Section 3.8
Air Quality

Introduction

This section addresses air quality impacts associated with the construction and operation of the proposed roadway improvements. Cumulative air quality impacts associated with growth projected in the CVMP area are also evaluated.

This section includes a discussion of existing conditions, a summary of local policies and regulations related to air quality, an analysis of air quality impacts related to the proposed program, and cumulative growth impacts per the CVMP. Where significant impacts are identified, mitigation measures are recommended, where feasible, to reduce impacts.

Methodology

Jones & Stokes reviewed the following sources of information to prepare this section.

- Benson, P. E. 1989. CALINE4—a dispersion model for predicting air pollution concentrations near roadways. California Department of Transportation. Sacramento, CA.
- California Air Resources Board. 2006a. The California Almanac of Emissions and Air Quality: 2006 Edition. Planning and Technical Support Division. Sacramento, CA.
- California Air Resources Board. 2006b. ARB Databases: Aerometric Data Analysis and Management System (ADAM). Last Revised: December 16, 2006. Available: <http://www.arb.ca.gov/html/databases.htm>. Accessed: March 8, 2007.
- California Air Resources Board. 2005. Air Quality and Land Use Handbook: A Community Health Perspective. April.
- DKS Associates. 2007. Carmel Valley Master Plan Traffic Study. July. Oakland, CA. Prepared for the County of Monterey, Oakland, CA.
- Monterey Bay Unified Air Pollution Control District. 2004. CEQA Air Quality Guidelines. June 2004. Monterey, CA.

- U.S. Environmental Protection Agency. 2006. Air Data. Last Revised: March 2, 2007. Available: <http://www.epa.gov/air/data/reports.html>. Accessed: March 8, 2007.

Additional information on air quality in Carmel Valley is provided in Appendices D and E.

Environmental Setting

This section discusses existing air quality conditions in the program area; describes pollutants of concern in the program corridor area; identifies sensitive receptors in the program area; and describes the overall regulatory framework for air quality management in California and the region, including federal and state ambient air quality standards; and describes the existing air quality regulations applicable to the program corridor. Information presented in this section is based in part on communication with the Monterey Bay Unified Air Pollution Control District (MBUAPCD).

The program area is located within the North Central Coast Air Basin (NCCAB), which includes all of Monterey, Santa Cruz, and San Benito Counties. The MBUAPCD has jurisdiction over air quality issues throughout the three-county NCCAB.

Climate and Topography

The NCCAB lies along the central coast of California covering an area of 5,159 square miles. The northwest sector of the basin is dominated by the Santa Cruz Mountains. The Diablo Range marks the northeastern boundary, and together with the southern extent of the Santa Cruz Mountains, forms the Santa Clara Valley, which extends into the northeastern tip of the Basin. Farther south, the Santa Clara Valley evolves into the San Benito Valley, which runs northwest to southeast and has the Gabilan Range as its western boundary. To the west of the Gabilan Range is the Salinas Valley, which extends from Salinas at the northwest end to King City at the southeast end. The western side of the Salinas Valley is formed by the Sierra de Salinas, which also forms the eastern side of the smaller Carmel Valley; the coastal Santa Lucia Range defines the western side of the valley.

The semi-permanent high-pressure cell in the eastern Pacific is the basic controlling factor in the climate of the air basin. In summer, the high-pressure cell dominates, and causes persistent west and northwest winds over the entire California coast. Air descends in the Pacific High forming a stable temperature inversion of hot air over a cool coastal layer of air. The onshore air currents pass over cool ocean waters to bring fog and relatively cool air into the coastal valleys. The warmer air aloft acts as a lid to inhibit vertical air movement.

The generally northwest-to-southeast orientation of mountain ridges tends to restrict and channel the summer onshore air currents. Surface heating in the interior of the Salinas and San Benito Valleys creates a weak low pressure, which intensifies the onshore airflow during the afternoon and evening.

In fall, the surface winds become weak and the marine layer grows shallow, dissipating altogether on some days. The airflow is occasionally reversed in a weak offshore movement, and the relatively stationary air mass is held in place by the Pacific High pressure cell, which allows pollutants to build up over a period of a few days. It is most often during this season, that the north or east winds develop to transport pollutants from either the San Francisco Bay area or the Central Valley into the NCCAB.

During winter, the Pacific High migrates southward and exerts less influence on the air basin. Air frequently flows in a southeasterly direction out of the Salinas and San Benito Valleys, especially during night and morning hours. Northwest winds are nevertheless still dominant in winter, but easterly flow is more frequent. The general absence of deep, persistent inversions and the occasional storm systems usually result in good air quality for the basin as a whole in winter and early spring.

According to data recorded by the Monterey station, the program area experiences moderate temperatures and humidities. Temperatures average 58 degrees Fahrenheit (F) annually. Summer afternoon high temperatures average 61 degrees F, decreasing to an average 50 degrees F overnight. Winter temperatures average 56 degrees F in the daytime, and 43 degrees F in the nighttime. Temperatures above 70 degrees F, or below 40 degrees F, occur only in unusual weather conditions. Because of the moderating marine influence, which decreases with distance from the ocean, monthly and annual spreads between temperatures are greatest inland and smallest at the coast. Temperature has an important influence on basin wind flow, dispersion along mountain ridges, vertical mixing, and photochemistry.

According to data recorded from the Monterey station, precipitation is highly variable seasonally. Rainfall in the Monterey area averages 25.5 inches annually. Summers are often completely dry, with frequent periods of no rain through the early fall. Annual rainfall is lowest in the coastal plain and inland valleys, higher in the foothills, and highest in the mountains.

Criteria Pollutants

The federal and state governments have established ambient air quality standards (AAQS) for the following six criteria pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (particulate matter 10 microns or less in diameter [PM10] and particulate matter 2.5 microns or less in diameter [PM2.5]), and lead. Ozone, NO_2, and particulate matter are generally considered to be regional pollutants, as these pollutants or their precursors affect air quality on a regional scale. Pollutants such as CO, SO_2, lead, and particulate matter are considered to be local pollutants that tend to

accumulate in the air locally. Particulate matter is considered to be a localized pollutant as well as a regional pollutant. In the program corridor area, CO, PM10, and ozone are of particular concern. Toxic air contaminants (TACs) are also discussed below, although no state or federal ambient air quality standards exist for these pollutants. Brief descriptions of these pollutants are provided below, while a complete summary of state and national AAQS is provided in Table 3.8-1.

Ozone

Ozone is a respiratory irritant that increases susceptibility to respiratory infections. It is also an oxidant that can cause substantial damage to vegetation and other materials. Ozone is a severe eye, nose, and throat irritant. Ozone also attacks synthetic rubber, textiles, plants, and other materials. Ozone cause causes extensive damage to plants by leaf discoloration and cell damage.

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors—reactive organic gases (ROG) and oxides of nitrogen (NO_x)—react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem. The ozone precursors, ROG and NO_X, are mainly emitted by mobile sources and by stationary combustion equipment.

State and federal standards for ozone have been set for an 8-hour averaging time. The state 8-hour standard is 0.07 parts per million (ppm), not to be exceeded, while the federal 8-hour standard is 0.08 ppm, not to be exceeded more than three times in any 3-year period. The state has established a 1-hour ozone standard of 0.09 ppm, not to be exceeded, while the federal 1-hour ozone standard of 0.12 ppm has recently been replaced by the 8-hour standard. State and federal standards are summarized in Table 3.8-1.

Carbon Monoxide

Carbon monoxide is essentially inert to plants and materials but can have significant effects on human health. Carbon monoxide is a public health concern because it combines readily with hemoglobin and reduces the amount of oxygen transported in the bloodstream. Carbon monoxide can cause health problems such as fatigue, headache, confusion, dizziness, and even death.

Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

Table 3.8-1. Ambient Air Quality Standards Applicable in California

			Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria	
Pollutant	Symbol	Average Time	California	National	California	National	California	National
Ozone*	O_3	1 hour	0.09	NA	180	NA	If exceeded	NA
		8 hours	0.070	0.08	137	157	If exceeded	If fourth highest 8-hour concentration in a year, averaged over 3 years, is exceeded at each monitor within an area
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
(Lake Tahoe only)		8 hours	6	NA	7,000	NA	If equaled or exceeded	NA
Nitrogen dioxide	NO_2	Annual average	NA	0.053	NA	100	NA	If exceeded on more than 1 day per year
		1 hour	0.25	NA	470	NA	If exceeded	NA
Sulfur dioxide	SO_2	Annual average	NA	0.03	NA	80	NA	If exceeded
		24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day per year
		1 hour	0.25	NA	655	NA	If exceeded	NA
Hydrogen sulfide	H_2S	1 hour	0.03	NA	42	NA	If equaled or exceeded	NA
Vinyl chloride	C_2H_3Cl	24 hours	0.01	NA	26	NA	If equaled or exceeded	NA
Inhalable particulate matter	PM10	Annual arithmetic mean	NA	NA	20	50	NA	If exceeded at each monitor within area
		24 hours	NA	NA	50	150	If exceeded	If exceeded on more than 1 day per year
	PM2.5	Annual arithmetic mean	NA	NA	12	15	NA	If 3-year average from single or multiple community-oriented monitors is exceeded
		24 hours	NA	NA	NA	65	NA	If 3-year average of 98^{th} percentile at each population-oriented monitor within an area is exceeded

Table 3.8-1. Continued

Pollutant	Symbol	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria	
			California	National	California	National	California	National
Sulfate particles	SO_4	24 hours	NA	NA	25	NA	If equaled or exceeded	NA
Lead particles	Pb	Calendar quarter	NA	NA	NA	1.5	NA	If exceeded no more than 1 day per year
		30-day average	NA	NA	1.5	NA	If equaled or exceeded	NA

Notes: All standards are based on measurements at 25ºC and 1 atmosphere pressure.
National standards shown are the primary (health effects) standards.
NA = not applicable.

* The U.S. Environmental Protection Agency recently replaced the 1-hour ozone standard with an 8-hour standard of 0.08 part per million. EPA issued a final rule that revoked the 1-hour standard on June 15, 2005. However, the California 1-hour ozone standard will remain in effect.

Source: ARB 2006c.

State and federal CO standards have been set for both 1-hour and 8-hour averaging times. The state 1-hour standard is 20 ppm by volume, and the federal 1-hour standard is 35 ppm. Both state and federal standards are 9 ppm for the 8-hour averaging period. State and federal standards are summarized in Table 3.8-1.

Inhalable Particulates

Particulates can damage human health and retard plant growth. Health concerns associated with suspended particulate matter focus on those particles small enough to reach the lungs when inhaled. Particulates also reduce visibility and corrode materials. Particulate emissions are generated by a wide variety of sources, including agricultural activities, industrial emissions, dust suspended by vehicle traffic and construction equipment, and secondary aerosols formed by reactions in the atmosphere.

The federal and state ambient air quality standard for particulate matter applies to two classes of particulates: PM10 and PM2.5. The state PM10 standards are 50 micrograms per cubic meter (μ/m^3) as a 24-hour average and 20 μ/m^3 as an annual geometric mean. The federal PM10 standards are 150 μ/m^3 as a 24-hour average and 50 μ/m^3 as an annual arithmetic mean. The federal PM2.5 standards are 15 μ/m^3 for the annual average and 65 μ/m^3 for the 24-hour average. The State PM2.5 standard is 12 μ/m^3 as an annual geometric mean. State and federal standards are summarized in Table 3.8-1.

Toxic Air Contaminants

TACs are pollutants which may be expected to result in an increase in mortality or serious illness or which may pose a present or potential hazard to human health. Health effects include cancer, birth defects, neurological damage, damage to the body's natural defense system, and diseases which lead to death. Although ambient air quality standards exist for criteria pollutants, no standards exist for TACs.

Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, the California Air Resources Board (ARB) has consistently found that there are no levels or thresholds below which exposure is risk-free. Individual TACs vary greatly in the risk they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. For certain TACs, a unit risk factor can be developed to evaluate cancer risk. For acute and chronic health risks, a similar factor called a Hazard Index is used to evaluate risk. In the early 1980s, the ARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Toxic Air Contaminant Identification and Control Act (Assembly Bill [AB] 1807, Tanner 1983) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588,

Connelly 1987) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks. In October 2000, ARB has identified diesel exhaust particulate matter as a TAC.

Greenhouse Gases

Global climate change is a problem caused by combined worldwide greenhouse gas emissions, and mitigating global climate change will require worldwide solutions. Greenhouse gases (GHGs) play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface, which could have otherwise escaped to space. Prominent GHGs contributing to this process include water vapor, carbon dioxide (CO2), nitrous oxide (N2O) methane (CH4), ozone, and certain hydro- and fluorocarbons. This phenomenon, known as the "greenhouse effect" keeps the Earth's atmosphere near the surface warmer than it would be otherwise and allows for successful habitation by humans and other forms of life. Increases in these gases lead to more absorption of radiation and warm the lower atmosphere further, thereby increasing evaporation rates and temperatures near the surface. Emissions of GHGs in excess of natural ambient concentrations are thought to be responsible for the enhancement of the greenhouse effect and to contribute to what is termed "global warming", a trend of unnatural warming of the Earth's natural climate. Climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors) and TACs, which are pollutants of regional and local concern.

The Intergovernmental Panel on Climate Change (IPCC) has been established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical and socio- economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation. The IPCC predicts substantial increases in temperatures globally of between 1.1 to 6.4 degrees Celsius (depending on scenario) (IPCC 2007a).

Climate change could impact the natural environment in California in the following ways, among others:

- Rising sea levels along the California coastline, particularly in San Francisco and the San Joaquin Delta due to ocean expansion;
- Extreme-heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent;
- An increase in heat-related human deaths, infection diseases and a higher risk of respiratory problems caused by deteriorating air quality;
- Reduced snow pack and stream flow in the Sierra Nevada mountains, affecting winter recreation and water supplies;
- Potential increase in the severity of winter storms, affecting peak stream flows and flooding;

- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield;
- Changes in distribution of plant and wildlife species due to changes in temperature, competition from colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects.

These changes in California's climate and ecosystems are occurring at a time when California's population is expected to increase from 34 million to 59 million by the year 2040 (California Energy Commission [CEC] 2005).

As such, the number of people potentially affected by climate change as well as the amount of anthropogenic GHG emissions expected under a "business as usual" scenario are expected to increase. Similar changes as those noted above for California would also occur in other parts of the world with regional variations in resources affected and vulnerability to adverse effects.

GHG emissions in California are attributable to human activities associated with industrial/manufacturing, utilities, transportation, residential, and agricultural sectors (CEC 2006) as well as natural processes. Worldwide, California is the 12th to 16th largest emitter of CO2 (California Energy Commission [CEC] 2006), and is responsible for approximately 2 percent of the world's CO2 emissions (CEC 2006)).

Transportation is responsible for 41 percent of the state's GHG emissions, followed by the industrial sector (23%), electricity generation (20%), agriculture and forestry (8%) and other sources (8%) (CEC 2006). Emissions of carbon dioxide and nitrous oxide are byproducts of fossil fuel combustion, among other sources. Methane, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills, among other sources. Sinks of carbon dioxide include uptake by vegetation and dissolution into the ocean. California GHG emissions in 2002 totaled approximately 491 MMT-CO2 eq.

No inventory of emissions has been completed to date for Monterey County or for the CVMP. However, existing carbon dioxide emissions were estimated based on vehicle miles traveled from the traffic study traffic model (see Table 3.8-6 below). Based on daily vehicle-miles traveled currently in the CVMP area (within the model area), daily carbon dioxide emissions were estimated as approximately 107 metric tons.

Other sources of greenhouse gas emissions in the CVMP area include (but are not limited to): offroad vehicles and equipment (construction, agriculture, water pumps, etc.; electricity consumption (resulting in indirect emissions at electricity generation locations); natural gas consumption (for heating and other uses); industrial processes; release of certain commercial and vehicle refrigerants; methane from landfill activity (indirect contributions due to waste disposal); and loss of carbon sinks (like forests that absorb carbon dioxide) due to conversion.

Existing Air Quality Conditions

Air Quality Monitoring Data

Existing air quality conditions in the program area can be characterized in terms of the ambient air quality standards that the federal and state governments have established for various pollutants (Table 3.8-1) and by monitoring data collected in the region. Monitoring data concentrations are typically expressed in terms of ppm or $\mu g/m^3$. The nearest air quality monitoring station to the program area is the Carmel Valley Ford Road monitoring station, located at 34 Ford Road in Carmel Valley. The Carmel Valley monitoring station monitors for ozone and PM10. In addition, CO is monitored at the Salinas monitoring station, which is the only monitoring station in Monterey County that monitors CO. Air quality monitoring data from the Carmel Valley and Salinas monitoring stations is summarized in Table 3.8-2. This data represents air quality monitoring data for the last three years (2004-2006) in which complete data is available. As indicated in Table 3.8-2, the Carmel Valley monitoring station has experienced no violations of the ozone and PM10 standards, while the Salinas monitoring station has experienced no violations of the CO standards during the last three years in which complete data is available (2003-2005).

Monterey County Federal and State Attainment Status

If monitored pollutant concentrations meet state or federal standards over a designated period of time, the area is classified as being in attainment for that pollutant. If monitored pollutant concentrations violate the standards, the area is considered a nonattainment area for that pollutant. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated unclassified.

The U.S. Environmental Protection Agency (EPA) has classified Monterey County as a moderate nonattainment area for the 1-hour ozone standard and an unclassified/attainment area for the 8-hour ozone, CO, PM10, and PM2.5 standards. The ARB has classified Monterey County as a moderate nonattainment area for the 1-hour ozone standard. For the CO standard, the ARB has classified Monterey County as an attainment area. The ARB has classified the County as a nonattainment area for the PM10 standard and an attainment area for the PM2.5 standard. Monterey County's attainment status for each of these pollutants relative to the NAAQS and CAAQS is summarized in Table 3.8-3.

Table 3.8-2. Ambient Air Quality Monitoring Data Measured at the Carmel Valley Monitoring Station

Pollutant Standards	2003	2004	2005
Ozone			
Maximum 1-hour concentration (ppm)	0.082	0.093	0.073
Maximum 8-hour concentration (ppm)	0.074	0.079	0.065
Number of days standard exceeded[a]			
NAAQS 1-hour (>0.12 ppm)	0	0	0
CAAQS 1-hour (>0.09 ppm)	0	0	0
NAAQS 8-hour (>0.08 ppm)	0	0	0
Particulate Matter (PM10)[b]			
National[c] maximum 24-hour concentration ($\mu g/m^3$)	35.0	31.0	23.0
National[c] second-highest 24-hour concentration ($\mu g/m^3$)	31.0	23.0	22.0
State[d] maximum 24-hour concentration ($\mu g/m^3$)	35.0	33.0	24.0
State[d] second-highest 24-hour concentration ($\mu g/m^3$)	32.0	23.0	23.0
National annual average concentration ($\mu g/m^3$)	12.8	11.7	11.3
State annual average concentration ($\mu g/m^3$)[e]	13.0	–	11.9
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 $\mu g/m^3$)[f]	0	0	0
CAAQS 24-hour (>50 $\mu g/m^3$)[f]	0	0	0

Notes: CAAQS = California ambient air quality standards.
NAAQS = national ambient air quality standards.
– = insufficient data available to determine the value.

[a] An exceedance is not necessarily a violation.

[b] Measurements usually are collected every six days.

[c] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[d] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, State statistics are based on California approved samplers.

[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[f] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored.

Sources: California Air Resources Board 2006b.

Table 3.8-3. Monterey County Attainment Status for State and Federal Standards

Pollutant	Federal	State
1-hour O_3	Moderate maintenance[1]	Moderate nonattainment
8-hour O_3	Unclassified/attainment	NA_2
CO	Unclassified/attainment	Attainment
PM10	Unclassified/attainment	Nonattainment
PM2.5	Unclassified/attainment	Attainment

Notes:
1 Previously in non-attainment area, no longer subject to the 1-hour standard as of June 15, 2005.
2 The Air Resources Board approved the 8-hour ozone standard on April 28, 2005, and it became effective on May 17, 2006. However, the ARB has not yet designated areas for this standard.

Sensitive Receptors

The MBUAPCD generally defines a sensitive receptor as a location where human populations, especially children, seniors, and sick persons, are located where there is reasonable expectation of continuous human exposure according to the averaging period for the AAQS (e.g., 24-hour, 8-hour, 1-hour). Sensitive receptors typically include residences, hospitals, and schools. Sensitive receptors in the program vicinity include (but are not limited to): residences located along Carmel Valley Road, Carmel Valley Community Chapel, Tularcitos Elementary School, Carmel Valley High School, Saint Dunstans Church, Carmelo School, First Baptist Church, All Saints Episcopal Church, Community Church of Monterey, and Carmel Middle School.

Regulatory Setting

This section discusses the local, state, and federal policies and regulations that are relevant to the analysis of air quality in Monterey County.

The air quality management agencies of direct importance in Monterey County include the EPA, ARB, and MBUAPCD. The EPA has established federal standards for which the ARB and MBUAPCD have primary implementation responsibility. The ARB and MBUAPCD are responsible for ensuring that state standards are met. The MBUAPCD is responsible for implementing strategies for air quality improvement and recommending mitigation measures for new growth and development. At the local level, air quality is managed through land use and development planning practices and measures addressing air quality are implemented in Monterey County through the general planning process. The MBUAPCD is also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws.

Federal and State Ambient Air Quality Standards

California and the federal government have established standards for several different pollutants. For some pollutants, separate standards have been set for different measurement periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions). The pollutants of greatest concern in the program area are CO, ozone, PM 2.5 and PM10, which are inhalable. State and federal standards for a variety of pollutants are summarized in Table 3.8-1.

Federal Regulations

The federal Clean Air Act (CAA), enacted in 1963 and amended several times thereafter (including the 1990 amendments), establishes the framework for modern air pollution control. The CAA directs the EPA to establish ambient air standards for six pollutants: ozone, CO, lead, nitrogen dioxide, particulate matter, and sulfur dioxide. The standards are divided into primary and secondary standards. Primary standards are designed to protect human health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, within an adequate margin of safety. Secondary standards are designed to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The primary legislation that governs federal air quality regulations is the Clean Air Act Amendments of 1990 (CAAA). The CAAA delegates primary responsibility for clean air to the EPA. The EPA develops rules and regulations to preserve and improve air quality, as well as delegating specific responsibilities to state and local agencies.

The CAA requires states to submit a state implementation plan (SIP) for areas in nonattainment for federal standards. In California, the EPA has delegated authority to prepare SIPs to the ARB, which, in turn, has delegated that authority to individual air districts. The SIP, which is reviewed and approved by the EPA, must demonstrate how the federal standards will be achieved. Failing to submit a plan or secure approval could lead to denial of federal funding and permits. In cases where the SIP is submitted by the state but fails to demonstrate achievement of the standards, the EPA is directed to prepare a federal implementation plan.

State Regulations

Responsibility for achieving California's air quality standards, which are more stringent than federal standards, is placed on the ARB and local air districts, and is to be achieved through district-level air quality management plans.

The ARB has traditionally established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving state implementation plans.

Responsibilities of air districts include overseeing stationary source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA.

The California CAA of 1988 substantially added to the authority and responsibilities of air districts. The California CAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The California CAA focuses on attainment of the state ambient air quality standards, which, for certain pollutants and averaging periods, are more stringent than the comparable federal standards.

The California CAA requires designation of attainment and nonattainment areas with respect to state ambient air quality standards. The California CAA also requires that local and regional air districts expeditiously adopt and prepare an air quality attainment plan if the district violates state air quality standards for carbon monoxide, sulfur dioxide, nitrogen dioxide, or ozone. These Clean Air Plans are specifically designed to attain these standards and must be designed to achieve an annual five percent reduction in district-wide emissions of each nonattainment pollutant or its precursors. Where an air district is unable to achieve a 5% annual reduction in district-wide emissions of each nonattainment pollutant or its precursors, the adoption of "all feasible measures" on an expeditious schedule is acceptable as an alternative strategy (Health and Safety Code Section 40914(b)(2)). No locally prepared attainment plans are required for areas that violate the state PM10 standards.

The California CAA requires that the state air quality standards be met as expeditiously as practicable but, unlike the federal CAA, does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards.

The ARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (2005) provides ARB recommendations for the siting of new sensitive land uses (including residences) near freeways, distribution centers, ports, refineries, chrome plating facilities, dry cleaners, and gasoline stations. The handbook recommends that new development be placed at distances from such facilities.

Local Regulations

At the local level, the MBUAPCD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and

state air quality laws. Air quality is also managed through land use and development planning practices. The MBUAPCD has adopted emission thresholds to determine the level of significance of a project's emissions.

The District adopted an *Air Quality Management Plan* (AQMP) in 1991 and 1994 to address attainment of the state air quality standards, and recently updated this plan in 2000. The 1991 and 1994 AQMPs relied on implementation of Trip Reduction Ordinances to meet requirements. More recently, mandatory Trip Reduction Ordinances are prohibited by State law and can no longer be used to meet requirements. The ARB indicates that a 20% reduction in 1987 ROG and NO_x was needed by 1997 to meet the ozone standard. ROG emissions have been reduced by 36% and NO_x emissions by 26% in this ten-year period in the region. Based on existing and projected air quality and recommendations of the ARB, the 2000 AQMP recommends adoption of the Suggested Architectural Coatings Control Measure. Additionally, the Plan recommends the inclusion of the Carl Moyer Memorial Air Quality Standards Attainment Program and enhanced enforcement of the District's Phase II Vapor Recovery rule as control measures.

Projects directly related to population growth (i.e., residential projects) have been forecast in the AQMP using population forecasts adopted by AMBAG. In general, population-related projects that are consistent with these forecasts are consistent with the AQMP since emissions for projects have been accounted for in the Plan and mitigated on a regional level through implementation of control measures identified in the Plan. Thus, a proposed project that is consistent with the AQMP would have insignificant impacts on air quality in the District. Exceptions are those projects that would generate more than 150 pounds per day of reactive organic gases or oxides of nitrogen (ozone precursors), as specified in the AQMP.

Climate Change

The current regulatory setting related to climate change and GHG emissions is summarized below.

Federal Regulations

Twelve U.S. states and cities (including California), in conjunction with several environmental organizations, sued to force the U.S. Environmental Protection Agency (EPA) to regulate GHGs as a pollutant pursuant to the Clean Air Act (Massachusetts vs. Environmental Protection Agency et al. [U.S. Supreme Court No. 05–1120. Argued November 29, 2006—Decided April 2, 2007). The court ruled that the plaintiffs had standing to sue, that GHGs fit within the CAA's definition of a pollutant, and that the EPA's reasons for not regulating GHGs were insufficiently grounded in the CAA.

Despite the Supreme Court ruling, there are no promulgated federal regulations to date limiting greenhouse gas emissions.

State Regulations

California Executive Order S-3-05 established the following greenhouse gas emission reduction targets for California:

- by 2010, reduce GHG emissions to 2000 levels;
- by 2020, reduce GHG emissions to 1990 levels; and
- by 2050, reduce GHG emissions to 80 percent below 1990 levels.

California Assembly Bill (AB) 1493 required ARB to develop and adopt the nation's first greenhouse gas emission standards for automobiles. The legislature declared in AB 1493 that global warming was a matter of increasing concern for public health and environment in the state. It cited several risks that California faces from climate change, including reduction in the state's water supply, increased air pollution creation by higher temperatures, harm to agriculture, and increase in wildfires, damage to the coastline, and economic losses caused by higher food, water energy, and insurance prices. Further the legislature stated that technological solutions to reduce greenhouse gas emissions would stimulate California economy and provide jobs.

California Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, codifies the State's GHG emissions target by requiring the State's global warming emissions be reduced to 1990 levels by 2020 and directs ARB to enforce the statewide cap that would begin phasing in by 2012. AB 32 was signed and passed into law by Governor Arnold Schwarzenegger on September 27, 2006. Key AB-32 milestones are as follows:

- June 30, 2007 – Identification of "discrete early action greenhouse gas emissions reduction measures.
- January 1, 2008 – Identification of the 1990 baseline GHG emissions level and approval of a statewide limit equivalent to that level. Adoption of reporting and verification requirements concerning GHG emissions.
- January 1, 2009 – Adoption of a scoping plan for achieving GHG emission reductions.
- January 1, 2010 – Adoption and enforcement of regulations to implement the "discrete" actions.
- January 1 1011 – Adoption of GHG emission limits and reduction measures by regulation.
- January 1, 2012 – GHG emission limits and reduction measures adopted in 2011 become enforceable.

CARB identified early actions in its April 20, 2007 report:

- Group 1 - Three new GHG-only regulations are proposed to meet the narrow legal definition of "discrete early action greenhouse gas reduction measures" in Section 38560.5 of the Health and Safety Code. These include the Governor's Low Carbon Fuel Standard, reduction of refrigerant losses from

motor vehicle air conditioning maintenance, and increased methane capture from landfills. These actions are estimated to reduce GHG emissions between 13 and 26 Million Metric tons of carbon dioxide equivalent (MMT-CO2 eq) annually by 2020 relative to projected levels. If approved for listing by the Governing Board, these measures will be brought to hearing in the next 12 to 18 months and take legal effect by January 1, 2010. When these actions take effect, they would influence GHG emissions associated with vehicle fuel combustion and air conditioning, but would not affect project site design or implementation otherwise. Thus, the project is consistent with these measures.

- Group 2 - ARB is initiating work on another 23 GHG emission reduction measures in the 2007-2009 time period, with rulemaking to occur as soon as possible where applicable. These GHG measures relate to the following sectors: agriculture, commercial, education, energy efficiency, fire suppression, forestry, oil and gas, and transportation.
- Group 3 - ARB staff has identified 10 conventional air pollution control measures that are scheduled for rulemaking in the 2007-2009 period. These control measures are aimed at criteria and toxic air pollutants, but will have concurrent climate co-benefits through reductions in CO2 or non-Kyoto pollutants (i.e., diesel particulate matter, other light-absorbing compounds and/or ozone precursors) that contribute to global warming.

Proposed Groups 2 and 3 measures that could become effective during implementation of the proposed program and could pertain to transportation include the following:

- Measure 2-6, Education: Guidance/protocols for local governments to facilitate GHG emission reductions.
- Measures 2-13, 2-14, 2-20, 3-2, 3-4, Transportation: Emission reductions for light-duty vehicles, heavy-duty vehicles, tire inflation program, and reductions for onroad diesel trucks and off-road diesel equipment (non-agricultural).

These measures have not yet been adopted. Some proposed measures will require new legislation to implement, some will require subsidies, some have already been developed, and some will require additional effort to evaluate and quantify. Applicable early action measures that are ultimately adopted from Groups 2 and 3 will become effective during implementation of the projects within the CVMP area which might be subject to these requirements, depending on their timing. There are no specific early action measures related to residential uses.

Local Regulations

The Monterey Bay Unified Air Pollution Control District presently has no guidance concerning CEQA evaluation of greenhouse gas emissions and no regulatory requirements.

Criteria for Determining Significance

In accordance with CEQA, State CEQA Guidelines, Monterey County plans and policies, Greater Monterey Peninsula Area Plan plans and policies, Carmel Valley Master Plan plans and policies, and agency and professional standards, a project impact would be considered significant if the project would cause one or more of the following:

A. Air Quality Plan Consistency

Conflict with or obstruct implementation of the applicable air quality management plan; or violate any air quality standard or contribute substantially to an existing or projected air quality violation.

B. Long-Term Emissions

Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors) or; expose sensitive receptors to substantial pollutant concentrations.

C. Construction Emissions

Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors) or; expose sensitive receptors to substantial pollutant concentrations.

D. Odors

Create objectionable odors affecting a substantial number of people.

The State CEQA Guidelines further state that the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make the determinations above. The MBUAPCD has specified significance thresholds within its CEQA Air Quality Guidelines (2004) to determine whether mitigation is needed for project-related air quality impacts. Based on consultation with MBUAPCD staff (Brennan pers. comm.) and the MBUAPCD's CEQA air quality guidelines, Table 3.8-4 summarizes applicable thresholds that are used in the analysis of significant air quality impacts.

Table 3.8-4. Monterey Bay Unified Air Pollution Control District Thresholds of Significance

Pollutant	Construction	Operation[1]
ROG	NA[2]	137 pounds per day
NO_X	NA[2]	137 pounds per day
CO	NA	550 pounds per day
PM10	82[3] pounds per day	82 pounds per day
SO_X	NA	150 pounds per day
DPM	Cancer incidence > 10 in 1 million	NA
Acrolein	Hazard Index > 1	NA

Notes:

[1] Projects that emit other criteria pollutant emissions would have a significant impact if emissions would cause or substantially contribute to the violation of State or national AAQS. Criteria pollutant emissions could also have a significant impact if they would alter air movement, moisture, temperature, climate, or create objectionable odors in substantial concentrations.

[2] The MBUAPCD does not have significance thresholds for construction-related ozone precursors from typical construction equipment because they are accommodated in the emission inventories of State- and federally-required air plans and would not have a significant impact on the attainment and maintenance of ozone AAQS.

[3] Based on the construction threshold of 82 pounds per day of PM10, the MBUAPCD has identified levels of construction activity that could result in a significant impact. For construction activities with minimal earthmoving, the MBUAPCD has identified construction sites that disturb more than 8.1 acres per day as having the potential to exceed the District's 82 pounds per day threshold. For construction activities involving grading, excavation, and other earthmoving activities, the MBUAPCD has identified construction sites that disturb more than 2.2 acres per day as having the potential to exceed the District's 82 pounds per day threshold.

Source: Monterey Bay Unified Air Pollution Control District 2004.

E. Greenhouse Gases / Climate Change

A fundamental difficulty in analysis of GHG emissions is the global nature of the existing and cumulative future conditions. Changes in GHG emissions can be difficult to attribute to a particular planning program or project because the planning effort or project may cause a shift in the locale for some types of GHG emissions, rather than causing "new" GHG emissions. Whether this represents a net global increase, reduction, or no change depends on the GHG emissions that would exist if the project were not implemented.

California has one of the lower per capita GHG emission rates in the United States, due to many factors including the relatively more urban character of the state compared to more rural states, as well as due to regulatory requirements such as building energy efficiency standards and electricity production efficiency. Thus, if a planning effort or a specific project results in residential growth in a particular part of California, and the bulk of new residents are from an area with higher per capita emissions, there could be a net reduction in GHG emissions from a global perspective. The reverse would be true if the

displacement of growth were from an area of lower per capita GHG emissions than the receiving locale. Similar considerations would apply to other sectors of the economy such as industrial activity or commercial activity. For example, if planning, policy, or project activities were to result in displacing industrial activity from the United States to a country with far higher industrial GHG emissions (on a pro rata basis), this might be measured as a reduction of GHG emissions in the 'sending' locale (the United States), but it could be a net increase on a global scale. It is for this reason that broader assessments of effective policies to promote GHG reductions are far more likely to be able to take into account the full global context of GHG emissions than an assessment for a particular planning effort or project.

While the existing traffic-related emissions in the CVMP area were estimated as discussed above and the estimated future emissions are greater than the existing emissions, this increase is due to growth within and outside of the CVMP area. While it is likely that some of the project-related GHG emissions associated with traffic would be truly "new" emissions, it is also likely that some of the emissions would occur in other locations if residential growth in the CVMP area were slowed due to continuation of the subdivision moratorium. Exactly how much diversion of residential growth occurs and from what locations makes it difficult to estimate how many traffic miles traveled are truly "new" and thus to estimate which GHG emissions are truly "new" as well.

There are further methodological problems to identify a significance threshold for greenhouse gas emissions. Under CEQA, an environmental impact report must identify and focus on the significant environmental effects of a proposed project. Significant effect on the environment means a substantial, or potentially substantial, adverse change in the environment (PRC Section 21068). CEQA further states that the CEQA guidelines shall specify certain criteria that require a finding that a project may have a significant effect on the environment. However, as of the writing of this EIR, the agencies with jurisdiction over air quality regulation and GHG emissions such as the ARB and the MBUAPCD have not established regulations, guidance, methodologies, significance thresholds, standards, or analysis protocols for the assessment of greenhouse gas emissions and climate change. Thus, the methodology to establish an appropriate baseline, to develop a project-level inventory for the program, or to evaluate the significance of GHG emission changes has not yet been established that would allow for an appropriate analysis of the impact of the program on climate change.

Impacts and Mitigation Measures

Approach and Methodology

Construction and operation activities could result in direct and indirect impacts on air quality caused by ground disturbance or vegetation clearing as part of project construction and or vehicle emissions associated with program operations. The thresholds of significance found in the State CEQA Guidelines

and MBUAPCD's CEQA Air Quality Guidelines (2004) (discussed below) were used to determine the significance of these impacts.

Construction-Related Emissions

The MBUAPCD does not require the quantification of construction-related ozone precursor (i.e., ROG or NO_X), as they are accommodated in the emission inventories of state and federally required air plans and therefore would not need to be quantified (Monterey Bay Unified Air Pollution Control District 2004). The MBUAPCD has established a construction PM10 threshold of 82 pounds per day (Table 3.8-4). Based on the construction threshold of 82 pounds per day of PM10, the MBUAPCD has identified levels of construction activity that could result in a significant impact. For construction activities with minimal earthmoving, the MBUAPCD has identified construction sites that disturb more than 8.1 acres per day as having the potential to exceed the District's 82 pounds per day threshold. For construction activities involving grading, excavation, and other earthmoving activities, the MBUAPCD has identified construction sites that disturb more than 2.2 acres per day as having the potential to exceed the District's 82 pounds per day threshold.

It is currently unknown what level of construction activities would occur with implementation of the projects included in the proposed program and where these activities would be located in relation to nearby sensitive receptors. Because this information is not known, quantification of fugitive dust emissions from construction activities is not appropriate at this time. As indicated above, construction activities of less than 8.1 acres per day (minimal earthmoving) or 2.2 acres per day (construction activities involving grading, excavation, and other earthmoving activities) are not anticipated to result in significant levels of fugitive dust emissions. However, it is anticipated that projects in excess of these levels of construction activity could result in significant levels of construction-related fugitive dust emissions. Consequently, this analysis takes the approach of specifying the appropriate control measures and limiting the levels of construction activity to ensure that emissions are effectively controlled to a less-than-significant level.

In addition, the MBUAPCD has also established health-based thresholds for construction emissions. These thresholds are identified in Table 3.8-4. Because the level and location of construction activities are currently unknown, this analysis takes the approach of specifying the appropriate control measures and limiting the levels of construction activity to ensure that health risks associated with construction emissions are effectively controlled to a less-than-significant level.

Operation-Related Emissions

The primary operational emissions associated with the program are CO, PM10, and ozone precursors emitted as vehicle exhaust. The effects of CO "hot spot"

emissions were evaluated through CO dispersion modeling, while mass emissions of CO, PM10, and ozone precursors were evaluated using the ARB's EMFAC2007 (version 2.3) emission rate program. Both models are briefly described below.

Carbon Monoxide Hot Spot Emissions. An evaluation to determine whether CO hot spots would occur at roadway intersections in the vicinity of the program area was conducted through CO dispersion modeling. The ambient air quality effects of operation-related CO emissions were evaluated using the CALINE4 dispersion model developed by the California Department of Transportation (Caltrans) (Benson 1989). CALINE4 treats each segment of a roadway as a separate emission source producing a plume of pollutants that disperses downwind. Pollutant concentrations at any specific location are calculated using the total contribution from overlapping pollution plumes originating from the sequence of roadway segments. CO modeling was conducted for the following conditions: existing year (2005), 2030 No project (limited CVMP buildout), and the 2030 Project (CVMP buildout, projects in the approval pipeline, traffic improvements) conditions. These various study conditions are described in the CVMP Traffic Study in Appendix F. Detailed methodology of the CO analysis is provided in Appendix D.

The EMFAC2007 (version 2.3) Model. The ARB's EMFAC2007 (version 2.3) emission rate program calculates emission rates from all motor vehicles (i.e., cars, trucks, etc.) operating on highways, freeways and local roads in California. EMFAC will calculate the emission rates of hydrocarbons, CO, NO_X, particulate matter, lead, SO_2 and CO_2 for up to 45 model years for each vehicle class within each calendar year; for 24 hourly periods; for each month of the year; and for each district, basin, county and subcounty in California. Emission inventories associated with the proposed program are estimated by applying emission rate data from EMFAC model to vehicle activity data. Detailed methodology of the mass emissions analysis is provided in Appendix E.

A. Air Quality Plan Consistency

Impact AIR-1: Consistency with the 2004 Air Quality Management Plan for the Monterey Bay Region (Less Than Significant)

CVMP Policy CV-2.18 requires that 12 specified road segments in Carmel Valley meet a designated level of service (LOS) ("LOS C"). In a December 11, 2001 report issued by the Monterey County Department of Public Works, the County found that two segments of Carmel Valley Road had exceeded the established level of service threshold. Consequently, the County has undertaken an update to the Carmel Valley Master Plan to include the proposed traffic improvements to address the existing and forecasted level of service deficiencies in the CVMP area, and allow development to proceed in accordance with all CVMP policies such that traffic operations will be in compliance with the CVMP. Population and employment growth data from the CVMP are incorporated into the projections in the 2004 Air Quality Management Plan for the Monterey Bay Region. Because the proposed program will ensure traffic

conditions meet the projections contained in the CVMP for the project area, this impact is considered **less-than-significant**. No mitigation is required.

B. Long-Term Emissions

Impact AIR-2: Exposure of Sensitive Receptors to Substantial Concentrations of CO (Less-than-Significant)

CO modeling protocol analysis was conducted to evaluate whether the proposed roadway improvements would cause or contribute to localized violations of the state or federal ambient standard in the program vicinity. CO concentrations at sensitive receptors near congested roadways and intersections were estimated using CALINE4 dispersion modeling and traffic data provided by the program traffic engineers, DKS Associates (2007b). Table 3.8-5 summarizes CO modeling results for existing year (2005), 2030 No project, and 2030 Project conditions.

As indicated in Table 3.8-5, no violations of the state or federal 1- or 8-hour CO standards are anticipated in the program area under design-year with-project conditions. Therefore, the impact of proposed program traffic conditions on ambient CO levels in the program area is considered **less-than-significant**. No mitigation is required.

Impact AIR-3: Generation of ROG and NO_X, CO, and PM10 Emissions in Excess of MBUAPCD Thresholds (Less than Significant)

Long-term air quality impacts are those associated with motor vehicles operating on the roadway network, predominantly those operating in the program vicinity. Emission of ROG, NO_X, CO, and PM10 for existing year (2005), 2030 No project, and 2030 Project conditions were evaluated through modeling conducted using the ARB's EMFAC2007 (version 2.3) emission rate program and traffic data provided by the program traffic engineers, DKS Associates (Story pers. comm.). The conditions modeled in the analysis include traffic operating on roadway network in the vicinity of the proposed program.

The assessment of the proposed program's contribution to an air quality impact was conducted by evaluating whether program-related operational emissions would exceed the MBUAPCD's thresholds of significance for program operations (Table 3.8-4). Program-related operational emissions were obtained by comparing buildout year (2030) with-project emissions to buildout year (2030) with no-project emissions. The results of these calculations are summarized in Table 3.8-6. Italicized data represents differences between with- and without- project conditions that were analyzed to determine emissions generated directly as a result of implementation of the proposed roadway improvements.

Table 3.8-5. Modeled Carbon Monoxide Levels Measured at Receptors in the Vicinity of the Project Area

		Existing		2030 No project		2030 Project Alternative	
Intersection[1]	Receptor[2]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]
Highway One & Carmel Valley Road	1	8.7	4.9	3.4	1.7	3.5	1.8
	2	8.1	4.6	3.4	1.7	3.4	1.7
	3	9.4	5.3	3.4	1.7	3.7	1.9
	4	7.5	4.2	3.3	1.7	3.3	1.7
Carmel Rancho Boulevard & Carmel Valley Road	5	7.0	3.9	3.2	1.6	3.2	1.6
	6	7.1	4.0	3.3	1.7	3.3	1.7
	7	7.6	4.3	3.3	1.7	3.3	1.7
	8	7.6	4.3	3.4	1.7	3.4	1.7
Highway One & Rio Road	9	7.0	3.9	3.3	1.7	3.3	1.7
	10	6.2	3.4	3.1	1.6	3.1	1.6
	11	6.8	3.8	3.3	1.7	3.3	1.7
	12	6.6	3.7	3.2	1.6	3.2	1.6
Crossroads Driveway & Rio Road	13	4.9	2.6	2.9	1.4	2.9	1.4
	14	4.9	2.6	2.9	1.4	2.9	1.4
	15	5.4	2.9	3.0	1.5	3.0	1.5
	16	5.4	2.9	3.0	1.5	3.0	1.5
Laureles Grade & Carmel Valley Road	17	5.8	3.2	3.1	1.6	3.1	1.6
	18	5.9	3.2	3.2	1.6	3.1	1.6
	19	5.4	2.9	3.0	1.5	3.0	1.5
	20	5.4	2.9	3.0	1.5	3.0	1.5

Notes:

[1] Receptors 1 through 16 are located 35.4 feet from the center of each intersection diagonal, 25 feet from the roadway centerline, and 3 feet from the boundary of the mixing zone.

[2] Background concentrations of 2.5 ppm and 1.2 ppm were added to the modeling 1-hour and 8-hour results, respectively. Based on MBUAPCD recommendation of using the highest CO concentration reported over the last three years for the Salinas air monitoring station for background CO concentrations (Monterey Bay Unified Air Pollution Control District 2004).

[3] The federal and state 1-hour standards are 35 and 20 ppm, respectively.

[4] The federal and state 8-hour standards are 9 and 9.0 ppm, respectively.

Table 3.8-6. Motor Vehicle Emissions (Pounds/Day)

Condition	VMT[1]	ROG	NO_X	CO	PM10	PM2.5	CO_2
Emissions by condition							
Existing	213,937	182.5	786.7	3,631.2	37.7	28.8	235,518.6
2030 No Project	334,567	42.0	185.1	1,017.1	37.6	25.1	361,808.3
2030 Project Alternative	334,636	42.1	185.2	1,017.4	37.6	25.1	361,882.9
Differences in emissions by condition							
2030 Project Alternative - 2030 No Project	69	0.0	0.0	0.2	0.0	0.0	74.6
MBUAPCD thresholds of significance	**NA**	**137**	**137**	**550**	**82**	**NA**	**NA**

Notes:

[1] Vehicle miles traveled.

Individual roadways may not add up to totals due to rounding.

Emissions calculations are based on EMFAC2002 Model.

Vehicular emissions are anticipated to lessen in future years due to continuing improvements in engine technology and the retirement of older, higher-emitting vehicles. Table 3.8-6 indicates that VMT are expected to increase with implementation of the proposed program, relative to the future no-project scenario. Table 3.8-6 also indicates that, relative to the future no-project scenario, emissions are expected to increase with implementation of the proposed program, although the increases are almost negligible due to the relatively small increases in VMT. As indicated in Table 3.8-6, emissions of ozone precursors (ROG and NO_X), CO, and PM10 are not anticipated to exceed the MBUAPCD's thresholds of significance (Table 3.8-4). Consequently, this impact is considered **less-than-significant**. No mitigation is required.

C. Construction Emissions

Impact AIR-4: Generation Construction Emissions in Excess of MBUAPCD Thresholds (Less than Significant with Mitigation)

Construction of the proposed roadway improvements would result in the temporary generation of emissions of ROG, NO_X, CO, and PM10 that would result in short-term impacts on ambient air quality in the program area. Emissions would originate from mobile and stationary construction equipment exhaust, employee vehicle exhaust, dust from clearing the land, exposed soil eroded by wind, and ROG from asphalt paving. Construction-related emissions would vary substantially depending on the level of activity, length of the construction period, specific construction operations, types of equipment, number of personnel, wind and precipitation conditions, and soil moisture content.

As previously indicated, it is currently unknown what level of construction activities would occur and quantification of emissions from construction activities is not appropriate at this time. However, construction activities could exceed the MBUAPCD's PM10 threshold for construction activities (Table 3.8-4), depending on the level of construction activity required to construct program improvements. Consequently, this impact is considered potentially significant. Implementation of **Mitigation Measure AIR-4.1 and AIR-4.2** would reduce construction-related emissions to a **less-than-significant** level.

Mitigation Measure AIR-4.1: Limit Construction Activities

The County shall limit daily construction activities to 8.1 acres per day for construction activities with minimal earthmoving and 2.2 acres per day for construction activities involving grading, excavation, and other earthmoving activities. This requirement shall be incorporated into the construction contract.

Mitigation Measure AIR-4.2: Implement MBUAPCD Mitigation Measures for Construction PM10 Emissions

The County shall require the construction contractor to implement all applicable and feasible control measures required by the MBUAPCD. This requirement shall be incorporated into the construction contract. These measures include:

- Water all active construction sites at least twice daily. Frequency should be based on the type of operation, soil, and wind exposure.
- Prohibit all grading activities during periods of high wind (over 15 mph).
- Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days).
- Apply non-toxic binders (e.g., latex acrylic copolymer) to exposed areas after cut and fill operations and hydroseed area.
- Haul trucks shall maintain at least 2'0" of freeboard.
- Cover all trucks hauling dirt, sand, or loose materials.
- Plant tree windbreaks on the windward perimeter of construction projects if adjacent to open land.
- Plant vegetative ground cover in disturbed areas as soon as possible.
- Cover inactive storage piles.
- Install wheel washers at the entrance to construction sites for all exiting trucks.
- Pave all roads at construction sites.
- Sweep streets if visible soil material is carried out from the construction site.

- Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the MBUAPCD shall also be visible to ensure compliance with Rule 402 (Nuisance).
- Limit the area under construction at any one time.

Impact AIR-5: Elevated Health Risk from Exposure to Construction-Related Emissions (Potentially Significant and Unavoidable)

Construction of the proposed roadway improvements are anticipated to involve the operation of diesel-powered equipment for various ground-disturbing activities. In October 2000, the ARB identified diesel exhaust as a TAC. In addition, the MBUAPCD has identified acrolein from construction exhaust as a pollutant of concern. Diesel fuel will be reformulated over the next several years to reduce particulate emissions. In addition, cleaner diesel powered equipment will replace older construction equipment leading to an overall decrease in emissions of exhaust particulate matter and ozone precursor emissions. However, emission reductions are still needed on individual construction projects to reduce the exposure of sensitive receptors to toxic air contaminants and reduce ozone levels.

The assessment of cancer health risks associated with exposure to diesel exhaust is typically associated with chronic exposure, in which a 70-year exposure period is often assumed. However, while excess cancer can result from exposure periods of less than 70 years, acute exposure periods (i.e. exposure periods of 2 to 3 years) to diesel exhaust are not anticipated to result in an increased health risk, as health risks associated with exposure to diesel exhaust are typically seen in exposure periods that are chronic in nature. Currently, it is unknown how long construction activities would occur. However, construction activities are typically short-term and occur over periods not lasting more than several months in duration, and are not often associated with long-term emissions of diesel exhaust at a project site. **Mitigation Measure AIR-5.1** would reduce construction-related emissions to a less-than-significant level.

The MBUAPCD has identified screening distances from which construction activities are not anticipated to result in significant health risks from DPM and acrolein exposure. However, because it is currently unknown how close construction activities may occur in relation to sensitive receptors, construction activities may occur with these distances and result in significant health risks. Consequently, this impact is considered **significant and unavoidable**.

Mitigation Measure AIR-5.1: Implement MBUAPCD Mitigation Measures for Off-Road Mobile Source and Heavy Duty Equipment Emissions

The County shall require the construction contractor to implement all applicable and feasible control measures required by the MBUAPCD. This requirement shall be incorporated into the construction contract. These measures include:

- Limit the pieces of equipment used at any one time.
- Minimize the use of diesel-powered equipment (i.e., wheeled tractor, wheeled loader, roller) by using gasoline-powered equipment.
- Limit the hours of operation for heavy-duty equipment.
- Undertake project during non-zone season.
- Off-site mitigation.
- Use PuriNOx emulsified diesel fuel in existing engines.
- Modify engine with ARB verified retrofit.
- Repower with current standard diesel technology.
- Repower with CNG/ LNG technology.

D. Odors

Impact AIR-6: Generation of Objectionable Odors Affecting a Substantial Number of People (Less than Significant)

Diesel exhaust from construction activities may generate temporary odors while construction of program improvement projects are underway. Once construction activities have been completed, these odors will cease. Operation of the proposed program would not generate any odors, as roadway projects are not typically associated as sources of odors. This impact is considered **less-than-significant**. No mitigation is required.

E. Greenhouse Gases / Climate Change

Impact AIR-7: Increase in Greenhouse Gas Contaminant Emissions (Less than Significant)

The MBUAPCD has not developed any CEQA significance thresholds for greenhouse gases. This is because greenhouse gases, especially carbon dioxide, do not pose any health risks at ambient concentrations. The impacts associated with greenhouse gases are long-term climatic changes, which are beyond the regulatory purview of the air district. However, automobiles are a major source of greenhouse gas emissions, and the quantity of greenhouse gas emissions from automobiles is directly correlated with the amount of VMT. Table 3.8-6 summarizes emissions of greenhouse gases (CO_2 and NO_X, as well as ROG, which is an ozone precursor) associated with vehicle trips. As previously indicated, the MBUAPCD has not established any thresholds or guidance to evaluate impacts associated with greenhouse gas emissions.

The impact scale for climate change is global and the amount of GHG emissions necessary to effect radiative forcing (e.g. global warming) is of a global scale. As noted above, California is responsible for perhaps 2 percent of global emissions. With the program, carbon dioxide emissions associated with vehicle-miles traveled in 2030 would result in an increase in emissions that are

approximately 0.004 percent of California's emissions, which is equivalent to 0.00009 percent of global emissions. The most ambitious state goal for GHG emissions reductions in current planning are for 80% less emissions in 2050 (compared to 1990 emissions levels) to contribute to stabilization of emissions. This goal would still mean that 20% of 1990 GHG emissions would still occur. Even if all of the GHG emissions in Table 3.8-6 are "new" on a global level, this amount of emissions, without considering other cumulative global emissions, would be insufficient to cause substantial climate change directly as it is far less than the amount of global emissions necessary to stabilize greenhouse gas atmospheric concentrations. Thus, project emissions, *in isolation*, are considered **less-than-significant**.

A further consideration is that with or without the proposed program, absent other actions, vehicle-miles traveled and associated GHG emissions will occur in the CVMP area. As shown in Table 3.8-6, VMT and carbon dioxide emissions with or without the proposed program are virtually the same. Thus, compared to the future no-project condition, the project only results in an increase in vehicle-related carbon dioxide emissions of 75 pounds/day, which would represent about 12 metric tons per year. This calculation does not include the increase in residential or other growth allowed by removal of the subdivision moratorium, but as discussed above, there are methodological difficulties in determining what portion of growth is truly "new" on a global basis compared to baseline.

However, climate change is a global cumulative impact, and thus the proper context for analysis of this issue is not a project's emissions in isolation, but rather as a contribution to cumulative GHG emissions, which is discussed in Chapter 4.