.1)	(0.4)	(2.2)	(2.1)

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; DMC = Developer's Mitigation Contract .
Numbers in parenthesis represent a negative number.

As shown in Table 4.3-47, because Scenario E would not result in stationary source emissions, it would result in less emissions of all criteria air pollutants compared to the Updated 28.7% HBW ICR (decrease in emissions of 100 percent).

Conclusion

Comparison of 2016 EIR, Updated 28.7% HBW ICR, and Reduced ICR Scenarios

The project proponent has entered into a DMC with the SJVAPCD to reduce emissions of ROGs, NO_X, and PM_{10} in the study area in accordance with MM-4.3-4 of the 2016 EIR and Grapevine Mitigation Monitoring and Reporting Program (2016 MMRP). Per the DMC, the project proponent would mitigate the project's ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) emissions from construction and operations by achieving surplus, quantifiable, and enforceable emission reductions; "surplus" emission reductions are reductions that are not otherwise required by existing laws or regulations. Stationary-source emissions of ROGs, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would also be fully mitigated under SJVAPCD permit requirements and the DMC. The DMC includes both designated quantities of emission reductions amounts for ROGs, NO_X, and PM_{10}, consistent with emission quantities included in the 2016 EIR, as well as procedural steps for timely mitigation and verification of required emission reductions.

The 2016 EIR estimated annual unmitigated and mitigated operational criteria air pollutant emissions from area sources (i.e., hearths, consumer product use, architectural coatings, and landscape maintenance equipment), energy (i.e., natural gas), mobile sources (i.e., vehicles), and stationary sources (e.g., gas stations and wastewater treatment plants). The SJVAPCD has established separate operational emissions thresholds for permitted equipment and activities and non-permitted equipment and activities. project-generated operational emissions for non-permitted equipment and activities (i.e., residential and nonresidential development, not including stationary sources that require a permit) were estimated by the 2016 EIR using CalEEMod Version 2013.2.2. As determined by the 2016 EIR, estimated project-generated operational emissions at full buildout would exceed the SJVAPCD annual thresholds of 10 tons per year ROG, 10 tons per year of NO_X, 100 tons per year of CO, 15 tons per year of PM_{10}, and 15 tons per year of $PM_{2.5}$, though project operation would not exceed the annual operational threshold for $SO_{X.}$ However, with implementation of the DMC, project-generated emissions for ROG, NO_X, PM_{10}, and $PM_{2.5}$ would be reduced below the SJVAPCD thresholds, and be fully offset, as required by the County in 2016 in the 2016 EIR MM 4.3-4.

Even with incorporation of mitigation required by the 2016 EIR and 2016 MMRP, including the DMC, estimated annual mitigated operational criteria air pollutant emissions for the 2016 EIR would continue to exceed the SJVAPCD threshold for CO. Therefore, the 2016 EIR concluded that this project impact would be significant and unavoidable.

Moreover, even with the emission reductions required by the 2016 MMRP, including the offsetting emissions reductions required by MM-4.3-3 and the DMC, the 2016 EIR concluded that project-level criteria pollutant emissions, as well as cumulative impacts of nonattainment criteria pollutants from other reasonably foreseeable projects in the SJVAB that are outside the County's jurisdiction and control, as well as other factors as described in the 2016 EIR, would be significant and unavoidable.

As previously discussed, an Updated 28.7% HBW ICR analysis was modeled consistent with the Updated 28.7% HBW ICR analysis included in the 2019 Traffic Study. The Updated 28.7% HBW ICR is the project as analyzed in the 2016 EIR, but using CalEEMod Version 2016.3.2 and updating it consistent with the five Reduced ICR Scenarios as identified and analyzed in the 2019 Traffic Study. New feasible mitigation measures have also been identified, as set forth in Section 4.3.4.4, some of which result in quantified emission reductions and others of which reduce emissions, but were not quantified by CalEEMod Version 2016.3.2. This re-evaluation of the 2016 EIR project emissions provides an apples-to-apples comparison between the project and the five Reduced ICR Scenarios with higher VMT identified in the 2019 Traffic Study. As such, the Updated 28.7% HBW ICR analysis presents an appropriate comparison to the five Reduced ICR Scenarios.

Annual operational criteria air pollutant emissions were estimated for the Updated 28.7% HBW ICR for year 2036, as explained in Section 2.5 of the 2019 Air Study, consistent with the full project buildout-year methodology used in the 2016 EIR. Annual operational criteria air pollutant emissions for Scenarios 1, 2, 4, 9, and 10 were also estimated for buildout year 2036, as explained in Section 2.6 of the 2019 Air Study. Table 4.3-48 sets forth a comparison of the estimated annual unmitigated, mitigated without DMC, and mitigated with DMC operational criteria air pollutant emissions Updated 28.7% HBW ICR and Reduced ICR Scenarios. Although the 2016 EIR represents an apples-to-oranges scenario, the estimated emissions included in the 2016 EIR are also included in Table 4.3-48 for informal purposes, and because these 2016 EIR quantities for ROGs, NO_X, and PM_{10} were included in the DMC. The 2016 VERA quantities for project-generated operational emissions are as follows: 345.91 tons per year of ROG, 554.55 tons per year of NO_X,[2] and 363.16 tons per year of PM_{10}.

As shown in Table 4.3-48, both the Updated 28.7% HBW ICR and all five Reduced ICR Scenarios result in lower project-generated emissions for ROG, NO_X, CO, and SO_X, but higher emissions of PM_{10} and $PM_{2.5}$, than the project emissions disclosed in the 2016 EIR. In regards to specific pollutant emissions required to be offset as set forth in the DMC, the Updated 28.7% HBW ICR and all five Reduced ICR Scenarios with higher VMT result in lower emissions of ROG and NO_X, and higher emissions of PM_{10}. Accordingly, MM-4.3-4 is proposed to be revised so as to ensure that emissions of ROG, NO_X, and specifically, PM_{10}, would be reduced to zero, which would require an amended DMC for the Updated 28.7% HBW ICR and Scenarios A, B, C, D, and E. Recommended modifications to MM-4.3-4 are shown in underline and strike through text in Section 4.3.4.4.

Accordingly, Table 4.3-48 sets forth (a) the SJVAPCD thresholds for criteria air pollutants, (b) the ROG, NO_X, and PM_{10} emission amounts included in the 2016 VERA, (c) estimated unmitigated emissions, (d) estimated mitigated emissions with 2016 EIR mitigation and proposed additional mitigation measures, but without the 2016 EIR MM-4.3-4 or the 2016 VERA, (e) estimated mitigated emissions with all mitigation measures and the 2016 EIR MM-4.3-4 and the 2016 VERA, and (f) estimated mitigated emissions with all mitigation measures and assuming implementation of the recommended revised MM-4.3-4 and an amended DMC.

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[2] The Final 2016 VERA included 554.55 tons per year of NO_X; however, project-generated mitigated NO_X emissions were estimated to be 554.56 tons per year in the 2016 EIR. This difference is considered nominal and could be a rounding error. For the purposes of this analysis, the 2016 VERA amount for NO_X of 554.55 tons per year is assumed to reduce the 2016 EIR estimated project-generated mitigated NO_X emissions of 554.56 tons per year to zero.

Table 4.3-48. Comparison of Scenarios Estimated Annual Operational Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
SJVAPCD Thresholds						
SJVAPCD Threshold	10	10	100	27	15	15
2016 VERA						
2016 VERA	345.91	554.55[a]	0.00	0.00	363.16	0.00[b]
Unmitigated						
2016 EIR	346.25	557.57	1,694.65	7.13	363.40	109.47
Updated 28.7% HBW ICR	165.08	237.25	669.45	3.55	413.21	112.88
Scenario A	170.97	260.91	797.20	4.30	515.10	140.27
Scenario B	176.39	282.60	915.03	4.99	609.01	165.51
Scenario C	138.28	211.96	686.20	3.75	456.75	124.12
Scenario D	161.71	178.57	871.71	4.32	590.65	160.28
Scenario E	138.61	152.97	755.75	3.70	506.27	137.38
Mitigated without MM-4.3-4, Revised MM-4.3-4, or 2016 VERA						
2016 EIR	345.91	554.56	1,693.01	7.11	363.16	109.23
Updated 28.7% HBW ICR	162.63	224.61	622.69	3.24	376.98	103.01
Scenario A	168.00	246.16	739.29	3.92	469.97	128.01
Scenario B	172.94	265.90	846.81	4.56	555.67	151.04
Scenario C	135.71	199.43	635.03	3.43	416.74	113.27
Scenario D	158.85	167.67	821.46	3.98	542.82	147.33
Scenario E	136.16	143.74	704.10	3.40	465.27	126.28
Mitigated with MM-4.3-4 and 2016 VERA						
2016 EIR	0.00	0.00	1,693.01	7.11	0.00	0.00
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	13.82	0.00
Scenario A	0.00	0.00	739.29	3.92	106.81	18.78
Scenario B	0.00	0.00	846.81	4.56	192.51	41.81
Scenario C	0.00	0.00	635.03	3.43	53.58	4.04
Scenario D	0.00	0.00	821.46	3.98	179.66	38.1
Scenario E	0.00	0.00	704.10	3.40	102.11	17.05
Mitigated with Recommended Modified MM-4.3-4 and Amended DMC						
2016 EIR	0.00	0.00	1,693.01	7.11	0.00	0.00
Updated 28.7% HBW ICR	0.00	0.00	622.69	3.24	0.00	0.00
Scenario A	0.00	0.00	739.29	3.92	0.00	0.00
Scenario B	0.00	0.00	846.81	4.56	0.00	0.00

Table 4.3-48. Comparison of Scenarios Estimated Annual Operational Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Scenario C	0.00	0.00	635.03	3.43	0.00	0.00
Scenario D	0.00	0.00	821.46	3.98	0.00	0.00
Scenario E	0.00	0.00	704.10	3.40	0.00	0.00

Source: Dudek, 2019a, Appendix D.

Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; 2016 EIR = Draft Environmental Impact Report; SREIR = Supplemental Recirculated Environmental Impact Report; VERA = Voluntary Emissions Reduction Agreement; DMC = Developer's Mitigation Contract.

Full buildout in year 2036 assumed. Operational Year 2035 was conservatively used for anticipated Operational Year 2036 since CalEEMod does not include year 2036.

[a] The Final 2016 VERA included 554.55 tons per year of NO_X; however, project-generated mitigated NO_X emissions were estimated to be 554.56 tons per year in the 2016 EIR. This difference is considered nominal and could be a rounding error. For the purposes of this analysis, the 2016 VERA amount for NO_X of 554.55 tons per year is assumed to reduce the 2016 EIR estimated project-generated mitigated NO_X emissions of 554.56 tons per year to zero.

[b] While the DMC does not specifically include offset requirements for $PM_{2.5}$, $PM_{2.5}$ emissions are a subset of PM_{10} emissions. Accordingly, it is assumed that PM_{10} emission reductions under a DMC would also cover $PM_{2.5}$ emissions (SJVAPCD, 2016).

As shown in Table 4.3-48, the 2016 EIR MM-4.3-4 and the 2016 VERA would reduce project-generated operational emissions of ROG and NO_X below the SJVAPCD thresholds for the Updated 28.7% HBW ICR and all five Reduced ICR Scenarios; however, PM_{10} would be above the SJVAPCD threshold for the Updated 28.7% HBW ICR, and PM_{10} and $PM_{2.5}$ emissions would be above thresholds for the Reduced ICR Scenarios. Accordingly, MM-4.3-4 is recommended to be revised, as shown in Section 4.3.4.4, to ensure that emissions of ROG, NO_X, and specifically, PM_{10}, would be reduced to zero, which would also require an amended DMC.

With incorporation of 2016 EIR mitigation measures, additional proposed mitigation measures, proposed revisions to MM-4.3-4 and the amended DMC, the project proponent is required to fully offset the Updated 28.7% HBW ICR and five Reduced ICR Scenarios emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$). However, as with the 2016 EIR, estimated annual mitigated operational emissions of CO for the Updated 28.7% HBW ICR, Scenario A, Scenario B, Scenario C, Scenario D, and Scenario E would still exceed the SJVAPCD CO threshold.

Stationary sources are industrial and other facilities that are required to obtain separate air emissions permits from the SJVAPCD and meet emission offset and other permit requirements established by the SJVAPCD. Because the pending 2019 project application includes the same mix of land uses (residential, commercial, schools/parks, industrial, etc.) as was considered in the 2016 EIR, the Updated 28.7% HBW ICR and two of the five Reduced ICR Scenarios (i.e., Scenarios A and B) result in no changes to the stationary source emission estimates included in the 2016 EIR and VERA. Two of the Reduced ICR Scenarios, Scenarios D and E involve residential buildout with no commercial or industrial uses, and thus, results in no stationary source emissions, which is lower than the stationary source emission estimates included in the 2016 EIR, Updated 28.7% HBW ICR, and other three Reduced ICR Scenarios considered. Scenario C would include 25 percent less industrial land use development than the 2016 EIR and Updated 28.7% HBW ICR project, so stationary source emissions were assumed to be 25 percent less than what was estimated in the 2016 EIR. Table 4.3-49 sets forth a comparison of the estimated annual unmitigated, mitigated without DMC, and mitigated with DMC operational criteria air pollutant emissions from stationary sources.

Table 4.3-49. Comparison of Scenarios Estimated Annual Operational Stationary Source Criteria Air Pollutant Emissions

Scenario	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Tons per Year					
Unmitigated and Mitigated without DMC						
2016 EIR	25.2	2.3	16.1	0.4	2.2	2.1
Updated 28.7% HBW ICR	25.2	2.3	16.1	0.4	2.2	2.1
Scenario A	25.2	2.3	16.1	0.4	2.2	2.1
Scenario B	25.2	2.3	16.1	0.4	2.2	2.1
Scenario C	18.9	1.7	12.1	0.3	1.7	1.6
Scenario D	0.0	0.0	0.0	0.0	0.0	0.0
Scenario E	0.0	0.0	0.0	0.0	0.0	0.0
Mitigated with DMC						
2016 EIR	0.0	0.0	16.1	0.4	0.0	0.0
Updated 28.7% HBW ICR	0.0	0.0	16.1	0.4	0.0	0.0
Scenario A	0.0	0.0	16.1	0.4	0.0	0.0
Scenario B	0.0	0.0	16.1	0.4	0.0	0.0
Scenario C	0.0	0.0	12.1	0.3	0.0	0.0
Scenario D	0.0	0.0	0.0	0.0	0.0	0.0
Scenario E	0.0	0.0	0.0	0.0	0.0	0.0

Source: Dudek, 2019a, Appendix D.
Notes: ROG = reactive organic gas; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; 2016 EIR = Draft Environmental Impact Report; DMC = Developer's Mitigation Contract.

Implementation of MM-4.3-4 and the DMC would fully mitigate emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) associated with stationary sources to the extent they are not otherwise required to obtain offsets under SJVAPCD Rule 2201. Accordingly, net stationary source emissions of ROG, NO_X, and PM_{10} (inclusive of $PM_{2.5}$) would be reduced to zero. Emissions of SO_X and CO would not be mitigated; however, these emissions would be below the SJVAPCD's thresholds for the Updated 28.7% HBW ICR and all five Reduced ICR Scenarios.

Accordingly, based on the emissions presented in the tables above and with implementation of the mitigation measures identified in Section 4.3.4.4, the SREIR analysis scenarios would result in less emissions of ROG, NO_X, CO, and SO_X compared to the 2016 EIR; however, the SREIR analysis scenarios would result in greater emissions of PM_{10} and $PM_{2.5}$ compared to the 2016 EIR. As shown in Table 4.3-48, Scenario B would result in the greatest emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$, as compared to the Updated 28.7% HBW ICR and other Reduced ICR Scenarios. As with the Updated 28.7% HBW ICR, Scenario B would result in less emissions of ROG, NO_X, CO, and SO_X compared to the 2016 EIR; however, Scenario B would result in greater emissions of PM_{10} and $PM_{2.5}$ compared to the 2016 EIR. Because the amended DMC (as required by revised MM-4.3-4) would offset all project-generated emissions of ROG, NO_X, PM_{10} (inclusive of $PM_{2.5}$), the Updated 28.7% HBW ICR and all five Reduced ICR Scenarios would not result in any new significant impacts relating to criteria air pollutants not already disclosed and required to be mitigated in the 2016 EIR and DMC, nor would the Updated 28.7% HBW ICR or any of the five Reduced ICR Scenarios worsen any previously identified significant adverse criteria air pollutant impact of the project.

Mitigation Measures

Implement Mitigation Measures MM 4.3-1 through MM 4.3-5, as described above.

Level of Significance after Mitigation

The ROG and NO_X emissions during project construction would result in temporary significant and unavoidable impacts. The CO emissions during project operations would result in a significant and unavoidable impact. Impacts would be less than significant for all other criteria air pollutants for project construction and operations.

Impact 4.3-3: 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

Cumulative air quality impacts are the effect of long-term emissions of the project plus any existing emissions at the same location, as well as the effect of long-term emissions of reasonably foreseeable similar projects, on the projected regional air quality or localized air pollution in the County. Cumulative air quality impacts for each of the Reduced ICR Scenarios would be the same as the impacts considered in FEIR (2016) analysis.

Mitigation Measures

Implement Mitigation Measures MM 4.3-1 through MM 4.3-17, as described above.

Level of Significance after Mitigation

Impacts would be significant and unavoidable.

Impact 4.3-4: The Project Would Expose Sensitive Receptors to Substantial Pollutant Concentrations

The analysis of the potential impacts that could occur regarding the potential exposure of sensitive receptors to substantial concentrations of localized air pollutants is discussed in detail in Section 2.8 of the 2019 Air Study. This section summarizes the results of the analysis, identifies potential significant impacts that could occur under one of more of the Updated 28.7% HBW ICR or five Reduced ICR Scenarios, provides mitigation measures to address the potential significant impacts, and summarizes the significance determinations of the Updated 28.7% HBW ICR and Reduced ICR Scenarios.

The 2016 EIR evaluated the potential for traffic-generated emissions to cause significant adverse hazard impacts to human health, including localized exposures to CO from traffic volumes at congested intersections (level of service [LOS] E or F), and localized exposure to TACs from vehicles from the I-5 and higher volume roadways. In December 2018, the Supreme Court, in *Sierra Club v. County of Fresno*, (2018) 6 Cal.5th 502 ("*Sierra Club*"), also interpreted CEQA to require an assessment of the potential that project emissions of criteria air pollutant emissions (notably O_3) could result in a significant localized adverse health effects. This section summarizes the results of these analyses.

The five Reduced ICR Scenarios analyzed in this section include higher volumes of traffic trips, as well as different trip distribution patterns such as higher incoming or outgoing commutes to the project site. The potential for CO hotspots related to vehicles operating at a selected congested intersection for all scenarios was evaluated. In addition, the potential health risk associated with these Reduced ICR Scenario changes to traffic volumes and localized traffic distribution patterns was then evaluated for TAC emissions. Based on these analyses, no significant new impact related to CO hotspot or TACs, or worsening of any previously identified impact related to CO hotspots or TACs, was caused by any of the five Reduced ICR Scenarios.

CO Hotspots

The 2016 EIR evaluated the potential for traffic at congested intersections (LOS E or F) to result in an elevated localized concentration of CO, also referred to as a CO hotspots analysis. The 2016 EIR evaluated three intersections, and for all three intersections, neither the 1-hour nor 8-hour state CO standard would be equaled or exceeded at any of the intersections studied. As such, the 2016 EIR concluded that the project would not result in a significant impact in regards to the potential to expose sensitive receptors to substantial pollutant concentrations related to CO hotspots.

Regarding CO hotspots, the intersection of Street D/Street A in the PM peak hour was determined to result in the highest total vehicle volume of the three congested intersections evaluated in the 2019 Traffic Study and therefore, was selected to be evaluated for the SREIR analysis. The same methodology applied in the 2016 EIR analysis was applied to the SREIR and five Reduced ICR Scenarios (with corresponding changes to traffic volumes and trip distribution on roadways and I-5), as discussed in Section 2.8.1.1 of the 2019 Air Study.

Additionally, the ambient level of CO was updated based on the most recent available data, although the 2016 EIR ambient CO data is also included herein for informational purposes. The 2016 EIR analysis assumed an ambient concentration of 1.3 ppm based on then available ambient data, while the ambient concentration for the SREIR analysis was assumed to be 1.9 ppm, which is the maximum 1-hour CO ambient concentration measured at the same location used for ambient air quality CO measurement used in the 2016 EIR (the 2000 South Union Avenue monitoring station in Bakersfield) from updated 2016 to 2018 data. While the 1-hour and 8-hour CO concentrations for the Updated 28.7% HBW ICR and five Reduced ICR Scenarios were estimated to be greater than what was evaluated in the 2016 EIR, the primary reason for the difference is due to using a higher ambient CO concentration for the Updated 28.7% HBW ICR and five Reduced ICR Scenarios analysis (i.e., 1.9 ppm assumed for the SREIR compared to 1.3 ppm assumed for the Draft EIR). Table 4.3-50 sets forth a comparison of the CO hotspot assessment for the intersection of Street D/Street A under Cumulative Conditions 2040 in the PM peak hour, which had the highest vehicle volumes of the anticipated impacted (congested) intersections. This emission calculation did not assume implementation of any additional traffic mitigation measures identified as appropriate in the 2019 Traffic Study, which are designed to avoid or lessen congestion in the most affected intersection, and is accordingly conservative (likely overstates) localized CO emissions.

Table 4.3-50 Comparison of Scenarios California LINE Source Dispersion Model Predicted Carbon Monoxide Concentrations for Street D/Street A (Cumulative Conditions 2040, PM Peak Hour)

Scenario	Maximum Modeled Project Conditions (ppm)	
	1-hour	*8-hour*[a]
2016 EIR	1.7	1.0
Updated 28.7% HBW ICR	2.3	1.4
Scenario A	2.3	1.4
Scenario B	2.4	1.4
Scenario C	2.4	1.4
Scenario D	2.4	1.4
Scenario E	2.3	1.4

Source: Dudek, 2019a, Appendix E.
Notes: ppm = parts per million; 2016 EIR = Draft Environmental Impact Report.

As shown in Table 4.3-50, maximum CO concentrations predicted for the 1-hour averaging period for the Updated 28.7% HBW ICR and the five Reduced ICR Scenarios would be below the state 1-hour CO standard of 20 ppm. Maximum predicted 8-hour CO concentrations for the Updated 28.7% HBW ICR and the five Reduced ICR Scenarios would also be below the state CO standard of 9.0 ppm. Neither the 1-hour nor 8-hour state standard would be equaled or exceeded for the Updated 28.7% HBW ICR, Scenario A, Scenario B, Scenario C, Scenario D, and Scenario E at the intersection of Street D/Street A under cumulative conditions. As such, in regards to CO hotspots, the Updated 28.7% HBW ICR, Scenario A, Scenario B, Scenario C, Scenario D, and Scenario E would result in a less than significant impact related to the potential for the project to expose sensitive receptors to any significant new adverse CO exposure level in intersections with which are projected, prior to required traffic mitigation measures, to result in elevated levels of CO in relation to the 2016 EIR.

Toxic Air Contaminant Exposures: Interstate 5 Freeway and High-Volume Roadway Health Risk Assessment

As part of the 2016 EIR, the *Diesel Particulate Matter Health Risk Assessment of Interstate-5 Freeway* (2016 Roadway HRA) was prepared to evaluate the health risk impact of the I-5 freeway on the project (Ramboll 2015). Regarding the potential for the project to expose future sensitive receptors to TAC emissions from vehicles traveling on I-5, the 2016 Roadway HRA evaluated the health risk impacts by comparing the result to the County's, and SJVAPCD's, air quality CEQA significance thresholds for TACs. The TAC CEQA significance thresholds are an incremental cancer risk that equals or exceeds 20 in a million and a non-cancer hazard index that equals or exceeds 1 for the maximally exposed individual. DPM was determined to be the primary cause of localized health risks from traffic emissions.

As described in the 2016 Roadway HRA, since the first phase of construction on the project site was expected to be completed as early as calendar year 2018, early occupants may be present at an earlier time (with an older, and higher-polluting fleet of vehicles) than the projected date for full project buildout. The early occupant residential cancer risk was determined to exceed the 20 in a million CEQA significant impact threshold used by the County, and SJVAPCD, in the 2016 EIR at locations within 3,000 feet east of the I-5 freeway and 4,400 feet west of the I-5 freeway. The early occupant cancer risk at proposed school locations were estimated to be below the 20 in a million threshold. The chronic hazard index was determined to be less than 1 for both residential and school receptors. The 2016 EIR included Mitigation Measure MM 4.3-7 to address health risk impacts for sensitive land uses such as residents and schools, including potential early occupants exposed to vehicular TACs. Implementation of MM-4.3-7, which provides for a range of implementation actions to exposing project occupants to potential TAC emissions from vehicles, such as setback distances, enhanced HVAC and filtration systems, and vegetation screening, was determined to reduce health risk impacts to project occupants at sensitive receptors along the I-5 freeway to less than significant levels.

In order to assess the Updated 28.7% HBW ICR, Scenario A, Scenario B, Scenario C, Scenario D, and Scenario E, an updated HRA was prepared by the same air quality consultant (2019 Roadway HRA), and is included as Appendix F to the 2019 Air Study. The same methodology applied in the 2016 EIR analysis were applied to the Updated 28.7% HBW ICR and the five Reduced ICR Scenarios, with the exception that the 2019 Roadway HRA focuses only on the Future Plus Project 2040 early occupant condition, which had the maximum impacts in the 2016 Roadway HRA for conditions which include the project. Regarding traffic volumes on local roadway segments under the 2040 Future Plus Project conditions, the PM peak hour traffic volumes were converted to annual average daily traffic (AADT) volumes using a factor of 10 (i.e., 10 percent of AADT occurs during the PM peak hour) and were determined to not exceed CARB's recommended threshold of 50,000 vehicles per day in the 2040 Future Plus Project condition (2019 Air Study, Appendix F). As such, consistent with the CARB Air Quality and Land Use Handbook, these local roadways are not included in this analysis.

The 2019 Roadway HRA uses the estimated changes in traffic data to evaluate the health impacts of the I-5 freeway on the project for the Updated 28.7% HBW ICR and five Reduced ICR Scenarios. Cancer and non-cancer health impacts of DPM emitted from vehicles traveling on the freeway are directly proportional to the DPM exhaust emissions from the vehicles, which in turn are directly proportional to AADT volumes of truck and non-truck vehicles traveling on modeled roadway segments. Therefore, the chronic health index and cancer risk impacts for each scenario relative to the 2016 Roadway HRA would change proportionally to the AADT. The calculated overall percent change was applied to the 2016 Roadway HRA health risk impacts at the maximally exposed residential and school receptors for the Future Plus Project 2040 condition with early occupants to estimate the maximum health risk impact for each scenario. The resulting health risk impacts at the maximally exposed residential and school receptors are shown in Table 4.3-51.

Table 4.3-51. Comparison of Updated 28.7% HBW ICR and Reduced ICR Scenarios Summary of Health Risk Estimates at Maximum Impacted Receptors

Scenario	Percent Increase from 2016 Roadway HRA Early Occupants	Maximum Estimated Cancer Risk (in a million)		Maximum Estimated Chronic Non-Cancer Hazard Index		Percent Reduction to Meet Cancer Risk Threshold
		Resident[1,2]	*School*[1,2]	*Resident*[1,2]	*School*[1,2]	
SJVAPCD CEQA Threshold	--	20	20	1.0	1.0	--
2016 Roadway HRA Early Occupants	--	78	7	0.016	0.011	74 percent
Updated 28.7% HBW ICR	1.12%	79	7	0.016	0.011	75%

Table 4.3-51. Comparison of Updated 28.7% HBW ICR and Reduced ICR Scenarios Summary of Health Risk Estimates at Maximum Impacted Receptors						
Scenario	Percent Increase from 2016 Roadway HRA Early Occupants	Maximum Estimated Cancer Risk (in a million)		Maximum Estimated Chronic Non-Cancer Hazard Index		Percent Reduction to Meet Cancer Risk Threshold
		Resident[1,2]	*School*[1,2]	*Resident*[1,2]	*School*[1,2]	
Scenario A	2.92%	81	7	0.016	0.011	75%
Scenario B	5.29%	83	8	0.017	0.011	76%
Scenario C	2.31%	80	7	0.016	0.011	75%
Scenario D	0.74%	79	7	0.016	0.011	75%
Scenario E	0.45%	79	7	0.016	0.011	75%

Source: Dudek, 2019a, Appendix F.
Notes:
1 Receptor types are designated based on the project's conceptual land use map.
2 Exposure period varies based on receptor type.

As shown in Table 4.3-51, the maximum chronic hazard index level under all scenarios is below the SJVAPCD threshold. The cancer risk estimates for the project, as presented in the 2016 EIR, as well as for all other scenarios (including the Updated 28.7% HBW ICR) are greater than the 20 in a million significance threshold. The Updated 28.7% HBW ICR analysis as well as the no commercial/industrial employment scenarios (i.e., Scenario 9 and Scenario 10) result in a very similar cancer risk in relation to the 2016 Roadway HRA and 2016 EIR (79 instead of 78), and the other three Reduced ICR Scenarios (i.e., Scenario 1, Scenario 2, and Scenario 4) have an increased risk of 2 to 5 above the 2016 Roadway HRA.

In order to mitigate the maximum residential cancer risk below the 20 in a million threshold, the 2019 Roadway HRA recalculated the distances from the I-5 that required mitigation to avoid causing a significant adverse health impact to project residents. As described in the 2019 Roadway HRA, in order to reduce the cancer risk impacts at the project receptors, MM-4.3-7 (Part A) was revised to avoid causing a significant adverse TAC impact from I-5 to the most impactful scenario (i.e., Scenario 2), as such revised mitigation measure is shown in Section 4.3.4.4. In addition, although the 2019 Traffic Study projected that local project roadways would not exceed 50,000 daily trips, MM-4.3-7 retained applicability to project roadways with the design potential to allow in excess of 50,000 daily trips.

Health Effects of Criteria Pollutants

The EPA and CARB have established AAQS at levels above which concentrations could be harmful to human health and welfare, with an adequate margin of safety. Further, California air districts, like the SJVAPCD, have established emission-based thresholds that provide project-level estimates of criteria air pollutant quantities that air basins can accommodate without affecting the attainment dates for the AAQS. Accordingly, elevated levels of criteria air pollutants as a result of a project's emissions could cause adverse health effects associated with these pollutants. The SJVAB is designated as a nonattainment area for O_3 and $PM_{2.5}$ under the NAAQS, and nonattainment for O_3, PM_{10}, and $PM_{2.5}$ under the CAAQS.

Regarding health effects of criteria air pollutants, implementation of revised MM-4.3-4 and the DMC would reduce the Updated 28.7% HBW ICR and the five Reduced ICR Scenarios potential to result in regional health effects associated with ROG, NO_X, PM_{10} and $PM_{2.5}$; however, localized health effects associated with NO_X, PM_{10}, and $PM_{2.5}$ could occur. However, implementation of the mitigation measures described in Section 4.3.4.4. would reduce both localized and regional project-generated construction and operational emissions.

In *Sierra Club,* the Supreme Court held that CEQA requires environmental impact reports to either (i) make a “reasonable effort” to substantively connect the estimated amount of a given air pollutant a project will produce and the health effects associated with that pollutant, or (ii) explain why such an analysis is infeasible. 6 Cal.5th at 1165-66. However, the Court also clarified that that CEQA “does not mandate” that EIRs include “an in-depth risk assessment” that provides “a detailed comprehensive analysis … to evaluate and predict the dispersion of hazardous substances in the environment and the potential for exposure of human populations and to assess and quantify both the individual and population wide health risks associated with those levels of exposure.” *Id.* at 1665. However, as explained in detail in 2.8.3 of the 2019 Air Study, correlating the project’s criteria air pollutant to specific health impacts, particularly with respect to O_3 is not possible because there is no feasible or established scientific method to perform such analysis. This conclusion is supported by both the SJVAPCD and the South Coast Air Quality Management District, who have determined that this type of analysis is speculative and infeasible. See Sections 2.2.1 and 2.8.3 of the 2019 Air Study for a detailed discussion.

In conclusion, with respect to CO hotspots, CO concentrations predicted for the Updated 28.7% HBW ICR and the five Reduced ICR Scenarios would be below the state 1-hour CO standard of 20 ppm and below the state 8-hour CO standard of 9.0 ppm. Neither the 1-hour nor 8-hour state standard would be equaled or exceeded for the Updated 28.7% HBW ICR, Scenario A, Scenario B, Scenario C, Scenario D, and Scenario E at the intersection of Street D/Street A under cumulative conditions; therefore, impacts would be less than significant without mitigation. No changes to the CEQA significance conclusions in the 2016 EIR would occur with implementation of the Updated 28.7% HBW ICR or five Reduced ICR Scenarios.

The 2019 Roadway HRA demonstrates that implementation of feasible mitigation measures will reduce the health risks on the project site from I-5 freeway TAC emissions to below SJVAPCD’s CEQA threshold of 20 in a million. Future developments in technology to reduce freeway emissions, air filtration, or alternative approaches to mitigate freeway emissions may eliminate the need to implement any mitigation measures discussed above to address potential health risk impacts from freeway TAC emissions. Impacts would be less than significant with mitigation. No changes to the CEQA significance conclusions in the 2016 EIR would occur with implementation of the Updated 28.7% HBW ICR or five Reduced ICR Scenarios.

Regarding health effects of criteria air pollutants, implementation of revised MM-4.3-4, as set forth in Section 4.3.4.4, and the amended DMC required by such measure would reduce the project, Updated 28.7% HBW ICR, and five Reduced ICR Scenarios’ potential to result in regional health effects associated with ROG, NO_X, PM_{10} and $PM_{2.5}$; however, localized health effects associated with NO_X, PM_{10}, and $PM_{2.5}$ could occur. However, the project includes various mitigation measures that would reduce both localized and regional project-generated construction and operational emissions, as discussed in Sections 2.3.1 and 2.5.3 for the 2019 Air Study, and as set forth in Section 4.3.4.4. In addition, see MM-4.3-2 (Fugitive Dust) and MM-4.3-3 (Construction Equipment) for construction emission reduction requirements, as set forth in Section 4.3.4.4.

Mitigation Measures

Implement Mitigation Measures MM 4.3-6 and 4.3-7, as described above.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.3-5: The Project Would Cause the Creation of Objectionable Odors, Affecting a Substantial Number of People.

Impacts related to the creation of objectionable odors for each of the Reduced ICR Scenarios would be the same as the impacts considered in FEIR (2016) analysis.

Mitigation Measures

MM 4.3-8 As part of the submittal packet for any proposed Special Use Permit with the potential to generate noxious odors. The project proponent shall be required to prepare an Odor Minimization and Complaint Management Plan. The Odor Minimization and Compliant Management Plan shall include provisions necessary to reduce odors generated from the proposed use. At minimum, the Odor Minimization and Complaint Management Plan shall include the following:

a. Name and telephone number of contact person(s) at the facility responsible for logging in and responding to odor complaints.

b. Policy and procedure describing the actions to be taken when an odor complaint is received, including the training provided to staff on how to respond.

c. Description of potential odor sources at the facility.

d. Description of potential methods for reducing odors, including minimizing idling of delivery and service trucks and buses, process changes, facility modifications, and/or feasible add-on air pollution control equipment, including a description of the specific measures to be implemented at the building design stage, the equipment installation and maintenance stage, and the operations management stage, to avoid or minimize adverse odor impacts.

e. Contingency measures to curtail emissions in the event of a public nuisance odor complaint.

Level of Significance after Mitigation Measures

Impacts would be significant and unavoidable. The project would locate new sensitive receptors in an area with existing ambient odors.

Cumulative Setting Impacts and Mitigation Measures

Cumulative Setting

The localized impact evaluation typically includes estimation of operational emissions from combined projects identified within a one-mile and six-mile radius of the project boundaries. Although a list-type approach works well for some environmental issue areas, it may not be the most appropriate approach to analyze the project's cumulative air quality impacts, because the project would include a DMC for mobile and stationary sources not requiring permits with offsets, and would not result in a net increase in emissions of pollutants of primary concern. As such, the potential for the project to result in significant cumulative impacts was determined using other approaches in place of the one-mile and six-mile cumulative analysis.

The geographic scope for cumulative impacts to hazards and hazardous materials encompasses an approximately six-mile radius around the project site. The cumulative study area is defined in Section 3.6, *Cumulative Projects*, and is defined by the SJVAB and the following boundaries:

- Northern Boundary: The Valley Floor south of the intersection of I-5 and SR-166
- Southern Boundary: Extending south to include all of the Tejon Mountain Village development
- Eastern Boundary: The Tehachapi foothills to the east; and
- Western Boundary: The eastern boundary of the Wildlands Conservancy's Wind Wolves Preserve.

The cumulative project list is provided in Table 3.11, *Cumulative Project List*, in Section 3.6, *Cumulative Projects*. This geographic scope of analysis is appropriate because of influence of the area with wildfires, as well as the localized nature of hazardous materials impacts and other hazards discussed in this section.

Impact 4.3-6: The Project Would Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant for Which the Project Region Is in Nonattainment under an Applicable National or State Ambient Air Quality Standard.

Per the SJVAPCD guidance and thresholds, the potential for the project to result in a cumulatively considerable impact is based on the project's potential to exceed the project-specific annual thresholds. Since the DMC would not reduce CO, project-generated operational CO emissions would exceed the SJVAPCD operational CO emissions threshold after incorporation of mitigation, which would be a significant and unavoidable project-level and cumulative impact. However, the Kern County portion of the SJVAB is in attainment of federal and state CO standards, and CO hotspot and stationary source impact modeling determined that the project would not contribute substantially to an existing or projected CO air quality violation. However, as explained in the 2016 EIR, because of scientific uncertainty regarding the relationship between the mitigation measures that can be used to satisfy the DMC obligations, and because other future projects within the SJVAB are not required to fully offset air emissions, the County practice is to conclude that cumulative emissions of these nonattainment pollutants will continue to be significant and unavoidable. Therefore, cumulative air quality impacts for each of the Reduced ICR Scenarios would be the same as the impacts considered in FEIR (2016) analysis.

Mitigation Measures

Implement Mitigation Measures MM 4.3-1 through MM 4.3-17, as described above.

Level of Significance after Mitigation

Cumulative ROG emissions would be significant and unavoidable.

Additional Mitigation Measures

Neither the 2016 EIR nor the Updated 28.7% HBW ICR separately quantified criteria air pollutant emission reductions from traffic mitigation measures designed to reduce automobile use, but not converted into VMT reductions by Fehr & Peers, such as MM-4.16-2, MM-4.16-4, and MM-4.16-9. Similarly, the revised mitigation measures recommended in the 2019 Traffic Study have not been quantified as VMT reductions with corresponding air pollutant emission reductions. Since measures to reduce automobile use do reduce criteria air pollutant emissions (as well as TAC emissions), the quantified emission calculations in this analysis continue to be conservative (i.e., likely overstate VMT and VMT-related [mobile source] emissions).

Since certification of the FEIR (2016), the following modified and additional air quality mitigation measures have been identified as feasible emission reduction strategies, and are proposed to be incorporated into the project to reduce potential air quality and GHG emissions impacts. Only modified MM-4.3-5, and additional MM-4.3-9, can be and have been calculated as criteria air pollutant emission reductions using CalEEMod; the remainder of the additional mitigation measures will reduce criteria air pollutant emissions, but the reduction is not quantifiable in CalEEMod Version 2016.3.2. Mitigation measures quantified in the 2016 EIR were also quantified in this analysis (see Table 2.5-9).

Research has shown that consumer incentives and the availability of EV infrastructure (i.e., public charge points and workplace charging) are linked to the uptake of EVs (International Council on Clean Transportation 2017). The mitigation measures identified in Section 2.5.3 for the project support these critical linkages for the usage of EVs. Increased EV usage would decrease both the exhaust criteria air pollutants and GHGs generated by the combustion of fossil fuels for on-road vehicle operation. However, reductions associated with these measures were not quantified, and therefore, the mitigated emissions inventory is considered a conservative.