

6.3 AIR QUALITY

6.3.1 INTRODUCTION

The Air Quality section of the EIR analyzes the potential short-term and cumulative impacts resulting from the construction and operation of the Proposed Project. The focus of the air quality discussion is on pollutants of particular concern for the Sacramento Metropolitan Area, which are ozone, carbon monoxide, and particulate matter.

6.3.2 SETTING

CLIMATE

Impacts on air quality are dependent upon the locations of air pollutant sources and the amounts of pollutants emitted. Meteorological and topographical conditions, however, are also important. The project is located in the City of Sacramento, which lies within Sacramento Valley Air Basin (Sacramento Valley). The climate of the Sacramento Valley is Mediterranean in character, with mild, rainy winter weather from November through March, and warm to hot, dry weather from May through September. The geographic features giving shape to Sacramento Valley are the Coast Range to the west, the Sierra Nevada Mountains to the east, and the Cascade Range to the north. These ranges channel winds through Sacramento Valley, but also inhibit dispersion of pollutant emissions.

The City is about 50 miles northeast of the Carquinez Strait, a sea-level gap between the Coast Range and the Diablo Range. The prevailing winds are from the south, primarily because of marine breezes through the Carquinez Strait, although during winter the sea breezes diminish and winds from the north occur more frequently.

Vertical and horizontal movement of air is an important atmospheric component involved in the dispersion of air pollutants. Movement of air allows for the dispersion and subsequent dilution of air pollutants. Without movement, air pollutants can collect and concentrate in a single area, increasing the health hazards associated with air pollutants. For instance, in the winter months, Sacramento Valley experiences a high percentage of calm atmospheric conditions. These calm conditions result in stagnation of valley air and increased air pollution.

Persistent inversions occur frequently in Sacramento Valley, especially during late fall and early spring, and act to restrict vertical dispersion of pollutants released near ground level. Inversions characteristic to Sacramento County involve nighttime cooling of air near the valley surface. The sun warms the air above the nocturnally cooled surface, creating the inversion that prohibits vertical mixing.

OZONE

Ozone is a reactive pollutant, which is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NO_x). ROG and NO_x are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NO_x under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds, like ozone. Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials.

CARBON MONOXIDE

Carbon monoxide (CO) is a non-reactive pollutant that is a product of incomplete combustion and is mostly associated with motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia.

INHALABLE PARTICULATE MATTER (PM₁₀)

Inhalable particulate matter (PM₁₀) and “fine” particulate matter (PM_{2.5})¹ consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter.). PM₁₀ and PM_{2.5} represent fractions of particulate matter that can be inhaled into the air passages and the lungs, and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility.

¹ New air quality standards for PM_{2.5} were established by the EPA in July 1997. Monitoring for this pollutant began in January 1999. PM_{2.5} samples are collected in Sacramento County every day, however, monitoring data and threshold standards have not been made available at this time by the California Air Resources Board.

AIR QUALITY PLANS, POLICIES, AND STANDARDS

Regulation of air quality is achieved through national and state ambient air quality standards and emission limits for individual sources of air pollutants. The federal Clean Air Act required the U.S. Environmental Protection Agency (EPA) to identify National Ambient Air Quality Standards (national standards) to protect public health and welfare. National standards have been established for ozone, CO, nitrogen dioxide, sulfur dioxide, particulate matter (PM₁₀ and PM_{2.5}), and lead. The U.S. EPA publishes criteria documents to justify the choice of standards. California has adopted ambient air quality standards (state standards) that are generally more stringent than their national counterparts and has adopted standards for some pollutants for which there are no corresponding national standards. **Table 6.3-1** presents both sets of standards for pollutants analyzed in this EIR.

TABLE 6.3-1
 STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Average Time	Standard, as parts per million		Standard, as micrograms per cubic meter		Violation Criteria	
		California	National	California	National	California	National
Ozone (O ₃)	1 hour	0.09	0.12	180	235	If exceeded	If exceeded on more than 3 days in 3 years
Carbon Monoxide (CO)	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
	1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
Inhalable Particulate Matter (PM ₁₀)	Annual geometric mean	N/A	N/A	30	N/A	If exceeded	N/A
	Annual arithmetic mean	N/A	N/A	N/A	50	N/A	If exceeded
	24 hours	N/A	N/A	50	150	N/A	If exceeded on more than 1 day per year

NOTES: All standards are based on measurements at 25 C and 1 atmosphere pressure.
 National standards shown are the primary (health effects) standards.
 N/A = not applicable.
 SOURCE: CCS, 2002

The federal Clean Air Act requires that the U.S. EPA designate regions as "attainment" or "nonattainment" with respect to the national standards. Under the state California Clean Air Act, patterned after the federal Clean Air Act, areas have also been designated as attainment or nonattainment with respect to the state standards. As indicated by **Table 6.3-2**, the project site

lies within Sacramento Valley Air Basin, which is currently designated as nonattainment for state ozone standard and 24-hour PM₁₀ standard. A subregion within Sacramento Valley Air Basin is designated nonattainment for the national 1-hour ozone standard as well; this subregion includes all or portions of Sacramento, Yolo, Solano, El Dorado, Placer, and Sutter counties.

Sacramento County is officially designated as nonattainment for the national PM₁₀ and 1-hour ozone standards, but, based on questions concerning the validity of the data supporting the nonattainment designation, the Sacramento Metropolitan Air Quality Management District (SMAQMD) has requested U.S. EPA to redesignate the county to attainment for the national PM₁₀ standard, which is currently under review by U.S. EPA. With respect to CO, the urbanized portion of Sacramento County is considered a "maintenance" attainment area for the national standard, which indicates that the area had once been designated nonattainment for that pollutant, but is now designated as attainment in light of improved conditions.

The federal Clean Air Act also requires nonattainment areas to prepare air quality plans that include strategies for achieving attainment. Air quality plans developed to meet federal requirements are referred to as State Implementation Plans (SIPs). The California Clean Air Act also requires nonattainment areas, except for state PM₁₀ nonattainment areas, to prepare plans that include strategies that demonstrate attainment, or alternatively, that implement all feasible control measures. Thus, just as regions in California have two sets of designations, many regions in California also have two sets of air quality plans: one to meet federal requirements and another to meet state requirements.

TABLE 6.3-2
SACRAMENTO COUNTY ATTAINMENT STATUS

Pollutant Type	State Standard	Federal Standard
1-hour Ozone	nonattainment	nonattainment
Particulate Matter	nonattainment	nonattainment ¹
Carbon Monoxide	attainment	attainment

NOTES: ¹ SMAQMD has requested US EPA to redesignate Sacramento County to attainment.
 SOURCE: Sacramento Metropolitan Air Quality Management District, 2000

The 1994 ozone SIP, the *Sacramento Area Regional Ozone Attainment Plan*, is the current federal air quality plan for the Sacramento metropolitan area. The SIP predicts attainment of the national one-hour ozone standard by 2005 (SMAQMD, 1994a). To attain the standard, the 1994 ozone SIP relies heavily on stationary source controls and on statewide mobile source control programs. With respect to the national CO standard, the revised SIP includes a "maintenance" plan, which demonstrates how Sacramento County will continue to maintain concentrations below the standard now that the county's designation is "attainment."

REGULATORY AGENCIES

The CARB regulates mobile emissions sources such as construction equipment, trucks, and automobiles, and oversees the activities of regional and county air districts. The regional and county air districts are primarily responsible for regulating stationary emissions sources and facilities. The project site lies within the jurisdiction of the SMAQMD. SMAQMD is the regional agency empowered to regulate air pollutant emissions from stationary sources in Sacramento County. SMAQMD regulates air quality through its permit authority over most types of stationary emissions sources and through its planning and review activities.

PROJECT SITE AND VICINITY

EXISTING AIR QUALITY

The air quality of the Sacramento Valley is determined by routinely monitoring changes in the quantities of air pollutants in the ambient environment. Air quality is a function of the criteria pollutants emitted locally, the existing regional ambient air quality, and the meteorological and topographic factors, which influence the intrusion of pollutants into the area from sources outside the immediate vicinity.

CARB and SMAQMD maintain ambient air quality monitoring stations at numerous locations throughout the Valley. **Table 6.3-3** summarizes the highest concentrations of ozone, carbon monoxide, and PM₁₀ for the most recent years available (1999-2001) and compares ambient air pollutant concentrations with the corresponding state or national ambient air quality standard.

Monitored CO levels have been trending down over the last several years and have been relatively stable the last few years. The downward trend over the last several years is primarily a result of the use of oxygenated gasoline during the winter CO season. Several exceedances of the state and federal 8-hour standards were recorded in the early 1990's. However, exceedances have not been recorded since then, and Sacramento County was declared an attainment area for the federal CO standard in March 1998.

The state ozone standard has been exceeded up to 23 times each year at the individual monitoring stations shown on **Table 6.3-3**. Exceedances of the federal ozone standard have also been recorded. Substantial year-to-year variations in monitored ozone levels are common. However, no clear trend in ozone levels is demonstrated by monitoring results over the 1990's.

TABLE 6.3-3
AIR QUALITY DATA SUMMARY (1999-2001) FOR THE PROJECT AREA

Station Location	Yearly Monitoring Data		
	1999	2000	2001
Carbon Monoxide			
<u>Del Paso Manor</u>			
Highest 8-hour concentration (ppm)	5.67	4.6	5.28
Days above standard (a)	0	0	0
<u>T-Street</u>			
Highest 8-hour concentration (ppm)	5.73	4.43	4.35
Days above standard (a)	0	0	0
<u>El Camino and Watt</u>			
Highest 8-hour concentration (ppm)	6.58	6.25	4.75
Days above standard (a)	0	0	0
PM10			
<u>Del Paso Manor</u>			
Highest 24-hour concentration (ug/m3)	141	58	66.0
State Average (ug/m3)	22	18	15
National Average (ug/m3)	27	21	19
Recorded days above standard (b)	6	2	2
<u>T- Street</u>			
Highest 24-hour concentration (ug/m3)	99	64	89.0
State Average (ug/m3)	23.7	22.9	21.7
National Average (ug/m3)	28.7	24.6	25.5
Recorded days above standard (b)	8	5	3
<u>Branch Center</u>			
Highest 24-hour concentration (ug/m3)	86	56	70
State Average (ug/m3)	29.4	23.5	26.3
National Average (ug/m3)	33.1	26.6	29.0
Recorded days above standard (b)	11	2	3
Ozone			
<u>Del Paso Manor</u>			
1st High (ppm)	0.131	0.124	0.142
2nd High (ppm)	0.123	0.123	0.118
Days above standard (c)	12	13	11
<u>T-Street</u>			
1st High (ppm)	0.116	0.101	0.113
2nd High (ppm)	0.107	0.098	0.110
Days above standard (c)	6	3	2
<u>3801 Airport Road</u>			
1st High (ppm)	0.106	0.099	0.103
2nd High (ppm)	0.100	0.096	0.10
Days above standard (c)	5	4	5

NOTES: (a) Days above standard = days above state 8-hour standard of 9 ppm.
(b) Number of days above standard; measurements are not conducted every day.
(c) Days above standard = days above state 1-hour standard of 0.09 ppm.

SOURCE: California Air Resources Board - <http://www.arb.ca.gov>

The state 24-hour PM₁₀ standard has been exceeded between 1% and 8% of the time. Neither the state nor federal annual PM₁₀ standards have been exceeded during the period.

Monitoring for PM_{2.5} has begun in Sacramento County at two locations. The T Street site, in the downtown area, began sampling in December 1998. The Del Paso Manor site, in North Sacramento, began sampling in January 1999. Preliminary data indicate exceedances of the 24-hour federal standard at both sites have occurred.

SENSITIVE RECEPTORS

Some receptors are considered more sensitive than others to air pollutants. The reasons for greater sensitivity than average include pre-existing health problems, proximity to the emissions source, or duration of exposure to air pollutants. Land uses such as primary and secondary schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people in residential areas are often at home for extended periods. Recreational land uses are moderately sensitive to air pollution, because vigorous exercise associated with recreation places a high demand on the human respiratory function. Sensitive land uses in the vicinity of the project site include the Holy Spirit Parish School located immediately west, William Land Park, and some residential developments located west, southeast and southwest.

6.3.3 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The Proposed Project would have a significant effect on the environment if it would:

- a. conflict with or obstruct implementation of the applicable air quality plan;
- b. violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- c. result in a cumulatively considerable net increase of any nonattainment pollutant;
- d. expose sensitive receptors to substantial pollutant concentrations; or
- e. create objectionable odors affecting a substantial number of people.

SMAQMD has recently revised significance criteria/thresholds for pollutants emitted into the air (SMAQMD, 2002). For evaluating short-term emission increases due to construction SMAQMD recommends that lead agencies use criteria of 85 pounds per day of NO_x. The previous threshold for short-term ROG emissions has been suspended. For evaluating long-term emission increases due to operations, SMAQMD recommends that lead agencies use criteria of 65 pounds per day of ROG and NO_x, identify significant increases in emissions. The emission threshold for PM₁₀ has

been changed from a “mass emission threshold” (pounds per day) to an “emission concentration threshold” (parts per million). However, the methodology for assessing project impacts based on the new criteria has not been provided by SMAQMD at this time. While this methodology is being developed, SMAQMD has advised that the new criteria for ROG and NO_x, and the previous criteria for PM₁₀ be used with current methodologies for assessing emission impacts (Matt Jones, pers. comm.).

Carbon monoxide impacts are evaluated through dispersion modeling techniques to determine whether the potential for project-related traffic would cause exceedances of carbon monoxide standards. Lastly, SMAQMD recommends that cumulative air quality effects be discussed with reference to 1) whether a project requires a change in the existing land use designation and, if so, 2) whether estimated emissions under the project would be greater than those anticipated for the site if developed under the existing land use designation.

MASTER PLAN IMPACTS AND MITIGATION MEASURES

Master Plan Impact 6.3-1 Generation of Construction-Related Emissions

PP Implementation of the overall master plan would result in the generation of construction-related emissions. Redevelopment envisioned under the master plan will not occur simultaneously. Improvements, renovations, and new construction will occur as funds become available. The generation of construction related emissions would depend upon the amount and type of construction planned under each phase.

PM₁₀ emissions would be the predominant pollutant generated during site grading. ROG, NO_x, and PM₁₀ would be generated during construction of structures. Proposed exhibits include the Sensory Exhibit Center, Discovery Lake walk-through aviary, Tiger Complex, Giraffe Complex and Chimpanzee Complex. Facilities include a new entry building, a new restaurant, a six space covered parking garage, and a new administration office complex with underground parking garage. Estimation of resulting emissions would be speculative since detailed design plans of all phases of exhibits/facilities are not available.

Further project specific review will be conducted as each phase is proposed for development. Construction emissions may exceed significance thresholds for ROG, NO_x and PM₁₀. This may be a **potentially significant impact**.

AA Implementation of the No Project Alternative would result in the generation of construction-related emissions from the development of a 5,300 square foot veterinary clinic. Because detailed plans of the facility and total area affected by construction activities is not available, estimation of resulting emissions would be speculative.

Project specific review will be conducted as this future phase is planned for development. Construction emissions may exceed significance thresholds for ROG, NO_x and PM₁₀. This may be a **potentially significant impact**.

AB

Implementation of the Reduced Intensity Alternative would result in the generation of construction-related emissions from the improvement of facilities necessary to maintain AZA and USDA standards. Likely improvements include replacing or renovating dilapidated exhibits and holding areas to assure animal health, and providing adequate facilities to provide for the care and maintenance of the Zoo's animal collection. An administration building would also be included in this alternative to provide additional staff office space and education classrooms (within the medical/service area of the Zoo). Estimation of resulting emissions would be speculative since detailed design plans of all phases of the exhibits and facilities are not available.

Further project specific review will be conducted as each phase is proposed for development. Construction emissions may exceed significance thresholds for ROG, NO_x and PM₁₀. This may be a **potentially significant impact**.

Master Plan Mitigation 6.3-1 Generation of Construction-Related Emissions

Implementation of the measures listed below will reduce PP, AA, and AB impacts to a less than significant level. Further project specific analysis and mitigation will be required when design details and construction methods of the proposed site preparation phases are available.

- a. Prior to construction of any future phase of the project, a project specific analysis of construction emissions shall be conducted and additional project specific mitigation measures may be employed.
- b. Based on the project-specific analysis, the size and schedule of facilities developed at a single time may be limited. Mitigation measures, such as the following, shall be employed to reduce emission impacts to a less than significant threshold.

If PM₁₀ thresholds are exceeded, the following mitigation measures shall be considered:

- Enclose, cover, or water twice daily all soil piles,
- Install automatic sprinkler system on all soil piles,
- Water all exposed soil twice daily
- Water all exposed soil with adequate frequency to keep soil moist at all times,
- Water all haul roads twice daily
- Pave all haul roads,
- Maintain at least two feet of freeboard,
- Cover load of all haul/dump trucks securely,
- Apply nontoxic soil stabilizer to all inactive construction areas,

- Replace groundcover in disturbed areas quickly,
- Reduce speeds on all unpaved roads to 15 miles per hour or less,
- Properly maintain equipment,
- Use methanol, natural gas, propane, or butane powered equipment instead of diesel,
- Develop and implement trip reduction plans.

If ROG thresholds are exceeded, the following mitigation measures shall be considered:

- Properly maintain equipment,
- Use methanol, natural gas, propane, or butane powered equipment instead of diesel,
- Develop and implement trip reduction plans,
- Use asphalt with a VOC content less than compliance levels,
- Use architectural coatings with VOC content less than compliance levels.

If NO_x thresholds are exceeded, the following mitigation measures shall be considered:

- Properly maintain equipment,
- Develop and implement trip reduction plans,
- Use NO_x-reducing alternative fuels in construction equipment engines.

Significance after Mitigation

Less-than-Significant.

Master Plan Impact 6.3-2 Operation of Parking Facilities

PP Implementation of the Proposed Project would include the construction and operation of a below-grade parking structure (up to 52 cars) and a 6-space garage at the northwestern corner of the project site adjacent to the Holy Spirit School property. Detailed plans have not yet been developed for the parking garage, therefore, a detailed assessment of the potential emissions cannot be quantified. It is unlikely that the use of this parking garage will result in a significant CO impact on adjoining uses; however, this will not be known until site plans can be evaluated. The operation of vehicles in the parking facilities could potentially expose staff and nearby sensitive receptors to concentrated levels of auto emissions. This is a **potentially significant impact**.

AA, AB Under the No Project Alternative and Reduced Intensity Alternative, there would be no additional parking facilities. **No impact** would occur.

Master Plan Mitigation 6.3-2 Operation of Parking Facilities

The following mitigation is recommended for the Proposed Project:

- a. Prior to construction of the parking facilities, a project specific analysis of operational emissions shall be conducted and project specific mitigation measures, such as mechanical ventilation or flow-through design may be employed. With adequate ventilation and dispersal, the impacts would be less than significant.

Significance after Mitigation

Less-than-Significant.

Master Plan Impact 6.3-3 Generation of Operations-Related Emissions

PP To determine long-term operational emissions resulting from the overall master plan (primarily emissions from mobile sources) during project operation, the URBEMIS7G computer program was used. Exhaust emissions related to motor vehicle travel during project operations were calculated by assuming a daily trip generation of 342 trips (City of Sacramento Public Works Department, Letter from Gwen Owens, May 31, 2002) and applying EMFAC7G emission factors to a standard mix of passenger vehicles and trucks. The 342 trips is the estimated increase of traffic associated with future increased visitation. The URBEMIS7G computer program output file is provided in **Appendix E**. As shown in **Table 6.3-4**, the operation of the Proposed Project would result in 2.92 pounds of ROG, 4.10 pounds of NO_x, and 1.51 pounds of PM₁₀ emissions per day, less than SMAQMD emission thresholds of 65 pounds per day of ROG and NO_x, and 275 pounds per day of PM₁₀. Therefore, this would be a **less-than-significant impact**.

TABLE 6.3-4
SUMMARY OF EMISSIONS

Activity	Type of Pollution Emissions (in pounds per day)		
	ROG	NO _x	PM ₁₀
Phase I of Concept/Vision Plan			
Site Grading	0.35	2.24	85.37
Construction of Structures	44.04	57.02	5.92
SMAQMD Construction Thresholds	None	85	275
Buildout of Concept/Vision Plan			
Operations	2.92	4.10	1.51
SMAQMD Operation Thresholds	65	65	275

SOURCE: CCS, 2002; AES, 2002

AA, AB The No Project Alternative and Reduced Intensity Alternative would generate less traffic than the Proposed Project. Therefore, these alternatives would have lower operation-related emissions. This is a **less-than-significant impact**.

Master Plan Mitigation 6.3-3 Generation of Operations-Related Emissions

No mitigation is required.

Master Plan Impact 6.3-4 Generation of Operations-Related Odors

PP, AA, AB Odors emanating from the Zoo could be perceived as objectionable. The SMAQMD and City staff were contacted to determine the number of complaints regarding the existing Zoo odors. The SMAQMD and the City have no record of odor complaints (Jamie Arno, 2002; Kelly Montgomery, 2002). The Zoo currently averages between 400 and 430 animals. Implementation of the proposed Master Plan would not result in an expansion of the Zoo, rather, the existing zoo would be updated with modern facilities. As such, implementation of the overall master plan would not significantly increase the average number of animals housed at the Zoo (Mary Healy, pers. comm.). Therefore the impact would be **less-than-significant**.

Master Plan Mitigation 6.3-4 Generation of Operations-Related Odors

No mitigation is required.

Master Plan Impact 6.3-5 CO Operations-Related Emission

PP To evaluate local CO impacts at affected intersections (i.e., "hot spot" analysis), the Transportation Project-Level Carbon Monoxide Protocol (UC Davis Institute of Transportation Studies, 1997) and SMAQMD Air Quality Thresholds of Significance for CO are typically used. Specifically, the Transportation Project-Level Carbon Monoxide Protocol is used to determine if analysis using the CALINE line-source dispersion model is required. The UCD-ITS Transportation Protocol describes screening procedures used to qualitatively estimate CO concentrations. Projects that are likely to worsen air quality would require further analysis. Projects that significantly increase traffic volumes by an excess of 5% should be considered for CO analysis. Growth under the Proposed Project is expected to generate an additional 342 daily trips. The traffic volume on Land Park Drive between 14th and 15th Avenues was examined. Traffic volume counts done in 2000 by the City of Sacramento Public Works Department indicate volumes in the range of 8,391 vehicles. Traffic volumes at the nearest intersection would not increase by 5% or more with the addition of project-related traffic. The project, therefore, is not likely to worsen air quality, so a CO analysis with the CALINE model is not required.

The operation of the Proposed Project would not generate enough new traffic to cause an increase of 5% or more of surrounding traffic volumes. Therefore, CO levels are not expected to increase enough to cause a significant impact. The impact is considered **less-than-significant**.

- AA The existing plus project conditions under the No Project Alternative would not change from the existing baseline conditions. Future growth on the site assumed under this alternative would likely include a 5,300 square foot health care facility, and renovations and redevelopment of the Zoo's exhibits and facilities. This alternative would generate less traffic than the Proposed Project. Therefore, CO levels are not expected to increase enough to cause a significant impact. The impact is considered **less-than-significant**.
- AB The Reduced Intensity Alternative would generate less traffic than the Proposed Project. Therefore, CO levels are not expected to increase enough to cause a significant impact. The impact is considered **less-than-significant**.

Master Plan Mitigation 6.3-5 CO Operations-Related Emissions

No mitigation is required.

PHASE I IMPACTS AND MITIGATION MEASURES

Phase I Impact 6.3-6 Generation of Site Grading and Paving Construction-Related Emissions

- PP To determine short-term NO_x and PM₁₀ containing fugitive dust emissions, the methodology outlined in SMAQMD's *Air Quality Thresholds of Significance* (SMAQMD, 1994b) was utilized in the quantification of construction-related impacts. Construction-related emission estimates were based on Phase I of the Proposed Project, which assumes an 8,460-square-foot (sq. ft.) veterinary clinic, 3,000 sq. ft. kitchen/commons building, 2,400-square-foot food storage building, and a 2,400 sq. ft. storage and shop. Phase I also includes a 3,040 sq. ft. multi-use pavilion and a 2,400 sq. ft. covered deck adjacent to Kampala Center. Short-term construction emission calculations are provided in **Appendix E**.

As shown in **Table 6.3-4**, construction-related activities associated with Phase I of the proposed project would generate 2.24 pounds of NO_x and 85.37 pounds of PM₁₀ emissions per day during the site grading and paving phases. Emissions generated during the phases would be less than SMAQMD emission thresholds of 85 pounds per day of NO_x and 275 pounds per day of PM₁₀. Therefore, the generation of these emissions is considered to be **less-than-significant**.

- AA The No Project Alternative does not include specific Phase I projects; no grading or paving would take place. Therefore, there would be no construction-related emissions resulting from grading. The impact would be **less-than-significant**.
- AB The Reduced Intensity Alternative includes the development of Medical/Service Complex components including the Veterinary Clinic, Kitchen/Commons, Food Storage, and Storage and Shop buildings. This alternative does not include construction of the multi-use pavilion or covered deck adjacent to Kampala

Center. Therefore, the generation of short-term construction emissions will be less than that of the Proposed Project. The impact would be **less-than-significant**.

Phase I Mitigation 6.3-6 Site Grading and Paving

No mitigation is required.

Phase I Impact 6.3-7 Generation of NO_x and PM₁₀ During Construction of Structure

PP, Operation of construction equipment during construction of Phase I of the Proposed Project would generate NO_x and PM₁₀ emissions. The predominant source would be equipment exhaust. However, as shown in **Table 6.3-4**, the generation of 57.02 pounds of NO_x and 5.92 pounds of PM₁₀ emissions per day would not exceed the SMAQMD threshold of 85 pounds per day for NO_x, and 275 pounds per day of PM₁₀. Therefore, this impact is **less-than-significant**.

AA The No Project Alternative does not include specific Phase I projects. Therefore, there would be no NO_x or PM₁₀ emissions. This is a **less-than-significant impact**.

AB Operation of construction equipment during construction of Phase I of the Reduced Intensity Alternative would generate NO_x and PM₁₀ emissions. The predominant source would be equipment exhaust. This alternative would result in fewer emissions than the Proposed Project, as this alternative does not include construction of the multi-use pavilion or covered deck adjacent to Kampala Center. Therefore, this impact is **less-than-significant**.

Phase I Mitigation 6.3-7 Generation of NO_x and PM₁₀ During Construction of Structure

No mitigation is required.

Phase I Impact 6.3-8 Generation of Odors from Construction-Related Emissions

PP, AB Implementation of the Proposed Project and the Reduced Intensity Alternative would result in the use of construction equipment. The predominant source of power for construction equipment is diesel engines. The use of diesel engines could result in the generation of undesirable odors from the engine exhaust. However, the generation of odors would be temporary, and would not be expected to be of a substantial magnitude.

Because the generation of odors would be temporary and are not expected to be substantial, the impacts would be **less-than-significant**.

AA The No Project Alternative does not include specific Phase I projects. Therefore, there would be no odors from construction-related emissions. This would be a **less-than-significant impact**.

Phase I Mitigation 6.3-8 Odors from Construction-Related Emissions

No mitigation is required.

Phase I Impact 6.3-9 Generation of Operations-Related Emissions

PP Implementation of Phase I would result in fewer daily trips than those generated by the Proposed Project at buildout. As shown in **Table 6.3-4**, at buildout, ROG and NO_x emissions would be less than the SMAQMD threshold of 65 pounds per day and PM₁₀ emissions would be less than 275 pounds per day. Because Phase I would generate less emissions than the overall project, there would be a **less-than-significant impact** in operation-related emissions.

AA The No Project Alternative does not include specific Phase I projects. These alternatives would generate less traffic than the Proposed Project. This would be a **less-than-significant impact**.

AB Implementation of Phase I improvements under the Reduced Intensity Alternative would result in fewer trips than those generated by the Proposed Project at buildout. Because Phase I of this alternative would generate less emissions than the Proposed Project, there would be a **less-than-significant impact** in operation-related emissions.

Phase I Mitigation 6.3-9 Generation of Operations-Related Emissions

No mitigation is required.