Air Quality Assessment For:

BASELINE ROAD MASTER PLAN

CITY OF UPLAND

Prepared For:

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Table Of Contents

Table of Contents (Cont.)

List of Exhibits

1.0 Existing Air Quality

1.1 Project Description

The Baseline Road Master Plan site consists of approximately 99 acres located south of the I-210 freeway and north of Baseline Road in the City of Upland. Two acres of the western corner of the site are located within the City of Claremont. The project proposes developing approximately 44 acres of the site with 265 single family homes, 135 condominiums, and a maximum of 100,000 square feet of commercial retail buildings. The remaining 55 acres is owned by the City of Upland. The City is proposing to develop this site with a 42 acre park and 13 acres of flood control/open space. The vicinity map is presented in Exhibit 1. The conceptual site plan is presented in Exhibit 2.

This report will analyze the potential air quality impacts associated with this project. Regional air quality impacts from construction and operation of the proposed project are analyzed. Local air quality impacts for project generated traffic are also examined. Mitigation measures to reduce air quality impacts are identified.

1.2 Local, State, and Federal Air Quality Agencies

The proposed project is located in the South Coast Air Basin (SCAB). The SCAB is comprised of parts of Los Angeles, Riverside and San Bernardino counties and all of Orange County. The basin is bounded on the west by the Pacific Ocean and surrounded on the other sides by mountains. To the north lie the San Gabriel mountains, to the north and east the San Bernardino Mountains, to the southeast the San Jacinto Mountains and to the south the Santa Ana Mountains. The basin forms a low plain and the mountains channel and confine air flow which trap air pollutants.

The primary agencies responsible for regulations to improve air quality in the SCAB are the South Coast Air Quality Management District (SCAQMD) and the California Air Resources Board (CARB). The Southern California Association of Governments (SCAG) is an important partner to the SCAQMD, as it is the designated metropolitan planning authority for the area and produces estimates of anticipated future growth and vehicular travel in the basin which are used for air quality planning. The SCAQMD sets and enforces regulations for non-vehicular sources of air pollution in the basin and works with SCAG to develop and implement Transportation Control Measures (TCM). TCM measures are intended to reduce and improve vehicular travel and associated pollutant emissions.

CARB was established in 1967 by the California Legislature to attain and maintain healthy air quality, conduct research into the causes and solutions to air pollution, and systematically attack the serious problem caused by motor vehicles, which are the major causes of air pollution in the State. CARB sets and enforces emission standards for motor vehicles, fuels, and consumer products. It sets the health based California Ambient Air Quality Standards (CAAQS) and monitors air quality levels throughout the state. The board identifies and sets control measures for toxic air contaminants. The board also performs air quality related research, provides compliance assistance for businesses, and produces education and outreach programs and materials. CARB provides assistance for local air quality districts, such as SCAQMD.

Exhibit 2 Conceptual Site Plan

The U.S. Environmental Protection Agency (U.S. EPA) is the primary federal agency for regulating air quality. The EPA implements the provisions of the Federal Clean Air Act (FCAA). This Act establishes national ambient air quality standards (NAAQS) that are applicable nationwide. The EPA designates areas with pollutant concentrations that do not meet the NAAQS as non-attainment areas for each criteria pollutant. States are required by the FCAA to prepare State Implementation Plans (SIP) for designated non-attainment areas. The SIP is required to demonstrate how the areas will attain the NAAQS by the prescribed deadlines and what measures will be required to attain the standards. The EPA also oversees implementation of the prescribed measures. Areas that achieve the NAAQS after a non-attainment designation are redesignated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the NAAQS.

The CCAA required all air pollution control districts in the state to prepare a plan prior to December 31, 1994 to reduce pollutant concentrations exceeding the CAAQS and ultimately achieve the CAAQS. The districts are required to review and revise these plans every three years. The SCAQMD satisfies this requirement through the publication of an Air Quality Management Plan (AQMP). The AQMP is developed by SCAQMD and SCAG in coordination with local governments and the private sector. The AQMP is incorporated into the SIP by CARB to satisfy the FCAA requirements discussed above. The AQMP is discussed further in Section 1.5.

1.3 Criteria Pollutants and Standards

Under the Federal Clean Air Act (FCAA), the U.S. EPA has established National Ambient Air Quality Standards (NAAQS) for six major pollutants; ozone (O_3), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), carbon monoxide (CO) nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. These six air pollutants are often referred to as the criteria pollutants. The NAAQS are two tiered: primary, to protect public health, and secondary, to prevent degradation to the environment (i.e., impairment of visibility, damage to vegetation and property).

Under the California Clean Air Act (CCAA), the California Air Resources Board have established California Ambient Air Quality Standards (CAAQS) to protect the health and welfare of Californians. State standards have been established for the six criteria pollutants as well as four additional pollutants; visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride.

Table 1 presents the state and national ambient air quality standards. A brief explanation of each pollutant and their health effects is presented follows.

1.3.1 Ozone (O_3)

Ozone is a secondary pollutant; it is not directly emitted. Ozone is the result of chemical reactions between volatile organic compounds (VOC) (also referred to as reactive organic gasses (ROG)) and nitrogen oxides (NO_x), which occur only in the presence of bright sunlight. Sunlight and hot weather cause ground-level ozone to form in the air. As a result, it is known as a summertime air pollutant. Ground-level ozone is the primary constituent of smog. Because ozone is formed in the atmosphere, high concentrations can occur in areas well away from sources of its constituent pollutants.

People with lung disease, children, older adults, and people who are active can be affected when ozone levels are unhealthy. Numerous scientific studies have linked ground-level ozone exposure to a variety of problems, including:

- lung irritation that can cause inflammation much like a sunburn;
- wheezing, coughing, pain when taking a deep breathe, and breathing difficulties during exercise or outdoor activities;
- permanent lung damage to those with repeated exposure to ozone pollution; and
- aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

Ground-level ozone can have detrimental effects on plants and ecosystems. These effects include:

- interfering with the ability of sensitive plants to produce and store food, making them more susceptible to certain diseases, insects, other pollutants, competition and harsh weather;
- damaging the leaves of trees and other plants, negatively impacting the appearance of urban vegetation, national parks, and recreation areas; and
- reducing crop yields and forest growth, potentially impacting species diversity in ecosystems.

1.3.2 Particulate Matter (PM_{10} & $PM_{2.5}$)

Particulate matter includes both aerosols and solid particles of a wide range of size and composition. Of particular concern are those particles smaller than 10 microns in size (PM_{10}) and smaller than or equal to 2.5 microns ($PM_{2.5}$). The size of the particulate matter is referenced to the aerodynamic diameter of the particulate. Smaller particulates are of greater concern because they can penetrate deeper into the lungs than large particles.

The principal health effect of airborne particulate matter is on the respiratory system. Short term exposures to high $PM_{2.5}$ levels are associated with premature mortality and increased hospital admissions and emergency room visits. Long term exposures to high $PM_{2.5}$ levels are associated with premature mortality and development of chronic respiratory disease. Short-term exposure to high PM_{10} levels are associated with hospital admissions for cardiopulmonary diseases, increased respiratory symptoms and possible premature mortality. The EPA has concluded that available evidence does not suggest an association between long-term exposure to PM_{10} at current ambient levels and health effects.

$PM_{2.5}$ is directly emitted in combustion exhaust and formed from atmospheric reactions between of various gaseous pollutants including nitrogen oxides (NO_x) sulfur oxides (SO_x) and volatile organic compounds (VOC). PM_{10} is generally emitted directly as a result of mechanical processes that crush or grind larger particles or the resuspension of dusts most typically through construction activities and vehicular travels. $PM_{2.5}$ can remain suspended in the atmosphere for days and weeks and can be transported long distances. PM_{10} generally settles out of the atmosphere rapidly and are not readily transported over large distances.

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	State Standards[1,3]	Federal Standards[2]	
			Primary[3,5]	Secondary[3,6]
Ozone (O_3)	1 Hour	0.09 ppm (180 $\mu g/m^3$)	--	--
	8 Hour	0.070 ppm (137 $\mu g/m^3$)	0.08 ppm (157 $\mu g/m^3$)	Same as Primary
Respirable Particulate Matter (PM_{10})[8]	24 Hour	50 $\mu g/m^3$	--	Same as Primary
	AAM[6]	20 $\mu g/m^3$	50 $\mu g/m^3$	Same as Primary
Fine Particulate Matter ($PM_{2.5}$)[8]	24 Hour	--	35 $\mu g/m^3$	Same as Primary
	AAM[6]	12 $\mu g/m^3$	15 $\mu g/m^3$	Same as Primary
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	None
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	--	--
Nitrogen Dioxide (NO_2)	AAM[6]	--	0.053 ppm (100 $\mu g/m^3$)	Same as Primary
	1 Hour	0.25 ppm (470 $\mu g/m^3$)	--	--
Sulfur Dioxide (SO_2)	AAM[6]	--	0.030 ppm (80 $\mu g/m^3$)	--
	24 Hour	0.04 ppm (105 $\mu g/m^3$)	0.14 ppm (365 $\mu g/m^3$)	--
	3 Hour	--	--	0.5 ppm (1,300 $\mu g/m^3$)
	1 Hour	0.25 ppm (655 $\mu g/m^3$)	--	--
Lead[7]	30 day Avg.	1.5 $\mu g/m^3$	--	--
	Calendar Quarter	--	1.5 $\mu g/m^3$	Same as Primary
Visibility Reducing Particles	8 hour	Extinction coefficient of 0.23 per km -- visibility ≥ 10 miles (0.07 per km -- ≥30 miles for Lake Tahoe)	**No Federal Standards**	
Sulfates	24 Hour	25 $\mu g/m^3$		
Hydorgen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)		
Vinyl Chloride[7]	24 Hour	0.01 ppm (26 $\mu g/m^3$)		

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded.
2. National standards (other than ozone, $PM_{10,}$ $PM_{2.5}$,, 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 PM_{10}, the 24 hour standard is attained when the expected number of days per calender year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.
3. 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.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. Annual Arithmetic Mean
7. The ARB 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.
8. On September 21, 2006 EPA published a final rule revoking the annual 150 $\mu g/m^3$ PM_{10} standard and lowering the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$. Attainment designations are to be issued in December, 2009 with attainment plans due April, 2010.

-- No Standard

1.3.3 Carbon Monoxide (CO)

Carbon monoxide is a colorless and odorless gas, which in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Carbon monoxide combines with hemoglobin in the bloodstream and reduces the amount of oxygen that can be circulated through the body. High carbon monoxide concentrations can lead to headaches, aggravation of cardiovascular disease, and impairment of central nervous system functions. Carbon monoxide concentrations can vary greatly over comparatively short distances. Relatively high concentrations are typically found near crowded intersections, along heavily used roadways carrying slow-moving traffic, and at or near ground level. Even under the most severe meteorological and traffic conditions, high concentrations of carbon monoxide are limited to locations within a relatively short distance (i.e., up to 600 feet or 185 meters) of heavily traveled roadways. Overall carbon monoxide emissions are decreasing as a result of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973.

1.3.4 Nitrogen Dioxide (NO_2)

Nitrogen gas, normally relatively inert (unreactive), comprises about 80% of the air. At high temperatures (i.e., in the combustion process) and under certain other conditions it can combine with oxygen, forming several different gaseous compounds collectively called nitrogen oxides (NO_x). Nitric oxide (NO) and nitrogen dioxide (NO_2) are the two most important compounds. Nitric oxide is converted to nitrogen dioxide in the atmosphere. Nitrogen dioxide (NO_2) is a red-brown pungent gas. Motor vehicle emissions are the main source of NO_x in urban areas.

Nitrogen dioxide is toxic to various animals as well as to humans. Its toxicity relates to its ability to form nitric acid with water in the eye, lung, mucus membrane and skin. In animals, long-term exposure to nitrogen oxides increases susceptibility to respiratory infections lowering their resistance to such diseases as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO_2 can suffer lung irritation and potentially, lung damage. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

NO_x is a combination of primarily NO and NO_2. While the NAAQS only addresses NO_2, NO and the total group of nitrogen oxides is of concern. NO and NO_2 are both precursors in the formation of ozone and secondary particulate matter as discussed in Sections 1.3.1 and 1.3.2. Because of this and that NO emissions largely convert to NO_2, NO_x emissions are typically examined when assessing potential air quality impacts.

1.3.5 Sulfur Dioxide (SO_2)

Sulfur oxides (SO_x) constitute a class of compounds of which sulfur dioxide (SO_2) and sulfur trioxide (SO_3) are of greatest importance. Ninety-five percent of pollution related SO_x emissions are in the form of SO_2. SO_x emissions are typically examined when assessing potential air quality impacts of SO_2. Combustion of fossil fuels for generation of electric power is the primary contributor of SO_x emissions. Industrial processes, such as nonferrous metal smelting, also contribute to SO_x emissions. SO_x is also formed during combustion of motor fuels. However, most of the sulfur has been removed from fuels greatly reducing SO_x emissions from vehicles.

SO_2 combines easily with water vapor, forming aerosols of sulfurous acid (H_2SO_3), a colorless, mildly corrosive liquid. This liquid may then combine with oxygen in the air, forming the even more irritating and corrosive sulfuric acid (H_2SO_4). Peak levels of SO_2 in the air can cause temporary breathing difficulty for people with asthma who are active outdoors. Longer-term exposures to high levels of SO_2 gas and particles cause respiratory illness and aggravate existing heart disease. SO_2 reacts with other chemicals in the air to form tiny sulfate particles which are measured as $PM_{2.5}$. The heath effects of $PM_{2.5}$ are discussed in Section 1.3.2.

1.3.6 Lead (Pb)

Lead is a stable compound, which persists and accumulates both in the environment and in animals. In humans, it affects the blood-forming or hematopoletic, the nervous, and the renal systems. In addition, lead has been shown to affect the normal functions of the reproductive, endocrine, hepatic, cardiovascular, immunological, and gastrointestinal systems, although there is significant individual variability in response to lead exposure. Since 1975, lead emissions have been in decline due in part to the introduction of catalyst-equipped vehicles, and decline in production of leaded gasoline. In general, an analysis of lead is limited to projects that emit significant quantities of the pollutant (i.e. lead smelters) and are not applied to transportation projects.

1.3.7 Visibility Reducing Particulates

Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The Statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. A separate standard for visibility-reducing particles that is applicable only in the Lake Tahoe Air Basin is based on reduction in scenic quality.

1.3.8 Sulfates(SO_4^{2-})

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

The ARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to fact that they are usually acidic, can harm ecosystems and damage materials and property.

1.3.9 Hydrogen Sulfide (H_2S)

Hydrogen sulfide (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. It can also be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation. Breathing H_2S at levels above the standard will result in exposure to a very disagreeable odor. In

1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance.

1.3.10 Vinyl Chloride (Chloroethene)

Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes in liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer in humans.

1.4 South Coast Air Basin Air Quality Attainment Designations

Based on monitored air pollutant concentrations, the U.S. EPA and CARB designate areas relative to their status in attaining the NAAQS and CAAQS respectively. Table 2 lists the current attainment designations for the SCAB. For the Federal standards, the required attainment date is also shown. The Unclassified designation indicates that the air quality data for the area does not support a designation of attainment or nonattainment.

Table 2
Designations of Criteria Pollutants for the SCAB

Pollutant	Federal	State
Ozone (O_3)	Severe-17 Nonattainment (2021)	Nonattainment
Respirable Particulate Matter (PM_{10})	Serious Nonattainment (2006)	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Serious Nonattainment (2015)	Nonattainment
Carbon Monoxide (CO)	Maintenance (as of June 11, 2007)	Attainment
Nitrogen Dioxide (NO_2)	Attainment/Maintenance (1995)	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Lead	Attainment	Attainment
Visibility Reducing Particles	n/a	Unclassified
Sulfates	n/a	Attainment
Hydrogen Sulfide	n/a	Unclassified
Vinyl Chloride	n/a	n/a

Table 2 shows that the U.S. EPA has designated SCAB as Severe-17 non-attainment for ozone, serious non-attainment for PM_{10}, $PM_{2.5}$ and maintenance for CO (as of June 11, 2007), and attainment/maintenance for NO_2. The basin has been designated by the state as non-attainment for ozone, PM_{10}, and $PM_{2.5}$. For the federal designations, the qualifiers, Severe-17 and Serious, affect the required attainment dates as the federal regulations have different requirements for areas that exceed the standards by greater amounts at the time of attainment/non-attainment designation.

The SCAB is designated as in attainment of the Federal SO_2 and lead NAAQS as well as the state CO, NO_2, SO_2, lead, hydrogen sulfide, and vinyl chloride CAAQS.

In July 1997, U.S. EPA issued a new ozone NAAQS of 0.08 ppm using an 8-hour averaging time. Implementation of this standard was delayed by several lawsuits. Attainment/non-attainment designations for the new 8-hour ozone standard were issued on April 15, 2004 and became effective on June 15, 2005. The SCAB was designated severe-17 non-attainment, which requires attainment of the Federal Standard by June 15, 2021. As a part of the designation, the EPA announced that the 1-hour ozone standard would be revoked in June of 2005. Thus, the 8-hour ozone standard attainment deadline of 2021 supercedes and replaces the previous 1-hour ozone standard attainment deadline of 2010.

The SCAQMD is requesting that U.S. EPA change the nonattainment status of the 8 hour ozone standard to extreme. This will allow the use of undefined reductions (i.e. “black box”) based on the anticipated development of new control technologies or improvement of existing technologies in the attainment plan. Further, the extreme classification could extend the attainment date by three years to 2024.

On April 28, 2005 CARB adopted an 8-hour ozone standard of 0.070 ppm. The California Office of Administrative Law approved the rulemaking and filed it with the Secretary of State on April 17, 2006. The standard became effective on May 17, 2006. California has retained the 1-hour concentration standard of 0.09 ppm. To be redesignated as attainment by the state the basin will need to achieve both the 1-hour and 8-hour ozone standards.

The SCAB was designated as moderate non-attainment of the PM_{10} standards when the designations were initially made in 1990 with a required attainment date of 1994. In 1993, the basin was redesignated as serious non-attainment with a required attainment date of 2006 because it was apparent that the basin could not meet the PM_{10} standard by the 1994 deadline. At this time Basin has met the PM_{10} standards at all monitoring stations except the western Riverside where the annual PM_{10} standard has not been met. However, on September 21, 2006, the U.S. EPA announced that it was revoking the annual PM_{10} standard as research had indicated that there were no considerable health effects associated with long-term exposure to PM_{10}. With this change the basin is technically in attainment of the federal PM_{10} standards although the redesignation process has not yet begun.

In July 1997, U.S. EPA issued NAAQS for fine particulate matter ($PM_{2.5}$). The $PM_{2.5}$ standards include an annual standard set at 15 micrograms per cubic meter ($\mu g/m^3$), based on the three-year average of annual mean $PM_{2.5}$ concentrations and a 24-hour standard of 65 $\mu g/m^3$, based on the three-year average of the 98th percentile of 24-hour concentrations. Implementation of these standards was delayed by several lawsuits. On January 5, 2005, EPA took final action to designate attainment and nonattainment areas under the NAAQS for $PM_{2.5}$ effective April 5,

2005. The SCAB was designated as non-attainment with an attainment required as soon as possible but no later than 2010. EPA may grant attainment date extensions of up to five years in areas with more severe $PM_{2.5}$ problems and where emissions control measures are not available or feasible. It is likely that the SCAB will need this additional time to attain the standard

Note that, although there is now a $PM_{2.5}$ standard, adequate tools are not currently available to perform a detailed assessment of $PM_{2.5}$ emissions and impacts at the project level. Analysis of $PM_{2.5}$ impacts is complex because it is both directly emitted from sources, like CO, and formed in the atmosphere from reactions of other pollutants, like ozone. Further, there are no good sources for the significance thresholds for $PM_{2.5}$ emissions at this time. Until tools and methodologies are developed to assess the impacts of projects on $PM_{2.5}$ concentrations, the analysis of PM_{10} will need to be used as an indicator of potential $PM_{2.5}$ impacts.

On September 21, 2006, the U.S. EPA announced that the 24-hour $PM_{2.5}$ standard was lowered to 35 $\mu g/m^3$. Attainment/non-attainment designations for the revised $PM_{2.5}$ standard will be made by December of 2009 with an attainment date of April 2015 although an extension of up to five years could be granted by the U.S. EPA.

The Federal attainment deadline for CO was to be December 31, 2000 however the basin was granted an extension. The SCAB has not had any violations of the federal CO standards since 2003. Therefore, the SCAB has met the criteria for CO attainment. The SCAQMD formally requested the U.S. EPA to redesignate the Basin as attainment for CO. However, U.S. EPA has yet to take action on this redesignation request. The SCAB is still formally designated as a non-attainment area for CO until U.S. EPA redesignates it as an attainment area.

The federal annual NO_2 standard was met for the first time in 1992 and has not been exceeded since. The SCAB was redesignated as attainment for NO_2 in 1998. The basin will remain a maintenance/attainment area until 2018, assuming the NO_2 standard is not exceeded.

Table 2 shows that SCAB is designated as in attainment of the SO_2 and lead NAAQS as well as the state CO, NO_2, SO_2, lead, hydrogen sulfide, and vinyl chloride CAAQS. Generally, these pollutants are not considered a concern in the SCAB.

1.5 Air Quality Management Plan (AQMP)

As, discussed above the CAA requires plans to demonstrate attainment of the NAAQS for which an area is designated as nonattainment. Further, the CCAA requires SCAQMD to revise its plan to reduce pollutant concentrations exceeding the CAAQS every three years. In the SCAB, SCAQMD and SCAG, in coordination with local governments and the private sector, develop the Air Quality Management Plan (AQMP) for the air basin to satisfy these requirements. The AQMP is the most important air management document for the basin because it provides the blueprint for meeting state and federal ambient air quality standards.

The l997 AQMP is the current Federally approved applicable air plan for ozone. The successor 2003 AQMP was adopted locally on August 1, 2003, by the governing board of the SCAQMD. CARB adopted the plan as part of the California State Implementation Plan on October 23, 2003. The EPA adopted the mobile source emission budgets from the plan on March 25, 2004. The PM_{10} attainment plan from the 2003 AQMP received final approval on November 14, 2005 with an effective date of December 14, 2005. The EPA has not approved the ozone or CO attainment plans of the 2003 AQMP to date. For federal purposes, the 1997 AQMP with the 1999 amendments is the currently applicable ozone attainment plan. The CO attainment plan in the 1997 AQMP was approved by the EPA but only on an interim basis through 1998. Therefore, the basin does not have a federally approved CO attainment plan.

The overall control strategy for the 2003 AQMP is to meet applicable state and federal requirements and to demonstrate attainment with ambient air quality standards. The 2003 AQMP contains short- and long-term measures. These measures are included in Appendix IV-B of the AQMP.

Short-term measures propose the application of available technologies and management practices between 2005 and the year 2010. The 2003 AQMP includes 24 short-term control measures for stationary and mobile sources that are expected to be implemented within the next several years. The stationary source measures in the 2003 AQMP include measures from the 1997 AQMP and 1999 Amendment to the Ozone SIP with eleven additional new control measures. In addition, a new transportation conformity budget backstop measure is included in the 2003 AQMP.

One long-term measure for stationary sources is included in the 2003 AQMP. This control measure seeks to achieve additional VOC reductions from stationary sources. The long-term measure is made up of Tier I and Tier II components. Tier I long-term measure has an adoption date between 2005 and 2007 and implementation date between 2007 and 2009 for Tier I. Tier II has an adoption date between 2006 and 2008 and implementation date between 2008 and 2010.

To ultimately achieve ambient air quality standards, additional emission reductions will be necessary beyond the implementation of short-term measures. Long-term measures rely on the advancement of technologies and control methods that can reasonably be expected to occur between 2005 and 2010. Additional stationary source control measures are included in Appendix IV-B of the AQMP, Proposed 2003 State and Federal Strategy for the California SIP. Contingency measures are also included in Appendix IV-Section 2 of the 2003 AQMP.

The SCAQMD has published a Draft 2007 AQMP in response to the new federal $PM_{2.5}$ and 8-hour ozone standards. The plan focuses on control of sulfur oxides (SO_x), directly emitted $PM_{2.5}$, and nitrogen oxides (NO_x) to achieve the $PM_{2.5}$ standard. Achieving the 8-hour ozone standard builds upon the $PM_{2.5}$ attainment strategy with additional VOC reductions. Control measures proposed by the District for sources under their jurisdiction include facility modernization, energy efficiency and conservation, good management practices, market incentives/compliance flexibility, area source programs, emission growth management and mobile source programs. CARB has only developed an overview of possible control strategies for sources controlled by CARB (i.e. on-road and off-road motor vehicles and consumer products) and the District has recommended several measures for CARB to consider. The AQMP states that significant additional emission reductions are required from sources under state and federal jurisdictions to meet the standards. A final draft of the AQMP is expected to be published in January 2007 with projected adoption by the SCAQMD board in April 2007 and by CARB in May 2007. The plan is to be submitted to the U.S. EPA by June 2007.

1.6 Climate

The climate in and around the project area, as with all of Southern California, is controlled largely by the strength and position of the subtropical high pressure cell over the Pacific Ocean. It maintains moderate temperatures and comfortable humidity, and limits precipitation to a few storms during the winter "wet" season. Temperatures are normally mild, excepting the summer months, which commonly bring substantially higher temperatures. In all portions of the basin, temperatures well above 100 degrees F. have been recorded in recent years. The annual average temperature in the basin is approximately 62 degrees Fahrenheit.

Winds in the project area are usually driven by the dominant land/sea breeze circulation system. Regional wind patterns are dominated by daytime onshore sea breezes. At night the wind generally slows and reverses direction traveling towards the sea. Wind direction will be altered by local canyons, with wind tending to flow parallel to the canyons. During the transition period from one wind pattern to the other, the dominant wind direction rotates into the south and causes a minor wind direction maximum from the south. The frequency of calm winds (less than 2 miles per hour) is less than 10 percent. Therefore, there is little stagnation in the project vicinity, especially during busy daytime traffic hours.

Southern California frequently has temperature inversions which inhibit the dispersion of pollutants. Inversions may be either ground based or elevated. Ground based inversions, sometimes referred to as radiation inversions, are most severe during clear, cold, early winter mornings. Under conditions of a ground-based inversion, very little mixing or turbulence occurs, and high concentrations of primary pollutants may occur local to major roadways. Elevated inversions can be generated by a variety of meteorological phenomena. Elevated inversions act as a lid or upper boundary and restrict vertical mixing. Below the elevated inversion, dispersion is not restricted. Mixing heights for elevated inversions are lower in the summer and more persistent. This low summer inversion puts a lid over the South Coast Air Basin (SCAB) and is responsible for the high levels of ozone observed during summer months in the air basin.

1.7 Monitored Air Quality

Air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates for the SCAB have been made for existing emissions ("2003 Air Quality Management Plan", August 1, 2003). The data indicate that mobile sources are the major source of regional emissions. Motor vehicles (i.e., on-road mobile sources) account for approximately 45 percent of volatile organic compounds (VOC), 63 percent of nitrogen oxide (NO_X) emissions, and approximately 76 percent of carbon monoxide (CO) emissions.

Air quality data for this area is collected at the Upland monitoring station. The data collected at this station is considered representative of the air quality experienced in the vicinity of the project. The air pollutants measured at the Upland station include ozone, carbon monoxide (CO) and nitrogen dioxide (NO_2). $PM_{2.5}$ and PM_{10} were collected at the San Bernardino station. The air quality monitored data from 2002 to 2005 for all of these pollutants are shown in Table 3. Table 3 also presents the Federal and State air quality standards.

Table 3
Air Quality Levels Measured at Upland/San Bernardino Monitoring Stations

Pollutant	California Standard	National Standard	Year	% Meas.[1]	Max. Level	Days State Standard Exceeded[2]	Days National Standard Exceeded[2]
Ozone	0.09 ppm for 1 hr.	0.12 ppm for 1 hr.	2005	100	0.149	34	8
			2004	100	0.138	31	3
			2003	99	0.155	48	15
			2002	98	0.139	36	5
Ozone	None	0.08 ppm for 8 hr.	2005	100	0.121	n/a	15
			2004	100	0.104	n/a	18
			2003	99	0.134	n/a	34
			2002	98	0.116	n/a	19
Particulates PM_{10} (24 Hour)	50 $\mu g/m^3$ for 24 hr.	150 $\mu g/m^3$ for 24 hr.	2003	98	72	20/122	0
			2002	96	118	25/158	0
			2003	94	98	21/129	0
			2002	98	94	33/198	0
Particulates PM_{10} (Annual)	20 $\mu g/m^3$ AAM[3]	50 $\mu g/m^3$ AAM[3]	2005	98	52	Yes	Yes
			2004	96	50	Yes	No
			2003	94	52	Yes	Yes
			2002	98	50	Yes	No
Particulates $PM_{2.5}$ (24 Hour)	None	65 $\mu g/m^3$ for 24 hr.	2005	--	106.2	n/a	1
			2004	--	93.4	n/a	4
			2003	--	73.9	n/a	1
			2002	100	82.1	n/a	3
Particulates $PM_{2.5}$ (Annual)	12 $\mu g/m^3$ AAM[3]	15 $\mu g/m^3$ AAM[3]	2005	--	17.4	Yes	Yes
			2004	--	21.9	Yes	Yes
			2003	--	22.2	Yes	Yes
			2002	100	25.8	Yes	Yes
CO	20 ppm for 1 hour	35 ppm for 1 hour	2005	97	2.5	0	0
			2004	97	3.3	0	0
			2003	95	3.7	0	0
			2002	93	3.5	0	0
CO	9.0 ppm for 8 hour	9 ppm for 8 hour	2005	97	1.9	0	0
			2004	97	2.2	0	0
			2003	95	2.7	0	0
			2002	93	1.7	0	0
NO_2 (1-Hour)	0.25 ppm for 1 hour	None	2005	98	0.102	0	n/a
			2004	100	0.106	0	n/a
			2003	98	0.115	0	n/a
			2002	99	0.122	0	n/a

1. Percent of year where high pollutant levels were expected that measurements were made
2. For annual averaging times a yes or no response is given if the annual average concentration exceeded the applicable standard. For the PM10 24 hour standard, daily monitoring is not performed. The first number shown in Days State Standard Exceeded column is the actual number of days measured that State standard was exceeded. The second number shows the number of days the standard would be expected to be exceeded if measurements were taken every day.
3. Annual Arithmetic Mean

n/a – not applicable (no standards to compare with).
-- Data not reported.
Source: CARB Air Quality Data Statistics web site www.arb.ca.gov/adam/ accessed 11/3/06

The Upland monitoring data presented in Table 3 show that ozone is the air pollutant of primary concern in the project area. The state 1-hour standard was exceeded 34 days in 2005, 31 days in 2004, 48 days in 2003, and 36 days in 2002. The federal 1-hour standard was exceeded 8 days in 2005, 3 days in 2004, 15 days in 2003, and 5 days in 2002. The federal 8-hour standard was exceeded between 15 and 34 days each year in the past four years. The data shows a slight downward trend in the maximum levels and the number of days exceeding the state and federal ozone standards between 2003 and 2005.

Ozone is a secondary pollutant; it is not directly emitted. Ozone is the result of chemical reactions between other pollutants, most importantly hydrocarbons and NO_2, which occur only in the presence of bright sunlight. Pollutants emitted from upwind cities react during transport downwind to produce the oxidant concentrations experienced in the area. Many areas of the SCAQMD contribute to the ozone levels experienced at the monitoring station, with the more significant areas being those directly upwind.

Particulate matter (PM_{10} and $PM_{2.5}$) is another air pollutant of primary concern in the area. The state standards for PM_{10} have been exceeded at the San Bernardino monitoring station between 122 and 198 days over the last four years. The federal standard for PM_{10} was not exceeded. The annual average PM_{10} concentrations have exceeded the state standards for the past four years and the federal standard for two of the past four years. The federal standard for $PM_{2.5}$ was exceeded 1 day in 2005 and 2003, 4 days in 2004 and 3 days in 2002. Both the state and federal annual $PM_{2.5}$ standards were exceeded in the last four years. There does not appear to be a trend toward fewer days of exceedances and maximum levels for both PM_{10} and $PM_{2.5}$. Particulate levels in the area are due to natural sources, grading operations and motor vehicles.

According to the EPA, some people are much more sensitive than others to breathing fine particles (PM_{10} and $PM_{2.5}$). People with influenza, chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death due to breathing these fine particles. People with bronchitis can expect aggravated symptoms from breathing in fine particles. Children may experience decline in lung function due to breathing in PM_{10} and $PM_{2.5}$. Other groups considered sensitive are smokers and people who cannot breathe well through their noses. Exercising athletes are also considered sensitive, because many breathe through their mouths.

Carbon monoxide (CO) is another important pollutant that is due mainly to motor vehicles. Currently, CO levels in the project region are in compliance with the state and federal 1-hour and 8-hour standards. High levels of CO commonly occur near major roadways and freeways. CO may potentially be a continual problem in the future for areas next to freeways and other major roadways.

The monitored data shown in Table 3 show that other than ozone, PM_{10} and $PM_{2.5}$ exceedances as mentioned above, no state or federal standards were exceeded for the remaining criteria pollutants.

1.8 Local Air Quality

1.8.1 Introduction and Criteria

Local air quality is a major concern along roadways. Carbon monoxide is a primary pollutant. Unlike ozone, carbon monoxide is directly emitted from a variety of sources. The most notable source of carbon monoxide is motor vehicles. For this reason, carbon monoxide concentrations are usually indicative of the local air quality generated by a roadway network and are used to assess its impacts on the local air quality. Comparisons of levels with state and federal carbon monoxide standards indicate the severity of the existing concentrations for receptors in the project area. The Federal and State standards for carbon monoxide are presented in Table 4.

Table 4
Federal and State Carbon Monoxide Standards

	Averaging Time	Standard
Federal	1 hour	35 ppm
	8 hours	9 ppm
State	1 hour	20 ppm
	8 hours	9 ppm

1.8.2 Existing CO Modeling Results

Carbon monoxide levels in the project vicinity due to nearby roadways were assessed with the CALINE4 computer model. CALINE4 is a fourth generation line source air quality model developed by the California Department of Transportation ("CALINE4," Report No. FHWA/CA/TL-84/15, June 1989). The precise methodology used in modeling existing air quality with the CALINE4 computer model is discussed in more detail in Section 2.3.1 (Local Air Quality Impacts.) The remainder of this section discusses the resulting existing carbon monoxide levels in comparison to the State and Federal carbon monoxide standards.

The existing peak hour traffic data were obtained from the traffic study titled “Baseline Road Master Plan” prepared by Linscott Law and Greenspan Engineers, September 20, 2006. Peak p.m. traffic data were utilized in the CALINE4 CO modeling to represent the worst case scenario. Composite vehicular emission factors were derived from EMFAC2007. EMFAC2007 is a computer program published by CARB that calculates on-road vehicle emissions.

Three key intersections were selected for CALINE4 analysis. The worst case intersections were selected based on the highest overall traffic volume or the greatest traffic increase due to the project that are adjacent to sensitive land uses. These intersections are Monte Vista Avenue at Baseline Road, Benson Avenue at 8th Street, and Benson Avenue at Baseline Road. The intersection locations are shown in Exhibit 3. CALINE4 modeling was conducted for four receptors in each corner of each intersection. The receptors are located approximately 10 feet from the corner of the intersections. The highest concentration of the four receptors at each intersection is reported below.

The existing background CO concentrations were obtained from the SCAQMD website (www.aqmd.gov/ceqa/hndbh.html accessed September 2006). Projected background concentrations are available for years 1999, 2000, 2010 and 2020. The nearest available CO

Exhibit 3 CALINE4 Modeling Receptor Locations

background data for the project area is the San Bernardino monitoring station. The existing (2006) background CO concentrations were calculated by linear interpolation between year 2000 and year 2010. As a result, the 2005 CO background levels were determined to be 4.1 ppm for 1-hour averaging time and 3.3 ppm for 8-hour averaging time. Therefore, 4.1 ppm is added to the worst case meteorological 1-hour average concentration projections, and 3.3 ppm to the 8-hour average concentrations projections, to account for background carbon monoxide levels from sources not included in the model. The 8-hour average CO concentration is estimated utilizing a persistence factor of 0.75 (this is described in more detail in Section 2.3.1). The modeling results of the highest existing CO levels in the vicinity of each of the three intersections are presented in Table 5.

Table 5
Existing Carbon Monoxide Concentrations (ppm)

	Modeled CO Concentration	
Intersection	**1-hour**	**8-hour**
Monte Vista Ave. and Baseline Rd.	7.5	5.8
8th St. and Benson Ave.	5.9	4.6
Baseline Rd. and Benson Ave.	6.1	4.8
State Standard	**20**	**9**
No. of Exceedances	0	0

NOTE: The CO concentrations include the ambient concentrations of 4.1 ppm for 1-hour levels, and 3.3 ppm for 8-hour levels.

The existing CO concentrations are estimated to range between 5.9 and 7.5 ppm for 1-hour averaging time and between 4.6 and 5.8 ppm for 8-hour averaging time in the vicinity of the intersections modeled. The data indicate that the existing CO concentrations in the vicinity of the project site comply with the 1-hour and 8-hour state and federal standards.

2.0 Potential Air Quality Impacts

Air quality impacts are usually divided into short term and long term. Short-term impacts are usually the result of construction or grading operations. Long-term impacts are associated with the built out condition of the proposed project.

2.1 Thresholds of Significance

2.1.1 Regional Air Quality

In their "1993 CEQA Air Quality Handbook" the SCAQMD has established significance thresholds to assess the regional impact of project related air pollutant emissions. Table 6 presents these significance thresholds. There are separate thresholds for short-term construction and long-term operational emissions. A project with daily emission rates below these thresholds are considered to have a less than significant effect on regional air quality throughout the South Coast Air Basin.

Table 6
SCAQMD Regional Pollutant Emission Thresholds of Significance

	Pollutant Emissions (lbs/day)					
	CO	VOC	NOX	PM10	PM2.5	SOX
Construction	550	75	100	150	55	150
Operation	550	55	55	150	55	150

2.1.2 Local Air Quality

To assess local air quality impacts, the significance thresholds are relative to the State Ambient Air Quality Standards. Because the area is in attainment of the CO state standards exceedances of these standards, 20 ppm for 1-hour Carbon Monoxide (CO) concentration levels, and 9 ppm for 8-hour CO concentration levels, result in a significant local air quality impact.

2.2 Short Term Impacts

2.2.1 Construction Air Pollutant Emissions

Temporary impacts will result from project construction activities. Air pollutants will be emitted by construction equipment and fugitive dust will be generated during on site grading of the site.

Construction activities for large development projects are estimated by the U.S. Environmental Protection Agency (according to the 1993 CEQA Handbook, emission factor for disturbed soil is 26.4 pounds of PM_{10} per day per acre, or 0.40 tons of PM_{10} per month per acre). If water or other soil stabilizers are used to control dust as required by SCAQMD Rule 403, the emissions can be reduced by 50 percent. The PM10 calculations include the 50% reduction from watering.

Typical emission rates for construction equipment were obtained from the 1993 CEQA Air Quality Handbook. These emission factors are presented in terms of pounds of pollutant per hour of equipment operation. It should be noted that most of these emission factors were initially published in 1985 in the EPA's AP-42 Compilation of Emission Factors. These have not been updated since their original publication. Several state and federal regulations have been enacted since this time that require reduced emissions from construction equipment. The effect of these regulations is not included in the emission factors used to calculate construction equipment emissions presented below. The actual emissions from construction equipment, therefore, will likely be lower than presented below. However, the exact reduction is not known. It would be dependent on the age of the specific equipment used at the construction site. As time passes, older equipment will be replaced with newer equipment manufactured with the lower emission requirements. Therefore, construction occurring farther in the future would likely be reduced by a greater amount versus near term construction.

Typically, the greatest levels of air pollutant emissions during construction activities occur during site grading, demolition and/or excavation. Operating more than four pieces of the largest heavy construction equipment for 8 hours a day or 6 to 8 pieces of smaller equipment will generate NO_x emissions in excess of the SCAQMD's 100 pounds per day significance threshold. However, actively disturbing less than 3 acres per day during site preparation will not generate PM10 emissions greater than the 150 pounds per day significance threshold.

Emission factors from EMFAC2007 published by the SCAQMD on their CEQA Handbook web site (http://www.aqmd.gov/ceqa/hdbk.html) were used to estimate vehicular emissions. EMFAC2007 is a computer program generated by the California Air Resources Board that calculates emission rates for vehicles.

In 1998 the California Air Resources Board (ARB) identified particulate matter from diesel-fueled engines (Diesel Particulate Matter or DPM) as a Toxic Air Contaminant (TAC). The majority of the heavy construction equipment utilized during construction will be diesel fueled and emit DPM. Impacts from toxic substances are related to cumulative exposure and are assessed over a 70-year period. Cancer risk is expressed as the maximum number of new cases of cancer projected to occur in a population of one million people due to exposure to the cancer-causing substance over a 70-year lifetime (California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Guide to Health Risk Assessment.) While construction of the project is projected to occur over a 1 year period, grading, when the peak diesel exhaust emissions would occur, is expected to take approximately six months. Because of the relatively short duration of construction compared to a 70 year lifespan, diesel emissions resulting from the construction of the project are not expected to result in a significant impact.

Grading

The commercial portion of the project is 44 acres. This will be graded at one time in Phase I. The park portion of the project is 55 acres. As a worse case scenario, it is assumed all 55 acres of the park would be graded. This will happen after the commercial site. The construction of the project is assumed to be completed in 2 years.

Based on the above worst case assumptions, the peak daily emissions are estimated to be 594 pounds per day of PM_{10} and 132 pounds per day of $PM_{2.5}$. for Phase I, and 742 pounds per day of PM_{10} and 166 pounds per day of $PM_{2.5}$ for Phase II. The PM_{10} and $PM_{2.5}$ emissions generated by the project are projected to be greater than the thresholds, and therefore, are considered to be significant.

It should be noted that the impact due to grading is very localized. Additionally, this material is inert silicates, rather than the complex organic particulate matter released from combustion sources which are more harmful to health. In some cases, grading may be near existing development. Care should be taken to minimize the generation of dust. Common practice for minimizing dust generation is watering before and during grading. Without watering, PM_{10} and $PM_{2.5}$ emission generation would be double the amount mentioned previously.

Heavy-duty equipment emissions are difficult to quantify because of day to day variability in construction activities and equipment used. Typical emission rates for construction equipment were obtained from the SCAQMD Air Quality Handbook. For Phase 1, heavy equipment estimated to be used in the grading includes (4) scrapers, (4) dozers, (4) graders, and (4) water trucks, all operating 8 hours per day. For Phase 2, heavy equipment estimated to be used in the grading includes (5) scrapers, (5) dozers, (5) graders, and (5) water trucks, all operating 8 hours per day.

Using the estimates presented above, the peak air pollutant emissions during grading were calculated and presented in Table 7. These emissions represent the highest level of emissions during construction of the proposed project. A worksheet showing the specific data used to calculate the grading emissions is presented in the appendix.

Table 7
Worst Case Peak Construction Emissions (pounds/day)

	Pollutant Emissions (lbs/day)					
Activity	**CO**	**VOC**	**NOX**	**PM10**	**PM2.5**	**SOX**
PHASE 1						
On-Road Vehicle	10.5	1.2	4.5	0.2	0.1	0.0
Heavy Duty Trucks	2.1	0.6	7.0	0.3	0.3	0.0
Ground Disturbance	0.0	0.0	0.0	580.8	120.8	0.0
Construction Equipment	124.5	30.5	273.1	12.2	11.3	0.2
Total Emissions	**137.2**	**32.2**	**284.5**	**593.6**	**132.5**	**0.2**
PHASE 2						
On-Road Vehicle	14.7	1.7	6.6	0.3	0.2	0.0
Heavy Duty Trucks	2.6	0.7	8.6	0.4	0.4	0.0
Ground Disturbance	0.0	0.0	0.0	726.0	151.0	0.0
Construction Equipment	155.6	38.1	341.3	15.3	14.1	0.3
Total Emissions	**172.9**	**40.4**	**356.5**	**742.0**	**165.7**	**0.3**
SCQAMD Thresholds	*550*	*75*	*100*	*150*	*55*	*150*

NOTE: Underline data indicate exceedances.

Note that some of the pollutant emissions are greater than the Significance Emission Thresholds established by the SCAQMD in the CEQA Air Quality Handbook, specifically for NO_X and PM_{10} and $PM_{2.5}$. The project construction emissions are considered to be significant, and therefore, mitigation measures for short-term construction are recommended. Mitigation measures are recommended in Section 3.0.

Architectural Coatings

Architectural coatings include painting exterior and interior walls as well as coatings applied to windows and window casings. ROGs are emitted from these coatings as well as the solvents used in cleanup of the coatings. The amount of ROGs that are emitted is dependant on the specific coating being used and its ROC content. The data presented in the SCAQMD CEQA Handbook shows that this can cause the emissions to range from 6.66 pounds of ROC emissions per 1,000 square feet of painted surface 1 mil thick to 149.34 pounds of ROC emissions per 1,000 square feet of painted surface 1 mil thick. The specific paints that will be used for the project are not known at this time. When specific data is not available, the SCAQMD CEQA Handbook recommends the use of an emission factor of 18.50 pounds of ROC emissions per 1,000 square feet of painted surface 1 mil thick. For most architectural coatings, this is the maximum emission factor allowed by SCAQMD Rule 1113, which regulates the ROC content of architectural coatings. The URBEMIS2002 Users' Guide also assumes a thickness of 1 mil when specific data is not available.

The SCAQMD CEQA Handbook (Table A9-13-C) recommends using twice the gross floor area as an estimate of the total painted area for commercial uses. This accounts for both interior and exterior surface areas. For this project, the proposed 100,000 square feet of the commercial buildings gross floor area will result in an estimate of 200,000 square feet of painted area. For the residential uses, it is assumed that each dwelling unit has an average of 10 rooms and a gross floor area of 2,500 square feet. This results in approximately 3,023,858 square feet of painted area based on 400 dwelling units. The data used to calculate painting emissions are included in the appendix.

Using the above data the total emissions from painting of the project is estimated to be 59,641 pounds of ROG. Assuming painting takes place over a 30-day period results in an estimate of 1,988 pounds of ROG emissions per day from painting. This is well above the 55 pounds per day significance threshold. Mitigation is discussed in Section 3.1.

2.3 Long Term Impacts

2.3.1 Local Air Quality

Because the project will introduce changes in traffic on the roadways serving the project, a detailed analysis of carbon monoxide concentrations at sensitive areas in the project vicinity was conducted.

Methodology

Carbon monoxide (CO) is the pollutant of major concern along roadways because the most notable source of carbon monoxide is motor vehicles. For this reason carbon monoxide concentrations are usually indicative of the local air quality generated by a roadway network, and are used as an indicator of its impacts on local air quality. Local air quality impacts can be assessed by comparing future carbon monoxide levels with State and Federal carbon monoxide standards moreover by comparing future CO concentrations with and without the project. The Federal and State standards for carbon monoxide were presented earlier in Table 4.

Future carbon monoxide concentrations with the project were forecasted with the CALINE4 computer model. CALINE4 is a fourth generation line source air quality model developed by the California Department of Transportation ("CALINE4," Report No. FHWA/CA/TL-84/15, June 1989). The purpose of the model is to forecast air quality impacts near transportation facilities in what is known as the microscale region. The microscale region encompasses the region of a few thousand feet around the pollutant source. Given source strength, meteorology, site geometry, and site characteristics, the model can reliably predict pollutant concentrations.

Worst case meteorology was assessed. Specifically, a late afternoon winter period with a ground based inversion was considered. For worst case meteorological conditions, a wind speed of 0.5 meter per second (1 mph) and a stability class G was utilized for a 1 hour averaging time. Stability class G is the worst case scenario for the most turbulent atmospheric conditions. The higher stability class promotes dispersion of pollutants. A worst case wind direction for each site was determined by the CALINE4 Model. A sigma theta of 10 degrees was also used and represents the fluctuation of wind direction. A high sigma theta number would represent a very changeable wind direction. The temperature used for worst case was 45 degrees Fahrenheit. The temperature affects the dispersion pattern and emission rates of the motor vehicles. The temperature represents the January mean minimum temperature as reported by Caltrans. The wind speed, stability class, sigma theta, and temperature data used for the modeling are those recommended in the "Development of Worst Case Meteorology Criteria," (California Department of Transportation, June 1989). A mixing height of 1,000 meters was used as recommended in the CALINE4 Manual. A surface roughness of the ground in the area, 100 centimeters, was utilized and is based on the CALINE4 Manual. It should be noted that the results are also dependent on the speeds of the vehicles utilized in the model.

Composite emission factors utilized with the CALINE4 computer model were derived from EMFAC2007. EMFAC2007 is a computer program published by CARB that estimates on-road vehicle air pollutant emissions.

The future peak hour traffic data were obtained from the traffic study titled "Baseline Road Master Plan" prepared by Linscott Law and Greenspan Engineers, September 20, 2006. Peak p.m. traffic data were utilized in the CALINE4 CO modeling to represent the worst case scenario. The peak hour volumes and the level-of-service data at the critical intersections were used in the CALINE4 computer modeling. The level-of-service (LOS) data are important in the CALINE4 computer modeling in that they determine the speeds and the emission factors. The lower the speeds, the higher the emission factors, hence, the higher the CO results. The p.m. peak hour traffic is utilized in the CALINE4 computer modeling as a the traffic data shows that the p.m. peak hour traffic volumes are projected to be higher than the a.m. peak hour volumes.

Eight hour carbon monoxide levels were projected using Caltrans methodology described in their "Air Quality Technical Analysis Notes." The method essentially uses a persistence factor which is multiplied times the 1 hour emission projections. The projected 8 hour ambient concentration is then added to the product. The persistence factor can be estimated using the average ratio of 8-hour to 1-hour carbon monoxide concentrations from the ten highest 8-hour concentrations over most recent three years that data is available. For the project, a persistence factor of 0.75 was utilized based on monitoring data from the Upland monitoring station. The data and results of the CALINE4 modeling are also provided in the appendix. (The CALINE4 CO emission results shown in the appendix do not include the ambient background CO levels.)

Three key intersections were selected for CALINE4 analysis. The worst case intersections were selected based on the highest overall traffic volume or the greatest traffic increase due to the project that are adjacent to sensitive land uses. These intersections are Monte Vista Avenue at Baseline Road, Benson Avenue at 8th Street, and Baseline Road at Benson Avenue. The intersection locations are shown in Exhibit 1. CALINE4 modeling was conducted for four receptors in each corner of each intersection (12 receptors total). The receptors are located approximately 10 feet from the corner of the intersections. The highest modeled concentration for the four receptors at each intersection is reported below.

The future background CO concentrations were obtained from the SCAQMD website (www.aqmd.gov/ceqa/hndbh.html accessed September 2006). Projected background concentrations are available for years 2000, 2010 and 2020. The future ambient (background) concentration levels for CO are not available for 2006. The 2009 background CO concentrations were calculated by linear interpolation between year 2000 and year 2010. As a result, the 2009 CO background levels at the San Bernardino station were estimated to be 3.7 ppm for the 1-hour averaging time and 3.0 ppm for 8-hour averaging time. The background levels are anticipated to decrease steadily in future years. 2020 background concentrations were used for the 2025 scenario. the 2025 CO background levels at the San Bernardino station were estimated to be 3.6 ppm for the 1-hour averaging time and 2.9 ppm for the 8-hour averaging time.

Modeling Results

The results of the CALINE4 CO modeling are summarized in Table 6. The CO modeling results are shown for the projected 1 hour and 8 hour average CO concentration levels. Existing concentrations (previously presented in Table 3) are presented along with opening year, 2009, concentrations with and without the project as well as area buildout, year 2025, concentrations. The pollutant levels are expressed in parts per million (ppm) for each receptor. The carbon monoxide levels reported in Table 8 are composites of the background levels of carbon monoxide coming into the area plus those generated by the local roadways.

Table 8
Worst Case Projections of Carbon Monoxide Concentrations (ppm)

	Modeled CO Concentration (ppm)				
Intersection	**Existing**	**2009 No Project**	**2009 With Project**	**2025 No Project**	**2025 With Project**
	Modeled 1-Hour Average Concentration				
Monte Vista Ave. and Baseline Rd.	7.5	7.0	7.1	4.8	4.8
8th St. and Benson Ave.	5.9	5.4	5.7	4.5	4.5
Baseline Rd. and Benson Ave.	6.1	5.6	5.8	4.5	4.5
State Standard	**20**	**20**	**20**	**20**	**20**
No. of Exceedances	**0**	**0**	**0**	**0**	**0**
	Modeled 8-Hour Average Concentration				
Monte Vista Ave. and Baseline Rd.	5.8	5.5	5.5	3.8	3.8
8th St. and Benson Ave.	4.6	4.3	4.5	3.6	3.6
Baseline Rd. and Benson Ave.	4.8	4.4	4.6	3.6	3.6
State Standard	**9**	**9**	**9**	**9**	**9**
No. of Exceedances	**0**	**0**	**0**	**0**	**0**

NOTE: The CO concentrations include the ambient concentrations of 4.1 ppm for existing 1-hour average levels, 3.9 ppm for 2009 1-hour average levels, 3.6 ppm for 2025 1-hour average levels, 3.3 ppm for existing 8-hour average levels, 3.0 ppm for 2009 8-hour levels, and 2.9 ppm for 2025 8-hour levels.

Table 8 shows that future CO concentrations are not projected to exceed the state standards. In 2009, the project is projected to increase the concentrations by 0.3 ppm for 1-hour and 0.2 ppm for 8-hour at the three receptors. In 2025, the project does not show an increase in the CO concentrations for both 1-hour and 8-hour. The increases are not considered substantial. Therefore, the project will not result in a significant local air quality impact.

Table 8 shows that the future CO concentrations are projected to be lower than existing concentrations. In 2009 and 2025, all concentrations are projected to be below existing levels. This occurs even though traffic volumes are projected to increase in the future. The reductions occur because vehicular pollutant emissions are projected to decrease in the future, as newer cars, complying with increasingly stringent emissions regulations, become a greater portion of the overall vehicle fleet in operation as projected by the EMFAC2007 computer model published by CARB. The projected decreases in vehicular emissions more than offset the projected increases in traffic volumes.

2.3.2 Regional Air Quality

The primary source of regional emissions generated by the proposed project will be from motor vehicles. Other on-site emissions will be generated from the combustion of natural gas for water, space heating and the use of consumer products. Emissions will also be generated by the use of natural gas consumed by the project.

The emission factors from EMFAC2007 were used to calculate the vehicular emissions. EMFAC2007 is a computer model published by the California Air Resources Board (CARB). The EMFAC2007 emission factors for San Bernardino County for the year 2009, the opening year of the project, at an average speed of 25 miles per hour were used to calculate motor vehicle emissions associated with the project.

Many consumer products, including air fresheners, automotive products, household cleaners, and personal care products emit ROG's. CARB has estimated that the amount of ROG released from consumer products is primarily dependant on the increased population associated with residential development. CARB estimates that 0.0171 pounds of ROG are emitted per person. For the purposes of the calculation, it was assumed that each unit would have three residents.

The traffic study prepared for the project indicates that the project will generate 7,801 daily trips. The average trip length for the proposed project is assumed to be 8.2 miles. This is a composite trip length derived from data contained in the SCAQMD CEQA Handbook (Page 9-24) for San Bernardino County. The product of the project daily trips and trip length, translate to total 63,968 vehicle miles traveled (VMT) generated by the proposed project. An average speed of 25 miles per hour was assumed.

Additional pollutant emissions associated with the project will be generated on-site by the combustion of natural gas for space heating and water heating. The project will consist of 265 single family homes, 135 condominiums and a maximum of 100,000 square feet of commercial/retail land uses. The square footages and emission factors utilized in calculating the emissions with these sources are provided in the appendix. The emissions are projected for year 2006. The total project emissions are presented in Table 9.

Table 9
Total Project Emissions (2009)

	Pollutant Emissions (lbs/day)					
Source	**CO**	**VOC**	**NOx**	**PM10**	**PM2.5**	**SOx**
Vehicular Trips	686.6	75.0	200.9	10.1	7.5	0.8
Natural Gas Consumption	1.7	0.5	7.2	0.0	0.0	0.0
Consumer Product Usage	0.0	25.1	0.0	0.0	0.0	0.0
Total Project Emissions	**<u>688.3</u>**	**<u>100.5</u>**	**<u>208.2</u>**	**10.1**	**7.5**	**0.8**
SCAQMD Thresholds	550	55	55	150	55	150

Underlined data indicate exceedances.

Table 9 shows that the total project emissions are above the SCAQMD Thresholds, specifically for CO, ROG and NO_X. Since the project emissions are above the significance thresholds, the project will result in significant regional air quality impacts. Long-term mitigation measures are recommended in Section 3.0.

Table 10 compares the project's emissions to the projected basin wide emissions from the 2003 AQMP. This comparison shows that the project represents a very small fraction of the total regional emissions. For the two pollutants above the thresholds, the project represents, at most, 6.7 thousands of a percent of the total regional emissions.

Table 10
Comparison of Project Emissions with SCAB Emissions

	Pollutant Emissions (tons/day)					
	CO	VOC	NO_x	PM_{10}	$PM_{2.5}$	SO_x
Project Emissions	0.344	0.050	0.104	0.005	0.004	0.000
2020 South Coast Air Basin*	2,414	584	532	318	--	76
Project as Percentage of Basin	0.0143%	0.0086%	0.0196%	0.0016%	--	0.0005%

* Source: 2003 AQMP Tables 3-5A & 3-5B

2.4 Compliance with Air Quality Planning

The following sections deal with the major air planning requirements for this project. Specifically, consistency of the project with the AQMP is addressed. As discussed below, consistency with the AQMP is a requirement of the California Environmental Quality Act (CEQA).

2.4.1 Consistency with AQMP

An EIR must discuss any inconsistencies between the proposed project and applicable GPs and regional plans (California Environmental Quality Act (CEQA) guidelines (Section 15125)). Regional plans that apply to the proposed project include the South Coast Air Quality Management Plan (AQMP). In this regard, this section will discuss any inconsistencies between the proposed project with the AQMP.

The purpose of the consistency discussion is to set forth the issues regarding consistency with the assumptions and objectives of the AQMP and discuss whether the project would interfere with the region's ability to comply with federal and state air quality standards. If the decision-maker determine that the project is inconsistent, the lead agency may consider project modifications or inclusion of mitigation to eliminate the inconsistency.

The SCAQMD's CEQA Handbook states that "New or amended GP Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." Strict consistency with all aspects of the plan is usually not required. A proposed project should be considered to be consistent with the plan if it furthers one or more policies and does not obstruct other policies. The Handbook identifies two key indicators of consistency:

(1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP (except as provided for CO in Section 9.4 for relocating CO hot spots).

(2) Whether the project will exceed the assumptions in the AQMP in 2010 or increments based on the year of project buildout and phase.

Both of these criteria are evaluated in the following sections.

Criterion 1 - Increase in the Frequency or Severity of Violations?

Based on the air quality modeling analysis contained in this report, there will be significant short-term construction and long-term operational impacts due to the project based on the SCAQMD thresholds of significance. While emissions will be generated during construction in excess of SCAQMD's threshold criteria, it is unlikely that short-term construction activities will increase the frequency or severity of existing air quality violations due to required compliance with SCAQMD Rules and Regulations. Emissions resulting from the operation of project are projected to be a small fraction of a percentage of the basin wide emissions and therefore, would not substantially affect pollutant concentrations. The analysis for long-term local air quality impacts showed that local pollutant concentrations are not projected to exceed any of the air quality standards.

The proposed project is not projected to contribute to the exceedance of any air pollutant concentration standards, thus the project is found to be consistent with the AQMP for the first criterion.

Criterion 2 - Exceed Assumptions in the AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the project with the assumptions in the AQMP. Thus, the emphasis of this criterion is to insure that the analyses conducted for the project are based on the same forecasts as the AQMP. The Regional Comprehensive Plan and Guide (RCP&G) consists of three sections: Core Chapters, Ancillary Chapters, and Bridge Chapters. The Growth Management, Regional Mobility, Air Quality, Water Quality, and Hazardous Waste Management chapters constitute the Core Chapters of the document. These chapters currently respond directly to federal and state requirements placed on SCAG. Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA.

Since the SCAG forecasts are not detailed, the test for consistency of this project is not specific. The traffic modeling methodologies upon which much of the air quality assessment are based on are from the County of San Bernardino Congestion Management Plan (CMP), Highway Capacity Manual (HCM), and ITE Trip Generation, 2th Edition (June 2004). The AQMP assumptions are based upon projections from local general plans. Projects that are consistent with the local general plan are consistent with the AQMP assumptions. It appears that the growth forecasts for the proposed project, at the project's opening year and buildout year, are consistent with the SCAG growth forecasts. The forecasts made for the project EIR seem to be based on the same demographics as the AQMP, and therefore, the second criterion is met for consistency with the AQMP.

3.0 Mitigation Measures

3.1 Short-Term Impacts

3.1.1 Particulate Emission (PM-10) Control

<u>AQ-1: Comply with SCAQMD Rule 402 and 403.</u> During construction of the proposed project, the property owner/developer and its contractors shall be required to comply with regional rules, which will assist in reducing short-term air pollutant emissions. SCAQMD Rule 403 requires that fugitive dust be controlled with the best available control measures so that the presence of

such dust does not remain visible in the atmosphere beyond the property line of the emission source. Two options are presented in Rule 403; monitoring of particulate concentrations or active control. Monitoring involves a sampling network around the project with no additional control measures unless specified concentrations are exceeded. The active control option does not require any monitoring, but requires that a list of measures be implemented starting with the first day of construction.

Rule 403 requires that "No person conducting active operations without utilizing the applicable best available control measures included in Table 1 of this Rule to minimize fugitive dust emissions from each fugitive dust source type within the active operation." The measures from Table 1 of Rule 403 are presented below as Table 11. The applicable measures presented in Table 1 are required to be implemented by Rule 403.

Rule 403 requires that "Large Projects" implement additional measures. A Large Project is defined as "any active operations on property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic meters (5,000 cubic yards) for more than three times during the most recent 365 day period. Grading of the project will be considered a Large Project under Rule 403. Therefore, the project will be required to implement the applicable actions specified in Table 2 of the Rule. Table 2 from Rule 403 is presented below as Table 12.

As a Large Operation, the project will also be required to:

- Submit a fully executed Large Operation Notification (SCAQMD Form 403N) to the SCAQMD Executive Officer within 7 days of qualifying as a large operation;
- Include, as part of the notification, the name(s), address(es), and phone number(s) of the person(s) responsible for the submittal, and a description of the operation(s), including a map depicting the location of the site;
- Maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the Executive Officer upon request.
- Install and maintain project signage with project contact signage that meets the minimum standards of the Rule 403 Implementation Handbook, prior to initiating any earthmoving activities.
- Identify a dust control supervisor that is employed by or contracted with the property owner or developer, is on the site or available on-site within 30 minutes during working hours, has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule requirements, and has completed the AQMD Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class
- Notify the SCAQMD Executive Officer in writing within 30 days after the site no longer qualifies as a large operation

Rule 403 also requires that the construction activities "shall not cause or allow PM_{10} levels exceed 50 micrograms per cubic meter when determined by simultaneous sampling, as the difference between upwind and down wind sample." Large Projects that cannot meet this performance standard are required to implement the applicable actions specified in Table 3 of Rule 403. Table 3 from Rule 403 is presented below as Table 13. Rather than perform monitoring to determine conformance with the performance standard, which will not reduce PM10 emissions, <u>the project shall implement all applicable measures presented in Table 13 (Rule 403 Table 3) regardless of conformance with the Rule 403 performance standard.</u> This potentially results in a higher reduction of particulate emissions than if these measures were implemented only after being determined to be required by monitoring.

Further, Rule 403 requires that that the project shall not "allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation." All track-out from an active operation is required to be removed at the conclusion of each workday or evening shift. Any active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk materials must utilize at least one of the measures listed in Table 14 at each vehicle egress from the site to a paved public road.

Table 11
Required Best Available Control Measures (Rule 403 Table 1)

Source Category		
	Control Measure	**Guidance**
Backfilling		
01-1	Stabilize backfill material when not actively handling; and	☐ Mix backfill soil with water prior to moving ☐ Dedicate water truck or high capacity hose to backfilling equipment ☐ Empty loader bucket slowly so that no dust plumes are generated ☐ Minimize drop height from loader bucket
01-2	Stabilize backfill material during handling; and	
01-3	Stabilize soil at completion of activity.	
Clearing and Grubbing		
02-1	Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and	☐ Maintain live perennial vegetation where possible ☐ Apply water in sufficient quantity to prevent generation of dust plumes
02-2	Stabilize soil during clearing and grubbing activities; and	
02-3	Stabilize soil immediately after clearing and grubbing activities.	
Clearing Forms		
03-1	Use water spray to clear forms; or	☐ Use of high pressure air to clear forms may cause exceedance of Rule requirements
03-2	Use sweeping and water spray to clear forms; or	
03-3	Use vacuum system to clear forms.	
Crushing		
04-1	Stabilize surface soils prior to operation of support equipment; and	☐ Follow permit conditions for crushing equipment ☐ Pre-water material prior to loading into crusher ☐ Monitor crusher emissions opacity ☐ Apply water to crushed material to prevent dust plumes
04-2	Stabilize material after crushing.	
Cut and Fill		
05-1	Pre-water soils prior to cut and fill activities; and	☐ For large sites, pre-water with sprinklers or water trucks and allow time for penetration ☐ Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
05-2	Stabilize soil during and after cut and fill activities.	

Table 11 (Continued)
Required Best Available Control Measures (Rule 403 Table 1)

Source Category / Control Measure		Guidance
Demolition – Mechanical/Manual		
06-1	Stabilize wind erodible surfaces to reduce dust; and	Apply water in sufficient quantities to prevent the generation of visible dust plumes
06-2	Stabilize surface soil where support equipment and vehicles will operate; and	
06-3	Stabilize loose soil and demolition debris; and	
06-4	Comply with AQMD Rule 1403.	
Disturbed Soil		
07-1	Stabilize disturbed soil throughout the construction site; and	Limit vehicular traffic and disturbances on soils where possible
07-02	Stabilize disturbed soil between structures	If interior block walls are planned, install as early as possible
		Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Earth-Moving Activities		
08-1	Pre-apply water to depth of proposed cuts; and	Grade each project phase separately, timed to coincide with construction phase
08-2	Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and	Upwind fencing can prevent material movement on site
08-3	Stabilize soils once earth-moving activities are complete.	Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Importing/Exporting of Bulk Materials		
09-1	Stabilize material while loading to reduce fugitive dust emissions; and	Use tarps or other suitable enclosures on haul trucks
09-2	Maintain at least six inches of freeboard on haul vehicles; and	Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage
09-3	Stabilize material while transporting to reduce fugitive dust emissions; and	Comply with track-out prevention/mitigation requirements
09-4	Stabilize material while unloading to reduce fugitive dust emissions; and	Provide water while loading and unloading to reduce visible dust plumes
09-5	Comply with Vehicle Code Section 23114.	

Table 11 (Continued)

Required Best Available Control Measures (Rule 403 Table 1)

Source Category	Control Measure	Guidance
Landscaping		
10-1	Stabilize soils, materials, slopes	□ Apply water to materials to stabilize Maintain materials in a crusted condition □ Maintain effective cover over materials □ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes □ Hydroseed prior to rain season
Road Shoulder Maintenance		
11-1	Apply water to unpaved shoulders prior to clearing; and	□ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs
11-2	Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	□ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs
Screening		
12-1	Pre-water material prior to screening; and	□ Dedicate water truck or high capacity hose to screening operation
12-2	Limit fugitive dust emissions to opacity and plume length standards; and	□ Drop material through the screen slowly and minimize drop height
12-3	Stabilize material immediately after screening.	□ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging Areas		
13-1	Stabilize staging areas during use; and	□ Limit size of staging area □ Limit vehicle speeds to 15 miles per hour
13-2	Stabilize staging area soils at project completion.	□ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling		
14-1	Stabilize stockpiled materials.	□ Add or remove material from the downwind portion of the storage pile
14-2	Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	□ Maintain storage piles to avoid steep sides or faces

Table 11 (Continued)
Required Best Available Control Measures (Rule 403 Table 1)

Source Category	Control Measure	Guidance
Traffic Areas for Construction Activities		
15-1	Stabilize all off-road traffic and parking areas; and	Apply gravel/paving to all haul routes as soon as possible to all future roadway areas
15-2	Stabilize all haul routes; and	Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
15-3	Direct construction traffic over established haul routes.	
Trenching		
16-1	Stabilize surface soils where trencher or excavator and support equipment will operate; and	Pre-watering of soils prior to trenching is an effective preventive measure.
16.2	Stabilize soils at the completion of trenching activities.	For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching
		Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck Loading		
17-1	Pre-water material prior to loading; and	Empty loader bucket such that no visible dust plumes are created
17.2	Ensure that freeboard exceeds six inches (CVC 23114)	Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding		
18-1	Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and	Haul waste material immediately off-site
18-2	Cover haul vehicles prior to exiting the site.	

Table 11 (Continued)
Required Best Available Control Measures (Rule 403 Table 1)

Source Category	Control Measure	Guidance
Unpaved Roads/Parking Lots		
19-1	Stabilize soils to meet the applicable performance standards; and	Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
19-2	Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	
Vacant Land		
20-1	In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

Table 12
Dust Control Measures for Large Operations (Rule 403 Table 2)

Fugitive Dust Source Category	Control Actions
Earth-moving (except construction cutting and filling areas, and mining operations)	
(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	
(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.
Earth-moving: Construction cut areas and mining operations:	
(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	
(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	
(2c)	Apply chemical stabilizers within five working days of grading completion; OR
(2d)	Take actions (3a) or (3c) specified for inactive disturbed surface areas.

Table 12 (Continued)
Dust Control Measures for Large Operations (Rule 403 Table 2)

Fugitive Dust Source Category	Control Actions
Inactive disturbed surface areas	
(3a)	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
(3b)	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
(3c)	Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
(3d)	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.
Unpaved Roads	
(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR
(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	
(5a)	Apply chemical stabilizers; OR
(5b)	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
(5c)	Install temporary coverings; OR
(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.
All Categories	
(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

Table 13
Contingency Control Measures for Large Operations (Rule 403 Table 3)

Fugitive Dust Source Category		Control Actions
Earth-moving		
	(1A)	Cease all active operations; OR
	(2A)	Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas		
	(0B)	On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR
	(1B)	Apply chemical stabilizers prior to wind event; OR
	(2B)	Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR
	(3B)	Take the actions specified in Table 2, Item (3c); OR
	(4B)	Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved Roads		
	(1C)	Apply chemical stabilizers prior to wind event; OR
	(2C)	Apply water twice per hour during active operation; OR
	(3C)	Stop all vehicular traffic.
Open Storage Piles		
	(1D)	Apply water twice per hour; OR
	(2D)	Install temporary coverings.
Paved Road Track-Out		
	(1E)	Cover all haul vehicles; OR
	(2E)	Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories		
	(1F)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

Table 14
Track Out Control Options

(A)	Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 20 feet wide and 50 feet long.
(B)	Pave the surface extending at least 100 feet and a width of at least 20 feet wide.
(C)	Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle under carriages before vehicles exit the site.
(D)	Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.
(E)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified items (A) through (D) above.

In addition to the measures presented above, a requirement to pave haul roads at the project was considered to further reduce emissions. However, such a requirement would be extraordinarily expensive and wasteful given that haul roads are temporary facilities. The cost of paving haul roads at the project site would be high, estimated at $660,000 per mile. The cost to remove the paved haul road and remove the waste asphalt would be approximately $140,000 per mile, bringing the total cost of paving haul roads at the project site to $800,000 per mile.

Furthermore, the location of haul roads could change daily in large grading operations. A requirement to pave haul roads would result in a continuous paving operation as the locations of haul roads change. Air emissions would result from the paving of haul roads, and additional emissions would result from the removal of the paving materials. Air emissions would also result from the delivery of paving materials for haul roads to the project site. In addition, waste asphalt materials from paved haul roads would need to be removed from the project site, resulting in higher emissions and the disposal of waste asphalt in significant quantities. As such, the purported environmental benefits associated with dust control from road paving would be offset by the negative environmental and economic impacts paving haul roads. Therefore, this potential mitigation measure for construction is considered infeasible.

3.1.2 Construction Equipment Emission Control

While Measure AQ-1 above addresses particulate emissions from construction activities, other pollutants generated by construction equipment will also exceed SCAQMD thresholds. The generation of these emissions is almost entirely due to engine combustion in construction equipment and employee commuting. The measure below addresses these emissions.

<u>AQ-2: Reduce construction equipment emissions by implementing the following measures.</u> The following measures should be implemented. They should be included in grading and improvement plans specifications for implementation by contractors. Some additional gains in particulate emission control will also be realized from the implementation of these measures.

- Use low emission mobile construction equipment. The property owner/developer shall comply with CARB requirements for heavy construction equipment.
- Maintain construction equipment engines by keeping them tuned.

- Use low sulfur fuel for stationary construction equipment. This is required by SCAQMD Rules 431.1 and 431.2.
- Utilize existing power sources (i.e., power poles) when available. This measure would minimize the use of higher polluting gas or diesel generators.
- Configure construction parking to minimize traffic interference.
- Minimize obstruction of through-traffic lanes. Construction should be planned so that lane closures on existing streets are kept to a minimum.
- Schedule construction operations affecting traffic for off-peak hours to the best extend when possible.
- 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.)

3.1.3 Architectural Coating Emission Control

The analysis presented in Section 2.2.1 showed that ROG emissions from painting are projected to exceed the significance threshold. There are no practical measures to reduce emissions from architectural coatings to below the significance threshold. The following measures should be incorporated into project construction to the greatest extent feasible.

- Limit the amount of painting each day. (To reduce emissions to below the significance threshold daily painting would need to be reduced so that it would take more than 12 years to complete the painting.)
- Minimize the amount of paint used by using pre-coated, pre-colored and naturally colored building materials. (This is already being done for the project to a large extent, when practicable).
- Use Water-Based and LOW-VOC coatings with VOC contents less than those required by SCAQMD Rule 1113.
- Use high transfer efficiency painting methods such as HVLP (High Volume Low Pressure) sprayers and brushes/rollers were possible.

3.2 Long Term Impacts

3.2.1 Local Air Quality Impacts

The local CO impacts due to the project are not considered to be significant. The project will not result in a significant local air quality impact. No mitigation is required.

3.2.2 Regional Emissions

The most significant reductions in regional and local air pollutant emissions are attainable through programs which reduce the vehicular travel associated with the project. Support and compliance with the AQMP for the basin is the most important measure to achieve this goal. The AQMP includes improvement of mass transit facilities and implementation of vehicular usage reduction programs. Additionally, energy conservation measures are included.

TDM Measures

1. Provide adequate ingress and egress at all entrances to public facilities to minimize vehicle idling at curbsides. Presumably, this measure would improve traffic flow into and out of the parking lot. The air quality benefits are incalculable because more specific data is required.

2. Provide dedicated turn lanes as appropriate and provide roadway improvements at heavily congested roadways. Again, the areas where this measure would be applicable are the intersections in and near the project area, such as Baseline Road, 17th Street and other roadways within the project site. Presumably, these measures would improve traffic flow. Emissions would drop as a result of the higher traffic speeds, but to an unknown extent.

Energy Efficient Measures

3. Improve thermal integrity of the buildings and reduce thermal load with automated time clocks or occupant sensors. Reducing the need to heat or cool structures by improving thermal integrity will result in a reduced expenditure of energy and a reduction in pollutant emissions. The air quality benefit depends upon the extent of the reduction of energy expenditure which is unknown in this case. The air quality benefit is also unknown, therefore.

4. Install energy efficient street lighting. Implementation of this measure is not feasible because of varying definitions of the phrase "energy efficient."

5. Capture waste heat and reemploy it in nonresidential buildings. This measure is applicable to the commercial buildings in the project.

6. Landscape with native drought-resistant species to reduce water consumption and to provide passive solar benefits. The connection between reducing water consumption and improving air quality is non-existent in the context of this analysis. A measure designed to reduce water consumption has no place in an air quality mitigation package. The assertion that such vegetation would provide "passive solar benefits" is false because drought resistant vegetation lacks both the height and the fullness to shade the building structures. No air quality benefit will occur as a result of the implementation of this measure.

7. Provide lighter color roofing and road materials and tree planning programs to comply with the AQMP Miscellaneous Sources MSC-01 measure. This measure reduces the need for cooling energy in the summer.

8. Synchronize traffic signals. The areas where this measure would be applicable are roadway intersections within the project area. This measure would be more effective if the roadways beyond the project limits are synchronized as well. The air quality benefits are incalculable because more specific data is required.

9. Introduce window glazing, wall insulation, and efficient ventilation methods. The construction of buildings with features that minimize energy use is already required by the Uniform Building Code.

4.0 Level of Significance after Mitigation

4.1 Short Term Impacts

The analysis indicates that project emissions from grading activities will exceed the SCAQMD's Thresholds of Significance for NO_X and PM_{10}. Mitigation will reduce emissions, but not to the point that they will fall under the SCAQMD's thresholds. Therefore, construction emissions of NO_X and PM_{10} will exceed the SCAQMD thresholds even after mitigation.

The analysis indicates that project emissions from architectural activities will exceed the SCAQMD's Thresholds of Significance for ROC. Mitigation will reduce emissions, but not to the point that they will fall under the SCAQMD's thresholds. Therefore, construction emissions of ROC will exceed the SCAQMD thresholds even after mitigation.

Short-term construction air quality impacts will are significant and unavoidable.

4.2 Long Term Impacts

The long term regional air quality impacts due to the proposed project with the recommended measures above will be reduced to an extent. However, CO, NO_X and ROG emissions would continue to exceed the SCAQMD thresholds and be considered significant and unavoidable.

APPENDICES

Construction Emissions Calculation Worksheets

Architectural Coating Off-Gasing (Paint Emissions)

Emission Rate	0.0185	lbs ROG/square foot	URBEMIS2002 User Guide
No. of Dwellings	400		
Square Feet of DU	2,500		
Average No. Rooms	10		
Surface Area	7,560	Square Feet	
Total Emissions	55,941	Total lbs of ROG	
No. of Days of Painting	30		
Daily Paint Emissions	1,865	lbs./day	
	0.93	tons/day	
Commercial gross area	100,000		
Commercial surface area	200,000	Square Feet	CEQA Handbook
Total Emissions	3,700	Total lbs of ROG	Table A9-13-C
No. of Days of Painting	30		
Daily Paint Emissions	123	lbs./day	
	0.06	tons/day	
TOTAL ROG:	59,641		
TOTAL ROG (LBS/DY):	1,988		

Operational Emissions Calculation Worksheet

CALINE4 CO Modeling Data

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1
JOB: Baseline Rd. - existing
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 7.2 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. MonteV/Basel	939	5858	1036	3584	AG	597	9.8	.0	25.0
B. MonteV/Basel	1036	3584	1122	305	AG	1848	9.8	.0	25.0
C. MonteV/Basel	4400	3660	2678	3621	AG	1694	8.0	.0	25.0
D. MonteV/Basel	2678	3621	1857	3603	AG	1342	8.0	.0	25.0
E. Bensn/8th N	1857	3603	1036	3584	AG	2587	9.8	.0	25.0
F. Bensn/8th S	1036	3584	-975	3536	AG	1462	9.8	.0	25.0
G. Bensn/8th E	2635	5800	2678	3621	AG	1266	8.0	.0	25.0
H. Bensn/8th W	2678	3621	2711	1991	AG	1432	8.0	.0	25.0
I. Baseln/Benso	2711	1991	2743	360	AG	1503	8.0	.0	25.0
J. Baseln/Benso	2743	360	2774	-1280	AG	1664	8.0	.0	25.0
K. Baseln/Benso	4328	402	2743	360	AG	1527	8.0	.0	25.0
L. Baseln/Benso	2743	360	1122	305	AG	1314	8.0	.0	25.0
M. I-210	2926	5054	1042	3389	AG	10784	6.0	.0	40.0
N. I-210	1042	3389	-1042	3340	AG	13100	6.0	.0	40.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. Recpt 1	1016	3563	1.8
2. Recpt 2	1056	3605	1.8
3. Recpt 3	1015	3604	1.8
4. Recpt 4	1057	3564	1.8
5. Recpt 5	2723	339	1.8
6. Recpt 6	2763	381	1.8
7. Recpt 7	2722	380	1.8
8. Recpt 8	2764	340	1.8
9. Recpt 9	2658	3600	1.8
10. Recpt 10	2698	3642	1.8
11. Recpt 11	2657	3641	1.8
12. Recpt 12	2699	3601	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. Recpt 1	81.	3.4	.0	.7	.0	.0	1.8	.0	.0	.0
2. Recpt 2	185.	3.1	.0	1.5	.0	.0	1.0	.0	.0	.0
3. Recpt 3	172.	2.7	.0	1.5	.0	.0	.0	.6	.0	.0
4. Recpt 4	81.	2.8	.0	.0	.0	.0	1.8	.0	.0	.0
5. Recpt 5	81.	1.5	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	186.	1.6	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	172.	1.5	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	352.	1.8	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	82.	1.6	.0	.0	1.1	.0	.0	.0	.0	.4
10. Recpt 10	262.	2.0	.0	.0	.0	.8	.1	.0	.4	.0
11. Recpt 11	262.	1.6	.0	.0	.0	.8	.1	.0	.0	.0
12. Recpt 12	275.	1.9	.0	.0	.0	.8	.1	.0	.0	.4

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N
1. Recpt 1	.0	.0	.0	.0	.7	.0
2. Recpt 2	.0	.0	.0	.0	.3	.4
3. Recpt 3	.0	.0	.0	.0	.3	.3
4. Recpt 4	.0	.0	.0	.0	.8	.0
5. Recpt 5	.0	.5	1.0	.0	.0	.0
6. Recpt 6	.0	1.1	.5	.0	.0	.0
7. Recpt 7	.0	1.1	.0	.4	.0	.0
8. Recpt 8	1.0	.0	.5	.0	.2	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.2	.3
11. Recpt 11	.0	.0	.0	.0	.2	.3
12. Recpt 12	.0	.0	.0	.0	.3	.0

```
CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   1
               JOB: Baseline Rd-2009 no project
               RUN: Hour 1           (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide

   I.  SITE VARIABLES
          U=    .5 M/S             Z0= 100. CM           ALT=     0. (M)
        BRG= WORST CASE            VD=    .0 CM/S
       CLAS=     7 (G)             VS=    .0 CM/S
       MIXH= 1000. M              AMB=    .0 PPM
      SIGTH=   10. DEGREES       TEMP=  7.2 DEGREE (C)

  II.  LINK VARIABLES
       LINK      *  LINK COORDINATES (M)   *                 EF     H     W
    DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. MonteV/Basel *   939  5858  1036  3584 *  AG   1855   9.2     .0  25.0
 B. MonteV/Basel *  1036  3584  1122   305 *  AG   2045   9.2     .0  25.0
 C. MonteV/Basel *  4400  3660  2678  3621 *  AG   2154   6.1     .0  25.0
 D. MonteV/Basel *  2678  3621  1857  3603 *  AG   1815   6.1     .0  25.0
 E. Bensn/8th  N *  1857  3603  1036  3584 *  AG   2834   9.2     .0  25.0
 F. Bensn/8th  S *  1036  3584  -975  3536 *  AG   2606   9.2     .0  25.0
 G. Bensn/8th  E *  2635  5800  2678  3621 *  AG   1610   6.1     .0  25.0
 H. Bensn/8th  W *  2678  3621  2711  1991 *  AG   1791   6.1     .0  25.0
 I. Baseln/Benso *  2711  1991  2743   360 *  AG   1876   6.1     .0  25.0
 J. Baseln/Benso *  2743   360  2774 -1280 *  AG   2041   6.1     .0  25.0
 K. Baseln/Benso *  4328   402  2743   360 *  AG   2064   6.1     .0  25.0
 L. Baseln/Benso *  2743   360  1122   305 *  AG   1899   6.1     .0  25.0
 M. I-210        *  2926  5054  1042  3389 *  AG  11431   4.6     .0  40.0
 N. I-210        *  1042  3389 -1042  3340 *  AG  13886   4.6     .0  40.0

 III.  RECEPTOR LOCATIONS
             *    COORDINATES (M)
   RECEPTOR  *     X      Y      Z
 ------------*---------------------
 1. Recpt 1  *   1016   3563   1.8
 2. Recpt 2  *   1056   3605   1.8
 3. Recpt 3  *   1015   3604   1.8
 4. Recpt 4  *   1057   3564   1.8
 5. Recpt 5  *   2723    339   1.8
 6. Recpt 6  *   2763    381   1.8
 7. Recpt 7  *   2722    380   1.8
 8. Recpt 8  *   2764    340   1.8
 9. Recpt 9  *   2658   3600   1.8
10. Recpt 10 *   2698   3642   1.8
11. Recpt 11 *   2657   3641   1.8
12. Recpt 12 *   2699   3601   1.8

  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )
             *       * PRED  *               CONC/LINK
             *  BRG  * CONC  *                 (PPM)
  RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
-------------*-------*-------*----------------------------------------
 1. Recpt 1  *   81. *   3.3 *   .0   .7   .0   .0  1.8   .0   .0   .0
 2. Recpt 2  *  258. *   2.9 *   .6   .0   .0   .0   .0  1.7   .0   .0
 3. Recpt 3  *   96. *   3.2 *   .7   .0   .0   .0  1.8   .0   .0   .0
 4. Recpt 4  *   81. *   2.6 *   .0   .0   .0   .0  1.8   .0   .0   .0
 5. Recpt 5  *   81. *   1.5 *   .0   .0   .0   .0   .0   .0   .0   .0
 6. Recpt 6  *  261. *   1.4 *   .0   .0   .0   .0   .0   .0   .0   .0
 7. Recpt 7  *  172. *   1.4 *   .0   .0   .0   .0   .0   .0   .0   .0
 8. Recpt 8  *  352. *   1.7 *   .0   .0   .0   .0   .0   .0   .0   .0
 9. Recpt 9  *   82. *   1.5 *   .0   .0  1.0   .0   .0   .0   .0   .4
10. Recpt 10 *  262. *   1.9 *   .0   .0   .0   .8   .1   .1   .4   .0
11. Recpt 11 *  262. *   1.5 *   .0   .0   .0   .8   .1   .1   .0   .0
12. Recpt 12 *  275. *   1.9 *   .0   .0   .0   .8   .1   .1   .0   .4

  IV.  MODEL RESULTS (WORST CASE WIND ANGLE)     (CONT.)
             *           CONC/LINK
             *             (PPM)
  RECEPTOR   *   I    J    K    L    M    N
 ------------*------------------------------
 1. Recpt 1  *   .0   .0   .0   .0   .6   .0
 2. Recpt 2  *   .0   .0   .0   .0   .0   .5
 3. Recpt 3  *   .0   .0   .0   .0   .5   .0
 4. Recpt 4  *   .0   .0   .0   .0   .6   .0
 5. Recpt 5  *   .0   .5  1.0   .0   .0   .0
 6. Recpt 6  *   .4   .0   .0   .9   .0   .0
 7. Recpt 7  *   .0  1.0   .0   .4   .0   .0
 8. Recpt 8  *   .9   .0   .5   .0   .1   .0
 9. Recpt 9  *   .0   .0   .0   .0   .0   .0
10. Recpt 10 *   .0   .0   .0   .0   .1   .2
11. Recpt 11 *   .0   .0   .0   .0   .1   .2
12. Recpt 12 *   .0   .0   .0   .0   .2   .0
```

```
CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                   PAGE   1
              JOB: Baseline Rd-2009 with project
              RUN: Hour 1           (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide

   I.  SITE VARIABLES
         U=    .5 M/S             Z0= 100. CM            ALT=     0. (M)
       BRG= WORST CASE            VD=    .0 CM/S
      CLAS=     7 (G)             VS=    .0 CM/S
      MIXH= 1000. M              AMB=    .0 PPM
     SIGTH=   10. DEGREES       TEMP=  7.2 DEGREE (C)

  II.  LINK VARIABLES
      LINK      *  LINK COORDINATES (M)   *                EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ---------------*-------------------------*------------------------------
 A. MonteV/Basel *   939  5858  1036  3584 *  AG   1884    9.2     .0  25.0
 B. MonteV/Basel *  1036  3584  1122   305 *  AG   2073    9.2     .0  25.0
 C. MonteV/Basel *  4400  3660  2678  3621 *  AG   2432    6.1     .0  25.0
 D. MonteV/Basel *  2678  3621  1857  3603 *  AG   2137    6.1     .0  25.0
 E. Bensn/8th  N *  1857  3603  1036  3584 *  AG   2938    9.2     .0  25.0
 F. Bensn/8th  S *  1036  3584  -975  3536 *  AG   2713    9.2     .0  25.0
 G. Bensn/8th  E *  2635  5800  2678  3621 *  AG   1733    6.1     .0  25.0
 H. Bensn/8th  W *  2678  3621  2711  1991 *  AG   1944    6.1     .0  25.0
 I. Baseln/Benso *  2711  1991  2743   360 *  AG   1932    6.1     .0  25.0
 J. Baseln/Benso *  2743   360  2774 -1280 *  AG   2048    6.1     .0  25.0
 K. Baseln/Benso *  4328   402  2743   360 *  AG   2075    9.2     .0  25.0
 L. Baseln/Benso *  2743   360  1122   305 *  AG   1861    9.2     .0  25.0
 M. I-210        *  2926  5054  1042  3389 *  AG  11554    4.6     .0  40.0
 N. I-210        *  1042  3389 -1042  3340 *  AG  14111    4.6     .0  40.0

 III.  RECEPTOR LOCATIONS
            *    COORDINATES (M)
   RECEPTOR  *     X      Y      Z
 ------------*---------------------
 1. Recpt 1  *   1016   3563   1.8
 2. Recpt 2  *   1056   3605   1.8
 3. Recpt 3  *   1015   3604   1.8
 4. Recpt 4  *   1057   3564   1.8
 5. Recpt 5  *   2723    339   1.8
 6. Recpt 6  *   2763    381   1.8
 7. Recpt 7  *   2722    380   1.8
 8. Recpt 8  *   2764    340   1.8
 9. Recpt 9  *   2658   3600   1.8
10. Recpt 10 *   2698   3642   1.8
11. Recpt 11 *   2657   3641   1.8
12. Recpt 12 *   2699   3601   1.8

  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )
     *       * PRED  *              CONC/LINK
             *  BRG  * CONC  *                    (PPM)
  RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
-------------*-------*-------*----------------------------------------
 1. Recpt 1  *   81. *   3.4 *   .0   .7   .0   .0  1.9   .0   .0   .0
 2. Recpt 2  *  258. *   3.0 *   .7   .0   .0   .0   .0  1.8   .0   .0
 3. Recpt 3  *  172. *   3.1 *   .0  1.6   .0   .0   .0   .9   .0   .0
 4. Recpt 4  *   81. *   2.7 *   .0   .0   .0   .0  1.9   .0   .0   .0
 5. Recpt 5  *   81. *   2.0 *   .0   .0   .0   .0   .0   .0   .0   .0
 6. Recpt 6  *  261. *   1.9 *   .0   .0   .0   .0   .0   .0   .0   .0
 7. Recpt 7  *   96. *   2.0 *   .0   .0   .0   .0   .0   .0   .0   .0
 8. Recpt 8  *  352. *   2.0 *   .0   .0   .0   .0   .0   .0   .0   .0
 9. Recpt 9  *   82. *   1.6 *   .0   .0  1.1   .0   .0   .0   .0   .5
10. Recpt 10 *  262. *   2.1 *   .0   .0   .0  1.0   .1   .1   .4   .0
11. Recpt 11 *  262. *   1.7 *   .0   .0   .0   .9   .1   .1   .0   .0
12. Recpt 12 *  275. *   2.1 *   .0   .0   .0   .9   .1   .1   .0   .5

  IV.  MODEL RESULTS (WORST CASE WIND ANGLE)     (CONT.)
             *          CONC/LINK
             *            (PPM)
  RECEPTOR   *   I    J    K    L    M    N
 ------------*------------------------------
 1. Recpt 1  *   .0   .0   .0   .0   .6   .0
 2. Recpt 2  *   .0   .0   .0   .0   .0   .5
 3. Recpt 3  *   .0   .0   .0   .0   .3   .2
 4. Recpt 4  *   .0   .0   .0   .0   .7   .0
 5. Recpt 5  *   .0   .5  1.5   .0   .0   .0
 6. Recpt 6  *   .5   .0   .0  1.4   .0   .0
 7. Recpt 7  *   .4   .0  1.5   .0   .0   .0
 8. Recpt 8  *   .9   .0   .7   .0   .2   .0
 9. Recpt 9  *   .0   .0   .0   .0   .0   .0
10. Recpt 10 *   .0   .0   .0   .0   .1   .2
11. Recpt 11 *   .0   .0   .0   .0   .1   .2
12. Recpt 12 *   .0   .0   .0   .0   .2   .0
```

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1
JOB: Baseline Rd-2025 no project
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

```
        U=    .5 M/S             Z0= 100. CM            ALT=     0. (M)
      BRG= WORST CASE            VD=    .0 CM/S
     CLAS=     7 (G)             VS=    .0 CM/S
     MIXH= 1000. M              AMB=    .0 PPM
    SIGTH=   10. DEGREES       TEMP=   7.2 DEGREE (C)
```

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. MonteV/Basel	939	5858	1036	3584	AG	1763	2.6	.0	25.0
B. MonteV/Basel	1036	3584	1122	305	AG	1913	2.6	.0	25.0
C. MonteV/Basel	4400	3660	2678	3621	AG	2457	2.6	.0	25.0
D. MonteV/Basel	2678	3621	1857	3603	AG	1987	2.6	.0	25.0
E. Bensn/8th N	1857	3603	1036	3584	AG	3199	2.6	.0	25.0
F. Bensn/8th S	1036	3584	-975	3536	AG	2883	2.6	.0	25.0
G. Bensn/8th E	2635	5800	2678	3621	AG	2259	2.6	.0	25.0
H. Bensn/8th W	2678	3621	2711	1991	AG	2271	2.6	.0	25.0
I. Baseln/Benso	2711	1991	2743	360	AG	2068	2.6	.0	25.0
J. Baseln/Benso	2743	360	2774	-1280	AG	2248	2.6	.0	25.0
K. Baseln/Benso	4328	402	2743	360	AG	2621	2.6	.0	25.0
L. Baseln/Benso	2743	360	1122	305	AG	2375	2.6	.0	25.0
M. I-210	2926	5054	1042	3389	AG	24251	1.4	.0	40.0
N. I-210	1042	3389	-1042	3340	AG	25373	1.4	.0	40.0

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
1. Recpt 1	1016	3563	1.8
2. Recpt 2	1056	3605	1.
3. Recpt 3	1015	3604	1.8
4. Recpt 4	1057	3564	1.8
5. Recpt 5	2723	339	1.8
6. Recpt 6	2763	381	1.8
7. Recpt 7	2722	380	1.8
8. Recpt 8	2764	340	1.8
9. Recpt 9	2658	3600	1.8
10. Recpt 10	2698	3642	1.8
11. Recpt 11	2657	3641	1.8
12. Recpt 12	2699	3601	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
1. Recpt 1	81.	1.2	.0	.2	.0	.0	.6	.0	.0	.0
2. Recpt 2	257.	1.0	.2	.0	.0	.0	.0	.5	.0	.0
3. Recpt 3	96.	1.1	.2	.0	.0	.0	.6	.0	.0	.0
4. Recpt 4	81.	1.1	.0	.0	.0	.0	.6	.0	.0	.0
5. Recpt 5	81.	.7	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	261.	.7	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	172.	.7	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	352.	.9	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	82.	.7	.0	.0	.5	.0	.0	.0	.0	.2
10. Recpt 10	262.	.9	.0	.0	.0	.4	.0	.0	.2	.0
11. Recpt 11	172.	.7	.0	.0	.0	.2	.0	.0	.0	.5
12. Recpt 12	352.	.9	.0	.0	.2	.0	.0	.0	.5	.0

CONC/LINK (PPM)

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

CONC/LINK (PPM

RECEPTOR	I	J	K	L	M	N
1. Recpt 1	.0	.0	.0	.0	.4	.0
2. Recpt 2	.0	.0	.0	.0	.0	.3
3. Recpt 3	.0	.0	.0	.0	.3	.0
4. Recpt 4	.0	.0	.0	.0	.4	.0
5. Recpt 5	.0	.2	.5	.0	.0	.0
6. Recpt 6	.2	.0	.0	.5	.0	.0
7. Recpt 7	.0	.5	.0	.2	.0	.0
8. Recpt 8	.4	.0	.3	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.1
11. Recpt 11	.0	.0	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.0	.1	.0

```
CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   1

              JOB: Baseline Rd-2025 with project
               RUN: Hour 1           (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide

   I.  SITE VARIABLES
          U=    .5 M/S             Z0= 100. CM            ALT=     0. (M)
        BRG= WORST CASE            VD=   .0 CM/S
       CLAS=     7 (G)             VS=   .0 CM/S
       MIXH= 1000. M              AMB=   .0 PPM      SIGTH=   10. DEGREES       TEMP=  7.2 DEGREE (C)

  II.  LINK VARIABLES
       LINK      *  LINK COORDINATES (M)   *             EF     H     W
    DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. MonteV/Basel *   939  5858  1036  3584 *  AG   1794   2.6     .0  25.0
 B. MonteV/Basel *  1036  3584  1122   305 *  AG   1941   2.6     .0  25.0
 C. MonteV/Basel *  4400  3660  2678  3621 *  AG   2735   2.6     .0  25.0
 D. MonteV/Basel *  2678  3621  1857  3603 *  AG   2309   2.6     .0  25.0
 E. Bensn/8th  N *  1857  3603  1036  3584 *  AG   3303   2.6     .0  25.0
 F. Bensn/8th  S *  1036  3584  -975  3536 *  AG   2990   2.6     .0  25.0
 G. Bensn/8th  E *  2635  5800  2678  3621 *  AG   2382   2.6     .0  25.0
 H. Bensn/8th  W *  2678  3621  2711  1991 *  AG   2424   2.6     .0  25.0
 I. Baseln/Benso *  2711  1991  2743   360 *  AG   2124   2.6     .0  25.0
 J. Baseln/Benso *  2743   360  2774 -1280 *  AG   2314   2.6     .0  25.0
 K. Baseln/Benso *  4328   402  2743   360 *  AG   2632   2.6     .0  25.0
 L. Baseln/Benso *  2743   360  1122   305 *  AG   2396   2.6     .0  25.0
 M. I-210        *  2926  5054  1042  3389 *  AG  24374   1.4     .0  40.0
 N. I-210        *  1042  3389 -1042  3340 *  AG  25598   1.4     .0  40.0

 III.  RECEPTOR LOCATIONS
             *    COORDINATES (M)
   RECEPTOR  *     X       Y      Z
 ------------*---------------------
  1. Recpt 1  *   1016   3563   1.8
  2. Recpt 2  *   1056   3605   1.
  3. Recpt 3  *   1015   3604   1.8
  4. Recpt 4  *   1057   3564   1.8
  5. Recpt 5  *   2723    339   1.8
  6. Recpt 6  *   2763    381   1.8
  7. Recpt 7  *   2722    380   1.8
  8. Recpt 8  *   2764    340   1.8
  9. Recpt 9  *   2658   3600   1.8
 10. Recpt 10 *   2698   3642   1.8
 11. Recpt 11 *   2657   3641   1.8
 12. Recpt 12 *   2699   3601   1.8

  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )
              *       * PRED  *                CONC/LINK
              *  BRG  * CONC  *                  (PPM)
  RECEPTOR    * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*---------------------------------------
  1. Recpt 1  *   81. *   1.2 *   .0   .2   .0   .0   .6   .0   .0   .0
  2. Recpt 2  *  257. *   1.0 *   .2   .0   .0   .0   .0   .5   .0   .0
  3. Recpt 3  *   96. *   1.2 *   .2   .0   .0   .0   .6   .0   .0   .0
  4. Recpt 4  *   81. *   1.1 *   .0   .0   .0   .0   .6   .0   .0   .0
  5. Recpt 5  *   81. *    .7 *   .0   .0   .0   .0   .0   .0   .0   .0
  6. Recpt 6  *  261. *    .7 *   .0   .0   .0   .0   .0   .0   .0   .0
  7. Recpt 7  *  172. *    .7 *   .0   .0   .0   .0   .0   .0   .0   .0
  8. Recpt 8  *  352. *    .9 *   .0   .0   .0   .0   .0   .0   .0   .0
  9. Recpt 9  *   81. *    .8 *   .0   .0   .5   .0   .0   .0   .0   .2
 10. Recpt 10 *  262. *   1.0 *   .0   .0   .0   .4   .0   .0   .2   .0
 11. Recpt 11 *  172. *    .8 *   .0   .0   .0   .2   .0   .0   .0   .5
 12. Recpt 12 *  352. *    .9 *   .0   .0   .3   .0   .0   .0   .5   .0

  IV.  MODEL RESULTS (WORST CASE WIND ANGLE)     (CONT.)
*           CONC/LINK
              *           (PPM)
  RECEPTOR    *   I    J    K    L    M    N
 -------------*-----------------------------
  1. Recpt 1  *   .0   .0   .0   .0   .4   .0
  2. Recpt 2  *   .0   .0   .0   .0   .0   .3
  3. Recpt 3  *   .0   .0   .0   .0   .3   .0
  4. Recpt 4  *   .0   .0   .0   .0   .4   .0
  5. Recpt 5  *   .0   .2   .5   .0   .0   .0
  6. Recpt 6  *   .2   .0   .0   .5   .0   .0
  7. Recpt 7  *   .0   .5   .0   .2   .0   .0
  8. Recpt 8  *   .4   .0   .3   .0   .0   .0
  9. Recpt 9  *   .0   .0   .0   .0   .0   .0
 10. Recpt 10 *   .0   .0   .0   .0   .0   .1
 11. Recpt 11 *   .0   .0   .0   .0   .0   .0
 12. Recpt 12 *   .0   .0   .0   .0   .1   .0
```

```
Title    : San Bernardino County Avg 2006  Annual Default Title
Title    : San Bernardino County Avg Winter 3 CYrs 2006; 2009 and 2025 Default Title
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2007/05/14 15:35:22
Scen Year: 2006 -- All model years in the range 1965 to 2006 selected
Season   : Winter
Area     : San Bernardino
*************************************************************************************
     Year: 2006 -- Model Years 1965 to 2006 Inclusive -- Winter
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

     County Average                     San Bernardino              County Average

Pollutant Name: Carbon Monoxide         Temperature:  45F  Relative Humidity:  57%
```

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	8.724	11.392	11.586	26.728	30.723	51.626	12.319
10	7.215	9.302	8.908	19.580	20.240	42.386	9.786
15	6.153	7.850	7.178	14.531	14.106	36.633	8.040
20	5.382	6.810	6.019	11.135	10.398	33.326	6.828
25	4.809	6.053	5.221	9.169	8.107	31.911	6.011
30	4.382	5.499	4.667	7.658	6.685	32.163	5.420
35	4.067	5.104	4.291	6.508	5.829	34.127	5.010
40	3.848	4.842	4.055	5.668	5.375	38.126	4.758
45	3.720	4.705	3.946	5.112	5.240	44.854	4.661
50	3.686	4.700	3.966	4.832	5.401	55.577	4.737
55	3.765	4.853	4.137	4.838	5.886	72.534	5.032
60	3.995	5.216	4.509	5.156	6.783	99.715	5.630
65	4.442	5.885	5.171	5.839	8.263	144.396	6.689

```
Title    : San Bernardino County Avg Winter 3 CYrs 2006; 2009 and 2025 Default Title
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2007/05/14 15:35:22
Scen Year: 2009 -- All model years in the range 1965 to 2009 selected
Season   : Winter
Area     : San Bernardino
*************************************************************************************
Year: 2009 -- Model Years 1965 to 2009 Inclusive -- Winter
Emfac2007 Emission Factors: V2.3 Nov 1 2006
County Average                     San Bernardino              County Average

Table   1:  Running Exhaust Emissions (grams/mile)

Pollutant Name: Carbon Monoxide         Temperature:  45F  Relative Humidity:  57%
```

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	6.191	8.569	8.298	22.128	27.586	43.994	9.204
10	5.206	7.094	6.530	15.870	18.165	36.312	7.366
15	4.496	6.052	5.363	11.503	12.655	31.485	6.086
20	3.968	5.291	4.564	8.694	9.326	28.664	5.200
25	3.565	4.725	4.000	7.184	7.269	27.397	4.605
30	3.255	4.301	3.597	6.033	5.992	27.498	4.169
35	3.018	3.988	3.313	5.166	5.224	29.003	3.860
40	2.844	3.769	3.125	4.544	4.816	32.173	3.663
45	2.727	3.637	3.022	4.146	4.694	37.572	3.578
50	2.671	3.597	3.007	3.966	4.839	46.229	3.616
55	2.686	3.663	3.094	4.010	5.273	59.965	3.812
60	2.791	3.871	3.315	4.299	6.076	82.025	4.226
65	3.028	4.282	3.730	4.874	7.402	118.329	4.973

```
Title    : San Bernardino County Avg Winter 3 CYrs 2006; 2009 and 2025 Default Title
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2007/05/14 15:35:22
Scen Year: 2025 -- All model years in the range 1981 to 2025 selected
Season   : Winter
Area     : San Bernardino
*************************************************************************************
Year: 2025 -- Model Years 1981 to 2025 Inclusive -- Winter
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average                    San Bernardino               County Average

Table   1:  Running Exhaust Emissions (grams/mile)

Pollutant Name: Carbon Monoxide          Temperature:  45F  Relative Humidity:  57%
```

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	1.258	2.050	2.408	6.451	19.655	27.485	2.582
10	1.139	1.844	2.072	4.084	12.964	23.237	2.088
15	1.036	1.669	1.821	2.586	9.044	20.438	1.743
20	0.946	1.519	1.626	1.861	6.673	18.668	1.524
25	0.867	1.389	1.468	1.623	5.207	17.699	1.388
30	0.798	1.276	1.339	1.467	4.296	17.437	1.283
35	0.737	1.178	1.232	1.370	3.748	17.894	1.205
40	0.683	1.093	1.142	1.323	3.457	19.194	1.150
45	0.636	1.018	1.067	1.318	3.372	21.609	1.121
50	0.594	0.954	1.005	1.355	3.476	25.640	1.121
55	0.557	0.898	0.956	1.433	3.790	32.174	1.159
60	0.525	0.850	0.920	1.559	4.367	42.797	1.252
65	0.496	0.810	0.901	1.742	5.320	60.401	1.432