

4.2 Air Quality

4.2 Air Quality

4.2.1 INTRODUCTION

This section focuses on the potential air quality impacts associated with construction of the proposed roadway and intersection modifications as well as changes to level of service (LOS) throughout the City's roadway system. This section assesses the potential air quality impacts based on references and new traffic data provided by DKS Associates (i.e., vehicle volume, LOS).

4.2.2 ENVIRONMENTAL SETTING

Ambient air quality in the City of Roseville is affected by pollutants generated locally, but pollutants from neighboring jurisdictions also impact local air quality. The local topography and climatological conditions transport pollutants from the Sacramento Metropolitan Area (SMA) into Roseville. The following subsections describe relevant characteristics of Roseville that affect ambient air pollutant concentrations and dispersion capability.

4.2.2.1 Climate and Topography

The City of Roseville is located in southern Placer County within the Sacramento Valley Air Basin (SVAB). Weather patterns throughout the SVAB are, in part, affected by the geography (i.e., terrain). The SVAB is bounded by the northern Coast Ranges to the west, the northern Sierra Nevada Mountains to the east, and the Cascade Range to the north. The area to the south is within these mountain ranges and is relatively flat. This area is also known as the Sacramento Valley, which is the northern portion of the Central Valley. The Carquinez Strait breaches the Coast Range, exposing the middle portion of the SVAB to the influence of Pacific Coast marine weather. This geography channels winds through the Sacramento Valley, but inhibits dispersion of pollutant emissions in portions of the valley (CARB, 2006a). Typically, marine air enters the SVAB through the Carquinez Strait and transports pollutants out of the valley to the north. However, conditions can lead to the prevailing winds circling back south, particularly between July and September, thus elevating pollution levels in the SVAB. This marine influence can result in pollutants being carried from the San Francisco Bay Area and Sacramento regions to western Placer County.

The climate of the SVAB is Mediterranean in character, with mild, rainy winter weather from November through March, and hot, dry weather from May through September. January temperatures in the SVAB area range from an average low in the 30s (°F) to an average high in the 50s (°F). July temperatures range from an average low in the 50s (°F) to an average high in the 90s (°F). These high temperatures, combined with low humidity, produce hot, dry summers that contribute to the buildup of ozone (a major constituent of smog). The climatological station closest to the project that monitors temperature is the Rocklin Station. The monthly average temperature recorded between 1971 and 2000 at the Rocklin Station ranges from 33.6°F in January to 95.5°F in August (Western Regional Climatic Center, 2006). January and December are typically the coldest months in the Rocklin area. Average rainfall measured in the Rocklin area varied from 3.84 inches in November to 1.83 inches or less between April and October, with an average annual total of 21.35 inches.

4.2.2.2 Air Quality Standards and Existing Concentrations

The federal and state governments have each established their own ambient air quality standards (AAQS). The U.S. Environmental Protection Agency (EPA) has established primary and secondary National Ambient Air Quality Standards (NAAQS) that specify allowable ambient concentrations for criteria pollutants under the provisions of the Clean Air Act (CAA.) Primary NAAQS are established at levels necessary (with an adequate margin of safety) to protect the public health, including the health of sensitive populations such as asthmatics, children, elderly, the acutely ill, and other chronically ill. Similarly, secondary NAAQS specify the levels of air quality determined appropriate to protect the public welfare from any known or anticipated adverse effects associated with air contaminants. Commonly identified sensitive land uses are residences, schools, playgrounds, childcare centers, retirement homes or convalescent homes, hospitals, and clinics. Areas sensitive to air pollutants in or near the project area include residential areas, schools, and the nearest right-of-way where the children and the elderly have continuous access, such as sidewalks.

Allowable ambient concentrations are set for ozone (O₃), respirable particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), carbon monoxide (CO), nitrogen dioxide (NO₂), lead (Pb), and sulfur dioxide (SO₂). **Table 4.2-1** summarizes the NAAQS for these pollutants. The 8-hour ozone and PM_{2.5} standards listed in the table were promulgated in 1997 but challenged in the courts. In 2002, the courts upheld these two standards. EPA made final designations for the 8-hour ozone standards on April 15, 2004, and final designations for the new federal PM_{2.5} standards in December 2004. Most recently, due to the lack of evidence linking health problems to long-term exposure to coarse particle pollution, U.S. EPA has decided to revoke the annual PM₁₀ standard, which will be effective on December 17, 2006. In addition, U.S. EPA also revoked the 1-hour O₃ standards for the majority of the U.S., including California. Currently, U.S. EPA and the states are working together to develop air quality attainment plans (AQAPs) or air quality management plans (AQMPs) to comply with the AAQS, where applicable.

In California, the California Air Resources Board (CARB), which is part of the California EPA, has promulgated ambient air quality standards for ozone, PM₁₀, PM_{2.5}, CO, NO₂, SO₂, and Pb that are more stringent than U.S. EPA's standards, as shown in **Table 4.2-1**. In 2002, CARB revised the state annual PM₁₀ standard and established an annual PM_{2.5} standard. These standards went into effect on July 7, 2004. In April 2005, CARB approved a new 8-hour average standard for ozone. CARB has also developed standards for sulfates, hydrogen sulfide, visibility-reducing particulates, and vinyl chloride.

Counties and metropolitan areas are classified as being attainment or nonattainment with respect to these federal and state AAQS. An area's classification is determined by comparing actual monitored air pollutant concentrations with state and federal guidelines. More than 200 air monitoring stations are located in California and are part of the State and Local Air Monitoring Network. These stations are operated by CARB, local Air Pollution Control Districts (APCDs) or Air Quality Management Districts (AQMDs), private contractors, and the National Park Service. Areas that do not have sufficient data for a determination are given an "unclassified" designation and are not considered to be nonattainment.

**TABLE 4.2-1
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	California Standards ¹		Federal Standards ²		
		Concentration ³	Method ⁴	Primary ^{3,5}	Secondary ^{3,6}	Method ⁷
Ozone (O ₃)	1 Hour	0.09 ppm (180 µg/m ³)	Ultraviolet Photometry	None	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m ³)*		0.08 ppm 157 µg/m ³) ⁸		
Respirable Particulate Matter (PM ₁₀)	24 Hour	50 µg/m ³	Gravimetric or Beta Attenuation	150 µg/m ³	--	Inertial Separation and Gravimetric Analysis
	Annual Geometric Mean	20 µg/m ³		Revoked ¹⁰		
Fine Particulate Matter (PM _{2.5})	24 Hour	No Separate State Standard		35 µg/m ³	--	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m ³	Gravimetric or Beta Attenuation	15 µg/m ³	Same as Primary Standard	
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m ³)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m ³)	None	Non-dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m ³)		35 ppm (40 mg/m ³)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m ³)		--	--	--
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	--	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m ³)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.25 ppm (470 µg/m ³)		--		
Lead ⁹	30 days average	1.5 µg/m ³	Atomic Absorption	--	--	--
	Calendar Quarter	--		1.5 µg/m ³	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	--	Ultraviolet Fluorescence	0.03 ppm	--	Spectro-photometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m ³)		0.14 ppm (365 µg/m ³)	--	
	3 Hour	--		--	0.5 ppm (1300 µg/m ³)	
	1 Hour	0.25 ppm (655 µg/m ³)		--	--	
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		

TABLE 4.2-1 (CONTINUED)

FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards ¹		Federal Standards ²		
		Concentration ³	Method ⁴	Primary ^{3,5}	Secondary ^{3,6}	Method ⁷
Sulfates	24 Hour	25 µg/m ³	Ion Chromatography	No Federal Standards		
Vinyl Chloride ⁹	24 Hour	0.01 ppm (26 µg/m ³)	Gas Chromatography	No Federal Standards		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m ³)	Ultraviolet Fluorescence	No Federal Standards		

Notes:

- California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, suspended particulate matter—PM₁₀, 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.
- National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM₁₀, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM_{2.5}, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.
- 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 in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
- Any equivalent procedure that can be shown to the satisfaction of the CARB to give equivalent results at or near the level of the air quality standard may be used.
- National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
- National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- Reference method as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.
- New federal 8-hour ozone and fine particulate matter standards were promulgated by U.S. EPA on July 18, 1997. Contact U.S. EPA for further clarification and current federal policies.
- The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
- Due to lack of evidence linking health problems to long-term exposure to coarse particle pollution, U.S. EPA revoked the annual PM₁₀ standard in 2006 (effective December 17, 2006).

* - µg/m³ = micrograms per cubic meter; mg/m³ = milligrams per cubic meter; ppm = parts per million

Source: CARB, 2006b; U.S. EPA, 2006

CARB collects ambient air pollutant concentration data at two locations near the City of Roseville: the Roseville air monitoring station, located at 151 North Sunrise Avenue, and the North Highlands station in Sacramento County. These two stations are shown in **Figure 4.2-1**. **Table 4.2-2** summarizes the measured criteria pollutant concentrations over the past three years at these stations. Based on pollutant concentrations measured at these stations, the western portion of Placer County

TABLE 4.2-2

SUMMARY OF AMBIENT AIR DATA AT MONITORING STATIONS NEAR ROSEVILLE, 2003-2005

Pollutant	Avg. Time	Units	Standards		2003				2004				2005			
			Federal	State	Conc. ROS1	Days > Federal Stds	Conc. NHI1	Days > Federal Stds	Conc. ROS	Days > Federal Stds	Conc. NHI	Days > Federal Stds	Conc. ROS	Days > Federal Stds	Conc. NHI	Days > Federal Stds
O ₃	1-hr	ppm	None	0.09	0.133 ³	1	0.131 ³	1	0.106 ³	0	0.103 ³	0	0.118 ³	0	0.103 ³	0
	8-hr	ppm	0.08	0.070	0.109 ^{2,3}	5	0.094 ^{2,3}	4	0.085 ^{2,3}	1	0.088 ^{2,3}	1	0.106 ^{2,3}	9	0.085 ^{2,3}	2
PM ₁₀	24-hr	µg/m ³	150	50	58,59 ^{3,4}	0	62 ³	0	43	0	44	0	55,58 ^{3,4}	0	110 ^{3,4}	0
	Annual	µg/m ³	None ⁵	20	21 ³	0	21 ³	0	22 ³	0	24 ³	0	19	0	27 ³	0
PM _{2.5}	24-hr	µg/m ³	35	None	30	0	--	--	32,48 ^{2,4}	0	--	--	51,59 ^{2,4}	0	--	--
	Annual	µg/m ³	15	12	9.9	0	--	--	9.4	0	--	--	10.7	0	--	--
NO ₂	1-hr	ppm	None	0.25	0.083	--	0.087	--	0.067	--	0.146	--	0.079	--	0.06	--
	Annual	ppm	0.053	None	0.014	0	0.015	0	0.013	0	0.014	0	0.013	0	0.011	0
CO	1-hr	ppm	35	20	2.4	0	4.4	0	2.6	0	7.3	0	2	0	8	0
	8-hr	ppm	9	9	1.59	0	2.07	0	1.93	0	4.05	0	1.27	0	2.86	0
SO ₂	1-hr	ppm	--	0.25	--	--	--	--	--	--	--	--	--	--	--	--
	3-hr	ppm	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--
	24-hr	ppm	0.14	0.04	--	--	0.006	0	--	--	0.002	0	--	--	0.002	0
	Annual	ppm	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

1. Stations: ROS (Roseville) or North Sunrise; NHI (North Highlands)
2. Exceeds the federal standard
3. Exceeds the state standard
4. Federal/state values. The federal and state values differ due to differences in sampling methods and criteria
5. The federal annual PM₁₀ standards are revoked as of December 17, 2006

-- Data not collected at the monitoring station

µg/m³ = micrograms per cubic meter; ppm = parts per million; conc. = concentration

Source. CARB, 2006c

is in compliance with ambient air quality standards for all pollutants except the state 1-hour, and state and federal 8-hour O₃ standards, and the state 24-hour and annual PM₁₀ standard. The health effects and other characteristics of O₃, PM₁₀, PM_{2.5}, CO, NO₂, and SO₂ are discussed below. Pb, sulfates, and hydrogen sulfide are of least concern in this project area because ambient air concentrations are well below standards and no major sources of these pollutants exist in the project area.

Ozone

Ozone is a colorless gas that has a pungent odor and causes eye and lung irritation, reduces visibility, and damages crops. Ozone is a primary constituent of smog and is formed in the atmosphere in the presence of sunlight by a series of chemical reactions involving oxides of nitrogen (NO_x) and reactive organic gases (ROG). (Note that volatile organic compounds (VOCs) and ROG are describing the same category of pollutants and will be used interchangeably throughout this section.) Because these reactions occur on a regional scale, ozone is considered a regional air pollutant. Industrial fuel combustion and motor vehicles are primary sources of NO_x and ROG.

As shown in **Table 4.2-2**, ozone concentrations have exceeded federal and state AAQS over the past three years. These violations, along with other violations throughout the Sacramento region, resulted in the region being classified as nonattainment for the state's 1-hour, and federal and state's 8-hour ozone standards. The nonattainment region is known as the Sacramento Metropolitan Nonattainment Area and encompasses all of Sacramento and Yolo Counties, and portions of El Dorado, Placer (western Placer County, including the City of Roseville), Sutter, and Solano Counties.

Particulate Matter

Particulate matter is generally composed of particles floating in the air, such as dust, soot, aerosols, fumes, and mists. Of particular concern are inhalable, coarse particulate matter with aerodynamic diameters of 10 microns or less (PM₁₀). A subgroup of these particulates is fine particulates (particles with aerodynamic diameters less than 2.5 micrometers, PM_{2.5}), which have very different characteristics and potential health effects than coarse particulates (particles with aerodynamic diameter between 2.5 to 10 micrometers). Coarse particulates are generated by sources such as windblown dust, agricultural fields, and dust from vehicular traffic on unpaved roads. PM_{2.5} is typically emitted from combustion activities such as industrial and manufacturing process equipment, vehicle exhaust, and residential wood-burning stoves and fireplaces. PM_{2.5} is also formed in the atmosphere when gases such as SO₂, NO_x, and VOC emitted by combustion activities are transformed by chemical reactions in the air. Inhalation of PM₁₀ and PM_{2.5} affects breathing and the respiratory system, and in particular, can damage lung tissue and contribute to cancer and premature death. There are separate standards for PM_{2.5} because these fine particles can penetrate deep into the respiratory tract and cause their own unique adverse health effects.

Measured concentrations at the monitoring stations have not exceeded federal 24-hour PM₁₀ standards over the past three years. However, exceedances of the state PM₁₀ standards have occurred over the past three years. These measured concentrations have contributed to the region being classified as nonattainment for the state PM₁₀ standards.

Carbon Monoxide

CO is an odorless, colorless gas that can impair the transport of oxygen in the bloodstream, aggravate cardiovascular disease and cause fatigue, headache, confusion, and dizziness. CO forms through incomplete combustion of fuels in vehicles, wood stoves, industrial operations, and fireplaces. In Placer County, vehicular exhaust is a major source of CO. CO tends to dissipate rapidly into the atmosphere and consequently is generally a concern at the local level, particularly at major road intersections.

CO concentrations recorded at the two nearby monitoring stations are well below federal and state 1-hour and 8-hour standards; therefore, all of Placer County is in attainment of the CO standards.

Nitrogen Dioxide

NO₂ is a brownish, highly reactive gas that can irritate the lungs, cause pneumonia, and lower the resistance to respiratory infections. NO_x, which includes NO₂, is a key precursor to O₃ and acid rain. NO_x forms when fuel is burned at high temperatures and primarily from transportation sources and stationary fuel combustion sources such as electric utility and industrial boilers.

Data in **Table 4.2-2** show that measured concentrations of NO₂ have consistently remained well below the federal and state standards. With similar trends throughout the region (and state), the area is well within federal and state NO₂ standards.

Sulfur Dioxide

Sulfur dioxide is a colorless acidic gas with a strong odor. High concentrations of SO₂ affect breathing and may aggravate existing respiratory and cardiovascular disease. Sulfur dioxide is also a primary contributor to acid deposition, which causes acidification of lakes and streams and can damage trees, crops, building materials, and statues. In addition, sulfur compounds in the air can contribute to visibility impairment. The major source category for SO₂ is fossil fuel-burning equipment.

Sulfur dioxide is not measured at the Roseville station. However, the project area is designated as unclassified for federal and attainment for state standards. A summary of the attainment status for criteria pollutants within Placer County is presented in **Table 4.2-3**.

Toxic Air Contaminants

Toxic air contaminants (TACs) have the potential to cause irreparable health effects such as increased risk of contracting cancer. TACs are considered separately from the criteria pollutants in the regulatory process. Ambient air quality standards have not been set for TACs because ambient TAC concentrations vary from area to area and are dependent on the type of emission sources within the region. Therefore, TACs are typically regulated on a source-by-source basis (e.g., type and amount of TACs emitted, proximity to nearest sensitive receptors [hospitals, school, daycare, residences]). Motor vehicles also emit TACs, and the amount is dependent on travel speed, type of vehicle (e.g., diesel, gasoline), and engine size.

TABLE 4.2-3

PLACER COUNTY ATTAINMENT STATUS

Criteria Pollutant	State Designation ¹	Proposed 2006 State Designation ²	Federal Designation ³
CO	Unclassified	Unclassified	Unclassified/Attainment
NO ₂	Attainment	Attainment	Unclassified/Attainment
SO ₂	Attainment	Attainment	Unclassified
PM ₁₀	Non-attainment	Non-attainment	Unclassified
PM _{2.5}	Unclassified	Unclassified	Unclassifiable/Attainment
O ₃ (1-hour)	Non-attainment	Nonattainment	Not Applicable
O ₃ (8-hour)	Non-attainment	Nonattainment	Nonattainment
Lead	Attainment	Attainment	Not Applicable
Sulfates	Attainment	Attainment	Not Applicable
H ₂ S	Unclassified	Unclassified	Not Applicable
Visibility-Reducing PM	Unclassified	Unclassified	Not Applicable

Notes:

1. These state area designations are based on air quality data collected during 2001 through 2003 and became effective on July 23, 2005.
2. The CARB will consider the proposed changes to the state area designations based on air quality data collected during 2003 through 2005 on November 16–17, 2006.
3. The federal designations are as of September 2006.

H₂S =Hydrogen Sulfide
Source. CARB, 2006d.

Existing Emissions Sources

The ambient air concentrations presented above are a result of emissions from manmade and natural sources. Manmade sources of emissions are generally divided into three general types: stationary, areawide, and mobile sources. The contributions of these source categories vary from region to region. CARB maintains an emissions inventory to determine the sources and quantities of air pollution generated within the state's counties and air basins. **Table 4.2-4** presents a summary of the estimated 2005 annual average pollutant emission data for the Sacramento Valley portion of Placer County and general source categories. Emissions from mobile sources constitute the majority of ROG, CO, NO_x, and SO_x emissions in the area. Areawide emissions contribute more than 75 percent of the PM₁₀ emissions in Placer County.

TABLE 4.2-4						
SUMMARY OF 2005 ESTIMATED ANNUAL AVERAGE EMISSIONS IN PLACER COUNTY (TONS/DAY)						
SOURCE	ROG	CO	NO_x	SO_x	PM₁₀	PM_{2.5}
Stationary Sources						
Fuel Combustion	0.4	1.9	2.9	0	0.2	0.2
Waste Disposal	0.1	--	--	--	--	--
Cleaning And Surface Coatings	2.3	--	--	--	0	0
Petroleum Marketing	0.8	--	--	--	--	--
Industrial Processes	1.5	0.2	0.1	0	1.4	0.8
Total Stationary Sources	5.1	2.1	3.0	0.1	1.7	1.0
Area Sources						
Solvent Evaporation	2.8	--	--	--	--	--
Miscellaneous Processes	1.9	32.2	0.8	0.1	13.0	5.3
Total Area Sources	4.7	32.2	0.8	0.1	13.0	5.3
Mobile Sources						
Other Mobile Sources	4.4	34.7	10.5	0.4	0.7	0.6
On-Road Motor Vehicles	6.0	56.4	9.3	0.1	0.3	0.2
Total Mobile Sources	10.4	91.0	19.8	0.5	1.0	0.8
Total All Sources	20.3	125.4	23.6	0.7	15.7	7.1
CO = carbon monoxide; NO _x = oxides of nitrogen; PM _{2.5} = fine particulate matter; PM ₁₀ = respirable particulate matter; ROG = reactive organic gases; SO _x = oxides of sulfur; Source: CARB, 2006e						

4.2.3 REGULATORY SETTING

4.2.3.1 Federal

The federal Clean Air Act Amendments (CAAA) of 1977 requires each state to adopt a State Implementation Plan (SIP) outlining pollution control measures to attain the federal AAQS in non-attainment areas of the state or comply with the Federal Implementation Plan. The SIP is not a single document, but a compilation of new and previously submitted plans, programs, district rules, state regulations, and federal controls detailing how the AAQS are to be met in each local area. Areas designated as serious nonattainment are required to achieve attainment by June 15, 2013. As discussed previously, the federal government, through the U.S. EPA, has established primary and secondary NAAQS for criteria pollutants under the provisions of the CAA. U.S. EPA has also promulgated new 8-hour ozone and PM_{2.5} ambient air quality standards, which have been upheld in the courts. U.S. EPA made final designations for the 8-hour ozone standards on April 15, 2004, and final designations for the new federal PM_{2.5} standards in December 2004. With the new 8-hour ozone standard in place, the 1-hour ozone standard has been revoked for all regions throughout California.

4.2.3.2 State

CARB coordinates and oversees both state and federal air pollution control programs in California. CARB oversees activities of local AQMDs/APCDs and is responsible for incorporating AQMPs or AQAPs from these local air districts into a SIP for approval by the U.S. EPA. California EPA established its own AAQS (CAAQS) for criteria air pollutants which are, in general, more stringent than the federal standards. Under the California CAA, each area exceeding the CAAQS for O₃, CO, SO₂, and NO₂ must develop an AQMP or AQAP to achieve these standards (California Health and Safety Code 40911.)

The California Health and Safety Code Section 40914 states that air districts must design a plan that achieves an annual reduction in districtwide emissions of 5 percent or more, averaged every consecutive three-year period. As such, local air districts and other agencies prepare AQMPs/AQAPs and submit them to CARB for review and approval. CARB then forwards the SIP revisions to U.S. EPA for approval and publication in the Federal Register. CARB enforces these standards by regulating mobile emission sources and overseeing activities of the County APCDs and regional AQMDs.

4.2.3.3 Local

Placer County Air Pollution Control District

The proposed project is located in the City of Roseville, where air quality is regulated by the local air district, Placer County Air Pollution Control District (PCAPCD). The 1976 Lewis Air Quality Management Act established the PCAPCD and other air districts throughout the State of California. Significant authority for air quality control has been given to local APCDs or AQMDs, which regulate stationary source emissions and develop local attainment plans. PCAPCD has the authority to manage transportation activities at indirect sources and regulate stationary source emissions. Indirect sources of pollution are generated when minor sources collectively emit a substantial amount of pollution (e.g., motor vehicles at an intersection, a mall, and highways.)

At the local level, the PCAPCD regulates air quality by establishing local air quality regulations, permitting stationary sources, and planning activities related to air quality. The PCAPCD is also responsible for enforcing and implementing federal and state standards.

The City of Roseville is located approximately 16 miles northeast of downtown Sacramento, which places the City in the northeast fringe of the SMA. The AQMD and APCD within the SMA worked together to develop the 1994 Sacramento Area Regional Ozone Attainment Plan to satisfy the SIP requirement for the 1-hour ozone standard. This Attainment Plan identifies source controls and trip reduction strategies that aimed at achieving the federal 1-hour ozone standard by 2005. The attainment strategy requires reductions of approximately 38 percent of ROG and 40 percent of NO_x (O₃ precursors) relative to 1990 baseline emissions. The strategy relies heavily on mobile source NO_x reductions because, as shown previously, mobile sources generate approximately the majority of the regional NO_x emissions. With the revocation of the 1-hour ozone standard, the APCDs will continue to implement the existing control strategies. Efforts are currently underway to develop and submit an 8-hour ozone attainment plan by June 2007. The new strategies would potentially include strategies for progressive reduction of air pollutants by promoting active public involvement, by

encouraging compliance through positive influence and behavior, and through public education in both public and private sectors.

City of Roseville

The City of Roseville contributes to improved air quality through strategic land use and development planning, and coordination with adjacent counties to avoid conflicts with the goal of the PCAPCD, which is to meet federal and state AAQS. The Air Quality Element in the City of Roseville's General Plan outlines the goals and policies aimed at improving air quality in Roseville. The goals and policy applicable to this project are identified below:

- Goal 1a:** Improve Roseville's air quality by achieving and maintaining ambient air quality standards established by the EPA and CARB.
- Goal 2:** Integrate air quality planning with the land use and transportation planning process.
- Goal 4:** Increase the capacity of the transportation system, including the roadway system and alternative modes of transportation.
- Policy 5:** Develop transportation systems that minimize vehicle delay and air pollution.

4.2.4 IMPACTS

The significance of air quality impacts resulting from the implementation of the proposed project (i.e., construction and operation) are analyzed in this section. Through the enhanced CEQA review process, PCAPCD developed criteria pollutant significance thresholds for proposed projects that generate air pollutants. The thresholds presented in **Table 4.2-5** apply to both short- (i.e., construction) and long-term (i.e., operation) air pollutant emissions. Projects with the potential to generate emissions exceeding the thresholds are considered to have a significant impact on air quality. If the project's emissions exceed any of the significance criteria, then feasible mitigation measures must be implemented to reduce air quality impacts to a level considered less than significant.

4.2.4.1 Method of Analysis

To accurately assess significance of air quality impacts from construction and operation of the proposed project, project-specific data and reasonable assumptions are used to make the determination. Proposed roadway and intersection improvements would occur from 2007 through 2020. The proposed improvements include widening roadways and intersections to increase the number of lanes, as well as modifying lanes that would not require widening (i.e., restriping). These improvements are expected to reduce traffic congestion and improve the LOS¹ on roadways throughout the City of Roseville.

¹ LOS is a qualitative measure of traffic flow based on a number of factors such as speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort, and convenience.

Pollutant	Significance Thresholds (lb/day)
ROG	82
NO _x	82
SO _x	136
PM ₁₀	82
CO	550
CO = carbon monoxide; NO _x = oxides of nitrogen; PM _{2.5} = fine particulate matter; PM ₁₀ = respirable particulate matter; ROG = reactive organic gases; SO _x = oxides of sulfur	

To quantify construction emissions and provide an accurate assessment of air quality impacts without grossly overestimating impacts, it is assumed that a maximum of two road widening projects would occur at any one time, with minimal overlapping of construction activities. The assumption is considered to be reasonable because simultaneous roadway construction would potentially create unnecessary traffic congestion throughout Roseville. Furthermore, funding for roadway widening would most likely be received in increments between 2007 and 2020, therefore reducing the likelihood of simultaneous construction work at multiple roadways (i.e., more than two projects). Modifications to intersections and roadways that do not require widening beyond the right-of-way designated in the current CIP are considered to have less-than-significant air quality impacts, and therefore, are not evaluated in this section. Emissions related to construction were quantified using Sacramento Metropolitan Air Quality Management District's (SMAQMD) Road Construction Emission Model (SMAQMD, 2006).

Air quality impacts associated with operational activities were assessed using traffic data provided by DKS Associates. The type of traffic data provided include intersections analyzed, LOS, volume to capacity (V/C) ratio, peak-hour vehicle volumes, and geometrics. Traffic data between the 2020 No Project conditions (Scenario 4) and 2020 Plus Project conditions (Scenario 5) were compared to determine significance of air quality impacts. In addition, localized air quality impacts (i.e., CO hot-spot) were also analyzed at the eight intersections with the worst LOS (LOS F). Intersections with the worst LOS are assumed to be the worst-case scenario. Therefore, if there are no CO hot-spots at these intersections, it was determined that the remaining intersections would not have CO hot-spots. CO concentrations were estimated at these intersections using the EMFAC2002 and CALINE4 models provided by CARB. The CO hot-spot analysis was conducted in accordance with the protocol recommended by the California Department of Transportation (Caltrans) and published in the Institute of Transportation Studies 1997 document entitled *Transportation Project-Level Carbon Monoxide Protocol*. Air quality modeling outputs for construction and operation are provided in Appendix F.

4.2.4.2 Standards of Significance

For the purposes of this Draft EIR, a significant impact would occur if the proposed project would result in the following:

- Cause or contribute to local CO concentrations exceeding 20 parts per million (ppm) over a 1-hour averaging period or 9 ppm over an 8-hour averaging period at the street corners of congested intersections;
- Cause short- and/or long-term project emissions to exceed PCAPCD's significance thresholds as presented in **Table 4.2-5**; or
- Not meet the goals and policies of the City's General Plan or relevant air quality plans prepared by PCAPCD.

4.2.4.3 Impacts and Mitigation Measures

IMPACT 4.2-1:	Construction-related air pollutant emissions
APPLICABLE ORDINANCES AND STANDARDS:	PCAPCD significance thresholds
SIGNIFICANCE WITH ORDINANCES AND STANDARDS:	Less than Significant
MITIGATION MEASURE:	Mitigation Measure 4.2-1: Implement construction emission control measures
RESIDUAL SIGNIFICANCE:	Less than Significant

Construction equipment, worker vehicles exhaust, and fugitive dust generated from grading activities would cause emissions during roadway widening.

PCAPCD has not created a method for calculating potential construction emissions associated with various projects; therefore, SMAQMD's construction emissions calculation method (Road Construction Emission [RCE] Model) was used to estimate daily emissions from widening a roadway. Equipment expected to be used during construction are presented in **Table 4.2-6**. Roadway dimensions of 10 acres from the largest roadway widening (Fiddymont Road widening from Pleasant Grove Boulevard to Baseline Road) and a project of approximately 5 acres, for a total of 15 acres were used as input into the RCE model. These widening projects are considered to be the worst-case construction scenario. If air quality impacts are found to be less than significant at these locations, then air quality impacts from construction activities at other roadway segments and intersections would also be considered less than significant. Note that the RCE model provides a default equipment list based on the data entered (i.e., total acreage and duration of construction [12 months].) To reflect a realistic construction scenario as well as to correlate with construction activities for road widening projects and construction equipment data provided by City of Roseville staff, certain default construction equipment parameters were changed. For example, the RCE model default parameters estimated two water trucks and two signal boards would be used. This was changed to four water trucks and four signal boards, which generates twice the amount of air pollutants, but is considered to be more realistic for two separate projects. Similarly, the two default scrapers and excavators were removed from the grubbing/land clearing and site grading activities,

respectively, because the default data also listed other equipment such as dozers and trenchers that can perform identical tasks. The RCE model run is provided in Appendix F.

Fugitive dust emissions were estimated based on the assumption that a maximum of 7 acres per day would be disturbed. Because the PCAPCD significance thresholds are based on daily emissions, the maximum amount of air pollutants emitted for construction activities was also estimated on a daily basis. Daily emissions generated during project construction would vary depending on the type and intensity of construction activity. **Table 4.2-7** presents calculated emissions on a peak construction day.

Equipment Description	Quantity of Equipment
Dozer	2
Signal Board	4
Wheeled Grader	2
Wheeled Loader	2
Scraper	1
Compactor	2
Trenchers	2
Pavers	2
Paving Equipment	2
Rollers	3
Concrete Truck	4
Semi-trucks – Asphalt	4
Water Truck	4
Source: Gandler, 2006; RCE Model default data; and reasonable assumptions.	

Pollutant	Significance Thresholds (lb/day)	Maximum Daily Construction Emissions (lb/day)
ROG	82	13
NO _x	82	81
PM ₁₀	82	39
CO	550	70

Because the significance thresholds are not exceeded on a peak construction day, construction associated with the proposed project would result in **less than significant** air quality impacts. However, construction emissions control measures presented in Mitigation Measure 4.2-1 are recommended to reduce overall construction emissions within the SVAB.

IMPACT 4.2-2:	Operational air pollutant emissions under Existing Plus Project conditions
APPLICABLE ORDINANCES AND STANDARDS:	Placer County APCD significance thresholds
SIGNIFICANCE WITH ORDINANCES AND STANDARDS:	Less than Significant
MITIGATION MEASURE:	None required
RESIDUAL SIGNIFICANCE:	Less than Significant

A qualitative evaluation of Existing Plus Project conditions (Scenario 2) was conducted because the proposed project is focused on relieving 2020 traffic congestion in Roseville that could result from growth in the City and future development outside the City limits, which will lead to increased traffic within the City limits. Most of the improvements are not needed to accommodate existing traffic demand, and in fact, would not be constructed under existing conditions.

The functional result of Existing Plus Project conditions would be to add capacity at existing intersections and roadways. Traffic volumes and pollutant emissions would increase at some locations as a result of the proposed improvements, while other locations would experience decreases in traffic volumes and emissions based on the potential redistribution of traffic from the improvements. As described in Section 4.1.4.3.1, the number of intersections operating at unacceptable conditions (LOS D or worse) would decrease under the proposed project. Therefore, the impact of project operations on existing conditions would be **less than significant**.

IMPACT 4.2-3:	Operational air pollutant emissions under 2020 Plus Project conditions
APPLICABLE ORDINANCES AND STANDARDS:	Placer County APCD significance thresholds
SIGNIFICANCE WITH ORDINANCES AND STANDARDS:	Less than Significant
MITIGATION MEASURE:	None required
RESIDUAL SIGNIFICANCE:	Less than Significant

Data in **Table 4.2-4** indicate that mobile sources are responsible for a substantial portion of total manmade emissions in the Roseville area. Vehicle traffic is generated as people move among various land uses. The proposed project would include modifications and widening improvements at intersections and roadways to accommodate future citywide buildout conditions within Roseville and adhere to the City's LOS policy. These improvements are designed to reduce vehicular traffic congestion and improve LOS in Roseville.

Traffic data provided information for 172 intersections in Roseville for 2020 No Project (Scenario 4) and 179 intersections for 2020 Plus Project (Scenario 5) conditions. When compared to No Project conditions, the proposed project would improve LOS at 22 intersections and degrade LOS at 4 intersections (see Section 4.1, Transportation and Circulation). In addition, traffic data show that the V/C ratio is expected to decrease at 69 other intersections with implementation of the proposed project, but not significantly enough to change the LOS. V/C ratio is used to assess vehicle volume on a particular roadway segment and whether the roadway capacity is congested (i.e., the higher the V/C ratio, the more congested a roadway segment), and is used to calculate LOS. Therefore, the proposed improvements would improve travel conditions at over 50 percent of the intersections in the City's CIP. Furthermore, the proposed project would not involve constructing any stationary air pollutant sources or affect anticipated land uses or population projections, and therefore, the project would not increase the total number of vehicle miles traveled in the Roseville area.

Consequently, with improved LOS and reduced V/C, it can be deducted that the implementation of the proposed project would result in less traffic congestion and less travel time, which can be interpreted as reducing vehicle emissions within Roseville. Therefore, the impact of project operations on 2020 conditions is considered **less than significant**.

IMPACT 4.2-4:	CO concentration at intersections
APPLICABLE ORDINANCES AND STANDARDS:	Federal and State Ambient Air Quality Standards
SIGNIFICANCE WITH ORDINANCES AND STANDARDS:	Less than Significant
MITIGATION MEASURE:	None required
RESIDUAL SIGNIFICANCE:	Less than Significant

Under congested traffic and high vehicle volumes conditions, ambient CO concentrations can be substantially increased at intersections because of slower travel speed and increased idle time. With these extreme conditions, CO levels can exceed the 1-hour standard of 20 parts per million (ppm) and/or the 8-hour standard of 9 ppm, which is known as a CO hot-spot. To ensure that the proposed project would not create any CO hot-spots, eight intersections with the worst LOS (i.e., LOS F) were identified using traffic data provided by DKS Associates for air modeling, using methodology approved by Caltrans.

To determine if a CO hot-spot would occur at any of these intersections, traffic data such as peak evening vehicle volumes, roadway configurations (i.e., geometrics), and the highest ambient CO concentrations within the last three years (as shown in **Table 4.2-2**) were used to estimate CO concentrations in 2020 for the Plus Project conditions (Scenario 5). In addition, the EMFAC2002 mobile emission factor model was used to estimate CO emission factors for vehicles at travel speeds of 5 and 10 miles per hour. All these data were used as input parameters for the CALINE4 pollutant dispersion model. The worst-case meteorological conditions were assumed. To represent a worst-case scenario, the model receptors were assumed at the four corners of each street intersection to represent pedestrians waiting to cross the intersections. Using these parameters, the model predicts the 1-hour concentration at the receptor locations. **Table 4.2-8** provides the results of the CO modeling effort. Data in **Table 4.2-8** show that the predicted CO concentrations at all of the intersections would not violate the state's 1-hour or 8-hour CO standards during the p.m. peak

traffic hour. Therefore, the operation of the proposed project would not cause any CO hot-spots at any intersections and this impact would be considered **less than significant**.

Intersection ID ¹	Intersection Description	LOS	Maximum 1-hour CO concentration (ppm)	Maximum 8-hour CO concentration (ppm)	California 1-hour CO standard (ppm)	California 8-hour CO standard (ppm)
18	Vernon St and Cirby Way	F	8.9	4.7	20	9
21	Harding Blvd and Douglas Blvd	F	8.9	4.7	20	9
60	Harding Blvd and Wills Rd	F	8.8	4.7	20	9
96	Galleria Blvd Roseville Pkwy	F	9.1	4.8	20	9
117	Sunrise Ave and Cirby Way	F	9.1	4.8	20	9
118	Sunrise Ave and Coloma Way	F	8.9	4.7	20	9
125	Sunrise Ave and Roseville Pkwy	F	9.0	4.8	20	9
128	Taylor Rd and Eureka Rd	F	9.2	4.9	20	9

Notes:

1 Intersection identification numbers used in traffic data provided by DKS Associates.
CO = carbon monoxide; LOS = level of service; ppm = parts per million

IMPACT 4.2-5:	Consistency with Air Quality Attainment Plans
APPLICABLE ORDINANCES AND STANDARDS:	State Implementation Plan
SIGNIFICANCE WITH ORDINANCES AND STANDARDS:	Less than Significant
MITIGATION MEASURE:	None required
RESIDUAL SIGNIFICANCE:	Less than Significant

The primary sources of ROG, NO_x, and CO in Placer County are from mobile sources (i.e., motor vehicles), with area sources (e.g., wood-burning stoves and fireplaces) and stationary sources also contributing to emissions of particulate matter. To comply with the AAQS, regional and county air quality attainment plans (AQAPs) are developed by the local AQMDs/APCDs and the Metropolitan Planning Organizations. The AQAP consists of growth projections that are provided in the General Plan and associated amendments. Based on these projections, pollutant reduction strategies including stringent pollutant control measures, are promulgated and enforced by local AQMDs/APCDs to offset the effects of normal growth and also reduce existing ambient air concentrations. The primary objective of the AQAP is to comply with the AAQS. To ensure proposed projects do not hinder the objective of the AQAP, a consistency analysis is conducted. The analysis determines whether operational emissions associated with the proposed project supports or conflicts with the growth projections stated in the General Plan. Because the pollutant reduction strategies in the AQAP are based on the growth projections stated in the General Plan and Regional Transportation Plan, any proposed projects that were not included in the General Plan are considered to be inconsistent with the AQAP. However, if the proposed project can be shown to be consistent with the General Plan (i.e., no net increase of air pollution), then it is considered to be consistent with the AQAP. Hence, the proposed 2020 CIP Update is considered to be consistent with the General Plan and the AQAP because improving the roadways within the City should result in better LOS, faster travel speeds, and reduced travel times. The combination of all these factors would result in less air pollutants emitted from motor vehicles.

The current AQAP for the project area is the Sacramento Regional Nonattainment Area 8-hour Ozone Rate of Progress Plan (Early Progress Plan). This plan fulfills the federal 8-hour ozone requirements for a 2002-2008 Reasonable Further Progress Plan for the Sacramento regional nonattainment area. The Early Progress Plan contains the most recent data on air quality and emissions to make progress towards attaining the 8-hour ozone standard. Within this plan are strategies to reduce overall pollutants within the region. The goal of the proposed project is to minimize traffic congestion within the City of Roseville and comply with the Circulation Element of the Roseville's General Plan. Since these goals would be met with implementation of the proposed project, the project is considered to be consistent with the AQAP.

Furthermore, to evaluate whether the proposed improvements are consistent with the Air Quality Element goals and policies of Roseville's General Plan, Goals 1a, 2, and 4 and Policy 5 of the General Plan were considered in this analysis (see Section 4.2.3, Regulatory Setting, for a complete description of these goals and policy).

The proposed project would comply with Goal 1a by not creating any CO hot-spots, by improving traffic circulation at over 50 percent of the affected intersections, and by improving air quality when compared to No Project conditions. The proposed project would satisfy Goal 2 since this air quality evaluation is being considered as part of the City's transportation planning process, and includes consideration of planning processes outside of the City of Roseville. The proposed project would comply with Goal 4 and Policy 5 because the objective of the proposed improvements and modifications to Roseville's transportation system is to improve LOS and reduce traffic congestion. Hence, the proposed project is deemed to be consistent with the existing AQAP and Roseville's General Plan.

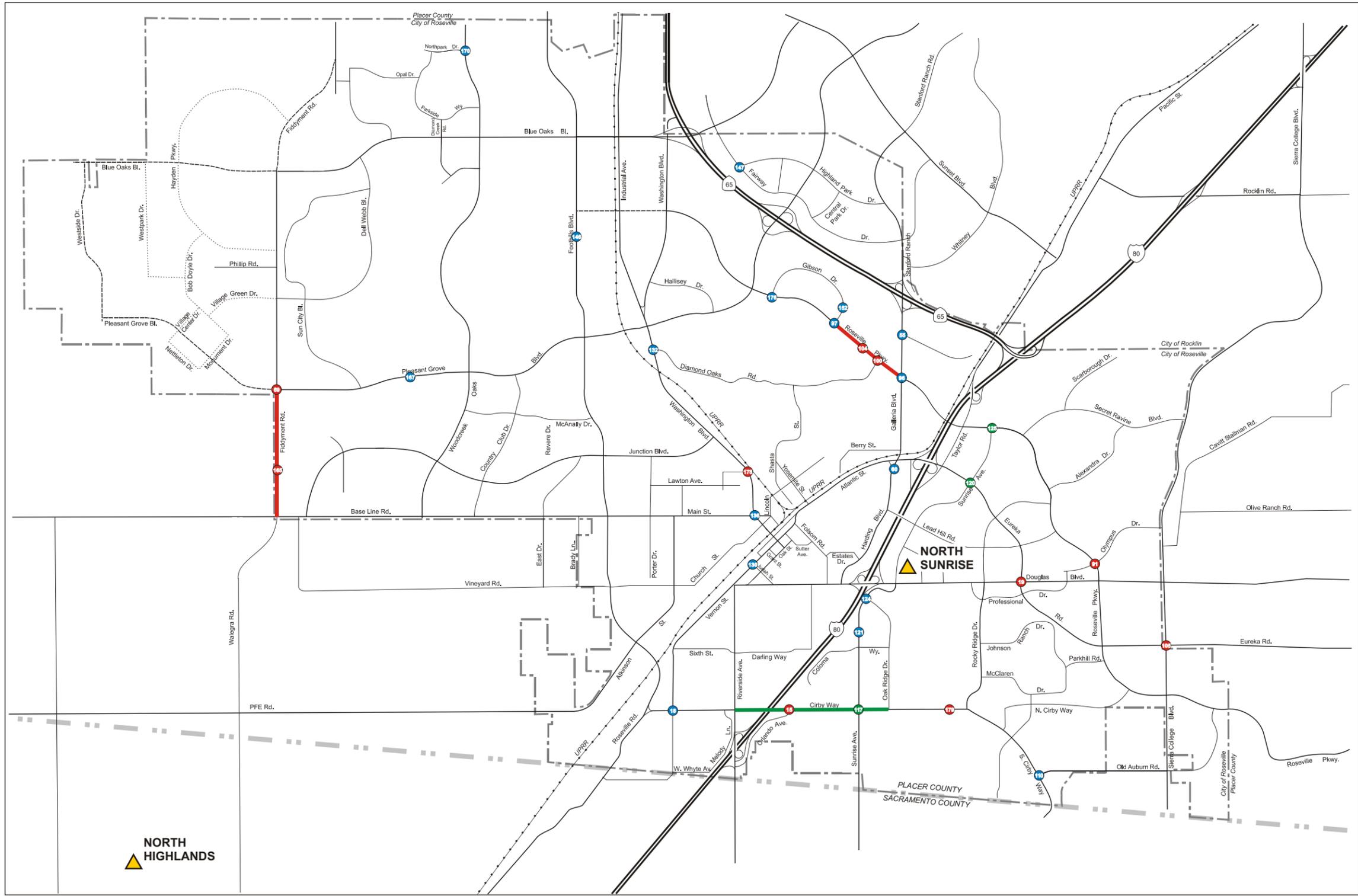
4.2.5 MITIGATION MEASURES

Mitigation Measure 4.2-1: Implement Construction Emissions Control Measures

This Mitigation Measure applies to Impact 4.2-1.

Construction emissions associated with the proposed project would not exceed the PCAPCD's significance thresholds and Mitigation Measures are not required. However, the implementation of feasible and applicable control measures listed below would further reduce construction emissions:

- Minimize idling time to 10 minutes for all diesel-powered equipment.
- Apply water to control dust as needed to prevent dust impacts offsite. Operational water truck(s) shall be onsite, as required, to control fugitive dust. Construction vehicles leaving the site shall be cleaned to prevent dust, silt, mud, and dirt from being released or tracked offsite.
- Spread soil binders on unpaved roads and employee/equipment parking areas and wet broom or wash streets if silt is carried over to adjacent public thoroughfares.
- Install wheel washers or wash all trucks and equipment leaving the site.
- Develop a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service.



- LEGEND**
- Air Monitoring Station
 - Widening
 - Reduced Widening
 - Modify: No Widening
 - City of Roseville Boundary

Source:
DKS Associates, 2006

AIR MONITORING STATIONS
City of Roseville 2020
Transportation System CIP Update
Roseville, California



FIGURE 4.2-1