6.2 AIR QUALITY

6.2.1 INTRODUCTION

This section includes a summary of applicable regulations, existing air quality conditions, and an analysis of potential short-term and long-term air quality impacts of the proposed project and alternatives. The method of analysis for short-term construction, long-term regional (operational), local mobile source, odor, and toxic air emissions is consistent with the recommendations of the Sacramento Metropolitan Air Quality Management District (SMAQMD). In addition, mitigation measures are recommended, as necessary, to reduce significant air quality impacts.

6.2.2 ENVIRONMENTAL SETTING

The proposed project site is located in Sacramento County, California, which is within the Sacramento Valley Air Basin (SVAB). The SVAB also comprises all of Butte, Colusa, Glenn, Shasta, Sutter, Tehama, Yolo and Yuba counties, the western portion of Placer County, and the eastern portion of Solano County. The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by pollutant sources and the atmosphere's ability to transport and dilute such emissions. Natural factors which affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

TOPOGRAPHY, METEOROLOGY, AND CLIMATE

The SVAB is relatively flat, bordered by the North Coast Ranges to the west and the Northern Sierra Nevada Mountains to the east. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin River Delta from the San Francisco Bay area.

The Mediterranean climate type of the SVAB is characterized by hot, dry summers and cool, rainy winters. During the summer, daily temperatures range from 50°F to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature.

Most precipitation in the area results from air masses that move in from the Pacific Ocean, usually from the west or northwest during the winter months. More than half the total annual precipitation falls during the winter rainy season (November through February); the average winter temperature is a moderate 49°F. Characteristic of SVAB winters are also periods of dense and persistent low-level fog, which are most prevalent between storms. The prevailing winds are moderate in speed and vary from moisture laden breezes from the south to dry land flows from the north.

The mountains surrounding the SVAB create a barrier to airflow, which leads to the entrapment of air pollutants when meteorological conditions are unfavorable for transport and dilution. The highest frequency of poor air movement occurs in the fall and winter when high-pressure cells are present over the SVAB. The lack of surface wind during these periods combined with the reduced vertical flow because of less surface heating reduces the influx of air and leads to the concentration of air pollutants under stable metrological conditions. Surface concentrations of air pollutant emissions are highest when these conditions occur in combination with agricultural burning activities or temperature inversions which hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground.

May through October is ozone season in the SVAB. This period is characterized by poor air movement in the mornings with the arrival of the delta sea breeze from the southwest in the afternoons. In addition, longer daylight hours provide a plentiful amount of sunlight to fuel photochemical reactions between reactive organic gases (ROG) and nitrogen oxides (NO_X), which result in ozone formation. Typically, the delta breeze transports air pollutants northward out of the SVAB; however, a phenomenon known as the Schultz Eddy prevents this from occurring during approximately half of the time from July to September. The Schultz Eddy phenomenon causes the wind pattern to shift southward resulting in air pollutants being blown back into the SVAB. This phenomenon exacerbates the concentration of air pollutant emissions in the area and contributes to violations of the ambient air quality standards.

Local meteorology of the proposed project site is represented by measurements recorded at the Sacramento station. The normal annual precipitation is approximately 18 inches. January temperatures range from a normal minimum of 38°F to a normal maximum of 53°F. July temperatures range from a normal minimum of 58°F to a normal maximum of 93°F (National Oceanic and Atmospheric Administration 1992). The predominant wind direction and speed is from the south-southwest at 10 mph (California Air Resources Board 1994).

Existing Air Quality—Criteria Air Pollutants

Concentrations of the following air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead are used as indicators of ambient air quality conditions. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as “criteria air pollutants.”

A brief description of each criteria air pollutant including source types, health effects, and future trends is provided below along with the most current attainment area designations and monitoring data for the project area.

Ozone

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of ROG and NO_X in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that results from the combustion of fuels.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 1991).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 parts per million (ppm) for 1 to 2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence also exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increase in responsiveness of the respiratory system to challenges, and the interference or inhibition of the immune system’s ability to defend against infection (Godish 1991).

Emissions of ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. Consequently, peak 1-hour and 8-hour ozone concentrations in the SVAB have declined overall by about 15% since 1988. However, peak ozone values in the SVAB have not declined as rapidly over the last several years as they have in other urban areas. This can be attributed to influx of pollutants into the SVAB from other urbanized areas, making the region both a transport contributor and a receptor of pollutants (California Air Resources Board 2005a).

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. In fact, 77% of the nationwide CO emissions are from mobile sources. The other 23% consists of CO emissions from wood-burning stoves, incinerators, and industrial sources.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (U.S. Environmental Protection Agency 2006).

The highest concentrations are generally associated with cold stagnant weather conditions that occur during the winter. In contrast to ozone, which tends to be a regional pollutant, CO problems tend to be localized.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (U.S. Environmental Protection Agency 2006). The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation during or shortly after exposure. After a period of approximately 4 to 12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung functions.

Sulfur Dioxide

Sulfur dioxide (SO_2) is produced by such stationary sources as coal and oil combustion, steel mills, refineries, pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (U.S. Environmental Protection Agency 2006). Fine particulate matter ($PM_{2.5}$) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less (California Air Resources Board 2005a).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons (PAH), and other toxic substances adsorbed onto fine particulate matter, which is referred to as the piggybacking effect, or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (U.S. Environmental Protection Agency 2006). $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health.

Direct emissions of both PM_{10} and $PM_{2.5}$ have increased in the SVAB between 1975 and 2000 and are projected to increase through 2020. These emissions are dominated by area-wide sources, primarily because of development. Direct emissions of PM from mobile and stationary sources have remained relatively steady (California Air Resources Board 2005a).

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, as discussed in detail below, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The EPA banned the use of leaded gasoline in highway vehicles in December 1995 (U.S. Environmental Protection Agency 2006).

As a result of the EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (95% between 1980 and 1999), and levels of lead in the air decreased by 94% between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded (U.S. Environmental Protection Agency 2006).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic success story. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (the EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, the ARB identified lead as a toxic air contaminant.

Monitoring Station Data and Attainment Area Designations

Criteria air pollutant concentrations are measured at several monitoring stations in the SVAB. The Sacramento-Airport and T Street stations are the closest in proximity to the proposed project site with recent data for ozone, CO, PM_{10} and $PM_{2.5}$. In general, the ambient air quality measurements from these stations are representative of the air quality in the vicinity of the proposed project site. Table 6.2-1 summarizes the air quality data from the most recent 3 years.

Both California Air Resources Board (ARB) and the U.S. Environmental Protection Agency (EPA) use this type of monitoring data to designate areas according to attainment status for criteria air pollutants established by the agencies. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. Unclassified is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called nonattainment-transitional. The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. The most current attainment designations for the Sacramento County portion of the SVAB are shown in Table 6.2-2 for each criteria air pollutant.

Existing Air Quality—Toxic Air Contaminants

Concentrations of toxic air contaminants (TACs) are also used as indicators of ambient-air-quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to the California Almanac of Emissions and Air Quality (California Air Resources Board 2005a), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, the ARB has made preliminary concentration estimates based on a PM exposure method. This method uses ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, *para*-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest existing ambient risk, for which data are available, in California.

Diesel PM poses the greatest health risk among these ten TACs mentioned. Based on receptor modeling techniques, the ARB estimated its health risk to be 360 excess cancer cases per million people in the SVAB. Since 1990, the diesel PM's health risk has been reduced by 52%. Overall, levels of most TACs have gone down since 1990 except for *para*-dichlorobenzene and formaldehyde (California Air Resources Board 2005a).

Table 6.2-1 Summary of Annual Ambient Air Quality Data (2003–2005)[1]			
	2003	2004	2005
Ozone			
Maximum concentration (1-hr/8-hr, ppm)	0.097/ 0.085	0.090/ 0.072	0.100/ 0.087
Number of days state standard exceeded (1-hr)	2	0	4
Number of days national standard exceeded (1-hr/8-hr)	0/1	0/0	0/1
Carbon Monoxide (CO)			
Maximum concentration (1-hr/8-hr, ppm)	4.1/3.13	4.0/3.53	3.9/2.97
Number of days state standard exceeded (8-hr)	0	0	0
Number of days national standard exceeded (1-hr/8-hr)	0/0	0/0	0/0
Nitrogen Dioxide (NO_2)			
Maximum concentration (1-hr, ppm)	0.102	0.082	0.074
Number of days state standard exceeded (1-hr)	0	0	0
Annual Average (ppm)	0.018	0.015	0.015
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration (µg/m3)	49.0	52.5	63.8
Number of days national standard exceeded (measured2)	0	0	0
Respirable Particulate Matter (PM_{10})			
Maximum concentration (µg/m3)	123.0	87.1	99.8
Number of days state standard exceeded (measured/calculated2)	-/28	0/12	6.4/19
Number of days national standard exceeded (measured/calculated2)	-/0	0/0	-/0

Notes: µg/m^3 = micrograms per cubic meter; ppm = parts per million

[1] Measurements from the Sacramento-Airport Road and T Street stations.

[2] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

Sources: California Air Resources Board 2006, U.S. Environmental Protection Agency 2006

Table 6.2-2
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards[1]		
		Standards[2,3]	Attainment Status[4]	Primary[3,5]	Secondary[3,6]	Attainment Status[7]
Ozone	1-hour	0.09 ppm (180 μg/m^3)	N(Serious)	0.12 ppm[9] (235 μg/m^3)	Same as Primary Standard	N(Severe)[9]
	8-hour	0.07 ppm[8] (137 μg/m^3)	–	0.08 ppm (157 μg/m^3)		N(Serious)
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	–	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	–	–	0.053 ppm (100 μg/m^3)	Same as Primary Standard	U/A
	1-hour	0.25 ppm (470 μg/m^3)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 μg/m^3)	–	U
	24-hour	0.04 ppm (105 μg/m^3)	A	0.14 ppm (365 μg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 μg/m^3)	
	1-hour	0.25 ppm (655 μg/m^3)	A	–	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 μg/m^3	N	50 μg/m^3	Same as Primary Standard	N(Moderate)
	24-hour	50 μg/m^3		150 μg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 μg/m^3	N	15 μg/m^3	Same as Primary Standard	U
	24-hour	–	–	65 μg/m^3		
Lead[10]	30-day Average	1.5 μg/m^3	U	–	–	–
	Calendar Quarter	–	–	1.5 μg/m^3	Same as Primary Standard	
Sulfates	24-hour	25 μg/m^3	A	**No National Standards**		
Hydrogen Sulfide	1-hour	0.03 ppm (42 μg/m^3)	U			
Vinyl Chloride[10]	24-hour	0.01 ppm (26 μg/m^3)	U/A			

Table 6.2-2 (Continued)
Ambient Air Quality Standards and Designations

Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U	

1 National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the EPA for further clarification and current federal policies.

2 California standards for ozone, CO (except Lake Tahoe), SO2 (1- and 24-hour), NO2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

3 Concentration expressed first in units in which it was promulgated [i.e., parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$)]. 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 Unclassified (U): a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
Attainment (A): a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment (N): a pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area.
Nonattainment/Transitional (NT): is a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

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

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

7 Nonattainment (N): any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.
Attainment (A): any area that meets the national primary or secondary ambient air quality standard for the pollutant.
Unclassifiable (U): any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

8 This concentration was approved by the ARB on April 28, 2005 and is expected to become effective in early 2006.

9 The 1-hour ozone NAAQS was revoked on June 15, 2005.

10 ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold 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.

Source: California Air Resources Board 2006, U.S. Environmental Protection Agency 2006

6.2.3 REGULATORY SETTING

Air quality within Sacramento County is regulated by such agencies as the EPA, ARB, and SMAQMD. Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

At the federal level, the EPA has been charged with implementing national air quality programs. The EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required the EPA to establish national ambient air quality standards (NAAQS). As shown in Table 6.2-2, the EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The EPA has responsibility to review all state SIPs to determine conformation to the mandates of the CAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If the EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures. Failure to submit an approvable SIP or to implement the plan within the mandated timeframe may result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

State Plans, Policies, Regulations, and Laws

The ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required the ARB to establish California ambient air quality standards (CAAQS) (Table 6.2-2). The ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources, and provides districts with the authority to regulate indirect sources.

Other ARB responsibilities include, but are not limited to, overseeing local air district compliance with California and federal laws, approving local air quality plans, submitting SIPs to the EPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

Local Plans, Policies, Regulations, and Laws

Sacramento Valley Air Quality Management District

The SMAQMD seeks to improve air quality conditions in Sacramento County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the SMAQMD includes the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. The SMAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA, CAAA, and the CCAA.

In July 2004, the SMAQMD released a revision to the previously adopted guidelines document. This revised Guide to Air Quality Assessment (SMAQMD 2004) is an advisory document that provides lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The guide contains the following applicable components:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
- Methods available to mitigate air quality impacts;
- Information for use in air quality assessments that will be updated more frequently such as air quality data, regulatory setting, climate, and topography.

As mentioned above, the SMAQMD adopts rules and regulations. All projects are subject to SMAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the proposed project may include, but are not limited to:

- **Rule 201:** General Permit Requirements. Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from SMAQMD before equipment operation. The applicant, developer, or operator of a project that includes an emergency generator, boiler, or heater should contact the SMAQMD early to determine if a permit is required, and to begin the permit application process. Portable construction equipment (e.g., generators, compressors, pile drivers, lighting equipment) with an internal combustion engine over 50 horsepower are required to have a SMAQMD permit or ARB portable equipment registration.
- **Rule 403:** Fugitive Dust. The developer or contractor is required to control dust emissions from earth moving activities or any other construction activity to prevent airborne dust from leaving the project site.
- **Rule 442:** Architectural Coatings. The developer or contractor is required to use coatings that comply with the volatile organic compound (VOC) content limits specified in the rule.
- **Rule 902:** Asbestos. The developer or contractor is required to notify SMAQMD of any regulated renovation or demolition activity. Rule 902 contains specific requirements for surveying, notification, removal, and disposal of asbestos containing material.

In addition, effective as of October 10, 2005, if modeled construction-generated emissions for a project are not reduced to SMAQMD's threshold of significance (85 pounds per day [lb/day]) by the application of the standard construction mitigation, then an off-site construction mitigation fee is recommended. Payment of the fee is required before the issuance of a grading permit. This fee is used by SMAQMD to purchase off-site emissions reductions. This is done through SMAQMD's Heavy Duty Incentive Program, through which select owners of heavy duty equipment in Sacramento County can repower or retrofit their old engines with cleaner engines or technologies.

Air Quality Plans

The SMAQMD in coordination with the air quality management districts and air pollution control districts of El Dorado, Placer, Solano, Sutter, and Yolo counties prepared and submitted the 1991 Air Quality Attainment Plan (AQAP) in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and to a lesser extent, CO and PM_{10}. The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the attainment plan must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the 1994 Ozone Attainment Plan (OAP). The OAP stresses attainment of ozone standards and focuses on strategies for reducing ozone precursor emissions of ROG and NO_X. It promotes active public involvement, enforcement of compliance with SMAQMD rules and regulations, public education in both the public and private sectors, development and promotion of transportation and land use programs designed to reduce vehicle miles traveled (VMT) within the region, and implementation of stationary and mobile-source control measures. The OAP became part of the SIP in accordance with the requirements of the CAAA and amended the 1991 AQAP. However, at that time the region could not show that the national ozone (1-hour) standard would be met by 1999. In exchange for moving the deadline to 2005, the region accepted a designation of “severe nonattainment” coupled with additional emission requirements on stationary sources. Additional triennial reports were also prepared in 1997, 2000, and 2003 in compliance with the CCAA that act as incremental updates.

As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the CAAA. Milestone reports were prepared for 1996, 1999, and 2002. These milestone reports include compliance demonstrations that the requirements have been met for the Sacramento nonattainment area. The air quality attainment plans and reports present comprehensive strategies to reduce ROG, NO_X, and PM_{10} emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations; enhancement of CEQA participation; implementation of a new and modified indirect source review program; adoption of local air quality plans; and stationary-, mobile-, and indirect-source control measures.

In July of 1997, the EPA promulgated a new 8-hour ozone standard. This change lowered the standard for ambient ozone from 0.12 ppm averaged over one hour to 0.08 ppm averaged over eight hours. In general, the 8-hour standard is more protective of public health and more stringent than the 1-hour standard. The promulgation of this standard prompted new designations and nonattainment classifications in June 2004, and resulted in the revocation of the 1-hour standard in June 2005. The region has been designated as a nonattainment (serious) area for the national (8-hour) ozone standard with an attainment deadline of June 2013.

Although the region has made significant progress in reducing ozone, a problem has arisen with regard to another issue. The region’s transportation plan must conform and show that implementation will not harm the region’s chances of attaining the ozone standard. The SIP is tied to a “motor vehicle emissions budget” and thus, transportation planners must ensure that emissions anticipated from plans and improvement programs remain within this budget. The region is not required to update the SIP before the ozone (8-hour) plans are due in 2006. However, since a conformity lapse began October 4, 2004, an expedited process to prepare a plan is underway (SMAQMD 2006).

City of Sacramento

The City of Sacramento General Plan does not have an adopted Air Quality Element and does not have any policies or goals directly related to air quality. However, other elements (e.g., transportation and housing) do contain goals, policies, and actions that refer to air quality where applicable in the context of the subject element.

LAFCo

The LAFCo Policies, Procedures, and Guidelines document does not contain any policies related to air quality.

Toxic Air Contaminants

Air quality regulations also focus on TACs, or in federal parlance hazardous air pollutants (HAPs). In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 6.2-2). Instead, the EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT) to limit emissions. These in conjunction with additional rules set forth by the ARB (for mobile sources) and SMAQMD establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Programs

The EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed the EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP may differ for major sources than for area sources of HAPs. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (TPY) of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources. The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), the EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), the EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required the EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum to benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State and Local Toxic Air Contaminant Programs

TACs in California are primarily regulated through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. To date, ARB has identified over 21 TACs, and adopted the EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, the ARB then adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

The ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). In

February 2000, the ARB adopted a new public transit bus fleet rule and emission standards for new urban buses. These new rules and standards provide for 1) more stringent emission standards for some new urban bus engines beginning with 2002 model year engines; 2) zero-emission bus demonstration and purchase requirements applicable to transit agencies; and 3) reporting requirements with which transit agencies must demonstrate compliance with the urban transit bus fleet rule. Upcoming milestones include the low sulfur diesel fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially less TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade, and will be reduced further in California through a progression of regulatory measures [e.g., Low Emission Vehicle (LEV)/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year 2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

The ARB recently published the Air Quality and Land Use Handbook: A Community Health Perspective, which provides guidance concerning land use compatibility with TAC sources (California Air Resources Board 2005b). While not a law or adopted policy, the handbook offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries dry cleaners, gasoline stations, and industrial facilities to help keep children and other sensitive populations out of harm's way. A number of comments on the Handbook were provided to the ARB by air districts, other agencies, real estate representatives, and others. The comments included concern over whether the ARB was playing a role in local land use planning, the validity of relying on static air quality conditions over the next several decades in light of technological improvements, and support for providing information that can be used in local decision making.

At the local level, air pollution control or management districts may adopt and enforce ARB control measures. Under SMAQMD Rule 201 (General Permit Requirements), Rule 202 (New Source Review), and Rule 207 (Federal Operating Permit), all sources that possess the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new source review standards and air toxics control measures. The SMAQMD limits emissions and public exposure to TACs through a number of programs. The SMAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors. The SMAQMD is also currently developing guidelines for implementation of ARB's Air Quality and Land Use Handbook (Maertz, pers. comm., 2006).

Sources that require a permit are analyzed by the SMAQMD (e.g., health risk assessment) based on their potential to emit toxics. If it is determined that the project would emit toxics in excess of SMAQMD's threshold of significance for TACs, as identified below, sources have to implement the best available control technology for TACs (T-BACT) in order to reduce emissions. If a source cannot reduce the risk below the threshold of significance even after T-BACT has been implemented, the SMAQMD will deny the permit required by the source. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology when retrofitting with respect to TACs. It is important to note that SMAQMD's air quality permitting process applies to stationary sources; properties which are exposed to elevated levels of non-stationary type sources of TACs, and the non-stationary type sources themselves (e.g., on-road vehicles) are not subject to air quality permits. Further, due to feasibility and practicality reasons, mobile sources (cars, trucks, etc.) are not required to implement T-BACT on a project-specific basis, even if they do have the potential to expose adjacent properties to elevated levels of TACs. Rather, emissions controls on such sources (e.g., vehicles) are subject to regulations implemented on the state and federal level. This regulatory program constitutes programmatic mitigation for these sources.

6.2.4 IMPACTS AND MITIGATION MEASURES

METHOD OF ANALYSIS

Short-term construction-generated criteria air pollutant (e.g., PM_{10}) and ozone precursor emissions (ROG and NO_X) were assessed in accordance with SMAQMD-recommended methods. Where quantification is required, emissions were modeled using the URBEMIS 2002 Version 8.7 computer model, and other emission factors and recommended methodologies from SMAQMD's Guide to Air Quality Assessment (SMAQMD 2004). Modeling was based on project-specific data (e.g., estimated duration of construction, size and type of proposed land uses); URBEMIS default settings for the SVAB; and SMAQMD recommended construction equipment types and number requirements, and maximum daily acreage disturbed. Predicted short-term construction-generated emissions were compared with applicable SMAQMD thresholds for determination of significance.

It is important to note that according to the SMAQMD, short-term construction-generated ROG emissions should be modeled; however, the SMAQMD does not have a threshold of significance to compare with such emissions. Thus, in accordance with SMAQMD recommended methodologies, short-term construction-generated ROG emissions resulting from implementation of the proposed project are modeled and shown for informational purposes, but no determination of significance is based on such emissions. SMAQMD bases this approach on the fact that ROG emissions attributable to construction equipment exhaust are low and those from the application of architectural coatings are regulated by Rule 442 (Christensen, pers. comm., 2005). For purposes of the EIR, determinations of significance for short-term construction emissions were based on the comparison of project-generated NO_X and PM_{10} to SMAQMD thresholds, as recommended by SMAQMD. (SMAQMD 2004, Christensen, pers. comm., 2005)

Long-term (i.e., operational) regional criteria air pollutant and precursor emissions, including mobile- and area-source emissions, were also quantified using the URBEMIS 2002 Version 8.7 computer model. Modeling was based on project-specific data (e.g., size and type of proposed uses), URBEMIS default settings for the SVAB, and trip generation data from the traffic analysis. Long-term stationary source emissions were qualitatively assessed in accordance with SMAQMD-recommended methodologies. Predicted long-term operational emissions were compared with applicable SMAQMD thresholds for determination of significance.

All other air quality impacts (i.e., local mobile source, odor, and TAC emissions) were assessed in accordance with ARB and SMAQMD-recommended methodologies. Such methodologies include the use of SMAQMD's screening level procedure for local mobile-source CO concentrations, and a qualitative assessment for the exposure of sensitive receptors to odor or TAC emissions.

THRESHOLDS OF SIGNIFICANCE

For the purpose of this analysis, the following thresholds of significance, as identified by the State CEQA Guidelines (Appendix G) and the SMAQMD, have been used to determine whether implementation of the proposed project would result in significant air quality impacts. Based on Appendix G of the State CEQA Guidelines, an air quality impact is considered significant if implementation of the proposed project under consideration would do any of the following:

- conflict with or obstruct implementation of the applicable air quality plan,
- violate any air quality standard or contribute substantially to an existing or projected air quality violation,
- result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is nonattainment under any applicable national or state ambient air quality standards (including releasing emissions that exceed quantitative thresholds for ozone precursors),

- expose sensitive receptors to substantial pollutant concentrations, or
- create objectionable odors affecting a substantial number or people.

As stated in Appendix G, the significance of criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. Thus, as contained in SMAQMD's Guide to Air Quality Assessment, implementation of the proposed project would result in significant air quality impacts if:

- Construction-generated emissions of NO_X exceed the SMAQMD-recommended mass emissions threshold of 85 pounds per day (lb/day).
- Construction-generated criteria air pollutant or precursor emissions result in or substantially contribute to emissions concentrations that exceed the CAAQS (e.g., 50 $\mu g/m^3$ [24-hour] for PM_{10}). According to SMAQMD, a project is considered to contribute substantially to an existing or projected violation of the CAAQS if it emits pollutants at a level equal to or greater than 5% of the CAAQS (e.g., 2.5 $\mu g/m^3$ [24-hour] for PM_{10}).
- Long-term operational (regional) emissions of ROG or NO_X exceed the SMAQMD-recommended mass emissions threshold of 65 lb/day.
- Long-term operational (regional) criteria air pollutant or precursor emissions result in or substantially contribute to emissions concentrations that exceed the CAAQS. According to SMAQMD, a project is considered to contribute substantially to an existing or projected violation of the CAAQS if it emits pollutants at a level equal to or greater than 5% of the CAAQS.
- Long-term operational local mobile-source emissions result in emissions concentrations of CO that exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm.
- Exposure of sensitive receptors to excessive odor emissions, as defined under the California Code of Regulations, Health & Safety Code Section 41700, Air Quality Public Nuisance.

No significance thresholds have been established by the SMAQMD for exposure of sensitive receptors to mobile source TAC emissions (Maertz, pers. comm., 2006). Construction-related air quality impacts associated with construction of wastewater treatment facilities are discussed in Section 6.4, "Utilities."

IMPACTS AND MITIGATION MEASURES

IMPACT 6.2-1

*Short Term Construction-Generated Emissions. Construction-generated emissions of NO_X would exceed SMAQMD's significance threshold of 85 lb/day, and because of the project's size, PM_{10} emissions would result in or substantially contribute to emission concentrations that exceed the CAAQS. In addition, because Sacramento County is currently designated as a nonattainment area for both ozone and PM_{10}, construction-generated emissions could further contribute to pollutant concentrations that exceed the CAAQS. This impact would be **significant**.*

Construction emissions are described as "short term" or temporary in duration and have the potential to represent a significant impact with respect to air quality. Construction of the proposed project is anticipated to begin in 2007 and would last approximately 5–10 years. Initial site preparation (i.e., clearing, grubbing, grading) of the entire project site would occur first before the building of the proposed uses, which would occur in two phases. Phase 1 of building construction would include the development of land north of Meister Way and Phase 2 would develop land south of Meister Way. Construction of the proposed project would temporarily generate emissions of ozone precursor pollutants (i.e., ROG and NO_X) and fugitive dust emissions (including PM_{10}), as discussed separately below, from employee commute trips, diesel mobile equipment, material transport, and other construction operations, such as asphalt paving and the application of architectural coatings.

Ozone Precursor Emissions (ROG and NO_X)

Emissions of ozone precursor pollutants are primarily associated with construction equipment exhaust. Employee commute trips and other construction activities (e.g., asphalt paving and the application of architectural coatings) also contribute to short-term increases in emissions but to a much lesser extent.

Short-term construction emissions of ROG and NO_X were estimated using the ARB-approved URBEMIS 2002 Version 8.7 computer program as recommended by the SMAQMD (SMAQMD 2004). URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Detailed construction information (e.g., equipment requirements, type, hours of operation, number of employees) was not available at the time this analysis was conducted. As a result, the estimation of construction-generated emissions was based primarily on the default assumptions contained in the model for the size and location (i.e., within the SVAB) of the proposed project. Model parameters were adjusted to reflect the overall construction phasing schedule, as well as equipment assumptions recommended by the SMAQMD for site preparation and building activities. The estimated daily construction-generated emissions of ROG and NO_X attributable to the proposed project are summarized in Table 6.2-3. Refer to Appendix D for model output files and assumptions.

As discussed above, SMAQMD has not established a threshold of significance with respect to construction-generated ROG emissions because those attributable to construction equipment exhaust are low and those from the application of architectural coatings are regulated by Rule 442 (Christensen, pers. comm., 2005); however, SMAQMD has adopted a threshold of 85 (lb/day) for NO_X (SMAQMD 2004). Thus, as depicted in Table 6.2-3, the initial site preparation phase of construction would generate maximum daily emissions of approximately 638.7 lb/day of NO_X. Subsequent development phases (i.e., building construction of phases 1 and 2) would generate maximum daily emissions of approximately 357.9 and 297.0 lb/day of NO_X, respectively. Modeled emissions of NO_X, during all phases of construction (i.e., initial site preparation phase and building construction of phases 1 and 2), would exceed the SMAQMD's significance threshold of 85 lb/day. In addition, because Sacramento County is currently designated as a nonattainment area for ozone and PM_{10}, construction-generated emissions could further contribute to pollutant concentrations that exceed the CAAQS.

PM_{10} Emissions

Fugitive dust emissions, including PM_{10}, are associated primarily with ground disturbance activities during site preparation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and VMT on- and off-site. Exhaust emissions from employee commute trips and diesel mobile construction equipment also contribute to short-term increases in PM_{10} emissions but to a much lesser extent.

Table 6.2-3
Summary of Modeled Worst-Case Daily Short-Term Construction-Generated Emissions

Source	Emissions (lb/day)	
	ROG	NO_X
Initial Site Preparation Phase (Beginning Spring 2007)		
Diesel Mobile Equipment Exhaust[1]	92.9	637.3
Employee Trips	1.2	1.4
Total Unmitigated (Site Preparation)	94.1	638.7
Total Mitigated (Site Preparation)[2]	89.5	511.2
Building Construction Phase 1-North of Meister Way (Beginning 2007)		
Diesel Mobile Equipment Exhaust[1]	52.0	330.9
Employee Trips	21.2	27.0
Architectural Coating [3]	-	-
Asphalt Off-Gas[4]	6.1	-
Total Unmitigated (Phase 1)	79.3	357.9
Total Mitigated (Phase 1)[2]	76.7	291.7
Building Construction Phase 2-Soutb of Meister Way (Beginning 2009)		
Diesel Mobile Equipment Exhaust[1]	43.8	279.2
Employee Trips	14.5	17.8
Architectural Coating [3]	-	-
Asphalt Off-Gas[4]	4.5	-
Total Unmitigated (Phase 2)	62.8	297.0
Total Mitigated (Phase 2)[2]	60.6	241.2
Maximum Daily Emissions Unmitigated All Phases	94.1	638.7
Maximum Daily Emissions Mitigated All Phases[2]	89.5	511.2
SMAQMD Significance Threshold:	None	85

[1] Based on default model settings, and SMAQMD-recommended equipment types and number requirements and maximum daily acreage disturbed.

[2] Reductions based on SMAQMD-recommended construction mitigation measures.

[3] As recommended by SMAQMD, architectural coating emissions are not included in the analysis

[4] Includes off-gas emissions from the application of asphalt during paving activities.

Refer to Appendix D for additional assumptions and modeling output files.
Source: Data modeled by EDAW 2006.

With respect to PM_{10} emissions, SMAQMD has also developed screening-level values related to the maximum actively disturbed area of the project site. According to these values, if more than 15 acres would be actively disturbed, even with the implementation of the recommended mitigation measures, project construction would likely result in potentially significant emissions. Consequently, because of the large size of the project coupled with the lack of available detailed construction information, SMAQMD has recommended that concentration of PM_{10} emissions be qualitatively discussed rather than modeled and that all SMAQMD-recommended mitigation measures be incorporated (Tholen, pers. comm., 2004). Thus, because of the project's size (577 acres) and the maximum actively disturbed area would exceed SMAQMD's screening level of 15 acres on any given day, short-term construction-generated PM_{10} emissions would result in or substantially contribute to emissions concentrations that exceed the CAAQS.

In summary, modeled emissions of NO_X, during all phases of construction, would exceed the SMAQMD's significance threshold of 85 lb/day and, because of the project's size, short-term construction-generated PM_{10} emissions would result in or substantially contribute to emissions concentrations that exceed the CAAQS. In addition, because Sacramento County is currently designated as a nonattainment area for ozone and PM_{10}, construction-generated emissions could further contribute to pollutant concentrations that exceed the CAAQS. As a result, this impact would be ***significant***.

Mitigation Measure 6.2-1: (City of Sacramento and LAFCo)

In accordance with the recommendations of the SMAQMD, the project applicant shall implement the following measures to reduce temporary construction emissions.

a. The project applicant shall implement the following measures to reduce NO_X and visible emissions from heavy-duty diesel equipment.

   i. Before issuance of a grading permit, the project applicant shall provide a plan for approval by the lead agency, in consultation with SMAQMD, demonstrating that the heavy-duty (>50 horsepower), off-road vehicles to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project-wide fleet-average 20% NO_X reduction and 45% particulate reduction compared to the most recent ARB fleet average at the time of construction. Acceptable options for reducing emissions include the use of late-model engines, low-emission diesel products, alternative fuels, particulate matter traps, engine retrofit technology, after-treatment products, and/or such other options as become available.

   ii. Before issuance of a grading permit, the project applicant shall submit to the lead agency and SMAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 hp, that will be used an aggregate of 40 or more hours during any portion of project construction. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction operations occur. At least 48 hours before heavy-duty off-road equipment is used, the project applicant shall provide the SMAQMD with the anticipated construction timeline including start date, and the name and phone number of the project manager and on-site foreman.

   iii. Before issuance of a grading permit, the project applicant shall ensure that emissions from off-road, diesel-powered equipment used on the project site do not exceed 40% opacity for more than 3 minutes in any 1 hour. Any equipment found to exceed 40% opacity (for white smoke) or Ringlemann 2.0 (for black smoke) shall be repaired immediately, and the SMAQMD shall be notified of non-compliant equipment within 48 hours of identification. A visual survey of all in-operation equipment shall be made at least weekly by the construction contractor, and the contractor shall submit a monthly summary of visual survey results throughout the duration of the construction project, except that the monthly summary shall not be required for any 30-day period in which no construction operations occur. The monthly summary shall include the quantity and type of vehicles surveyed, as well as the dates of each survey. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance.

b. As recommended by the SMAQMD, the project applicant shall reduce fugitive dust emissions by implementing the measures listed below during construction.

   i. All disturbed areas, including storage piles that are not being actively used for construction purposes, shall be effectively stabilized of dust emissions using water, a chemical stabilizer or suppressant, or vegetative ground cover. Soil shall be kept moist at all times.

   ii. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or a chemical stabilizer or suppressant.

iii. When materials are transported off-site (e.g., trees, plantings), all material shall be covered, effectively wetted to limit visible dust emissions, or maintained with at least 2 feet of freeboard space from the top of the container.

iv. All operations shall limit or expeditiously remove the accumulation of project-generated mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring.

v. After materials are added to or removed from the surfaces of outdoor storage piles, the storage piles shall be effectively stabilized of fugitive dust emissions using sufficient water or a chemical stabilizer or suppressant.

vi. On-site vehicle speeds on unpaved roads shall be limited to 15 mph.

vii. Wheel washers shall be installed for all trucks and equipment exiting unpaved areas, or wheels shall be washed to remove accumulated dirt before such vehicles leave the site.

viii. Sandbags or straw waddles shall be installed to prevent silt runoff to public roadways from adjacent project areas with a slope greater than 1 %.

ix. Excavation and grading activities shall be suspended when winds exceed 20 mph.

x. The extent of areas simultaneously subject to excavation and grading shall be limited, wherever possible, to the minimum area feasible.

xi. Emulsified diesel, diesel catalysts, or SMAQMD-approved equal, shall be used on applicable heavy-duty construction equipment that can be operated effectively and safely with the alternative fuel type.

c. The applicant shall pay $1,525,537 into SMAQMD's off-site construction mitigation fund to further mitigate construction-generated emissions of NO_X that exceed SMAQMD's daily emission threshold of 85 lb/day. The calculation of daily NO_X emissions is based on the current cost of $14,300 to reduce a ton of NO_X. The determination of the final mitigation fee shall be conducted in coordination with SMAQMD. The fee shall be paid to the SMAQMD prior to any ground disturbance in total or on an acre bases ($5,959.13/acre) as development occurs and permits are sought. (See Appendix D for calculation worksheet.)

d. In addition to the measures identified above, construction operations are required to comply with all applicable SMAQMD rules and regulations.

Significance After Mitigation

Implementation of the measures under part a above would result in a 20% reduction in NO_X emissions and a 45% reduction in visible emissions from heavy-duty diesel equipment acoording to SMAQMD. Implementation of the measures under part (b) would reduce fugitive dust emissions by up to 75%, according to estimates provided by SMAQMD. Daily construction emissions would still exceed the SMAQMD's significance threshold (Table 6.2-3) despite implementation of all feasible mitigation measures, and thus would potentially result in or substantially contribute to pollutant concentrations that exceed the CAAQS. As a result, this would be considered a ***significant and unavoidable*** impact.

IMPACT 6.2-2

*Generation of Long-Term Operational (Regional) Emissions ROG, NO_X, and PM_{10}. Long-term operation of the proposed project would result in emissions of ozone-precursor pollutants that would exceed SMAQMD's threshold. Furthermore, the project's operational emissions would potentially conflict with or obstruct implementation of applicable air quality plans. As a result, this impact would be considered **significant**.*

Regional area- and mobile-source emissions of ROG, NO_X, and PM_{10} associated with implementation of the proposed project were estimated using URBEMIS 2002 Version 8.7.0 computer program, which is designed to model emissions for land use development projects.

URBEMIS allows land use selections that include project location specifics and trip generation rates. URBEMIS accounts for area emissions from the usage of natural gas, wood stoves, fireplaces, landscape maintenance equipment, and consumer products; and mobile sources emissions associated with trip generation. Regional area and mobile source emissions were estimated based on proposed land uses identified in the phasing plan and trip generation rates obtained from the transportation analysis prepared for this project, Section 6.1, "Transportation and Circulation." The estimation of mobile-source emissions includes a pass-by trip adjustment, which accounts for trips made as intermediate stops on the way from an origin to a primary trip destination, and a double-counting trip adjustment, which is designed to reduce double counting of internal trips between residential and nonresidential land uses.

Operational emissions are summarized in Table 6.2-4. During the summer months, buildout of the proposed project would generate operational emissions of approximately 418.3 lb/day of ROG, 266.1 lb/day of NO_X, and 241.1 lb/day of PM_{10}. Operational emissions would increase substantially during the winter months because of emissions generated by residential-use wood-burning fireplaces. Estimated operational emissions during the winter months would be approximately 2,382.1 lb/day of ROG, 438.3 lb/day of NO_X, and 778.2 lb/day of PM_{10}.

Table 6.2-4
Summary of Modeled Daily Long-Term Operational Emissions

Source	Emissions (lb/day)[1]		
	ROG	NO_X	PM_{10}
Summer			
Motor Vehicles	233.4	216.9	240.7
Landscape Maintenance	11.3	1.5	0.3
Natural Gas Usage	3.7	47.7	0.1
Consumer Products	169.9	--	--
Wood-Burning Fireplace		No Summer Emissions	
Total Unmitigated	418.3	266.1	241.1
Total Mitigated	355.5	226.2	204.9
Winter			
Motor Vehicles	237.4	323.3	240.7
Landscape Maintenance		No Winter Emissions	
Natural Gas Usage	3.7	47.7	0.1
Consumer Products	169.9	--	--
Wood-Burning Fireplace	1,971.1	67.3	537.4
Total Unmitigated	2,382.1	438.3	778.2
Total Mitigated	350.7	338.5	206.6
SMAQMD Significance Threshold:	65	65	–

[1] Emissions modeled using the Urbemis2002 (v8.7) computer model, based on trip generation rates obtained from the transportation analysis prepared for this project and proposed land uses identified in the project phasing plan. Refer to Appendix D for additional assumptions and modeling output files.

Source: Data modeled by EDAW 2006.

Long-term operation of the proposed project would result in emissions of ROG and NO_X in excess of SMAQMD's corresponding thresholds of 65 lb/day. Furthermore, operation of the project would result in increased vehicle trips and VMT compared to existing conditions that are not already accounted for in an approved plan. An increase in VMT and associated mobile source emissions, may conflict with the SMAQMD's air quality planning efforts. Consequently, an increase in VMT beyond projections in local plans would potentially result in a significant adverse incremental effect on the region's ability to attain and/or maintain the CAAQS. This would be a ***significant*** impact.

Mitigation Measure 6.2-2: (City of Sacramento and LAFCo)

When a proposed project's operational emissions are estimated to exceed SMAQMD's threshold of significance of 65 lb/day for ROG or NO_X, an Air Quality Mitigation Plan (Appendix E) to reduce operational emissions by a minimum of 15% shall be submitted to the SMAQMD for approval. The following mitigation has been chosen from SMAQMD's most current recommended land use reduction measure and shall be incorporated to achieve a 15% reduction.

a. Non-residential land uses shall provide bicycle lockers and/or racks (commercial).

b. Nonresidential land uses shall provide personal showers and lockers for employees (commercial).

c. Bicycle storage (Class I) shall be provided at apartment complexes or condos without garages (residential).

d. Entire project shall be located within ½ mile of a Class I or Class II bike lane and provide a comparable bikeway connection to that existing facility (residential, commercial, mixed).

e. The project shall provide for pedestrian facilities and improvements such as overpasses and wider sidewalks (e.g., 5-foot) (residential, commercial, mixed).

f. Preferential parking shall be provided for carpools/vanpools (commercial).

g. High density residential, mixed, or retail/commercial uses shall be within 1/4 mile of planned light rail, linking with activity centers and other planned infrastructure (residential, commercial, mixed).

h. Parking lot design shall include clearly marked and shaded pedestrian pathways between transit facilities and building entrances (commercial).

i. Setback distance shall be minimized between development and planned transit, bicycle, or pedestrian corridor (commercial, mixed).

j. Neighborhood shall serve as focal point with parks, school and civic uses within 1/4 mile (residential, mixed).

k. Separate, safe, and convenient bicycle and pedestrian paths shall connect residential, commercial, and office uses (residential, commercial, mixed).

l. The project shall provide a development pattern that eliminates physical barriers such as walls, berms, landscaping, and slopes between residential and non-residential uses that impede bicycle or pedestrian circulation (commercial, mixed).

m. Wood-burning fireplaces shall be prohibited, and if natural gas fireplaces are installed they shall be the lowest emitting commercially available (residential).

n. The lowest emitting commercially available furnaces shall be installed (residential, commercial, mixed).

o. Ozone destruction catalyst shall be installed on air conditioning systems in consultation with SMAQMD (residential, commercial, mixed).

p. Loading and unloading facilities shall be provided for transit and carpool/vanpool users (commercial).

q. Average residential density shall be seven dwelling units per acre or greater (residential).

r. The project shall be mixed-use and consist of at least three of the following on-site and/or within 1/4 mile; residential development, retail development, personal services, open space, and, office space (mixed).

Although the above mitigation measures would substantially reduce the project's operational emissions, they would not reduce the project's operational emissions below SMAQMD's significance thresholds (refer to Table 6.2-4). As a result, this impact would be ***significant and unavoidable***.

IMPACT 6.2-3

Generation of Local Mobile-Source CO Emissions. Implementation of the proposed project would not contribute to localized mobile-source CO concentrations that exceed the 1-hour or 8-hour CAAQS of 20 ppm and 9.0 ppm, respectively. Therefore, this impact would be ***less than significant****.*

CO concentration is a direct function of motor vehicle activity, particularly during peak commute hours, and meteorological conditions. Under specific meteorological conditions, CO concentrations may reach unhealthy levels with respect to local sensitive land-uses such as residential areas, schools, and hospitals. As a result, the SMAQMD recommends analysis of CO emissions at a local rather than a regional level.

The recent guidelines from the SMAQMD (SMAQMD 2004) provide a project-level screening procedure to determine whether detailed intersection-level modeling is required. The screening procedure conservatively estimates the background CO concentration in the project area and the project's contribution to predicted future concentrations, based on an estimation of peak hour vehicle trips. The project's contributions to local CO concentrations were estimated for interim Phase 1 completion and buildout conditions. Predicted CO concentrations are presented in Table 6.2-5.

Based on the modeling conducted, the predicted local mobile-source CO concentrations would not exceed the 1-hour or 8-hour CAAQS (i.e., 20 ppm and 9.0 ppm, respectively). As a result, this impact would be ***less than significant***.

No mitigation measures are required.

Table 6.2-5 Predicted Local Mobile Source Carbon Monoxide Concentrations				
	CO Concentration (ppm)			
	Phase 1		Buildout - Phase 1 & 2	
	1-hour	8-hour	1-hour	8-hour
Background Concentration[1]	3.06	1.53	2.64	1.32
Project Contribution	3.10	2.17	9.2	6.5
Predicted Total Concentration[2]	6.16	3.70	11.84	7.8
California Ambient Air Quality Standard	20.0	9.0	20.0	9.0

[1] The SMAQMD CO screening methodology does not identify corresponding background concentrations for buildout year 2012. To ensure a conservative analysis, the background concentration for buildout conditions are based on SMAQMD-recommended year 2010 concentrations. This is a conservative approach because background concentrations for the buildout year of 2012 would actually be lower due to more stringent vehicle emission control standards.

[2] Predicted CO concentrations are the sums of a background component, which includes the cumulative effects of all CO sources in the project area vicinity, and the proposed project's contribution.

Refer to Appendix D for CO screening analysis modeling.

Source: EDAW 2005.

IMPACT 6.2-4

Exposure of Sensitive Receptors to Toxic Air Contaminant Emissions. Implementation of the proposed project could result in the exposure of existing sensitive receptors to minor increases in short-term construction emissions and future residents closest to I-5 and SR 70/99 to mobile source TAC emissions that elevate their health risks compared to other areas on the site and in the Sacramento region in general. There are no accepted or prescribed thresholds for exposure to the impacts of TAC emissions from mobile sources. Consequently, although there is a potential that exposure to mobile sources along the margins of the site closest to the freeways would result in elevated health risk compared with other areas of the site, an accurate quantifiable risk is not possible. Further, in view of the on-going state and federal regulatory programs which have demonstrated significant reductions in health risks from toxic air contaminants in the Sacramento area (as well as throughout the state), and forecasted future improvements as a result of continued implementation of these existing regulatory programs, this impact would be ***less than significant.***

The exposure of sensitive receptors to TAC emissions can occur during both the construction and operational phases of the project. Health-related impacts associated with short-term construction and long-term stationary and mobile source operational emissions are discussed separately, as follows:

Short-Term Construction

Construction of the project and associated infrastructure would result in short-term diesel exhaust emissions from on-site heavy duty equipment. Diesel PM were identified as a TAC by the ARB in 1998. Construction of the project would result in the generation of diesel PM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities. According to the ARB, the potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential non-cancer health impacts (ARB 2003).

The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (Salinas, pers. comm., 2004). Thus, because the use of mobilized equipment would be temporary (i.e., less than 7% of the total exposure period for which risk is based upon) in combination with the dispersive properties of diesel PM (Zhu and Hinds 2002) and project construction activities would not be atypical in comparison to similar development-type projects (i.e., no excessive material transport or associated truck travel), short-term construction activities would not result expose sensitive receptors to substantial TAC concentrations. This would be a ***less-than-significant*** impact.

Stationary Sources

Long-term operation of the project would likely include the installation of diesel-fueled emergency backup generators at some of the proposed land uses. This category of stationary sources, in addition to any other stationary sources that may emit TACs, would be subject to SMAQMD permitting and T-BACT requirements.

The proposed project includes construction of commercial land uses, which may potentially include stationary sources of TACs, such as dry cleaning establishments, gasoline dispensing facilities, diesel-fueled back-up generators. These types of stationary sources, in addition to any other stationary sources that may emit TACs, would be subject to SMAQMD rules and regulations, including SMAQMD Rule 201 (General Permit Requirements), Rule 202 (New Source Review), Rule 904 (Air Toxics Control Measures), and Rule 207 (Title V-Federal Operating Permit Program), T-BACT requirements. Thus, as discussed above, SMAQMD would analyze such sources (e.g., health risk assessment) based on their potential to emit TACs. If it is determined that the sources would emit TACs in excess of SMAQMD's applicable threshold of significant, T-BACT would be implemented in order to reduce emissions. If the implementation of T-BACT would not reduce the risk below the applicable threshold, the SMAQMD would deny the required permit. As a result, given compliance with applicable rules and regulations, operation of any stationary sources would not result in the exposure of sensitive receptors to TACs at levels exceeding SMAQMD's significance threshold. This would be a ***less-than-significant*** impact.

Airport

In recent years there has been heightened scientific awareness and public debate over potential impacts that may result from the exposure of sensitive receptors to TACs generated for aircraft and ground support operations at and near airports. Sources of airport-related TACs include aircraft (e.g., air carriers, commuter and cargo aircraft, and general aviation), ground service equipment, fuel storage and handling, and others. TACs released by these sources include, but are not limited to, volatile organic compounds, VOCs (acetaldehyde, formaldehyde, benzene, and 1,3-butadiene), chromium, dioxins, polycyclic organic compounds (PAHs), tetrachloroethylene, nickel, and toluene.

Several studies and analyses have been performed in an effort to evaluate the risk posed from airport operations. In 1999 and 2000, public initiated studies and analyses of toxic emissions from the O'Hare International Airport and associated health risks in surrounding residential communities were released. The overall findings of these analyses were that the cancer risks associated with operations at O'Hare Airport exceeds 10 in 1,000,000 over an area of approximately 40 square miles and 1 in 1,000,000 over an area of approximately 1,000 square miles, assuming 70 years of exposure (Environ 2000). These studies also identified the need for better assessment of the data used and recommended that comprehensive air monitoring be conducted around O'Hare so that these data could be used to conduct a more complete and comprehensive analysis.

In response, the Illinois EPA monitored toxic air contaminants in the vicinity of O'Hare as well as other locations in the Chicago area from June to December of 2000, focusing on toxic compounds identified in the EPA's national strategy and on mobile source emissions associated with airport operations (Illinois EPA 2002). The compounds of interest included volatile and semi-volatile organics, carbonyls, and trace metals. The purpose of this program was to collect information that would help assess the relative impact of airport-generated emissions and toxic characteristics of large urban areas. One important objective of the monitoring program was to determine if the emissions associated with O'Hare have a measurable impact on air quality in areas adjacent to the airport. A review and analysis of the accumulated monitoring results found that the levels of toxic compounds (e.g., acetaldehyde and formaldehyde) attributable to airport operations were detected at monitoring sites. However, the concentrations of such compounds were indistinguishable from (or lower than) typical urban background levels.

Overall, from the studies and analyses conducted so far, including those discussed above, uncertainties in data and methods have provided an inadequate foundation to perform airport-related heath studies. More recently, in an effort to improve available data, a multi-agency aircraft particle emissions experiment (APEX) was established with participants from the EPA, National Aeronautics and Space Administration (NASA), Federal Aviation Administration (FAA), the aviation industry (GE and Boeing), and the research community (Massachusetts Institute of Technology [MIT]). The main focus is to test aircraft engines for TACs. Data from this study is currently being analyzed and updated emission factors to follow in approximately 2 years. This will, along with further monitoring around airports and validation of modeling results, allow the compilation of more accurate emissions data into EPA models and identification of the proper characterization methods.

Based on the above discussion, it can be ascertained that the proposed project, because of its proximity to the Sacramento International Airport, has the potential to expose sensitive receptors to toxic air emissions to an extent that health risks could result. However, this issue is not well understood and is the subject of ongoing research, and any conclusions regarding health risks would be speculative. Therefore, a conclusion on significance of the environmental impact cannot be reasonably reached. Section 15145 of the State CEQA Guidelines provides that, if after a thorough investigation a lead agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impacts. This is the case here. No impact conclusion can be made based on research of this issue.

Off-site Mobile Sources

As previously discussed, the project site is located adjacent to Interstate I-5 and SR 70/99 (Refer to Exhibit 3-3 of this report). The proposed project includes a mix of land uses, including commercial and residential uses, senior housing, and an elementary school. The nearest proposed residences would be within approximately 300 feet of I-5 and SR 70/99. Proposed senior housing would be located approximately 1,200 feet from I-5 and approximately 1,500 feet from SR 70/99. The proposed elementary school would be located near the southeastern portion of the project site, approximately 545 feet from I-5 and SR 70/99.

In April 2005, the ARB published a guidance document entitled "Air Quality and Land Use Handbook: A Community Health Perspective," which includes the recommendation to avoid siting of new sensitive land uses (e.g., residences and schools) within 500 feet of freeways. In addition, the recently adopted SB 352 (Education Code Section 17213, Public Resources Code Section

21151.8) expands upon previous requirements for the review of TAC sources near school sites. Accordingly, SB 352 requires that any school site located within 500 feet of the edge of the closest travel lane of a freeway or other busy traffic corridor be reviewed for potential health risks. The location of the school site, which as discussed above would be further than 500 feet from the nearby freeways, would be consistent with the above recommendations. Consequently, off-site mobile source TAC emissions at the school site would be considered less than significant; however, the location of the nearest proposed residencies would not be in concurrence with ARB recommendations. The ARB guidance document is not regulatory. The SMAQMD has not established any guidelines for the assessment of such impacts or any applicable thresholds, as the 10 in one million threshold mentioned above only applies to individual stationary-type sources, and not to the mobile source emissions at issue here. (Maertz, pers. comm. 2006).

A health-risk assessment (HRA) was prepared by Sierra Research to evaluate the potential health-related impacts to on-site sensitive receptors, proposed as part of the project, from exposure to off-site, on-road, mobile sources of TACs associated with nearby freeways (i.e., I-5 and SR 70/99) (Refer to Appendix E). A summary of the HRA is included for informational purposes. The SMAQMD does not currently recommend the use of HRAs for assessing the potential risk from diesel PM adjacent to freeways until specific guidelines for development and review have been established by the District. This is based on the limitations of HRAs conducted to date regarding the level of uncertainty in real world assumptions, model selection, and due in large part to a number of complexities associated with methodologies and their applicability to mobile source conditions (Maertz, pers. comm., 2006).

That stated, the results of the HRA are included because they provide the best informational basis for considering relative risk of exposure at the site. However, they need to be considered with caution, respecting the concerns raised above. To assess the risk, vehicle emissions on the freeway segments were quantified by Sierra Research for 21 TACs and the cancer risk and non-cancer acute and chronic hazard indices were estimated at various distances from I-5, SR 70/99, and the interchange using dispersion modeling. Dispersion modeling was performed in 5-year increments, beginning with the initial year of construction (2007) (Sierra Research 2005).

Based on the findings of the HRA, the highest modeled acute and chronic non-cancer hazard indices at all distances from the freeway segments and for all years analyzed were 0.63 and 0.26, respectively. The acute and chronic hazard indices represent the potential non-cancer health impacts resulting from short-term (one-hour) and long-term (from one year to a 70-year lifetime) exposure to TACs, respectively. The hazard indices are calculated by dividing the concentrations of TACs by the applicable reference exposure levels (i.e., an indicator of potential non-cancer health impacts and defined as the concentration at which no adverse effects are anticipated).

For the residences nearest the freeways, the highest modeled 70-year average cancer risk was 5.5% of the 2000 total average risk for the SVAB as determined by ARB (i.e., 520 chances in one million), which interpolates to 28.6 chances in one million, (Sierra Research 2005). This cancer risk represents the number of chances in one million of developing cancer based on 70-year exposure duration.

With respect to the SVAB, the 2000 total average risk of 520 chances in one million, as determined by ARB, takes into account emissions of 10 select TACs which pose the greatest risk in California based primarily on ambient air quality data from all sources (e.g., stationary, area, on-road mobile, other mobile, and natural). According to ARB's emissions inventory for 2000, approximately 23% of the total SVAB acetaldehyde emissions for that year, 43% of benzene, 39% of 1,3-butadiene, 31% of formaldehyde, and 28% of diesel PM were associated with on-road mobile sources (California Air Resources Board 2001). Based on these percentages and the individual health risks as determined by ARB in 2000 for each TAC, approximately 27.5% (143 chances in one million) of the total SVAB estimated risk of 520 chances in one million was associated with on-road mobile sources, 70% of the risk being attributable to diesel PM alone. According to the ARB, implementation of the risk reduction plan to reduce diesel PM is estimated to drop 2010 and 2020 concentrations, and associated health risk by 75% and 85% respectively, from the estimated 2000 level (California Air Resources Board 2005a). The ARB also estimated a range of relative cancer risk near freeways of 300–1,700 chances in one million, as contained in the Air Quality and Land Use Handbook (California Air Resources Board 2005b).

By comparison, the highest 70-year risk value estimated at the proposed residences nearest the freeways is 5 times lower than the risk of 143 chances in one million from on-road mobile sources, as interpolated from ARB's 2000 total average risk for SVAB, and over 10 times lower than the low end of ARB's range of 300-1,300 chances in one million, as presented in the Air Quality and Land Use Handbook (Sierra Research 2005).

However, though the comparison above relates the risk estimated by Sierra Research from on-road mobile sources to those attributable to the same source-type as estimated by ARB, the modeling methodologies (e.g., model, timeframe, TACs analyzed) used by each differ and could account for differences between the results. Also, because SMAQMD has not established specific guidelines for the development and review of HRAs for such impacts, SMAQMD cannot support any conclusions drawn from the results thereof (Maertz, pers. comm., 2006). In the interim, SMAQMD recommends, as does the ARB, the potential risk be considered in the planning process (Maertz, pers. comm., 2006). It is also important to note that the recommendations of the ARB concerning the siting of sensitive receptors provides guidance on planning issues and are not adopted thresholds for which development projects can be evaluated against.

Based on the above discussion, it can be ascertained that the proposed project, because of its proximity to existing freeways, has the potential to expose sensitive receptors to TACs to an extent that health risks could result. Since this potential risk is related to existing sources of emissions (i.e., the adjacent roadways), and not to emissions from the project, it is important to understand the trend in emissions (and associated risk) from these existing sources. As shown in Table 6.2-6 below, and as summarized above, the TAC risk management programs implemented by the SMAQMD and ARB have been extremely effective at reducing risks from toxic air contaminants in the Sacramento area.

Table 6.2-6
Summary of Health Risks from Toxic Air Contaminants Sacramento Valley Air Basin

	1990	1995	2000	2004	Change (1990–2004)
All TACs	1,135	705	520	<478[2]	-58%
Mobile Source TACs[1]	1,079	624	447	<430[2]	-60%
Mobile Source TACs (excluding Diesel PM)	329	144	87	73	-78%
Diesel PM	750	480	360	<360	>52%

Notes: ARB estimates changes in Diesel PM health risk every 5 years; 2004 data are based on the assumption that these levels are lower than those estimated for 2000.

[1] Benzene, 1,3-butadiene, and Diesel PM.

Source: Sierra Research 2006; The California Almanac of Emissions and Air Quality. 2006 Edition. California Air Resources Board. 2006.

Although the values presented in Table 6.2-6 represent estimated exposures throughout the SVAB, the trend in risks from mobile source TACs applies equally to the proposed project location, where the background health risk is expected to be dominated by the health risks associated with emissions from motor vehicles on nearby roadways. Consequently, although residents in the proposed project development may be exposed to health risks that are somewhat elevated as compared with other locations, these health risks are declining substantially, and are expected to continue to decline, as a result of existing ARB and SMAQMD regulatory programs. Consequently, this impact is concluded to be ***less-than-significant.*** Importantly, this analysis provides information on the relative level of health risk, including disclosures on increased health risks along the margins of the freeways, to allow the City of Sacramento to make the most informed decision currently possible on this issue.

On-site Mobile Sources

On-site mobile sources of TACs would be primarily associated with the operation of school buses transporting students to and from the proposed elementary school, as well as diesel-powered delivery trucks associated with proposed on-site commercial activities.

Emissions from school buses can vary, depending on various factors, including bus type, age, maintenance, and amount of time spent idling. Health impacts from exhaust exposure include eye and respiratory irritation, enhanced respiratory allergic reactions, asthma exacerbation, increased cancer risk, and immune system degradation. Generally, children are more vulnerable to air pollutants because of higher inhalation rates, narrower airways, and less mature immune systems.

In response to the above issue, the ARB adopted an air toxic control measure (ATCM) as part of the Particulate Matter Risk Reduction Plan to specifically deal with diesel emissions from school buses. This ATCM became effective July 16, 2003. The school bus idling ATCM includes the following requirements:

(a) The driver of a school bus or vehicle, transit bus, or heavy-duty vehicle (other than a bus) shall manually turn off the bus or vehicle upon arriving at a school and to restart no more than 30 seconds before departing. A driver of a school bus or vehicle shall be subject to the same requirement when operating within 100 feet of a school and shall be prohibited from idling more than five minutes at each stop beyond schools, such as parking or maintenance facilities, school bus stops, or school activity destinations. A driver of a transit bus or heavy-duty vehicle (other than a bus) shall be prohibited from idling more than five minutes at each stop within 100 feet of a school. Idling necessary for health, safety, or operational concerns shall be exempt from these restrictions.

(b) The motor carrier of the affected bus or vehicle shall ensure that drivers are informed of the idling requirements, track complaints and enforcement actions, and keep track of driver education and tracking activities.

According to ARB, implementation of the above requirements would eliminate unnecessary idling for school buses and other heavy-duty vehicles, protecting children from unhealthful exhaust emissions and thus reducing localized exposure to air toxic contaminant and other harmful air pollution emissions at and near schools.

In addition to the school bus idling ATCM, ARB recently adopted an idling restriction ATCM for large commercial diesel-powered vehicles, which became effective February 1, 2005. In accordance with this measure, affected vehicles are required to limit idling to no longer than 5 minutes under most circumstances. ARB is currently evaluating additional ATCMs intended to further reduce TACs associated with commercial operations, including a similar requirement to limit idling of smaller diesel-powered commercial vehicles. Nonetheless, given that proposed on-site commercial land uses have not yet been identified and given the potential proximity of nearby sensitive receptors, exposure of nearby on-site receptors to mobile-source TACs associated with commercial activities would be considered ***potentially significant***.

Mitigation Measure 6.2-4: (City of Sacramento and LAFCo)

On-site Mobile Sources. The following mitigation measures shall be implemented:

a. Proposed facilities that would require the long-term use of diesel equipment and heavy-duty trucks shall develop and implement a plan to reduce emissions, which may include such measures as scheduling such activities when the residential uses are the least occupied, and requiring such equipment to be shut off when not in use and prohibiting heavy-trucks from idling. The plan shall be submitted to and approved by the City before loading dock activities begin. Copies of the plan shall be provided to all residential dwellings located within 1,000 feet of loading dock areas.

b. Proposed commercial/convenience land uses (e.g., loading docks) that have the potential to emit toxic air emissions shall be located as far away as feasibly possible from existing and proposed sensitive receptors.

Significance After Mitigation

Implementation of the above mitigation measure would reduce health-related risks associated with on-site mobile-source TACs, but not necessarily to a less-than-significant level. Exposure to mobile-source TAC emissions from on-site mobile sources are, therefore, considered ***significant and unavoidable***. This conclusion is because of the uncertainty associated with on-site commercial land use activities and the proximity of sensitive receptors to such uses. This conclusion may, therefore, change as more detailed information regarding proposed on-site commercial uses becomes available.

Regarding exposure to TACs from freeways adjacent to the site, the current regulatory programs being implemented by the ARB have resulted and are expected to continue to result in a substantial reduction in exposure to TACs. This reduction has resulted in a commensurate reduction in health risks from exposure to TACs at the project site and along all major roadways in the Sacramento region.

IMPACT 6.2-5

Exposure to Odor Emissions. *Operation of the proposed project could result in the frequent exposure of on-site receptors to substantial objectionable odor emissions. As a result, this impact would be considered significant.*

No major sources of odors have been identified in the project area that would result in the exposure of on-site receptors to existing odorous emissions.

Minor sources of odors associated with the proposed project would be primarily associated with the construction of the proposed land uses. The predominant source of power for construction equipment is diesel engines. Exhaust odors from diesel engines, as well as emissions associated with asphalt paving and the application of architectural coatings, may be considered offensive to some individuals. However, because odors would be temporary and would disperse rapidly with distance from the source, construction-generated odors would not result in the frequent exposure of on-site receptors to objectionable odorous emissions. As a result, short-term construction-related odors would be considered ***less than significant***.

Commercial uses may include sources of odorous emissions (e.g., charbroiling restaurants, dry cleaners). The operation of such sources could result in the frequent exposure of on-site receptors to substantial objectionable odorous emissions. As a result, this impact would be considered ***potentially significant.***

Mitigation Measure 6.2-5: (City of Sacramento and LAFCo)

The following mitigation measures shall be implemented:

a. To the extent feasible, proposed commercial/convenience land uses that have the potential to emit objectionable odor emissions shall be located as far away as possible from existing and proposed receptors.

b. When permitting the facility that would occupy the proposed commercial/convenience space, the City shall take into consideration its odor-producing potential.

c. If an odor-emitting facility is to occupy space in the commercial/convenience area, the City shall require odor control devices (e.g., wet chemical scrubbers, activated carbon scrubbers, biologically-active filters, enclosures) to be installed to reduce the exposure of receptors to objectionable odor emissions.

Implementation of the above-mentioned mitigation measures would prevent high numbers of odor complaints by ensuring that odor sources are located near sensitive receptors and reduce the affects of any odor-generating facilities by addressing odors at the source. Thus, implementation of Mitigation Measure 6.2-5 would reduce this impact to a ***less-than-significant*** level.