4.3 Air Quality

This section analyzes the impacts of the 2018 RTP/SCS on local and regional air quality, through the year 2042. Both temporary impacts relating to construction activities and long-term impacts associated with population and employment growth and associated growth in vehicle traffic and energy consumption are discussed. Greenhouse gas emissions are analyzed in Section 4.9, *Greenhouse Gas Emissions/Climate Change.*

4.3.1 Setting

a. Local Climate and Topography

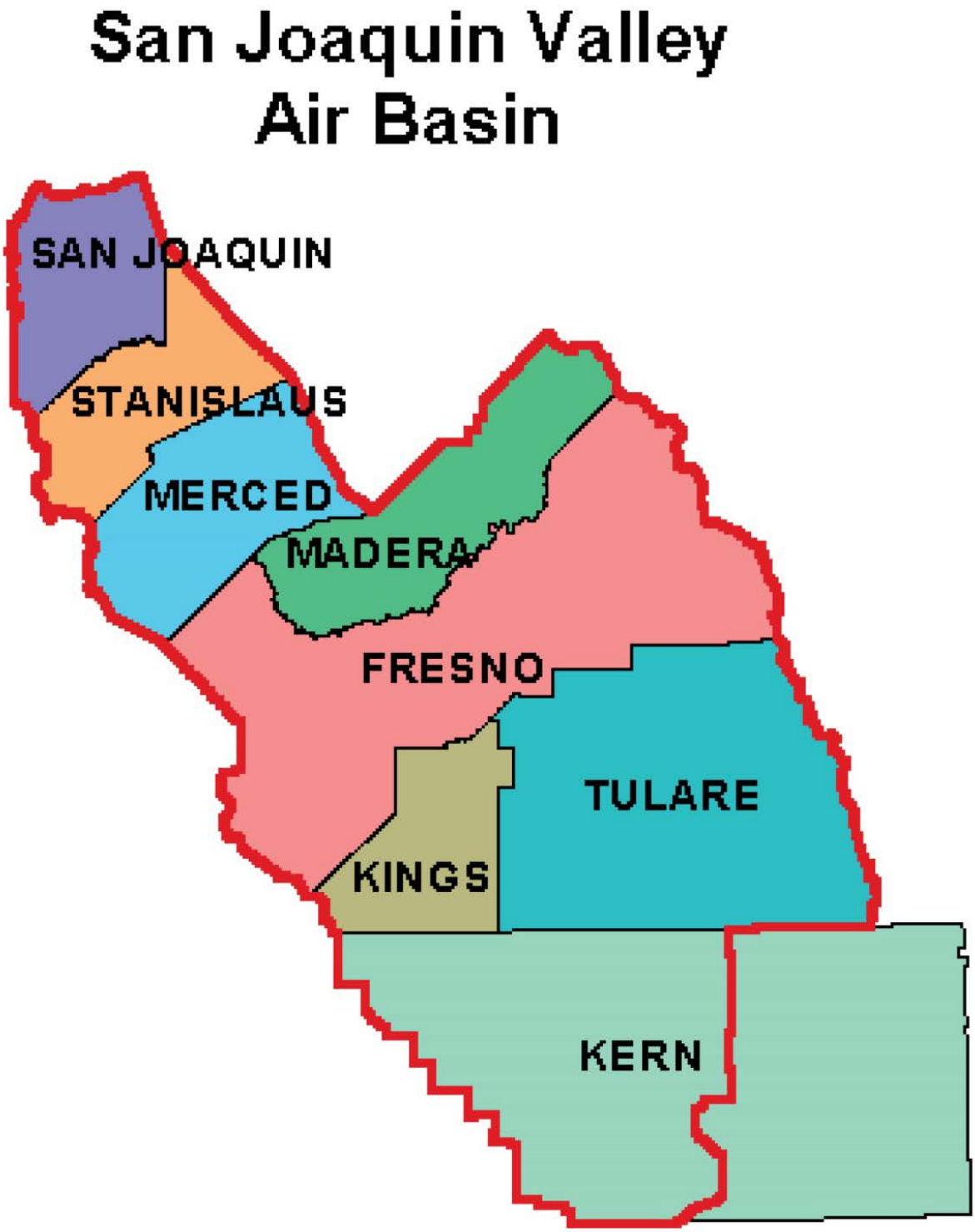
The San Joaquin Valley Air Basin (SJVAB) consists of eight counties, stretching from Kern County in the south to San Joaquin County in the north. The SJVAB is bounded by the Sierra Nevada to the east, the Coast Ranges to the west, and the Tehachapi mountains to the south. Figure 7 illustrates the location of the County within the SJVAB.

The SJVAB has an inland Mediterranean climate with warm, dry summers, relatively cool nights, and cooler winters with limited rainfall. Winters are mild with light rains and frequent heavy fog from December to January. The average temperature in the Basin is 61.5 degrees Fahrenheit (°F) (USA.com 2018). The average maximum daily temperature in July is approximately 93°F and the average minimum daily temperature in January is 38°F (Sperling's Best Places 2016). Rainfall occurs mainly in the winter months from November to April and averages 18.6 inches per year (USA.com 2018).

Air quality is affected by the rate and location of pollutant emissions and by climatic and topographic conditions that influence the movement and dispersion of pollutants. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients, along with local and regional topography, mediate the relationship between air pollutant emissions and air quality. In the SJVAB, the surrounding mountains restrict air movement and impede the dispersion of pollutants out of the basin. The SJVAB also experiences temperature inversions frequently throughout the year, which restrict vertical dispersion of air pollutants; an inversion occurs when a mass of warm dry air sits over cooler air near the ground, essentially trapping the air mass below (SJVAPCD 2012a). In addition, the Valley's long, hot summers, and stagnant, foggy winters, provide ideal conditions for the formation of photochemical oxidants and reduce dispersion, respectively.

Wind speed and direction determine the dispersion of air pollutants. Marine air comes into the basin from the Sacramento River–San Joaquin River Delta, although most air movement is restricted by the surrounding mountains. Winds from the Bay Area flow northeasterly into the Sacramento Valley and southward into San Joaquin County. This results in weak winds from the north and northeast, with an average speed of seven miles per hour. During the summer, wind from the north flows south and southeasterly through the Valley, through the Tehachapi Pass and into the Southeast Desert Air Basin. Thus, emissions from the San Francisco Bay Area and the Broader Sacramento air basins are transported into San Joaquin County and the SJVAB. Emissions in the San Joaquin Valley are then transported to the Southeast Desert and Great Basin Valley Air Basins. In late fall and winter, cold air from the mountains flows into the Valley. This results in winds from the south that flow north and northwesterly. Some emissions from San Joaquin County are transported to the broader Sacramento air basin during these times. However, the winds are relatively light, limiting the dispersion of CO and other pollutants.

Figure 7 San Joaquin Valley Air Basin



Source: San Joaquin ValleyUnified Air Pollution Control District, 2017

In the late fall and winter, when there is little interchange of air between the valley and the coast, humidity is high following winter rains, and temperature inversions at ground level persist over the entire valley for several weeks, air movement is virtually absent and radiation fog, known as tule fog, forms. This is typically when peak concentrations of carbon monoxide (CO), oxides of nitrogen (NO_X), and particulate matter (PM) occur.

b. Air Pollutants of Primary Concern

The federal and State Clean Air Acts (CAA) mandate the control and reduction of certain air pollutants, referred to as "criteria pollutants." Under these laws, the U.S. Environmental Protection Agency (U.S. EPA) and the California Air Resources Board (CARB) have established ambient air quality standards for criteria pollutants. Primary criteria pollutants are emitted directly from a source (e.g., vehicle tailpipe, an exhaust stack of a factory, etc.) into the atmosphere and include carbon monoxide, reactive organic gasses (ROG), NO_X, fine particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). Secondary criteria pollutants are created by atmospheric chemical and photochemical reactions. ROG, together with NO_X, form the building blocks for the creation of photochemical (secondary) pollutants. Secondary pollutants include oxidants, ozone, and sulfate and nitrate particulates (smog). The characteristics, sources, and effects of critical air contaminants are provided in Table 5.

Table 5 Description of Criteria Pollutants

Photochemical Oxidant (Ox)
Characteristics. The term "photochemical oxidant" can include several different pollutants, but consists primarily of ozone (more than 90 percent) and a group of chemicals called organic peroxynitrates. Photochemical oxidants are created in the atmosphere rather than emitted directly into the air. Reactive organic gases and oxides of nitrogen are the emitted contaminants, which participate in the reaction. Ozone is a pungent, colorless toxic gas, which is produced by the photochemical process. Photochemical oxidant is a characteristic of southern California-type smog, and reaches highest concentrations during the summer and early fall.
Sources. Ozone is caused by complex atmospheric reactions involving oxides of nitrogen and reactive organic gases with ultraviolet energy from sunlight. Motor vehicles are the major source of oxides of nitrogen and reactive organic gases in the basin.
Effects. The common manifestations of ozone and other photochemical oxidants are damage to vegetation and cracking of untreated rubber. Ozone in high concentrations (ranging from 0.15 ppm to 0.50 ppm) can also directly affect the lungs, causing respiratory and coronary irritation and possible changes in lung functions. These health problems are particularly acute in children and elderly people exposed to these pollutants.
Carbon Monoxide (CO)
Characteristics. CO is a colorless, odorless, toxic gas produced through the incomplete combustion of fossil fuels. Concentrations are higher in winter when more fuel is burned for heating purposes and weather conditions favor the build-up of directly emitted contaminants.
Sources. The use of gasoline-powered engines is the major source of this contaminant, with automobiles being the primary contributor. CO emissions from gasoline-powered engines are higher during winter months due to poor engine efficiency in cold temperatures. Various industrial processes also produce CO emissions through incomplete combustion of fossil fuels.
Effects. CO does not irritate the respiratory tract. However, it passes through the lungs directly into the blood stream and, by interfering with the transfer of oxygen, deprives sensitive tissues of oxygen.

Nitrogen Oxides (NO_X)

Characteristics. NO_X primarily consists of nitric oxide (NO) (a colorless, odorless gas formed from atmospheric nitrogen and oxygen when petroleum combustion takes place under high temperatures and/or pressure) and nitrogen dioxide (NO_2) (a reddish-brown irritating gas formed by the combination of nitric oxide with oxygen). Due to the role they play as ozone precursors, oxides of nitrogen are one of the two criteria pollutants subject to federal ozone requirements.

Sources. High combustion temperatures cause nitrogen and oxygen to combine and form nitric oxide. Further reaction produces additional oxides of nitrogen. Combustion in motor vehicle engines, power plants, refineries and other industrial operations are the primary sources in the region. Ships, railroads and aircraft are other significant emitters.

Effects. Oxides of nitrogen are direct participants in photochemical smog reactions. The emitted compound, nitric oxide, combines with oxygen in the atmosphere in the presence of sunlight, to form nitrogen dioxide and ozone. Nitrogen dioxide, the most significant of these pollutants, can color the atmosphere at concentrations as low as 0.5 ppm on days of 21 0-mile visibility. NO_2 is an important air pollutant in the region because it is a primary receptor of ultraviolet light. The latter initiates photochemical reactions, helping to form ozone and/or particulate nitrate. It will also react in the air to form nitrate particulates.

Sulfur Dioxide (SO_2)

Characteristics. SO_2 is a colorless, pungent, irritating gas formed primarily by the combustion of sulfur-containing fossil fuels. In humid atmospheres, SO_2 can form sulfur trioxide and sulfuric acid mist, with some of the latter eventually reacting to produce sulfate particulates.

Sources. This contaminant is the natural combustion product of sulfur or sulfur-containing fuels. Fuel combustion is the major source, while chemical plants, sulfur recovery plants, and metal processing are minor contributors.

Effects. At sufficiently high concentrations, sulfur dioxide irritates the upper respiratory tract. At lower concentrations, when in conjunction with particulates, SO_2 appears able to do still greater harm by injuring lung tissues. Sulfur oxides, in combination with moisture and oxygen, can yellow the leaves of plants, dissolve marble and eat away iron and steel. Sulfur oxides can also react to form sulfates, which reduce visibility.

Particulates (Total Suspended Particles and PM_{10})

Characteristics. Atmospheric particulates are made up of finely divided solids or liquids, such as soot, dust, aerosols, fumes, and mists. About 90 percent by weight of the emitted particles are larger than 10 microns in diameter, but about 10 percent by weight, or 90 percent of the total *number* of particulates, are less than 5 microns in diameter. The aerosols formed in the atmosphere, primarily sulfate and nitrate, are usually smaller than 1 micron. In areas close to major sources, particulate concentrations are generally higher in the winter, when more fuel is burned for heating, and meteorological conditions favor the build-up of directly-emitted contaminants. However, in areas remote from major sources and subject to photochemical smog (ozone), particulate concentrations can be higher during summer months because the presence of ozone increases the potential for SO_2 and NO_2 to convert to sulfate and nitrate particulates.

Sources. Particulate matter consists of particles in the atmosphere resulting from many kinds of dust and fume-producing industrial and agricultural operations, from combustion, and from atmospheric photochemical reactions. Re-entrained road dust from vehicles is a significant source of particulates. Natural activities also put particulates into the atmosphere; wind-raised dust and ocean spray are two such sources of particulates.

Effects. In the respiratory tract very small particles of certain substances may produce injury by themselves, or may contain absorbed gases that are injurious. Suspended in the air, particulates less than 5 microns in diameter can both scatter and absorb sunlight, producing haze and reducing visibility. They can also cause a wide range of damage to materials.

Diesel Particulate Matter (DPM)

Characteristics. Diesel particulate matter is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is commonly found throughout the environment. Diesel exhaust is composed of two phases, either gas or particle, and both phases contribute to the risk. The gas phase is composed of many of the urban hazardous air pollutants, such as acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde, and polycyclic aromatic hydrocarbons. Diesel exhaust has a distinct odor, which is primarily a result of hydrocarbons and aldehydes contained in diesel fuel. The particle phase also has many different types of particles that can be classified by size or composition. The size of diesel particulates that are of greatest health concern are those that are in the categories of fine and ultra-fine particles. The composition of these fine and ultra-fine particles may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals, and other trace elements.

Sources. Diesel exhaust is emitted from a broad range of diesel engines: the on-road diesel engines of trucks, buses, and cars and the off-road diesel engines that include locomotives, marine vessels, and heavy-duty equipment.

Effects. Acute exposure to diesel exhaust may cause irritation to the eyes, nose, throat and lungs, and some neurological effects such as lightheadedness. Acute exposure may also elicit a cough or nausea as well as exacerbate asthma. Chronic exposure in experimental animal inhalation studies has shown a range of dose-dependent lung inflammation and cellular changes in the lung and there are also diesel exhaust immunological effects. Based upon human and laboratory studies, there is considerable evidence that diesel exhaust is a likely carcinogen. Human epidemiological studies demonstrate an association between diesel exhaust exposure and increased lung cancer rates in occupational settings.

Hydrocarbons and other Organic Gases (Total Hydrocarbons, CH_4NMHC (non-methane), AHC, NHC)

Characteristics. Any of the vast family of compounds consisting of hydrogen and carbon in various combinations are known as hydrocarbons. Fossil fuels are included in this group. Many hydrocarbon compounds are major air pollutants, and those which can be classified as olefins or aromatics are highly photochemically reactive. Atmospheric hydrocarbon concentrations are generally higher in winter because the reactive hydrocarbons react more slowly in the winter and meteorological conditions are more favorable to their accumulating in the atmosphere to higher concentration before producing photochemical oxidants. Due to the role they play as ozone precursors, reactive hydrocarbons are one of the two criteria pollutants subject to federal ozone requirements.

Sources. Motor vehicles are a major source of anthropogenic hydrocarbons (AHC) in the basin. Other sources include evaporation of organic solvents and petroleum refining and marketing operations. Trees are the principal emitters of biogenic or natural hydrocarbons (NHC).

Effects. Certain hydrocarbons can damage plants by inhibiting growth and causing flowers and leaves to fall. Levels of hydrocarbons currently measured in urban areas are not known to cause adverse effects in humans. However, certain members of this contaminant group are important components in the reactions which produce photochemical oxidants.

Lead (Pb)

Characteristics. Lead is an elemental heavy metal found naturally in the environment as well as in manufactured products. Lead can be released directly into the air, as suspended particles. It is soft, malleable, and melts at a relatively low temperature. When freshly cut, it has a bluish-white tint; it tarnishes to a dull gray upon exposure to air. Lead has several properties that make it useful: high density, low melting point, ductility, and relative inertness to oxidation. Combined with relative abundance and low cost, these factors resulted in the extensive worldwide use of lead. Lead is persistent in the environment and accumulates in soils and sediments through deposition from air sources, direct discharge of waste streams to water bodies, mining, and erosion.

Sources. The major sources of lead emissions historically have been mobile and industrial sources. As a result of phasing out leaded gasoline, metal processing currently is the primary source of Pb emissions. The highest level of lead in the air is generally found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers.

Effects. Humans may be exposed to lead from air pollution directly, through inhalation, or through the incidental ingestion of lead that has settled out from the air onto soil or dust. Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system. Lead exposure also affects the oxygen carrying capacity of the blood. The lead effects most commonly encountered in current populations are neurological effects in children and cardiovascular effects (e.g., high blood pressure and heart disease) in adults. Infants and young children are especially sensitive to even low levels of lead, which may contribute to behavioral problems, learning deficits and lowered IQ. Elevated lead in the environment can result in decreased growth and reproductive rates in plants and animals, and neurological effects in vertebrates.

c. Other Pollutants

Diesel engine fuel combustion emits particulate matter, referred to as diesel particulate matter (DPM) that can be very small and readily respirable. The particles have hundreds of chemicals adsorbed onto their surfaces, including many known or suspected mutagens and carcinogens (CARB 2016a). Both short and long-term exposure to DPM can result in adverse health effects. Short-term exposure may cause irritation to the eyes, nose, throat and lungs and exacerbate asthma, while chronic exposure has been shown to lead to lung inflammation and cellular changes in animals and has been linked to cancer (U.S. EPA 2017a). Statewide, DPM is estimated to result in 1,400 additional cases of cardiopulmonary death, 100 cases of cardiovascular hospitalization, 120 cases of respiratory hospitalization, and 600 cases of respiratory emergency room visits (CARB 2016a). Most major sources of diesel emissions, such as ships, trains, and trucks, operate in and around ports, rail yards, and heavily traveled roadways. DPM is identified by CARB as a toxic air contaminant (TAC) (CARB 2016a).

Besides DPM, several other pollutants emitted by vehicle exhaust are a public health concern. The U.S. EPA has identified five pollutants of highest priority in addition to DPM: acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene. The latter five pollutants are found in organic gases emitted by vehicles.

d. Odors

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another.

It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air.

When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

e. Sensitive Receptors

A sensitive receptor is a location where human populations, especially children, seniors, and sick persons, are present and where there is a reasonable expectation of continuous human exposure to pollutants. Examples of sensitive receptors include residences, hospitals, and schools.

f. Ambient Air Quality

The federal and state governments have established ambient air quality standards for the protection of public health. The U.S. EPA has set primary national ambient air quality standards (NAAQS) for ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter with a diameter of up to ten microns (PM_{10}) and up to 2.5 microns ($PM_{2.5}$), and lead (Pb). Primary standards are those levels of air quality deemed necessary, with an adequate margin of safety, to protect public health. In addition, California has established ambient air quality standards for these and other pollutants, which are typically more stringent than the federal standards. Table 6 lists the current federal and State standards for regulated pollutants.

Table 6 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standards
Ozone	1-Hour	–	0.09 ppm
	8-Hour	0.070 ppm	0.070 ppm
CO	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
NO_2	Annual	0.053 ppm	0.030 ppm
	1-Hour	0.100 ppm	0.18 ppm
SO_2	Annual	–	–
	24-Hour	–	0.04 ppm
	1-Hour	0.075 ppm	0.25 ppm
PM_{10}	Annual	---	20 µg/m^3
	24-Hour	150 µg/m^3	50 µg/m^3
PM_{25}	Annual	12 µg/m^3	12 µg/m^3
	24-Hour	35 µg/m^3	–
Lead	30-Day	–	1.5 µg/m^3
	3-Month	0.15 µg/m^3	–
Visibility-Reducing Particles	–	–	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.
Sulfates	24-Hour	–	25 µg/m^3
Hydrogen Sulfide	1-Hour	–	0.03 ppm
Vinyl Chloride	24-Hour	–	0.01 ppm

ppm = parts per million;
µg/m^3 = micrograms per cubic meter
Source: CARB 2016b

The U.S. EPA and CARB designate air basins, or portions of air basins, and counties as being in "attainment" or "nonattainment" for each of the criteria pollutants. Nonattainment areas are ranked as marginal, moderate, serious, severe, or extreme according to the degree of nonattainment. Areas that do not meet the standards shown in Table 6 are classified as nonattainment areas. The NAAQS (other than ozone, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year; the NAAQS for ozone, PM_{10}, $PM_{2.5}$ are based on statistical calculations over one- to three-year periods, depending on the pollutant. The California Ambient Air Quality Standards (CAAQS) are not to be exceeded during a three-year period.

The determination of whether an area meets state and federal standards is based on air quality monitoring data. Some areas are unclassified, which means there is insufficient monitoring data for determining attainment or nonattainment. Unclassified areas are typically treated as being in attainment. Because the attainment/nonattainment designation is pollutant specific, an area may be classified as nonattainment for one pollutant and attainment for another. Similarly, because the State and federal standards differ, an area could be classified as in attainment for the federal standards of a pollutant and nonattainment for the State standard of the same pollutant.

Table 7 summarizes the SJVAB's attainment status for federal and State criteria pollutant standards. As indicated in the table, the SJVAB is currently in nonattainment of the following standards (SJVAPCD 2012b):

- State one-hour ozone
- State and federal eight-hour ozone
- State 24-hour PM10
- State and federal $PM_{2.5}$

The SJVAB is classified as being in nonattainment for the state one-hour ozone standard, federal and state eight-hour ozone standards, the state PM_{10} standard, and the federal and state 24-hour and annual $PM_{2.5}$ standards.

Table 7 Criteria Pollutant Attainment Status for San Joaquin Valley Air Basin

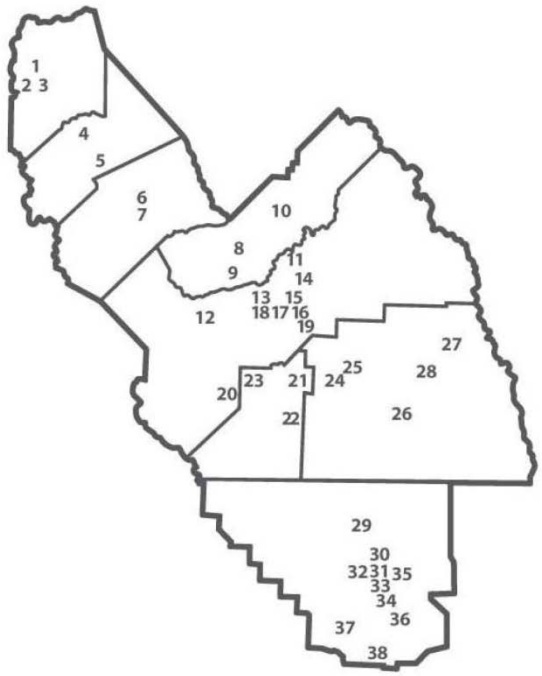
Pollutant	NAAQS	CAAQS
Ozone – 1 hour	None	Nonattainment/Severe
Ozone – 8 hour	Nonattainment	Nonattainment
CO	Attainment/Unclassified	Attainment
NO_2	Attainment/Unclassified	Attainment
SO_2	Unclassified	Attainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Lead (Pb)	Attainment/Unclassified	Attainment
Sulfates	None	Attainment
Hydrogen Sulfide	None	Unclassified
Visibility-Reducing Particles	None	Unclassified
Vinyl Chloride	None	Attainment

Source: SJVAPCD 2012

g. Air Quality Monitoring

The SJVAPCD and CARB maintain four air quality-monitoring sites in San Joaquin County: Hazelton Street, Stockton; Airport, Tracy; Wagner/Holt, Stockton; and 530 Fishback Road, Manteca. Figure 8 shows the locations of air quality monitoring stations in the SJVAB. Table 8 summarizes the top four maximum daily concentrations of criteria pollutants throughout San Joaquin County in 2014, 2015, and 2016. Table 9 and Table 10 show the emissions inventory and forecast for ROG, NO_X, and $PM_{2.5}$ and PM_{10} within the SJVAB, respectively.

Figure 8 SJVAB Air Quality Monitoring Stations (2017)



SAN JOAQUIN COUNTY
- ■ 1 Stockton-Hazelton: G, M, P, F, T
- ★ 2 Tracy-Airport: G, M, P, F
- ★ 3 Manteca: P, F, M

STANISLAUS COUNTY
- ■ 4 Modesto-14th St: G, M, P, F
- ★ 5 Turlock: G, M, P, F

MERCED COUNTY
- ★ 6 Merced-M St: P, F
- ★ 7 Merced-Coffee: G, F, M

MADERA COUNTY
- ★ 8 Madera City: G, P, F, M
- ★ 9 Madera-Pump Yard: G, M

Other[1]:
Chukchansi Indians
- ▲ 10 Picayune Rancheria: G, F, P, M

FRESNO COUNTY
Other[1]:
Monache Tribe/Foothill Yokut Indians
- ▲ 11 Table Mountain AMS+: G, F, P, M
- ★ 12 Tranquillity: G, F, M
- ★ 13 Fresno-Sky Park: G, M
- ★ 14 Clovis: G, M, P, F
- ■ 15 Fresno-Garland: G, M, P, F, T, N, L
- ★ 16 Fresno-Pacific: F
- ★ 17 Fresno-Drummond: G, P, M
- ★ 18 Fresno-Foundry Park Ave: G, M
- ★ 19 Parlier: G, M
- ★ 20 Huron: F, M

KINGS COUNTY
- ★ 21 Hanford: G, F, M, P
- ★ 22 Corcoran: F, M, P

Other[1]:
Tachi Yokut Tribe
- ▲ 23 Santa Rosa Rancheria: G, M, P

TULARE COUNTY
- ★ 24 Visalia Airport: M
- ■ 25 Visalia-Church St: G, F, M, P
- ★ 26 Porterville: G, F, M

Other[2]:
- ▲ 27 Lower Kaweah: A, G, M
- ▲ 28 Ash Mountain: A, G, M, F

KERN COUNTY
- ● 29 Shafter: G, M
- ■ 30 Oildale: G, M, P
- ■ 31 Bakersfield-Golden/M St: F, P
- ■ 32 Bakersfield-Calif Ave: A, G, M, P, F, T
- ★ 33 Bakersfield-Muni: G, M
- ■ 34 Bakersfield-Airport (Planz): F
- ■ 35 Edison: G, M
- ■ 36 Arvin-Di-Giorgio: G, M
- ★ 37 Maricopa: G, M
- ★ 38 Lebec: F, M

MONITORING DESIGNATIONS

A	Acid Deposition	P	Particulate (PM10)
F	Fine Particulate (PM2.5)	N	National Core
G	Gaseous	T	Toxins
M	Meteorological	L	Lead

MONITORING OPERATION
- ★ Sites operated by the District
- ● Sites operated by the District & CARB
- ■ Sites operated by CARB
- ▲ Sites operated by other agencies
  - Other[1] Tribal
  - Other[2] National Park Service
- \+ Air Monitoring Station (AMS)

Source: San Joaquin ValleyUnified Air Pollution Control District, 2017

Table 8 Maximum Sampled Pollutant Concentrations for San Joaquin County (2014-2016)

Pollutant	2014	2015	2016
8-Hour Ozone (ppm), 8-Hour Average	0.084	0.091	0.092
Number of days of State exceedances (>0.070 ppm)	17	21	19
Number of days of Federal exceedances (>0.070 ppm)	17	21	19
Ozone (ppm), Worst Hour	0.097	0.107	0.109
Number of days of State exceedances (>0.10 ppm)	1	4	4
Nitrogen Dioxide (ppb) - Worst Hour	66.9	58	64.1
Number of days of State exceedances (>180 ppb)	0	0	0
Particulate Matter 10 microns, μg/m^3, Worst 24 Hours[1]	109.0	107.3	71.7
Number of samples of State exceedances (>50 μg/m^3)[2]	3	4	5
Number of samples of Federal exceedances (>150 μg/m^3)	0	0	0
Particulate Matter <2.5 microns, μg/m^3, Worst 24 Hours	56.8	62.1	50.8
Number of samples above Federal standard (>35 μg/m^3)	17	18	7

[1] Maximum PM_{10} data is taken from the Manteca-530 Fishback Rd Station monitoring results.

[2] Because no State monitoring data is available for the Manteca-530 Fishback Rd Station, the number of State exceedances is taken from the Stockton-Hazelton Street Station.

Source: CARB 2017a

Table 9 Emissions Inventory and Forecasts for ROG and NO_X

	Annual Average Emissions (tons/day)			
	2013	2017	2020	2022
ROG	324.4	301.6	296.4	294.8
NO_X	318.1	237.5	208.3	185.2
$PM_{2.5}$	63.4	60.0	60.0	59.5

Source: SJVAPCD 2016a

Table 10 Emissions Inventory and Forecasts for PM_{10}

	Annual Average Emissions (tons/day)			
Tons/Day	2000	2005	2010	2020
PM_{10} (All Sources)	324.0	284.6	282.4	290.3

Source: SJVAPCD 2007

h. Regulatory Setting

Air quality in the County is addressed through the efforts of various federal, state, regional, and local government agencies. The agencies primarily responsible for improving the air quality within the County include the U.S. EPA, CARB, SJVAPCD, and the SJCOG. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies primarily responsible for improving the air quality within San Joaquin County are discussed below, along with their individual responsibilities.

Federal

The U.S. EPA is responsible for enforcing the CAA and establishing National Ambient Air Quality Standards (NAAQS), as required under the 1977 CAA and subsequent amendments. The U.S. EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. The agency has jurisdiction over emission sources outside state waters (e.g. beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by CARB.

As part of its enforcement responsibilities, the U.S. EPA requires each state with areas that do not meet the federal standards to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the time frame identified in the SIP.

State

In California, CARB is responsible for meeting the state requirements of the federal CAA, administering the California CAA, and establishing the California Ambient Air Quality Standards (CAAQS). The California CAA, as amended in 1992, requires all air districts in the state to endeavor to achieve and maintain the CAAQS. The CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB established passenger vehicle fuel specifications, which became effective in March 1996. In addition, the California Legislature enacted Senate Bill 656 (SB 656) to reduce public exposure of airborne particulate matter in 2003, which required CARB to develop and adopt a list of readily available, feasible, and cost-effective control measures that could be employed by CARB and local air districts. CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

Regional and Local

The SJVAPCD is the agency responsible for monitoring and regulating air pollutant emissions from stationary, area, and indirect sources throughout the SJVAB. Under state law, the SJVAPCD is required to prepare a plan for air quality improvement for pollutants for which the SJVAPCD is in non-compliance. SJVAPCD has adopted numerous air quality plans to reduce ozone and particulate

precursor emissions since 1992. The following list provides the latest plan iterations to address attainment of different standards for which the Basin is in nonattainment (SJVAPCD 2016b, 2017):

- **2016 Plan for the 2008 8-hour Ozone Standard (adopted June 2016).** Ensures attainment of federal 2008 8-hour ozone standard (0.075 ppm) by December 31, 2031. The Ozone Plan describes a comprehensive stationary and mobile source control strategy to reduce NO_X emissions by over 60 percent between 2012 and 2031.
- **2013 Plan for the Revoked 1-Hour Ozone Standard (adopted September 2013).** Ensures attainment of the now revoked 1-hour federal ozone standard (0.124 ppm).
- **2017 PM Plans (in preparation).** Will provide a single comprehensive attainment plan that addresses multiple $PM_{2.5}$ standards under the FCAA (1997, 2006, and 2012 federal annual PM 2.5 standards), and the 1987 federal annual PM_{10} standard.
- **2016 Moderate Area Plan for the 2012 $PM_{2.5}$ Standard (adopted September 2016).** Ensures attainment of the federal annual $PM_{2.5}$ standard of 12 $\mu g/m^3$ established in 2012. The Moderate Area Plan addresses the fact that attainment of the 2012 $PM_{2.5}$ standard by 2021 is impracticable and is physically impossible given that critical mobile source regulations, such as CARB regulations for trucks, buses, and off-road engines, would not be fully implemented until 2023.
- **2015 Plan for the 1997 $PM_{2.5}$ standard (adopted April 2015).** Ensures attainment of 1997 federal annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ and 24-hour $PM_{2.5}$ standard of 65 $\mu g/m^3$.
- **2012 $PM_{2.5}$ Plan (adopted December 2012).** Addresses federal 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$ established in 2006.

In addition to preparing planning documents to ensure attainment of federal and state standards, the SJVAPCD sets rules and regulations to support attainment of standards and address air quality issues. Applicable rules and regulations including the following:

- **Regulation VIII – Fugitive PM_{10} Prohibition.** This regulation requires actions to prevent, reduce, or mitigate fugitive dust emissions associated with human activities, including construction and earthmoving activities.
  - **Rule 8021 – Construction, Demolition, Excavation, Extraction, and other Earthmoving Activities.** This rule requires that appropriate measures be implemented during construction, demolition, excavation, extraction, or other earthmoving activities, to ensure that visible dust emissions (VDE) do not exceed 20% opacity. Control measure options include watering of exposed surface areas, application of chemical/organic stabilizers, constructing wind barriers, restricting vehicles from the site, and establishing a speed limit of 15 miles per hour on unpaved access/haul roads. Rule 8021 also establishes administrative requirements, such as a Dust Control Plan for residential development involving 10 acres or more of disturbed surface area, non-residential development involving 5 acres or more, or for any project that would relocate more than 2,500 cubic yards per day of bulk materials on at least three days.
- **Regulation IX – Mobile and Indirect Sources.** This regulation encompasses a number of regulations that apply to mobile and indirect sources including the following:
  - **Rule 9120 – Transportation Conformity.** This rule specifies criteria and procedures for determining the conformity of highway and transit plans and projects funded by the US DOT, MPOs, or other recipients of funds under Title 23, United States Code or the Federal Transit Act, with SJVAPCD implementation plans.

- **Rule 9410 – Employer Based Trip Reduction.** This rule requires employers with at least 100 employees to develop and implement an Employer Trip Reduction Implementation Plan (eTRIP). The rule provides a menu of measures that can be incorporated into the eTRIP to encourage employees to use alternative transportation and ridesharing, such as registering with a local rideshare agency, internal ride matching, and providing onsite food service or childcare. Each measure is allotted a certain amount of points and the employer must achieve a total of either 100 or 250 points, depending on the type of work site.
- **Rule 9510 – Indirect Source Review.** The Indirect Source Review (ISR) rule, which went into effect March 1, 2006, requires developers of new residential, commercial, and industrial projects to reduce smog-forming and particulate emissions generated by their projects. The ISR rule also applies to transportation and transit projects whose construction exhaust emissions would result in a total of two or more tons per year of NO_X or PM_{10}. The rule requires developers to reduce construction NO_X and PM_{10} exhaust emissions by 20 percent and 45 percent, respectively, and reduce operational NO_X and PM_{10} emissions by 33.3 percent and 50 percent, respectively, as compared to the unmitigated baseline.

County and City General Plans

A General Plan Air Quality element is required for all jurisdictions in the SJVAPCD. The Air Quality Element is intended to protect the public's health and welfare by implementing measures that allow the SJVAPCD to attain Federal and State air quality standards. To achieve this goal, the Element sets forth a number of policies and standards to reduce current pollution emissions and to require new development to include measures to comply with air quality standards. Policies include preparing local plans to achieve air quality standards, enforcing SJVAPCD regulations and guidance, monitoring air pollutants, implementing dust control practices for construction sites, and encouraging transportation alternatives to motor vehicles.

4.3.2 Impact Analysis

a. Significance Thresholds and Methodology

Significance Thresholds

The SJVAPCD has established the following significance thresholds for construction and operational emissions from individual projects:

Construction and Operational Thresholds
100 tons per year of CO
10 tons per year of NO_X
10 tons per year of ROG
27 tons per year of SO_X
15 tons per year of PM_{10}
15 tons per year of $PM_{2.5}$

Because the 2018 RTP/SCS is a programmatic document and would not directly generate emissions, SJVAPCD significance thresholds do not apply in determining the significance of emissions associated with the 2018 RTP/SCS. However, individual projects included in the 2018 RTP/SCS undergoing CEQA review would be subject to these thresholds.

State and federal clean air laws require that emissions of pollutants for which national or state ambient air quality standards are violated be reduced from current levels. Therefore, for the purposes of this EIR, SJCOG has determined that adoption and/or implementation of the proposed 2018 RTP/SCS (including adoption of the RTP policies, adoption of the SCS, and adoption of the transportation project list and financing plan) could result in significant adverse impacts to air quality if any of the following would occur:

1. Projected long-term emissions of criteria pollutants are greater than current emission levels;
2. Projected short-term emissions of criteria pollutants (construction of transportation projects and anticipated development) would result in substantial levels of criteria pollutant emissions;
3. Projected long-term emissions of toxic air contaminants (DPM from heavy-duty diesel trucks and other emissions from industrial activities) are greater than current emission levels;
4. Localized concentrations of toxic air contaminants at sensitive receptors (short-term and/or long- term) exceed existing conditions; and/or
5. Projected long-term emissions would be considered to be cumulatively significant if they are not consistent with the local air quality management plans and state implementation plans.

Short-Term Emissions Methodology

Emissions from construction activities represent temporary impacts that are typically short in duration and depend on the size, phasing, and type of project. Air quality impacts can nevertheless be acute during construction periods, resulting in significant localized impacts to air quality. Construction-related emissions are speculative at the RTP level because such emissions are dependent on the characteristics of individual projects. However, because implementation of the 2018 RTP/SCS would generate temporary criteria pollutant emissions, primarily due to the operation of construction equipment and truck trips, a qualitative analysis is provided.

Long-Term Emissions Methodology

The methodology for determining the significance of air quality impacts compares baseline conditions (i.e., 2015, the baseline year utilized in traffic modeling) to the future RTP/SCS conditions in 2042, as required in CEQA Section 15126.2(a).

Air emissions from mobile sources were calculated using CARB's EMFAC 2014 model and regional vehicle miles travelled (VMT) calculated using the San Joaquin Valley Model Improvement Plan, Phase 2 (VMIP2), which incorporates land use, socioeconomic growth projections, interregional travel, and adjustments to reflect employment density, intersection density, and access to jobs and houses. EMFAC 2014 was developed by CARB and accommodates mobility assumptions (e.g., vehicle speed, delay times, average trip lengths, time of day, and total travel time) provided by VMIP2.

b. Project Impacts and Mitigation Measures

This section evaluates generalized air quality impacts associated with the 2018 RTP/SCS. Due to the programmatic nature of the 2018 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time.

Threshold 1:	Projected long-term emissions of criteria pollutants are considered significant if they are greater than current emission levels

IMPACT AQ-1 IMPLEMENTATION OF THE 2018 RTP/SCS WOULD REDUCE OZONE PRECURSOR AND $PM_{2.5}$ EMISSIONS FROM MOBILE SOURCES COMPARED TO 2015 EXISTING CONDITIONS. HOWEVER, THE 2018 RTP/SCS WOULD RESULT IN INCREASED PM_{10} EMISSIONS RELATIVE TO EXISTING CONDITIONS. IMPACTS WOULD BE SIGNIFICANT BUT MITIGABLE.

The 2018 RTP/SCS would alter mobile source emissions of criteria pollutants by implementing traffic improvement projects and promoting more compact growth with greater infill development in proximity to transit. Table 11 summarizes the emission levels (tons/day) of criteria pollutants under baseline (2015) conditions and 2042 with 2018 RTP/SCS conditions. As shown below, all criteria pollutants are expected to decrease under 2042 conditions with the project, except for $PM_{10,}$ which would minimally increase by about 0.1 ton per day.

Table 11 Regional On-Road Motor Vehicle Emissions of Criteria Pollutants

Scenario	ROG (tons/day)	NO_X (tons/day)	PM_{10} (tons/day)[1]	$PM_{2.5}$ (tons/day)
2015 SJCOG Baseline	7.2	17.3	1.2	0.61
2042 with 2018 RTP/SCS	2.0	4.2	1.3	0.53
Net change	-5.2	-13.1	+0.1	-0.08

[1] PM_{10} includes emissions from exhaust only.

Notes: The modeling season providing the highest pollutant levels was used for each criteria pollutant: ROG (summer), NOx (winter), PM_{10} (annual), $PM_{2.5}$(winter).

SJVAPCD Rule 9510 (ISR) requires developers of new residential, commercial, and industrial projects to reduce operational NO_X and PM_{10} emissions by 33.3 percent and 50 percent, respectively, as compared to the unmitigated baseline. In addition, SJVAPCD Rule 9410 requires employers with at least 100 employees to develop and implement an Employer Trip Reduction Implementation Plan (eTRIP) to reduce employee trees. Enforcement of these rules would reduce PM_{10} emissions associated with implementation of the 2018 RTP/SCS. However, because individual project details are not known at this time, it is possible that impacts from development of the envisioned land use scenario would remain potentially significant even with implementation of applicable rules.

Mitigation Measure

For transportation projects under their jurisdiction, SJCOG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measure developed for the 2018 RTP/SCS program where applicable for transportation projects involving construction activities. Local agencies in the SJCOG region can and should implement this measure, where relevant, to land use projects implementing the 2018 RTP/SCS.

AQ-1 Long-term PM_{10} Emission Reductions

Project Sponsors shall require project proponents to demonstrate compliance with SJVAPCD Rules 9510 and 9410, if applicable, prior to the issuance of grading/building permits for individual projects. In addition, implementing and local agencies shall require projects that would exceed SJVAPCD significance thresholds for operational PM_{10} emissions after implementation of applicable rules to enter into a Voluntary Emission Reduction Agreement (VERA) with the SJVAPCD to reduce PM_{10} emissions to below threshold level, as described in the SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI)*. A VERA is a mitigation measure by which the project proponent provides pound-for-pound mitigation of air emissions increases through a process that funds and implements emission reduction projects by the SJVAPCD.

Significance After Mitigation

With implementation of the above mitigation, impacts related to long-term PM_{10} emissions would be less than significant.

Threshold 2:	Projected short-term emissions of criteria pollutants (from construction of transportation projects and anticipated development) are considered to be significant if they would result in substantial criteria pollutant emissions

IMPACT AQ-2 IMPLEMENTATION OF THE TRANSPORTATION PROJECTS AND LAND USE PATTERN ENVISIONED IN THE 2018 RTP/SCS WOULD INVOLVE CONSTRUCTION ACTIVITIES THAT WOULD GENERATE SHORT-TERM EMISSIONS OF CRITERIA POLLUTANTS. IMPACTS WOULD BE SIGNIFICANT BUT MITIGABLE.

Implementation of the 2018 RTP/SCS would involve construction activities related to transportation improvements, as well as general construction as part of regional growth. These construction activities would result in short-term emissions of air pollutants including ROGs, NOx, PM_{10}, $PM_{2.5}$ and fugitive dust from operation of construction equipment, employee and vendor vehicle trips, demolition, grading and other ground-disturbing activities, application of paint and other coatings, paving, and other activities.

Individual projects would be required to comply with SJVAPCD regulations to reduce air quality impacts associated with construction activities, such as Regulation VIII, which establishes control measures for fugitive dust, and Rule 9510 (ISE), which requires developers and transportation projects meeting applicability criteria to reduce on-site construction NO_X and PM_{10} emissions by 20 percent and 45 percent, respectively, or pay fees to fund off-site mitigation of the remaining balance of emission reductions required. In addition, the SJVAPCD has established quantitative significance thresholds for construction emissions that would apply to individual projects undergoing CEQA review . However, given the unknown scale of construction and timing of individual projects, it is possible that construction emissions of criteria pollutant emissions could create or substantially contribute to a short-term exceedance of ambient air quality standards. Impacts would be potentially significant, but mitigable.

Mitigation Measure

For transportation projects under their jurisdiction, SJCOG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measure developed for the 2018 RTP/SCS program where applicable for transportation projects involving construction activities. Local agencies in the SJCOG region can and should implement this measure, where relevant, to land use projects implementing the 2018 RTP/SCS.

AQ-2 Short-term Criteria Pollutant Emission Reductions

Implementing and local agencies shall require project proponents to demonstrate that they have obtained all required permits from the SJVAPCD prior to the issuance of grading/building permits for individual projects and that all construction activities will continuously comply with applicable regulatory standards, including, but not limited to SJVAPCD Regulation VIII, "Control Measures for Construction Emissions of PM_{10}," and ISR. In addition, Implementing and local agencies require projects that would exceed SJVAPCD significance thresholds for construction emissions to enter into a VERA with the SJVAPCD, as described in the SJVAPCD's *GAMAQI*.

Significance After Mitigation

With implementation of the above mitigation, impacts related to short-term construction emissions from individual projects would be less than significant.

Threshold 3:	Projected long-term emissions of toxic air contaminants (diesel particulate matter from heavy-duty diesel trucks and other emissions from industrial activities) are considered significant if they would be greater than current emission levels

IMPACT AQ-3 IMPLEMENTATION OF THE 2018 RTP/SCS WOULD REDUCE LONG-TERM EMISSIONS OF DIESEL PARTICULATE MATTER (DPM) FROM MOBILE SOURCES. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

Vehicle use is associated with a number of toxic air contaminants (TACs), including DPM, benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, polycyclic organic matter (POM), and naphthalene. Diesel particulate matter (DPM) is the primary TAC and is emitted in the exhaust of diesel-powered vehicles. DPM is primarily composed of very fine particles, with more than 90 percent of DPM being less than one micron in diameter. Since particles less than 2.5 microns in diameter are categorized as $PM_{2.5}$, this means that over 90 percent of DPM is in the form of $PM_{2.5}$, with less than 10 percent existing as PM_{10}; PM_{10} emissions from mobile sources mainly result from tire wear, brake dust, and road dust being re-entrained rather than from fuel combustion. Therefore, $PM_{2.5}$ emissions are used as a proxy for DPM emissions in this analysis. The remaining TACs are primarily ROGs and generally components of vehicle exhaust, though a small portion occur as fugitive emissions that are emitted during fueling or fuel transport. Fugitive emissions of TACs are relatively minor in amount, and would not be considered likely to affect the overall rate of TAC emissions.

In order to more closely evaluate DPM emissions, $PM_{2.5}$ emissions from heavy-duty diesel vehicles (the primary source of DPM) were estimated using the EMFAC 2014 model. Table 12 summarizes $PM_{2.5}$ emissions from heavy-duty diesel vehicles under existing conditions and 2042 with project conditions; 2042 conditions without the project are also included for informational purposes. $PM_{2.5}$ emissions from heavy-duty diesel vehicles would be lower in 2042 with the 2018 RTP/SCS than under existing conditions. This impact would be less than significant.

Table 12 $PM_{2.5}$ Emissions from Heavy-Duty Diesel Vehicles

Scenario	$PM_{2.5}$ (tons/day)
2015 SJCOG Baseline	0.26
2042 with 2018 RTP/SCS	0.11
Net change	-0.15

Notes: The modeling season providing the highest levels of criteria pollutants was used for $PM_{2.5}$(winter).

Mitigation Measures

No Mitigation Measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Threshold 4:	Localized concentrations of toxic air contaminants at sensitive receptors (short-term and/or long- term) are considered significant if they would exceed existing conditions

IMPACT AQ-4 IMPLEMENTATION OF THE 2018 RTP/SCS MAY RESULT IN INCREASED EXPOSURE OF SENSITIVE RECEPTORS TO DIESEL PARTICULATE MATTER (DPM) FROM MOBILE SOURCES. IMPACTS WOULD BE SIGNIFICANT BUT MITIGABLE.

The 2018 RTP/SCS would result in the construction of new roadways or widening of existing roadways that may occur in proximity to existing sensitive receptors. In addition, as a result of 2018 RTP/SCS policies and the selected land use scenario, the anticipated growth pattern in the SJCOG region would concentrate population adjacent to transit and other transportation facilities that could result in more people being exposed to elevated health risks and nuisance odors relative to existing conditions. Populations residing close to freeways or busy roadways may experience adverse health effects beyond those typically found in urban areas. In the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB 2011), CARB recommends avoiding siting new sensitive land uses, such as residences, schools, daycare centers, playgrounds, or medical facilities, within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. California freeway studies show about a 70 percent drop-off in particulate pollution levels at 500 feet (CARB 2005). Vehicle delay, especially along corridors near sensitive residential receptors, can also increase idling emissions and associated health risks for nearby receptors from roadways.

The CARB has several programs and regulations in place to reduce DPM and TAC emissions from mobile sources statewide, including the Diesel Risk Reduction Plan (CARB 2010) and Advanced Clean Cars Program (CARB 2017b). These programs include measures such as enforced retrofit of diesel particulate filters, replacement of older trucks and buses, requirements for lower emissions on new diesel vehicles, inspection programs, idling restrictions, and other programs for marine and off-road diesel vehicles. These programs and regulations would reduce air toxic emissions from mobile sources over the horizon of the 2018 RTP/SCS. Nevertheless, in order to achieve the greatest VMT reductions from a compact growth pattern, development must necessarily occur in close proximity to public transit and major roadway corridors. Although the precise location and density of such development is not known at this time, the proposed 2018 RTP/SCS may result in new sensitive

receptors being sited close to existing and new hazardous air pollutant sources, potentially resulting in substantial exposure to substantial hazardous air pollutant concentrations and nuisance odors. Impacts would be significant but mitigable.

Mitigation Measure

For transportation projects under their jurisdiction, SJCOG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measure developed for the 2018 RTP/SCS program where applicable. Local agencies in the SJCOG region can and should implement this measure, where relevant, to land use projects implementing the 2018 RTP/SCS.

AQ-3 Health Risk Reduction Measures

Consistent with the general guidance contained in CARB's *Air Quality and Land Use Handbook*, appropriate and feasible measures shall be incorporated into project building design for residential, school and other sensitive uses located within 500 feet, or other distance as determined by the lead agency, of freeways, heavily travelled arterials, railways and other sources of DPM, including roadways experiencing significant vehicle delays (CARB 2005). The appropriate measures shall include one or more of the following methods, as determined by a qualified professional, as applicable:

The project sponsor shall incorporate health risk reduction measures based on analysis of individual sites and project circumstances. These measures may include:

- Avoid siting new sensitive land uses within 500 feet of a freeway, railway, or other source of TACs.
- Require development projects for new sensitive land uses to be designed to minimize exposure to roadway-related pollutants to the maximum extent feasible through inclusion of design components including air filtration and physical barriers.
- Avoid locating sensitive receptors near the entry and exit points of a distribution center.
- Locate structures and outdoor living areas for sensitive uses as far as possible from the source of emissions. As feasible, locate doors, outdoor living areas, and air intake vents primarily on the side of the building away from the freeway or other pollution source. As feasible, incorporate dense, tiered vegetation that regains foliage year round and has a long life span between the pollution source and the project.
- Maintain a 50-foot buffer from a typical gas dispensing facility (under 3.6 million gallons of gas per year).
- Install, operate and maintain in good working order a central heating and ventilation (HV) system or other air take system in the building or in each individual residential unit that meets the efficiency standard of the MERV 13. The HV system should include the following features: Installation of a high efficiency filter and/or carbon filter-to-filter particulates and other chemical matter from entering the building. Either HEPA filters or ASHRAE 85% supply filters should be used. Ongoing maintenance should occur.
- Retain a qualified HV consultant or Home Energy Rating Systems (HERS) rater during the design phase of the project to locate the HV system based on exposure modeling from the mobile and/or stationary pollutant sources.
- Achieve a performance standard of at least one air exchange per hour of fresh outside filtered air.

- Achieve a performance standard of at least four air exchanges per hour of recirculation. Achieve a performance standard of 0.25 air exchanges per hour if the building is not positively pressurized.
- Require project owners to provide a disclosure statement to occupants and buyers summarizing technical studies that reflect health concerns about exposure to highway exhaust emissions.
- Retain a qualified air quality consultant to prepare a health risk assessment (HRA) in accordance with CARB and the Office of Environmental Health and Hazard Assessment requirements to determine the exposure of project residents/occupants/users to stationary air quality polluters prior to issuance of a demolition, grading, or building permit. Project sponsors shall implement HRA recommendations to a level which would not result in exposure of sensitive receptors to substantial pollutant concentrations (pursuant to the State CEQA Guidelines).

Significance After Mitigation

With implementation Mitigation Measure AQ-3, localized concentrations of toxic air contaminants at sensitive receptor locations would be reduced to a less than significant level.

Threshold 5:	Projected long-term emissions would be considered to be cumulatively significant if they are not consistent with the local air quality management plans and state implementation plans

IMPACT AQ-5 THE 2018 RTP/SCS WOULD CONFORM WITH EMISSION BUDGETS FOR CRITERIA POLLUTANTS ESTABLISHED IN THE SIP FOR THE SJVAB. THE PROJECT WOULD BE CONSISTENT WITH THE SIP AND THERE WOULD BE NO IMPACT.

A State Implementation Plan (SIP) provides for the attainment of ambient air quality in a region on a cumulative basis. That is, it considers emissions from both mobile and stationary sources, and determines the maximum allowable quantities for emissions of air pollutants in a region. These maximum allowable quantities are known as emission budgets. Consistency with a SIP is shown through a conformity analysis, which determines if project emissions are within the approved emissions budget for the region.

A conformity analysis was performed for the 2018 RTP/SCS and found that project emissions would be within emission budgets for CO, ozone, PM_{10}, and $PM_{2.5}$. Therefore, the project would not conflict with the SIP. A SIP is not a single document, but rather a collection of documents including technical reports, district rules, state regulations, programs, and air quality management plans (AQMP). AQMPs are developed by the local air districts to ensure local compliance with the aims of the SIP and become part of the SIP once submitted and approved. Consequently, compliance with the applicable SIP ensures compliance with the AQMP as well. Therefore, as the 2018 RTP/SCS is in conformance with the SIP it also complies with the AQMP. The project would not conflict with the SIP or local AQMPs and there would be no impact.

Mitigation Measures

No Mitigation Measures are required.

Significance After Mitigation

There would be no impact without mitigation.

c. Cumulative Impacts

A discussion of cumulative impacts is included in Impact AQ-5. In addition, the SJCOG planning region falls within the jurisdiction of SJVAPCD, and is bordered by Stanislaus County (within the SJVAPCD) to the south, Contra Costa and Alameda Counties to the west, which fall within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD), Sacramento County to the north, Amador and Calaveras Counties to the east, each having their own air pollution control district. Each of these four air districts has prepared an air quality plan to improve conditions and meet federal and state air quality standards. While each air district is primarily responsible for regulating its own emissions, the transport of emissions in one area can affect another area's ability to achieve attainment of pollutant standards. All four air districts currently exceed at least one federal and/or state air quality standard. Construction activities associated with transportation projects under the 2018 RTP/SCS, as well as the land use projects envisioned by the 2018 RTP/SCS, would create fugitive dust and ozone precursor emissions and have the potential to result in temporary adverse impacts on air quality. Although regional ozone precursors would be reduced with the 2018 RTP/SCS compared to existing 2015 conditions, regional PM_{10} emissions would increase beyond existing conditions leading to a significant cumulative impact. However, exceedances would be mitigated to below threshold level through implementation of SJVAPCD rules and mitigation of individual project emissions to below significance threshold-level through VERAs, as needed. Therefore, the 2018 RTP/SCS would have a less than significant cumulatively considerable contribution to regional air quality impacts.

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