

**Air Quality Analysis Report
MacArthur Park
City of Los Angeles, California**

Prepared for:

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TABLE OF CONTENTS

Acronyms and Abbreviations.....	iv
Section 1: Introduction	2
1.1 - Purpose and Methods of Analysis.....	2
1.2 - Executive Summary.....	2
1.2.1 - Findings	2
1.2.2 - Mitigation Measures Designed to Reduce Air Emissions.....	2
1.3 - Project Description.....	4
1.4 - Sensitive Receptors.....	5
Section 2: Criteria Pollutant Setting.....	6
2.1 - Regulatory Setting	6
2.1.1 - Federal and State Regulatory Agencies	6
2.1.2 - South Coast Air Quality Management District.....	8
2.2 - Pollutants.....	9
2.2.1 - Carbon Monoxide	9
2.2.2 - Ozone	10
2.2.3 - Nitrogen Oxides	11
2.2.4 - Sulfur Dioxide.....	11
2.2.5 - Lead.....	12
2.2.6 - Particulate Matter (PM ₁₀ and PM _{2.5}).....	12
2.2.7 - Visibility Reducing Particles.....	14
2.2.8 - Vinyl Chloride	14
2.2.9 - Hydrogen Sulfide.....	15
2.2.10 - Volatile Organic Compounds and Reactive Organic Gases.....	15
2.3 - Physical Setting	16
2.3.1 - Local Climate	16
2.3.2 - Local Air Quality	17
2.3.3 - Attainment Status.....	19
Section 3: Greenhouse Gas Setting.....	20
3.1 - Greenhouse Gases.....	20
3.1.1 - Federal Inventory	25
3.1.2 - State Inventory	26
3.1.3 - Local Inventory.....	26
3.2 - Regulatory Environment	26
3.2.1 - International and Federal	26
3.2.2 - California.....	27
3.2.3 - Local Public Agencies	30
Section 4: Thresholds.....	31
4.1 - CEQA Guidelines	31
4.2 - Regional Significance Thresholds.....	31
4.3 - Local Significance Thresholds	32
4.4 - Greenhouse Gas Threshold.....	32
Section 5: Emission Estimation	34
5.1 - Short-Term Impacts.....	34
5.2 - Long-Term Impacts.....	36
5.3 - Carbon Monoxide Hotspot Analysis	37
Section 6: Impact Analysis	39

6.1 - Conformance with Air Quality Management Plan	39
6.1.1 - Project's Contribution to Air Quality Violations.....	39
6.1.2 - Control Measures.....	39
6.1.3 - Compliance with the SCAQMD Regional Thresholds	40
6.1.4 - Summary.....	40
6.2 - Potential for Air Quality Standard Violation	40
6.3 - Cumulative Impacts	42
6.3.1 - Regional Analysis.....	42
6.3.2 - Plan Approach	42
6.3.3 - Cumulative Health Impacts.....	43
6.3.4 - Summary of Cumulative Impacts.....	43
6.4 - Expose Sensitive Receptors to Substantial Pollutant Concentrations	43
6.4.1 - Construction.....	44
6.4.2 - Operation	44
6.5 - Odors	45
Section 7: Climate Change Analysis.....	47
7.1 - Project Level Analysis.....	47
7.2 - Impacts to Project from Climate Change.....	52
7.3 - Cumulative Impacts	53
Section 8: References.....	54

Appendix A: URBEMIS Output

LIST OF TABLES

Table 1: Ambient Air Quality Standards.....	7
Table 2: Los Angeles 2005 Emissions Inventory (tons per day)	17
Table 3: Air Quality Monitoring Summary	18
Table 4: Attainment Status	19
Table 5: Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases	21
Table 6: SCAQMD Regional Thresholds	32
Table 7: SCAQMD Localized Thresholds	32
Table 8: Short-Term Emissions (Unmitigated).....	35
Table 9: Short-term Emissions (Mitigated).....	36
Table 10: Operational Emissions (Buildout, Summer)	37
Table 11: Operational Emissions (Buildout, Winter).....	37
Table 12: Traffic Information.....	38
Table 13: Construction Greenhouse Gas Emissions	47
Table 14: Greenhouse Gas Reduction Strategy Consistency Analysis	49

ACRONYMS AND ABBREVIATIONS

µm	Micrometer
AQMP	Air Quality Management Plan
ARB	California Air Resources Control Board
CAT	Climate Action Team (Report)
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
DPM	Diesel Particulate Matter
EPA	Environmental Protection Agency
HVLP	High-Volume Low-Pressure
LOS	Level of Service
LST	Localized Significance Thresholds
NAAQS	National Ambient Air Quality Standards
PAH	Polycyclic Aromatic Hydrocarbons
PM2.5	Particulate matter less than 2.5 microns in diameter
PM10	Particulate matter less than 10 microns in diameter
ppm	Parts per Million
ppt	Parts per Trillion
PVC	Polyvinyl Chloride
REL	Relative Exposure Level
ROG	Reactive Organic Gases
RTP	Regional Transportation Plans
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plans
SRA	Source Receptor Areas
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

SECTION 1: INTRODUCTION

1.1 - Purpose and Methods of Analysis

The following air quality analysis was prepared to evaluate whether the expected criteria air pollutant emissions generated from the proposed Project would cause significant impacts to air resources in the Project area. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000 et seq.). The methodology follows the CEQA Air Quality Handbook prepared by the South Coast Air Quality Management District (SCAQMD) for quantification of emissions and evaluation of potential impacts to air resources. Note that this report does not address climate change or the Project's contribution of greenhouse gases as that assessment was not in the scope of this study.

1.2 - Executive Summary

1.2.1 - Findings

- The construction and operation of the Project will not exceed the SCAQMD regional significance emission thresholds.
- Emissions during construction could exceed the localized significance thresholds without mitigation for PM₁₀ and PM_{2.5}. However, with mitigation, the construction emissions do not exceed the localized significance thresholds.
- The operation of the Project will not result in a localized carbon monoxide hotspot and thus will not cause or contribute to the violation of any federal or state carbon monoxide standard.
- The Project will not result in a cumulative impact.
- The Project will not result in an air quality violation after application of mitigation measures.
- The Project will not create objectionable odors that affect sensitive receptors in the vicinity of the Project area after application of mitigation measures.
- The Project is consistent with the Air Quality Management Plan (AQMP) after application of mitigation measures.

1.2.2 - Mitigation Measures Designed to Reduce Air Emissions

MM AIR-1 During construction of the proposed improvements, the City shall utilize best management practices to control dust during construction, and shall include:

- Application of water on disturbed soils a minimum of two times per day;
- Using track-out prevention devices at construction site access points;
- Stabilizing construction area exit points (i.e., if vehicles travel offsite);
- Reducing speed on unpaved roads to less than 15 miles per hour (mph);
- A maximum of 5 acres per day shall be actively graded;

- Apply soil stabilizers to inactive areas;
- Covering haul vehicles that travel offsite; and
- Replanting disturbed areas as soon as practical and other measures, as deemed appropriate for the site, to control fugitive dust.

- MM AIR-2** If construction activities will limit traffic or access along adjacent streets, the City shall prepare a Construction Traffic Control Plan (CTCP), which will be reviewed and approved by the City Transportation Department. The CTCP will describe in detail safe detours around Project construction sites and provide temporary traffic control (i.e., flag person) during construction-related, truck-hauling activities, if needed.
- MM AIR-3** During construction of the proposed improvements, construction equipment shall be properly maintained at an offsite location and includes proper tuning and timing of engines. Equipment maintenance records and equipment design specification data sheets shall be kept onsite during construction.
- MM AIR-4** During construction of the proposed improvements, all contractors will be advised not to idle construction equipment on the site for more than 5 minutes.
- MM AIR-5** During construction of the proposed improvements, onsite electrical hook ups shall be provided for electric construction tools, including saws, drills, and compressors, to eliminate the need for diesel powered electric generators.
- MM AIR-6** The City shall install energy efficient lighting with electronic timing controls to limit unnecessary lighting. These controls may include keyed or remote control to allow the lights to be turned off when the soccer field is not being used.
- MM AIR-7** During construction, the City shall reuse or recycle construction waste where feasible and shall reuse or recycle a minimum of 50 percent of the waste.
- MM AIR-8** The City shall plant drought tolerant trees where practical to replace trees that are removed as part of the Project.
- MM AIR-9** The City shall install irrigation control devices to prevent watering of non-plant surfaces and to control the quantity of water used. The irrigation system shall be maintained and inspected at least once per year to make sure that system devices are working properly and watering appropriate areas.
- MM AIR-10** The City shall apply the Leadership in Energy and Environmental Design (LEED) Green Building Rating System for Existing Buildings: Operations & Maintenance

Rating System requirements to the building(s) to be renovated as long as they do not conflict with the City's applicable historical preservation requirements.

1.3 - Project Description

MacArthur Park is located within the City of Los Angeles and is bounded by West 6th Street on the north, South Alvarado Street on the east, West 7th Street on the south, and South Park View Street on the west. Wilshire Boulevard passes through the center of the park in an east-west direction, and the Metropolitan Transit Authority's (MTA) Red Line runs beneath the park roughly paralleling Wilshire Boulevard. The Westlake/MacArthur Park subway station lies immediately to the east of the park and across Alvarado Street. The park site is within a highly urbanized area of central Los Angeles. MacArthur Park is located within the City's Westlake Community Plan Area.

There are no dedicated automobile parking areas within the park, and park users enter the area on foot or via public transportation. MTA Bus routes 18, 20, 21, 26, 51, 52, 352, and 603 serve Wilshire Boulevard and/or the other streets adjacent to the park. In addition, the heavily used Westlake/MacArthur Park Metro train station lies immediately to the east of the park across Alvarado Street. Visitors to the park arriving by automobile can use metered parking spaces along Wilshire Boulevard, South Park View Street, or West 6th Street.

The Project consists of the expected improvements:

- Installation of six 40-foot light poles with state-of-the-art field lights and eight 30-foot security lights;
- Replacement of dirt and grass in the soccer field section of the park with artificial turf and interconnecting concrete and natural walkways;
- Development of a new children's play area with a resilient surface;
- Renovations to the existing recreation center in the old Signal Building (approximately 14,500 square feet);
- Replacement the existing boat house with a new building for the same use (2,100 square feet);
- Installation of new park furniture and outdoor exercise equipment around the soccer field and play area;
- Irrigation and landscaping; and
- The placement of a new monument in the park honoring Oscar Romero, a San Salvadorean catholic priest.

Existing Sources of Onsite Air Pollutants

The Project is currently a park. The uses on the park that would emit air pollutants may include the following:

- Fugitive dust emissions from the people using the dirt field as a soccer play area;
- Mobile emissions from the cars and light trucks that access the park;
- Indirect emissions from electricity generation to provide electricity to the existing uses; and
- Indirect emissions from the electricity required to pump water to the site.

Local Sources of Air Pollutants

The local sources of air pollutants in the Project vicinity are primarily from motor vehicles and trucks that traverse the local roadway network.

1.4 - Sensitive Receptors

Those who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. For purposes of CEQA, the SCAQMD considers a sensitive receptor to be a location where a sensitive individual could remain for 24 hours, such as residences, hospitals, or convalescent facilities. Commercial and industrial facilities are not included in the definition because employees do not typically remain onsite for 24 hours. However, when assessing the impact of pollutants with 1-hour or 8-hour standards (such as nitrogen dioxide and carbon monoxide), commercial and/or industrial facilities would be considered sensitive receptors for those purposes.

The park is surrounded by commercial and light industrial uses, with residential further away to the west, north and south. A former hotel just west of the park is currently in the process of being converted to loft apartments. The closest primary health care facilities to the park are the Saint Vincent Medical Center located a quarter mile north of the park at the northwest corner of 3rd and Alvarado, and Good Samaritan Hospital located 0.6 miles east of the park on the northeast corner of Wilshire and Witmer. Other than the potential for future loft apartments in the former hotel, there are no residential, institutional, or congregate care facilities in the immediate vicinity of the park; however, the park itself could be considered a sensitive receptor as it is frequently used by children and the elderly.

SECTION 2: CRITERIA POLLUTANT SETTING

2.1 - Regulatory Setting

Air pollutants are regulated at the national, state, and air basin level; each agency has a different degree of control. The United States Environmental Protection Agency (EPA) regulates at the national level. The California Air Resources Board (ARB) regulates at the state level. The SCAQMD regulates at the air basin level.

2.1.1 - Federal and State Regulatory Agencies

The EPA handles global, international, national, and interstate air pollution issues and policies. The EPA sets national vehicle and stationary source emission standards, oversees approval of all State Implementation Plans (SIP), provides research and guidance in air pollution programs, and sets National Ambient Air Quality Standards (NAAQS), also known as federal standards. There are NAAQS for six common air pollutants, called criteria air pollutants, which were identified resulting from provisions of the Clean Air Act of 1970. The six criteria pollutants are:

- Ozone;
- Particulate matter (PM₁₀ and PM_{2.5});
- Nitrogen dioxide;
- Carbon monoxide (CO);
- Lead; and
- Sulfur dioxide.

The NAAQS were set to protect public health, including that of sensitive individuals; thus, the standards continue to change as more medical research is available regarding the health effects of the criteria pollutants.

A SIP is a document prepared by each state describing existing air quality conditions and measures that will be followed to attain and maintain NAAQS. The SIP for the State of California is administered by ARB who has overall responsibility for statewide air quality maintenance and air pollution prevention. The ARB also administers California Ambient Air Quality Standards (CAAQS), for the 10 air pollutants designated in the California Clean Air Act (CCAA). The 10 state air pollutants are the 6 NAAQS listed above as well as:

- Visibility reducing particulates;
- Hydrogen sulfide;
- Sulfates; and
- Vinyl chloride.

The national and state ambient air quality standards and the most relevant effects are summarized in Table 1.

Table 1: Ambient Air Quality Standards

Air Pollutant	Averaging Time	California Standard	National Standard	Most Relevant Effects
Ozone	1 Hour	0.09 ppm	—	(a) Decrease of pulmonary function and localized lung edema in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (e) Vegetation damage; (f) Property damage.
	8 Hour	0.070 ppm	0.08 ppm	
Carbon Monoxide (CO)	1 Hour	20 ppm	35 ppm	(a) Aggravation of angina pectoris (chest pain or discomfort) and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses.
	8 Hour	9.0 ppm	9 ppm	
Nitrogen Dioxide (NO ₂)	1 Hour	0.18 ppm*	—	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration.
	Mean	0.030 ppm*	0.053 ppm	
Sulfur Dioxide (SO ₂)	1 Hour	0.25 ppm	—	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
	24 Hour	0.04 ppm	0.14 ppm	
	Mean	—	0.030 ppm	
Particulate Matter (PM ₁₀)	24 hour	50 µg/m ³	150 µg/m ³	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; (c) Increased risk of premature death from heart or lung diseases in the elderly.
	Mean	20 µg/m ³	—	
Particulate Matter (PM _{2.5})	24 Hour	—	35 µg/m ³	
	Mean	12 µg/m ³	15 µg/m ³	
Sulfates	24 Hour	25 µg/m ³	—	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage.
Lead	30-day	1.5 µg/m ³	—	(a) Learning disabilities; (b) Impairment of blood formation and nerve conduction.
	Quarter	—	1.5 µg/m ³	
<p>Abbreviations: ppm = parts per million (concentration) µg/m³ = micrograms per cubic meter Mean = Annual Arithmetic Mean 30-day = 30-day average Quarter = Calendar quarter * The nitrogen dioxide ambient air quality standard was amended on February 22, 2007. These changes become effective after regulatory changes are submitted and approved by the Office of Administrative Law. Source: South Coast Air Quality Management District, 2007c. California Air Resources Board, Ambient Air Quality Standards, 2007.</p>				

The ARB approved a regulatory measure to reduce emissions of toxics and criteria pollutants by limiting idling of heavy-duty diesel vehicles (ARB 2005c). The driver of any vehicle subject to this section: (1) shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location; and (2) shall not idle a diesel-fueled auxiliary power system (APS) for more than 5 minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle if it has a sleeper berth and the truck is located within 100 feet of a restricted area (homes and schools).

2.1.2 - South Coast Air Quality Management District

The air pollution control agency for the South Coast Air Basin (basin) is the SCAQMD. SCAQMD is responsible for controlling emissions primarily from stationary sources. SCAQMD maintains air quality monitoring stations throughout the basin. SCAQMD, in coordination with the Southern California Association of Governments (SCAG), is also responsible for developing, updating, and implementing the AQMP for the basin. An AQMP is a plan prepared by an air pollution control district for a county or region designated as nonattainment of the national and/or California ambient air quality standards. The term nonattainment area is used to refer to an air basin where one or more ambient air quality standards are exceeded.

The current AQMP for the Basin is the 2007 AQMP, which was adopted by the SCAQMD on June 1, 2007. On July 13, 2007, the SCAQMD Board adopted 2007 Final AQMP Transportation Conformity Budgets and directed the Executive Officer to forward them to ARB for its approval and subsequent submittal to the U.S. EPA. On September 27, 2007, ARB adopted the State Strategy for the 2007 State Implementation Plan (SIP) and the 2007 AQMP as part of the SIP.

The 2007 AQMP incorporates significant new emissions inventories, ambient measurements, scientific data, control strategies, and air quality modeling. The 2007 AQMP outlines a detailed strategy for meeting the federal health-based standards for PM_{2.5} by 2015 and 8-hour ozone by 2024 while accounting for and accommodating future expected growth. Most of the reductions will be from mobile sources, which are currently responsible for about 75 percent of all smog and particulate forming emissions. The 2007 AQMP includes 37 control measures proposed for adoption by the SCAQMD, including measures to reduce emissions from new commercial and residential developments, more reductions from industrial facilities, and reductions from wood-burning fireplaces and restaurant charbroilers.

Rules and Regulations

The AQMP for the basin establishes a program of rules and regulations administered by SCAQMD to obtain attainment of the state and national air quality standards. The rules and regulations that apply to this Project include, but are not limited to, the following:

- SCAQMD Rule 403 governs emissions of fugitive dust during construction and operation activities. Compliance with this rule is achieved through application of standard best management practices, such as application of water or chemical stabilizers to disturbed soils,

covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites. Rule 403 also requires submission of a Fugitive Dust Plan to the SCAQMD for projects that disturb over 100 acres of soil or move 10,000 cubic yards per day of material.

- SCAQMD Rule 1108 governs the sale, use, and manufacturing of asphalt and limits the volatile organic compound (VOC) content in asphalt used in the South Coast Air Basin. Although this rule does not directly apply to the Project, it does regulate the VOC content of asphalt used during construction. Therefore, all asphalt used during construction of the Project will be in compliance with SCAQMD Rule 1108.
- SCAQMD Rule 1113 governs the sale, use, and manufacturing of architectural coating and limits the VOC content in paints and paint solvents. Although this rule does not directly apply to the Project, it does regulate the VOC content of paints available during construction. Therefore, all paints and solvents used during construction and operation of the Project will be in compliance with SCAQMD Rule 1113.

2.2 - Pollutants

Air pollutants can be categorized into two main sources, stationary and mobile. A point source is a stationary source, which is an emission from an identifiable location, usually associated with manufacturing and industrial sources. Area sources are considered stationary sources, which are widely distributed and produce many small emissions. Mobile source emissions are associated with motor vehicles and include on-road and off-road sources. On-road sources are emissions from vehicles, trucks, motorcycles, buses, etc. Off-road sources include equipment and vehicles in the following sectors: recreational, construction, mining, industrial, lawn and garden, farm, airport service, and rail. A brief summary of the pollutants of concern follows.

2.2.1 - Carbon Monoxide

Description and Properties: Carbon monoxide (CO) is a colorless, odorless, toxic gas produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). CO is a primary pollutant, which means that it is emitted directly into the air (unlike secondary pollutants such as ozone that are formed by the reactions of other pollutants). CO levels tend to be highest during the winter months when the meteorological conditions favor the accumulation of the pollutants. This occurs when relatively low inversion levels trap pollutants near the ground and concentrate the CO (EPA 2007i). However, because CO is somewhat soluble in water, rainfall and fog can suppress CO conditions.

Health Effects: CO is essentially inert to plants and materials but can have significant effects on human health. CO gas enters the body through the lungs, dissolves in the blood, and replaces oxygen as an attachment to hemoglobin. This binding reduces available oxygen in the blood and; therefore,

reduces oxygen delivery to the body's organs and tissues. Effects on humans range from slight headaches to nausea to death. Elevated levels of CO can also cause visual impairments, reduced manual dexterity, poor learning ability, reduced work capacity, and trouble performing complex tasks. For people with heart disease, exposure to CO at low levels may cause chest pain and reduced ability to exercise; repeated exposures may contribute to other cardiovascular effects (EPA 2007h).

Sources: CO is produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). The primary source of CO is from on-road motor vehicles. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. Other non-road engines and vehicles (such as construction equipment and boats) contribute about 22 percent of all CO emissions nationwide. Higher levels of CO generally occur in areas with heavy traffic congestion. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are sources of CO concentrations indoors.

2.2.2 - Ozone

Description and Physical Properties: Ozone is a photochemical pollutant as it is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between VOC, NO_x, and sunlight. VOC and NO_x, also called "ozone precursors," are emitted from automobiles, solvents and fuel combustion. Ozone is a regional pollutant that is generated over a large area and is transported and spread by the wind. In order to reduce ozone, it is necessary to control emissions of ozone precursors. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. These conditions are prevalent during the summer when thermal inversions are most likely to occur. As a result, summertime conditions of long periods of daylight and hot temperatures form ozone in the greatest quantities. During the summer, thermal inversions trap ozone from dispersing vertically, and high concentrations of this pollutant are prevalent.

Health Effects: Health effects of ozone can include the following: respiratory system irritation, reduction of lung capacity, asthma aggravation, inflammation, and damage to lung cells, aggravated cardiovascular disease, chronic lung disease aggravation, and permanent lung damage (EPA 1999). The greatest health risk is to those who are active outdoors during smoggy periods, such as children, athletes, and outdoor workers. Ozone also damages natural ecosystems such as forests and foothill communities, and damages agricultural crops and materials such as rubber, paint, and plastics.

Sources: Ozone is a secondary pollutant, thus is not emitted directly into the lower level of the atmosphere. The sources of ozone precursors (VOC and NO_x) are discussed above in the description of ozone as well as the discussions concerning VOC and NO_x.

2.2.3 - Nitrogen Oxides

Description and Physical Properties: During combustion of fossil fuels, oxygen reacts with nitrogen to produce NO_x (NO, NO₂, NO₃, N₂O, N₂O₃, N₂O₄, and N₂O₅). This occurs primarily in motor vehicle internal combustion engines and fossil fuel-fired electric utility and industrial boilers. As discussed previously, NO_x is an ozone precursor, which means that when it is emitted into the atmosphere, it forms or may cause ozone to be formed. When NO_x and VOC are released in the atmosphere, they can chemically react with one another in the presence of sunlight to form ozone. NO_x can also be a precursor to PM₁₀ and PM_{2.5}. NO_x can react with moisture, ammonia, and other compounds to form nitric acid and related particles. This deposition can harm natural resources and materials.

Health Effects: The EPA has concluded that the only form of NO_x that exists at a level high enough to cause public health concerns is nitrogen dioxide (NO₂) (EPA 1997). Nitrogen dioxide is a brown gas with a strong odor. The main human health concerns of nitrogen dioxide include lung damage, increased incidence of chronic bronchitis, eye, and mucus membrane damage, negative effects on the respiratory system, pulmonary dysfunction, and premature death. Small particles can penetrate deeply into the sensitive tissue of the lungs and can cause or worsen respiratory disease such as emphysema, asthma, and bronchitis, and can also aggravate existing heart disease (EPA 2007d).

Because NO_x is an ozone precursor, the health effects associated with ozone (as discussed above) are also indirect health effects associated with unhealthful levels of NO_x emissions.

Sources: Natural sources of oxides of nitrogen (NO_x) include lightning, soils, wildfires, stratospheric intrusion, and the oceans. Natural sources accounted for approximately seven percent of 1990 emissions of NO_x for the United States.

2.2.4 - Sulfur Dioxide

Description and Physical Properties: Sulfur dioxide (SO₂) is a colorless, pungent gas. At levels greater than 0.5 ppm, the gas has a strong odor, similar to rotten eggs. Sulfuric acid is formed from sulfur dioxide, which is an aerosol particle component that may lead to acid deposition. Acid deposition into water, vegetation, soil, or other materials can harm natural resources and materials. Sulfur oxides (SO_x) include sulfur dioxide and sulfur trioxide (SO₃). Although sulfur dioxide concentrations have been reduced to levels well below state and national standards, further reductions are desirable because sulfur dioxide is a precursor to sulfate and PM₁₀. Sulfates are particulates formed through the photochemical oxidation of sulfur dioxide.

Health Effects: Sulfur dioxide is a soluble gas; therefore, it can be absorbed in the mucous membranes of the respiratory tract and nose. Long-term exposure to high levels of sulfur dioxide can cause irritation of existing cardiovascular disease, respiratory illness, and changes in the defense systems of the lungs. When people with asthma are exposed to high levels of sulfur dioxide for short

periods of time during moderate activity, effects may include wheezing, chest tightness, or shortness of breath (EPA 2004).

Sources: Anthropogenic, or human caused, sources include fossil-fuel combustion, mineral ore processing, and chemical manufacturing. Volcanic emissions are a natural source of sulfur dioxide. The gas can also be produced in the air by dimethylsulfide and hydrogen sulfide. Sulfur dioxide is removed from the air by dissolution in water, chemical reactions, and transfer to soils and ice caps. The ARB demonstrates that sulfur dioxide levels in the State are well below the maximum standards (ARB 2006b, Page 107, 408, and 409).

2.2.5 - Lead

Description and Physical Properties: Lead (Pb) is a solid heavy metal that can exist in air pollution as an aerosol particle component. An aerosol is a collection of solid, liquid, or mixed-phase particles suspended in the air. Lead was first regulated as an air pollutant in 1976. Leaded gasoline was first marketed in 1923 and was used in motor vehicles until around 1970. Lead concentrations once exceeded the state and national air quality standards by a wide margin, but have not exceeded state or national air quality standards at any regular monitoring station since 1982. The exclusion of lead from gasoline helped to decrease emissions of lead in the United States from 219,000 to 4,000 short tons per year between 1970 and 1997. Leaded gasoline has been phased out in most countries, but is still in use in some areas.

Health Effects: Lead accumulates in bones, soft tissue, and blood and can affect the kidneys, liver, and nervous system. The more serious effects of lead poisoning include behavior disorders, mental retardation, and neurological impairment. Low levels of lead in fetuses and young children can result in nervous system damage, which can cause learning deficiencies and low IQs. Lead may also contribute to high blood pressure and heart disease.

Sources: Lead ore crushing, lead-ore smelting, and battery manufacturing are currently the largest sources of lead in the atmosphere in the United States. Other sources include dust from soils contaminated with lead-based paint, solid waste disposal, and crustal physical weathering. The mechanisms by which lead can be removed from the atmosphere (sinks) include deposition to soils, ice caps, and oceans, and inhalation.

2.2.6 - Particulate Matter (PM₁₀ and PM_{2.5})

Description and Physical Properties: Particulate matter is a generic term that defines a broad group of chemically and physically different particles (either liquid droplets or solids) that can exist over a wide range of sizes. Examples of atmospheric particles include those produced from combustion (diesel soot or fly ash), light produced (urban haze), sea spray produced (salt particles), and soil-like particles from re-suspended dust. In discussions of air pollution, particulate matter is typically divided into two size categories, PM₁₀ and PM_{2.5}, because of the adverse health effects associated with the smaller sized particles. PM₁₀ refers to particulate matter that is 10 microns or less in

diameter (1 micron is one-millionth of a meter, also known as micrometer [μm]). $\text{PM}_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter. Soil dust consists of the minerals and organic material found in soil being lifted up into the air by winds. Fugitive dust is entrained particulate matter caused by anthropogenic (grading, road dust) or natural (windblown dust) activities.

Health Effects: Particulate matter can be inhaled into the lungs where it can be absorbed into the bloodstream. It is a respiratory irritant and can cause direct pulmonary effects such as coughing, bronchitis, lung disease, respiratory illnesses, increased airway reactivity, and exacerbation of asthma. Particulate matter is also thought to have direct effects on the heart (EPA 2003a). Relatively recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non-health effects include reduced visibility and soiling of property.

Sources: Particulate matter originates from a variety of stationary and mobile sources. Stationary sources include fuel combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal, and recycling. Mobile or transportation-related sources include particulate matter from highway vehicles and non-road vehicles and fugitive dust from paved and unpaved roads.

Diesel Particulate Matter

Description and Physical Properties: Diesel particulate matter (DPM) is a source of $\text{PM}_{2.5}$ —diesel particles are typically 2.5 microns and smaller. In 1998, DPM made up about 6 percent of the total $\text{PM}_{2.5}$ inventory nationwide (EPA 2002). Diesel exhaust is a complex mixture of thousands of particles and gases that is produced when an engine burns diesel fuel. Organic compounds account for 80 percent of the total particulate matter mass, which is comprised of compounds such as hydrocarbons and their derivatives, and polycyclic aromatic hydrocarbons (PAHs) and their derivatives. Fifteen PAHs are confirmed carcinogens, a number of which are found in diesel exhaust (NTP 2005b). The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), expected load, engine emission controls, fuel formulations (high/low sulfur fuel), and engine year (EPA 2002).

Non-Cancer Health Effects: Some short-term (acute) effects of diesel exhaust exposure include eye, nose, throat, and lung irritation, and can cause coughs, headaches, light-headedness, and nausea. Diesel exhaust is a major source of ambient particulate matter pollution in urban environments. Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems (OEHHA 2002).

Cancer Health Effects: Human studies on the carcinogenicity of DPM demonstrate an increased risk of lung cancer, although the increased risk cannot be clearly attributed to diesel exhaust exposure (NTP 2005b).

Sources: In 2002 in the SCAQMD, the main sources of diesel particulate matter were due to the combustion of diesel fuel in diesel-powered engines. Such engines can include on-road vehicles like diesel trucks, off-road construction vehicles, diesel electrical generators, and various pieces of stationary construction equipment. Over 97 percent of the diesel emissions were from mobile sources (SCAQMD 2007c).

2.2.7 - Visibility Reducing Particles

Description and Physical Properties: Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The State standard is intended to limit the frequency and severity of visibility impairment due to regional haze.

Health Effects: Health effects of particulate matter are addressed under the PM₁₀ and PM_{2.5} section. Non-health effects include reduced visibility and soiling of property. Reduced visibility occurs when light interacts with the particles, becoming modified or reduced. Visibility effects include changes in apparent color as well as reduction of clarity and visible distance.

Sources: Particulate matter originates from a variety sources. Stationary sources include fuel combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal and recycling. Mobile or transportation-related sources include particulate matter from highway vehicles and non-road vehicles and fugitive dust from paved and unpaved roads. In addition, wildfires and windblown dust contribute to visibility reducing particulates.

2.2.8 - Vinyl Chloride

Description and Physical Properties: Vinyl chloride, or chloroethene, is a chlorinated hydrocarbon and a colorless gas with a mild, sweet odor. In 1978, ARB established a state ambient air quality standard for vinyl chloride. The standard was set at 0.01 ppm for a 24-hour duration because that was the lowest level that could be detected at that time. In 1990, ARB identified vinyl chloride as a toxic air contaminant and estimated a cancer unit risk factor.

Health Effects: Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches (ARB 2005b). Epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare

cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers.

Sources: Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products, including pipes, wire and cable coatings, and packaging materials. Vinyl chloride is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloroethylene are broken down. This can occur when plastics containing these substances are left to decompose in solid waste landfills. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites due to microbial breakdown of chlorinated solvents.

2.2.9 - Hydrogen Sulfide

Description and Physical Properties: Hydrogen sulfide (H₂S) is a flammable, colorless, poisonous gas that smells like rotten eggs.

Health Effects: High levels of hydrogen sulfide can cause immediate respiratory arrest. It can irritate the eyes and respiratory tract and cause symptoms like headache, nausea, vomiting, and cough. Long exposure to hydrogen sulfide can cause pulmonary edema.

Sources: Hydrogen sulfide and other reduced-sulfur compounds form by the anaerobic decomposition of manure. Some types of bacteria found in animal and human by-products produce hydrogen sulfide during reduction of sulfur-containing compounds, such as proteins. Manure, storage tanks, ponds, anaerobic lagoons, and land application sites are the primary sources of hydrogen sulfide emissions. Anthropogenic sources include the combustion of sulfur containing fuels (oil and coal) and organic matter that undergoes putrefaction. Hydrogen sulfide is used in the production of heavy water for nuclear reactors, the manufacture of chemicals, in metallurgy, and as an analytical reagent.

2.2.10 - Volatile Organic Compounds and Reactive Organic Gases

Description and Physical Properties: Reactive organic gases (ROGs), or volatile organic compounds (VOCs), are defined as any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Although there are slight differences in the definition of ROG and VOC, the two terms are often used interchangeably. VOC consist of non-methane hydrocarbons and oxygenated hydrocarbons. Hydrocarbons are organic compounds that contain only hydrogen and carbon atoms. Non-methane hydrocarbons are hydrocarbons that do not contain the unreactive hydrocarbon, methane. Oxygenated hydrocarbons are hydrocarbons with oxygenated functional groups attached.

There are no state or national ambient air quality standards for VOC because they are not classified as criteria pollutants. They are regulated, however, because VOC is an ozone precursor. As such, a reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of

ozone. VOCs are also transformed into organic aerosols in the atmosphere, which contribute to higher PM₁₀ and lower visibility.

Health Effects: Although health-based standards have not been established for ROG, health effects can occur from exposures to high concentrations because of interference with oxygen uptake. In general, concentrations of VOCs are suspected to cause eye, nose, and throat irritation; headaches, loss of coordination, nausea, damage to liver, kidney, and the central nervous system (EPA 2007e). There are many ROGs that have been classified as toxic air contaminants. A particular VOC of concern is benzene, which is described in more detail below. EPA maintains a list of all air substances that have been classified as hazardous to humans and/or animals, and include VOCs, pesticides, herbicides, and radionuclides (EPA 2007f).

Benzene

Description and Physical Properties: Benzene is a VOC. It is a clear or colorless light-yellow, volatile, highly flammable liquid with a gasoline-like odor. The EPA has classified benzene as a “Group A” carcinogen.

Health Effects: Short-term (acute) exposure of high doses from inhalation of benzene may cause dizziness, drowsiness, headaches, eye irritation, skin irritation, and respiratory tract irritation, and at higher levels, unconsciousness can occur. Long-term (chronic) occupational exposure of high doses by inhalation has caused blood disorders, including aplastic anemia and lower levels of red blood cells (EPA 1992). Occupational exposure to benzene has been shown to cause leukemia (mainly acute myelogenous leukemia) (NTP 2005a). Studies have also found that benzene exposure increased the risks of lymphatic and hematopoietic cancer (cancers of the lymphatic system and of organs and tissues involved in the production of blood), total leukemia, and specific histologic types of leukemia (NTP 2005a).

Sources: Benzene is emitted into the air from gasoline service stations (fuel evaporation), motor vehicle exhaust, tobacco smoke, and from burning oil and coal. Benzene is also used as a solvent for paints, inks, oils, waxes, plastic, and rubber. It is used in the extraction of oils from seeds and nuts. It is also used in the manufacture of detergents, explosives, dyestuffs, and pharmaceuticals.

2.3 - Physical Setting

2.3.1 - Local Climate

The Project site is located just west of downtown Los Angeles in the Basin. Regional and local air quality is impacted by dominant airflows, topography, atmospheric inversions, location, season, and time of day.

Dominant airflows provide the driving mechanism for transport and dispersion of air pollution. The mountains surrounding the region form natural horizontal barriers to the dispersion of air

contaminants. Air pollution created in the coastal areas and around the Los Angeles area is transported inland until it reaches the mountains where the combination of mountains and inversion layers generally prevent further dispersion. This poor ventilation results in a gradual degradation of air quality from the coastal areas to inland areas. Air stagnation may occur during the early evening and early morning during periods of transition between day and nighttime flows. The region also experiences periods of hot, dry winds from the desert, known as Santa Ana winds. If the Santa Ana winds are strong, they can surpass the sea breeze, which blows from the ocean to the land, and carry the suspended dust and pollutants out to the ocean. If they are weak, they are opposed by the sea breeze and cause stagnation, resulting in high pollution events.

Temperature inversions limit the vertical depth through which pollution can be mixed. Among the most common temperature inversions in the basin, radiation inversions form on clear winter nights when cold air off mountains sink to the valley floor while the air aloft over the valley remains warm. These inversions, in conjunction with calm winds, trap pollutants near the source. Other types of temperature inversions include marine, subsidence, and high-pressure inversions.

Summers are often periods of hazy visibility and occasionally unhealthy air, while winter air quality impacts tend to be highly localized and can consist of odors from agricultural operations.

2.3.2 - Local Air Quality

Table 2 summarizes estimated 2005 emissions of key criteria air pollutants from major categories of air pollutant sources. For each pollutant, estimated emissions are presented for Los Angeles County. No further spatial refinement is available.

Table 2: Los Angeles 2005 Emissions Inventory (tons per day)

Emission Category	VOC	CO	NO _x	PM ₁₀	PM _{2.5}
Fuel combustion	7.8	41.4	34.0	4.8	4.8
Waste disposal	0.7	0.9	1.6	0.5	0.4
Cleaning and surface coatings	37.6	0.2	0.1	0.5	0.4
Petroleum production and marketing	23.0	8.7	4.8	1.1	0.9
Industrial processes	9.0	1.1	2.5	6.4	10.1
Solvent evaporation	98.1	0.0	0.0	0.0	<0.1
Miscellaneous processes	4.3	33.9	17.2	133.0	31.5
On-road motor vehicles	176.4	1,751.2	361.0	11.9	8.2
Other mobile sources	72.6	551.0	209.9	25.9	12.8
TOTAL	429.5	2,388.4	631.1	172.3	62.5
Notes: Inventory does not include natural sources. All values in tons per day. 2006 Almanac data is shown for the base year 2005. The sum of values may not equal total shown due to rounding. Source: California Air Resources Board, 2006 (ARB 2006b).					

Los Angeles County is similar to many other portions of California and the United States in general, in that a large portion of the CO emissions comes from on-road mobile sources (73 percent), with the majority coming from passenger cars and trucks. On-road mobile sources are also a primary source of NO_x but to a lesser degree, with 57 percent coming from passenger cars and trucks. In Los Angeles County, almost 41 percent of the VOC emissions come from on-road motor vehicles. PM₁₀ primarily comes from an emissions category called “miscellaneous processes,” which includes a variety of subcategories. In the case of Los Angeles County’s emissions, these subcategories are primarily paved road dust, construction and demolition, and residential fuel combustion.

Existing levels of ambient air quality and historical trends and projections of air quality in the Project area are best documented from measurements made near the Project site. The proposed Project is within Source Receptor Area 1. The air quality monitoring station closest to the site is the Central Los Angeles Station located 1.5 miles east of MacArthur Park on North Main Street in the downtown area.

Table 3 summarizes 2004–2006 published monitoring data. The data shows that the federal standards for ozone and small particulate matter (PM_{2.5}) were violated several times in each of the past three years at the nearest air monitoring station (8 and 11 days in 2006, respectively). The State standard for ozone during a 1-hour average was violated eight times in 2006 at the Central LA station, and the State standard for PM₁₀ during a 24-hour period and as an annual average was violated 3-5 times in the last 3 years.

Table 3: Air Quality Monitoring Summary

Air Pollutant, Averaging Time (Units)	2004	2005	2006
Ozone			
Max 1 Hour (ppm)	0.110	0.121	0.110
Days > CAAQS (0.09 ppm)	7	2	8
Max 8 Hour (ppm)	0.079	0.098	0.079
Days > CAAQS (0.07 ppm)	7	2	4
Days > NAAQS (0.08 ppm)	1	1	0
Particulate Matter (PM₁₀)			
Mean (µg/m ³)	32.4	29.6	30.3
24 Hour (µg/m ³)	72	70	59
Days > CAAQS (50 µg/m ³)	5	4	3
Days > NAAQS (150 µg/m ³)	0	0	0
Particulate Matter (PM_{2.5})			
Mean (µg/m ³)	19.6	18.2	15.6
24 Hour (µg/m ³)	75.0	73.7	56.2
Days > NAAQS (35 µg/m ³)	2	2	11

Table 3: Air Quality Monitoring Summary (Cont.)

Air Pollutant, Averaging Time (Units)	2004	2005	2006
Carbon Monoxide			
Max 8 Hour (ppm)	3.2	3.2	2.6
Days > CAAQS (9.0 ppm)	0	0	0
Days > NAAQS (9.0 ppm)	0	0	0
Nitrogen Dioxide			
Mean (ppm)	0.0328	0.0278	0.0288
Max 1 Hour (ppm)	0.16	0.13	0.11
Days > CAAQS (0.25 ppm)	0	0	0
Abbreviations: > = exceed ppm = parts per million µg/m ³ = micrograms per cubic meter ID = insufficient data ND = no data max = maximum CAAQS = California Ambient Air Quality Standard NAAQS = National Ambient Air Quality Standard Mean = Annual Arithmetic Mean Source: South Coast Air Quality Management District (SCAQMD 2007b).			

2.3.3 - Attainment Status

Air basins where ambient air quality standards are exceeded are designated as “nonattainment” areas. If standards are met, the area is designated as an “attainment” area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered “unclassified.” Federal nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards.

The current attainment designations for the Project area are shown in Table 4. The basin is designated as nonattainment for the state and federal ozone, PM₁₀, and PM_{2.5}, standards.

Table 4: Attainment Status

Pollutant	State Status	National Status
Ozone (1-hour)	Extreme Nonattainment	No Standard
Ozone (8-hour)	Unclassified	Severe Nonattainment
Carbon Monoxide	Attainment	Attainment
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
PM ₁₀	Nonattainment	Serious Nonattainment
PM _{2.5}	Nonattainment	Nonattainment
Source: State Status from California Air Resources Board (ARB 2006a). National Status from U.S. Environmental Protection Agency (EPA 2007g).		

SECTION 3: GREENHOUSE GAS SETTING

Note that the references in this section are contained in Section 9, under the sub heading, Greenhouse Gas References.

Briefly stated, global climate change is a change in the average weather of the earth that may be measured by changes in wind patterns, storms, precipitation, and temperature. These changes are measured using historical records of temperature changes that have occurred in the past, such as during previous ice ages. Many of the recent concerns regarding climate change use this data to extrapolate a level of statistical significance specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

The United Nations Intergovernmental Panel on Climate Change (IPCC) constructed several emission trajectories of greenhouse gases needed to stabilize global temperatures and climate change impacts. The IPCC predicted that global mean temperature change from 1990 to 2100, given six scenarios, could range from 1.1 degrees Centigrade (°C) to 6.4°C (IPCC 2007). Regardless of analytical methodology, global average temperature and sea level are expected to rise under all scenarios (IPCC 2007).

3.1 - Greenhouse Gases

Gases that trap heat in the atmosphere are called greenhouse gases. The effect is analogous to the way a greenhouse retains heat. Common greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxides, chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols. Natural processes and human activities emit greenhouse gas. The accumulation of greenhouse gases in the atmosphere regulates the earth's temperature. Without the natural heat-trapping effect of greenhouse gas, the earth's surface would be about 34°C cooler (CAT 2006). However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations.

Climate change is driven by forcings and feedbacks. Radiative forcing is the difference between the incoming energy and outgoing energy in the climate system. A feedback is "an internal climate process that amplifies or dampens the climate response to a specific forcing" (NRC 2005). The global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere; it is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas" (EPA 2006a).

Individual greenhouse gas compounds have varying warming potentials and atmospheric lifetimes. The reference gas for the global warming potential is carbon dioxide; as shown in Table 2, carbon dioxide has a global warming potential of one. The calculation of the carbon dioxide equivalent is a

consistent methodology for comparing greenhouse gas emissions since it normalizes various greenhouse gas emissions to a consistent metric. Methane’s warming potential of 21 indicates that methane has a 21 times greater global warming effect than carbon dioxide on a molecule per molecule basis (EPA 2006b). One million metric tons of carbon dioxide equivalent (MMT CO_2e) is the mass emissions of an individual greenhouse gas multiplied by its global warming potential.

The atmospheric lifetime and global warming potentials of selected greenhouse gases are summarized in Table 5. As shown in the table, global warming potentials range from 1 (carbon dioxide) to 23,900 (sulfur hexafluoride).

Table 5: Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases

Greenhouse Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide (CO_2)	50 to 200	1
Methane (CH_4)	12 ± 3	21
Nitrous Oxide (N_2O)	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane	50,000	6,500
PFC: Hexafluoroethane	10,000	9,200
Sulfur Hexafluoride	3,200	23,900
Source: EPA 2006b.		

Water Vapor

Description: Of all greenhouse gases in the atmosphere, water vapor is the most abundant, important, and variable. It is not considered a pollutant; in the atmosphere, it maintains a climate necessary for life.

Health Effects: There are no health effects from water vapor. When some pollutants are exposed to water vapor, they can dissolve and then the water vapor can be a transport mechanism to enter the human body.

Sources: The main source of water vapor is evaporation from the oceans (JAC 2002). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.

Ozone

Description: Ozone (O₃) is known as a photochemical pollutant. Ozone is a greenhouse gas; however, unlike other greenhouse gases, ozone in the troposphere is relatively short-lived and therefore is not global in nature. It is difficult to make an accurate determination of the contribution of ozone precursors (nitrogen oxides [NO_x] and VOC) to climate change (ARB 2004). Ozone is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between VOC, NO_x, and sunlight. VOC and NO_x are emitted from automobiles, solvents and fuel combustion, the sources of which are widespread throughout the South Coast Air Basin. In order to reduce ozone, it is necessary to control emissions of these ozone precursors such as NO_x. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. A reduction of ozone precursors reduces ozone. The conditions conducive to the formation of ozone include extended periods of daylight (solar radiation) and hot temperatures. These conditions are prevalent during the summer when thermal inversions are most likely to occur. As a result, summertime conditions of long periods of daylight and hot temperatures form ozone in the greatest quantities. During the summer, thermal inversions trap ozone from dispersing vertically, and high concentrations of this pollutant are prevalent.

Health Effects: Health effects of ozone can include the following: respiratory system irritation, reduction of lung capacity, asthma aggravation, inflammation of and damage to lung cells, aggravated cardiovascular disease, and permanent lung damage. The greatest health risk is to those who are more active outdoors during smoggy periods, such as children, athletes, and outdoor workers. Ozone also damages natural ecosystems such as forests and foothill communities, and damages agricultural crops (EPA 2003a).

Sources: Ozone is a secondary pollutant, thus it is not emitted directly into the lower level of the atmosphere. The sources of ozone precursors (VOC and NO_x) are discussed above in the description of ozone.

Aerosols

Description: Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during biomass burning and incomplete combustion of fossil fuels.

Health Effects: Particulate matter can be inhaled directly into the lungs where it can be absorbed into the bloodstream. It is a respiratory irritant and can cause direct pulmonary effects such as coughing, bronchitis, lung disease, respiratory illnesses, increased airway reactivity, and exacerbation of asthma (EPA 2003b). Particulate matter is also thought to have direct effects on the health, capacity, and productivity of the heart (EPA 2003b). Relatively recent mortality studies have shown a statistically

significant direct association between mortality and daily concentrations of particulate matter in the air (EPA 2003b). Non-health effects include reduced visibility and soiling of property.

Sources: Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during biomass burning and incomplete combustion of fossil fuels. The regulation of particulate matter has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Carbon Dioxide

Description: Carbon dioxide (CO₂) is an odorless, colorless natural greenhouse gas.

Health Effects: Outdoor levels of carbon dioxide are not high enough to result in negative health effects. The National Institute for Occupational Safety and Health reference exposure level is 5,000 ppm, averaged over 10 hours in a 40-hour workweek. The short-term reference exposure level is 30,000 ppm, averaged over 15 minutes. At those levels, potential health problems are as follows: headache, dizziness, restlessness, paresthesia (skin tingling, prickling, or numbness); dyspnea (breathing difficulty); sweating, malaise (vague feeling of discomfort); increased heart rate, cardiac output, blood pressure; coma; asphyxia; and/or convulsions (NIOSH 2005).

Sources: Carbon dioxide is emitted from natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources are from burning coal, oil, natural gas, and wood. Concentrations of carbon dioxide were 379 ppm in 2005, which is an increase of 1.4 ppm per year since 1960 (IPCC 2007). The concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (IPCC 2001).

Sinks: Sinks are mechanisms by which a gas or aerosol is taken out of the atmosphere. Carbon dioxide is removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and mineral sequestration into solid carbonate salts (surface limestone or calcium carbonate).

Methane

Description: Methane (CH₄) is a flammable gas and is the main component of natural gas. When one molecule of methane is burned in the presence of oxygen, one molecule of carbon dioxide and two molecules of water are released.

Health Effects: There are no ill health effects from methane. The immediate health hazard is that it may cause burns if it ignites. It is highly flammable and may form explosive mixtures with air. Methane is violently reactive with oxidizers, halogens, and some halogen-containing compounds. Methane is also an asphyxiant and may displace oxygen in an enclosed space (OSHA 2003).

Sources: A natural source of methane is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain methane, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and ruminants such as cattle.

Nitrous Oxide

Description: Nitrous oxide (N₂O), also known as laughing gas, is a colorless greenhouse gas.

Health Effects: Higher concentrations can cause dizziness, euphoria, and sometimes-mild hallucinations.

Sources: Nitrous oxide is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used in rocket engines, racecars, and as an aerosol spray propellant.

Chlorofluorocarbons

Description: Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface).

Health Effects: CFCs are no longer being used; therefore, it is not likely that health effects would be experienced. Nonetheless, in confined indoor locations, working with CFC-113 or other CFCs are thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation (NIOSH 1989).

Sources: CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped as required by the Montreal Protocol in 1987.

Hydrofluorocarbons

Description: Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs. Of all the greenhouse gases, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF₃), HFC-134a (CF₃CH₂F), and HFC-152a (CH₃CHF₂) (EPA 2006c). Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a refrigerant. Concentrations of HFC-23 and HFC-134a are now about 10 parts per trillion (ppt) each (EPA 2006c). Concentrations of HFC-152a are about 1 ppt.

Health Effects: Most HFCs do not have health effects associated with them. For example, 1, 1-difluoroethane (HCFC-152A) does not have any adverse health effects (EPA 1995). However,

HFC-134a has a chronic inhalation exposure of 80 mg/m³; the critical effect is Leydig cell hyperplasia (EPA 1995).

Sources: HFCs are man made for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons

Description: Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF₄) and hexafluoroethane (C₂F₆). Concentrations of CF₄ in the atmosphere are over 70 ppt (EPA 2006c).

Health Effects: High concentrations of CF₄ can cause confusion, dizziness, or headache and may cause effects on the cardiovascular system, resulting in cardiac disorders (NIOSH 1997).

Sources: The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur Hexafluoride

Description: Sulfur hexafluoride is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest global warming potential of any gas evaluated, 23,900. Concentrations in the 1990s were about 4 ppt (EPA 2006c).

Health Effects: In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

Sources: Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

3.1.1 - Federal Inventory

In 2004, total worldwide greenhouse gas emissions were estimated to be 20,135 MMTCO₂e, excluding emissions/removals from land use, land use change, and forestry (UNFCCC 2006). (Note that sinks, or greenhouse gas removal processes, play an important role in the greenhouse gas inventory as forest and other land uses absorb carbon.) In 2004, greenhouse gas emissions in the U.S. were 7,074.4 MMTCO₂e (EPA 2006a). In 2005, total U.S. greenhouse gas emissions were 7,260.4 MMTCO₂e, a 16.3 percent increase from 1990 emissions, while U.S. gross domestic product has increased by 55 percent over the same period (EPA 2007a). Emissions rose from 2004 to 2005, increasing by 0.8 percent. The main causes of the increase are believed to be: (1) strong economic growth in 2005, leading to increased demand for electricity, and (2) an increase in the demand for electricity due to warmer summer conditions (EPA 2007a). However, a decrease in demand for fuels

due to warmer winter conditions and higher fuel prices moderated the increase in emissions (EPA 2007a).

3.1.2 - State Inventory

California is a substantial contributor of greenhouse gases as it is the second largest contributor in the U.S. and the sixteenth largest in the world (CEC 2006). In 2004, California produced 500 MMTCO₂e (CEC 2007), including imported electricity and excluding combustion of international fuels and carbon sinks or storage, which is approximately 7 percent of U.S. emissions. The major source of greenhouse gases in California is transportation, contributing 41 percent of the State's total greenhouse gas emissions (CEC 2006). Electricity generation is the second largest source, contributing 22 percent of the State's greenhouse gas emissions (CEC 2006).

3.1.3 - Local Inventory

The local agencies (i.e., the South Coast Air Quality Management District or the City) have not developed a local inventory of greenhouse gases.

3.2 - Regulatory Environment

3.2.1 - International and Federal

International and Federal agreements have been enacted to deal with global climate change issues. In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess "the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation" (IPCC 2004).

On March 21, 1994, the United States joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). Under the Convention, governments do the following: gather and share information on greenhouse gas emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change (UNFCCC 2007).

A particularly notable result of the UNFCCC efforts was a treaty known as the Kyoto Protocol, which went into effect on February 16, 2005. When countries sign the treaty, they demonstrate their commitment to reduce their emissions of greenhouse gases or engage in emissions trading. More than 170 countries are currently participating in the Protocol. Industrialized countries have to reduce their greenhouse gas emissions by on average 5 percent below their 1990 levels by 2012.

The reduction targets established in the Kyoto Protocol can be met by reducing domestic greenhouse gas emissions, or by utilizing three mechanisms allowed under the Kyoto Protocol: Emissions

Trading, Joint Implementation, and the Clean Development Mechanism. Emissions Trading is discussed in Section 2.3 below. Joint Implementation is a mechanism for transfer of emissions permits from one Annex B country to another. The Clean Development Mechanism allows Project-based emission reduction activities in developing countries. Certificates are generated through this mechanism from projects that lead to certifiable emissions reductions that would otherwise not occur.

In 1998, United States Vice President Al Gore symbolically signed the Protocol; however, in order for the Protocol to be formally ratified, it must be ratified by the United States Congress. Congress did not do this during the Clinton Administration, and the current US President, George W. Bush, has indicated that he does not intend to submit the treaty for ratification.

In October 1993, President Clinton announced his Climate Change Action Plan, which had a goal to return greenhouse gas emissions to 1990 levels by the year 2000. This was to be accomplished through 50 initiatives that relied on innovative voluntary partnerships between the private sector and government aimed at producing cost-effective reductions in greenhouse gas emissions.

The U.S. EPA currently does not regulate greenhouse gas emissions from motor vehicles. *Massachusetts v. EPA* (Supreme Court Case 05-1120) was argued before the United States Supreme Court on November 29, 2006, in which it was petitioned that EPA regulate four greenhouse gases, including carbon dioxide, under Section 202(a)(1) of the Clean Air Act. A decision was made on April 2, 2007, in which the Court held that petitioners have a standing to challenge the EPA and that the EPA has statutory authority to regulate emissions of greenhouse gases from new motor vehicles.

3.2.2 - California

There has been significant legislative and regulatory activity regarding global climate change and greenhouse gases in California. Although it was not originally intended to reduce greenhouse gases, California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The latest amendments were made in October 2005 and currently require new homes to use half the energy they used only a decade ago. Energy efficient buildings require less electricity, and electricity production by fossil fuels results in greenhouse gas emissions. Therefore, increased energy efficiency results in decreased greenhouse gas emissions.

California Assembly Bill 1493 (Pavley), enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. Regulations adopted by the ARB would apply to 2009 and later model year vehicles. The ARB estimates that the regulation would reduce climate change emissions from the light-duty passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030 (ARB, 2004).

California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following greenhouse gas emission reduction targets:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels (CA 2005).

To meet these targets, the Governor directed the Secretary of the California EPA to lead a Climate Action Team (CAT) made up of representatives from the Business, Transportation and Housing Agency; the Department of Food and Agriculture; the Resources Agency; the Air Resources Board; the Energy Commission; and the Public Utilities Commission. The CAT's Report to the Governor in 2006 contains recommendations and strategies to help ensure the targets in Executive Order S-3-05 are met (CAT 2006).

Executive Order S-01-07 was signed by the Governor on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. It also requires that a Low Carbon Fuel Standard for transportation fuels be established for California.

In 2006, the State Legislature adopted Senate Bill 1368 ("SB 1368"), which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission to adopt a greenhouse gas emission performance standard for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than five years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Due to the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law will effectively prevent California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower greenhouse gas emissions associated with California energy demand, as SB 1368 will effectively prohibit California utilities from purchasing power from out of state producers that cannot satisfy the greenhouse gas emission performance standard required by SB 1368.

SB 97 was passed in August 2007 and added Section 21083.05 to the Public Resources Code, "(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a)" (SB 97). Section 21097 was also added to the Public Resources Code and indicates that the failure to analyze adequately the effects of greenhouse gases in a document

related to the environmental review of a transportation Project funded under the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 does not create a cause of action for a violation. However, SB 97 does not safeguard non-transportation funded projects from being challenged in court for omitting a global climate change analysis.

AB 32

In 2006, the California State Legislature adopted AB 32, the California Global Warming Solutions Act of 2006. AB 32 focuses on reducing greenhouse gas emissions in California. Greenhouse gases, as defined under AB 32, include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. ARB is the state agency charged with monitoring and regulating sources of emissions of greenhouse gases that cause global warming in order to reduce emissions of greenhouse gases. AB 32 requires that by January 1, 2008, ARB must determine what the statewide greenhouse gas emissions level was in 1990, and it must approve a statewide greenhouse gas emissions limit so it may be applied to the 2020 benchmark.

The ARB Board approved the 1990 greenhouse gas emissions level of 427 million metric tons of carbon dioxide equivalent (MMTCO₂e) on December 6, 2007. Therefore, in 2020, emissions in California are required to be at or below 427 MMTCO₂e.

Under AB 32, the ARB published its Final Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California (ARB 2007a). Discrete early action measures are currently underway or are enforceable by January 1, 2010. Early action measures are regulatory or non-regulatory and are currently underway or to be initiated by the ARB in the 2007 to 2012 timeframe. The ARB has 44 early action measures that apply to the transportation, commercial, forestry, agriculture, cement, oil and gas, fire suppression, fuels, education, energy efficiency, electricity, and waste sectors. Of those early action measures, nine are considered discrete early action measures, as they are regulatory and enforceable by January 1, 2010. The ARB estimates that the 44 recommendations are expected to result in reductions of at least 42 MMTCO₂e by 2020, representing approximately 25 percent of the 2020 target. CEQA is only mentioned once in the Early Action Measures report. The California Air Pollution Control Officer's Association (CAPCOA) suggested that ARB work with local air districts on approaches to the review of greenhouse gas impacts under the CEQA process, including greenhouse gas significance thresholds for projects, and to develop a process for the capturing of reductions that result from CEQA mitigations. ARB's response to this recommendation in the report is as follows: "the Governor's Office of Planning and Research is charged with providing statewide guidance on CEQA implementation. With respect to quantifying any reductions that result from Project level mitigation of greenhouse gas emissions, we would like to see air districts take a lead role in tracking such reductions in their regions" (ARB 2007a).

Under AB 32, the ARB has the primary responsibility for reducing greenhouse gas emissions. However, the CAT Report contains strategies that many other California agencies can take. The CAT

published a public review draft of Proposed Early Actions to Mitigate Climate Change in California (CAT 2007). Most of the strategies were in the 2006 CAT Report or are similar to the 2006 CAT strategies.

3.2.3 - Local Public Agencies

The local agencies such as the South Coast Air Quality Management District and the City do not currently have formal reduction plans or legislation regarding greenhouse gases.

SECTION 4: THRESHOLDS

4.1 - CEQA Guidelines

The following significance thresholds were derived from Appendix G of the CEQA Guidelines. A significant impact would occur if the proposed Project would:

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 pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

Expose sensitive receptors to substantial pollutant concentrations; or

Create objectionable odors affecting a substantial number of people.

CEQA Guidelines define a significant effect on the environment as “a substantial, or potentially substantial, adverse change in the environment.” To determine if a proposed Project would have a significant impact on air quality, the type, level, and impact of emissions generated by the proposed Project must be evaluated. While the final determination of whether or not a Project is significant is within the purview of the lead agency pursuant to Section 15064(b) of the State CEQA Guidelines, SCAQMD recommends that its quantitative air pollution thresholds be used to determine the significance of Project emissions. If the lead agency finds that the proposed Project has the potential to exceed these air pollution thresholds, the Project should be considered to have significant air quality impacts.

4.2 - Regional Significance Thresholds

The following regional significance thresholds have been established by SCAQMD. Projects within the South Coast Air Basin region with construction or operation related emissions in excess of any of the thresholds presented in Table 6 are considered significant.

Table 6: SCAQMD Regional Thresholds

Pollutant	Construction (pounds per day)	Operation (pounds per day)
Oxides of Nitrogen (NO _x)	100	55
Volatile Organic Compounds (VOC)	75	55
Particulate Matter (PM ₁₀)	150	150
Particulate Matter (PM _{2.5})	55	55
Oxides of Sulfur (SO _x)	150	150
Carbon Monoxide (CO)	550	550
Source: South Coast Air Quality Management District, 2006.		

4.3 - Local Significance Thresholds

The SCAQMD Governing Board adopted a methodology for calculating localized air quality impacts through localized significance thresholds (LSTs), which is consistent with SCAQMD's Environmental Justice Enhancement Initiative I-4. LSTs represent the maximum emissions from a Project that will not cause or contribute to an exceedance of the most stringent applicable state or national ambient air quality standard. The LSTs are developed based on the ambient concentrations of that pollutant for each source receptor area and are applicable to NO_x, CO, PM₁₀, and PM_{2.5}.

To provide a screening level LST analysis for emissions generated during construction, LSTs were obtained from the look-up tables in the SCAQMD Final LST Methodology (2003) for a 5-acre Project in SRA 1. The distance to the nearest receptor is assumed to be 25 meters, as there could be sensitive receptors in the park while construction activities occur. The LSTs are summarized in Table 7.

Table 7: SCAQMD Localized Thresholds

Pollutant	Localized Significance Threshold
Nitrogen Dioxide	242 pounds per day
Carbon Monoxide	1279 pounds per day
PM ₁₀	16 pounds per day
PM _{2.5}	8 pounds per day
Source: South Coast Air Quality Management District, 2003 and 2006.	

4.4 - Greenhouse Gas Threshold

CEQA requires that Lead Agencies inform decision makers and the public regarding potential significant environmental effects of proposed projects and feasible ways that environmental damage

can be avoided or reduced, through the use of feasible mitigation measures and/or Project alternatives, and disclose the reasons why the Lead Agency approved a Project if significant environmental effects are involved (CEQA Guidelines Section 15002). CEQA also requires Lead Agencies to evaluate potential environmental effects based on, to the fullest extent possible, scientific and factual data (CEQA Guidelines Section 15064[b]). Significance conclusions must be based on substantial evidence, which includes facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts (CEQA Guidelines Section 15064f [5]).

There are currently no published thresholds of significance established by any state or regional regulatory agency for measuring the impact of climate change on or from a Project. CEQA Guidelines Section 15064.7 indicates, “each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects.”

The threshold to be used in this analysis is as follows:

Greenhouse gas emissions from the Project would be potentially significant if they would hinder or delay California’s ability to meet the reduction targets contained in AB 32.

SECTION 5: EMISSION ESTIMATION

This section calculates the expected emissions from the construction and operation of the Project as a necessary requisite for assessing the regulatory significance of Project emissions on a regional level.

5.1 - Short-Term Impacts

Short-term impacts will include fugitive dust and other particulate matter, as well as exhaust emissions generated by earthmoving activities and operation of grading equipment during site preparation. Construction emissions are caused by onsite or offsite activities. Onsite emissions principally consist of exhaust emissions (NO_x, SO_x, CO, VOC, PM₁₀, and PM_{2.5}) from heavy-duty construction equipment, motor vehicle operation, and fugitive dust (mainly PM₁₀) from disturbed soil. During the finishing phase, paving operations and application of architectural coatings will release VOC emissions. Offsite emissions are caused by motor vehicle exhaust from delivery vehicles, as well as worker traffic, but also include road dust (PM₁₀). Construction emission can vary substantially from day to day, depending on the level of activity, the specific type of operation, and prevailing weather conditions.

Expected improvements include the following.

- Installation of six 40-foot light poles with state-of-the-art field lights and eight 30-foot security lights;
- Replacement of dirt and grass in the soccer field section of the park with artificial turf and interconnecting concrete and natural walkways;
- Development of a new children's play area with a resilient surface;
- Renovations to the existing recreation center in the old Signal Building (approximately 14,500 square feet);
- Replacement the existing boat house with a new building for the same use (2,100 square feet);
- Installation of new park furniture and outdoor exercise equipment around the soccer field and play area;
- Irrigation and landscaping; and
- The placement of a new monument in the park honoring Oscar Romero, a San Salvadorean catholic priest.

No information was available about the Project's construction fleet at the time of this writing, so the construction fleet was estimated based on the author's experience to estimate "worst case" emissions. The construction emission analysis was performed using the URBEMIS2007 emissions inventory model. It was assumed for purposes of this analysis that all of the above activities would occur on one day, although this is unlikely.

It should be noted that the URBEMIS program recommended by SCAQMD to estimate Project emission impacts calculates emissions of ROGs rather than VOCs, but these are considered equivalent for the purposes of this analysis.

Unmitigated estimated short-term emissions are shown in Table 8 and are compared with the SCAQMD regional and localized thresholds. The evaluation of localized impacts determines the potential of the Project to violate any air quality standard, contribute substantially to an existing or projected air quality violation or expose sensitive receptors to substantial pollutant concentrations. This analysis indicates that PM₁₀ and PM_{2.5} may exceed SCAQMD localized daily thresholds. The primary source of PM₁₀ and PM_{2.5} is from fugitive dust during grading. Therefore, without mitigation, the Project would result in a potentially significant impact.

Table 8: Short-Term Emissions (Unmitigated)

Phase	Emissions (pounds per day)						
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	CO ₂
Demolition of boat house	4.7	40.7	19.1	0.0	3.8	2.2	4315.0
Grading of all areas	3.4	29.2	15.1	0.0	51.5	11.8	2702.9
Renovation, construction of boat house, etc.	1.5	10.4	12.5	0.0	0.7	0.6	1742.5
Painting/Coating	15.5	0.0	0.2	0.0	0.0	0.0	22.5
Total	25.1	80.3	46.9	0.0	56.0	14.6	8782.9
SCAQMD Regional Significance Threshold	75	100	550	150	150	55	**
Significant Regional Impact?	No	No	No	No	No	No	**
SCAQMD Localized Significance Threshold	*	242	1279	*	16	8	**
Significant Localized Impact?	*	No	No	*	Yes	Yes	**
Notes: * No localized threshold ** Refer to Section 7 of this report ROG = reactive organic gases NO _x = nitrous oxides CO = carbon monoxide SO _x = sulfur oxides PM ₁₀ and PM _{2.5} = particulate matter CO ₂ = carbon dioxide Source: URBEMIS output contained in Appendix A.							

Construction Mitigation Measures

Mitigation measures AIR-1 through AIR-5 are required.

Short-Term Construction Emissions After Mitigation

Less than significant. Short-term emissions after implementation of the above mitigation measures are provided in Table 9 below. As shown in Table 9, short-term construction emissions are expected to be less than significant after application of mitigation measures.

Table 9: Short-term Emissions (Mitigated)

Phase	Emissions (pounds per day)						
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	CO ₂
Demolition of boat house	4.7	40.7	19.1	0.0	3.8	2.2	4315.0
Grading of all areas	3.2	29.2	15.1	0.0	5.0	2.1	2702.9
Renovation, construction of boat house, etc.	1.5	10.4	12.5	0.0	0.7	0.6	1742.5
Painting/Coating	15.5	0.0	0.2	0.0	0.0	0.0	22.5
Total	24.9	80.3	46.9	0.0	9.5	4.9	8782.9
SCAQMD Regional Significance Threshold	75	100	550.	150	150	55	**
Significant Regional Impact?	No	No	No	No	No	No	**
SCAQMD Localized Significance Threshold	*	242	1279	*	16	8	**
Significant Localized Impact?	*	No	No	*	No	No	**
Notes: * No localized threshold ** See Section 7 of this report ROG = reactive organic gases NO _x = nitrous oxides CO = carbon monoxide SO _x = sulfur oxides PM ₁₀ and PM _{2.5} = particulate matter CO ₂ = carbon dioxide Source: URBEMIS output contained in Appendix A.							

5.2 - Long-Term Impacts

Operational, or long-term, emissions occur over the life of the Project. Operational emissions include mobile and area source emissions. Mobile emissions refer to the emissions from the increase in mobile vehicle trips that the improvements would generate. Area source emissions are from gasoline-powered landscape equipment and architectural coating maintenance (painting).

Mobile and area source emissions were estimated using URBEMIS2007 (version 9.2). For the purposes of this analysis, it was assumed the park would generate approximately 100 additional trips from the Project features (i.e., soccer field, children’s play area, walkways, etc). The soccer field is already in regular use, but adding artificial turf and lighting will extent its use into the night and throughout the year. The park has limited vehicular parking but does have bike racks and ready

access to the Metro Redline subway (i.e., a station just east of the park). Therefore, park users will continue to walk, bicycle, and use transit to access the park rather than drive individual vehicles.

The estimated mobile and area emissions are displayed in Table 10 and Table 11 for summer and winter, respectively. The data indicates that long-term emissions from Project improvements would not exceed the applicable SCAQMD thresholds of significance. Mitigation is therefore not required to further reduce these emissions.

Table 10: Operational Emissions (Buildout, Summer)

Source	Emissions (pounds per day)						
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	CO ₂
Mobile vehicles	0.9	1.3	10.9	0.0	1.6	0.3	931.8
Area sources	0.3	0.0	1.6	0.0	0.0	0.0	2.8
Total	1.2	1.3	12.5	0.0	1.6	0.3	934.6
Significance Threshold	55	55	550	150	150	55	None
Significant Impact?	No	No	No	No	No	No	*
VOC = volatile organic compounds NO _x = nitrous oxides CO = carbon monoxide SO _x = sulfur oxides PM ₁₀ and PM _{2.5} = particulate matter CO ₂ = carbon dioxide Source: URBEMIS output contained in Appendix A. * Refer to Section 7							

Table 11: Operational Emissions (Buildout, Winter)

Source	Emissions (pounds per day)						
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	CO ₂
Mobile vehicles	1.0	1.6	10.8	0.0	1.6	0.3	847.3
Area sources	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.1	1.6	10.8	0.0	1.6	0.3	847.3
Significance Threshold	55	55	550	150	150	55	None
Significant Impact?	No	No	No	No	No	No	*
VOC = volatile organic compounds NO _x = nitrous oxides CO = carbon monoxide SO _x = sulfur oxides PM ₁₀ and PM _{2.5} = particulate matter CO ₂ = carbon dioxide * Refer to Section 7. Source: URBEMIS output contained in Appendix A.							

5.3 - Carbon Monoxide Hotspot Analysis

Carbon monoxide (CO) from mobile sources is the main pollutant of local concern and correlates to traffic volume, speed, and delay. CO emissions disperse quickly under normal meteorological

conditions but can reach unhealthy levels with more stagnant meteorological conditions. High concentrations of CO are often found near signalized intersections or roadway segments operating at poor levels of service (LOS E or worse) during peak-hour traffic and are called hotspots.

The significance of Project-related CO impacts is generally based on guidance presented in the CO Protocol prepared by the University of California, Davis, Institute of Transportation Studies. The CO Protocol presents a series of criteria that are used to determine the significance of impacts. Following the flow chart in Figure 3 in the CO Protocol, the Project is in a CO attainment area, so the next step is to determine if the proposed Project would worsen air quality. According to Section 4.7.1 in the CO Protocol, the following questions are posed to determine if a Project would worsen air quality:

- Does the Project increase the percentage of vehicles operating in cold start by 2%? Analysis: As shown in Table 12, the Project does not increase the percentage of vehicles by more than 2%.
- Does that Project increase traffic volumes by 5%? Analysis: As shown in Table 12, the Project does not increase traffic by more than 5%.
- Does the Project reduce average speed (within a range of 3 to 50 miles per hour)? Analysis: It is not anticipated that the Project will reduce the average speed by a significant amount.

In summary, the Project would not worsen air quality and no further analysis is needed according to the CO Protocol.

Table 12: Traffic Information

Roadway Segment	Existing Traffic (ADT)	LOS	Project Traffic (%/ADT)
W. 6 th Street	32,387	D	0.3%
Wilshire Boulevard	27,906	B	0.4%
W. 7 th Street	35,112	D	0.3%
Alvarado Street	25,678	B	0.4%
S. Park View Drive	10,420	A	1.0%
Source: EIR, Table 4.10-2			

SECTION 6: IMPACT ANALYSIS

This section contains an analysis of the criteria in the CEQA Guidelines regarding air quality as well as an assessment of Project conformity with the General Plan.

6.1 - Conformance with Air Quality Management Plan

The CEQA Guidelines indicate that a significant impact would occur if the proposed Project would conflict with or obstruct implementation of the applicable air quality plan.

This assessment will use the following criteria for determining Project consistency with the current AQMP, as discussed below.

6.1.1 - Project's Contribution to Air Quality Violations

According to the SCAQMD (1993), the Project is consistent with the AQMP if the Project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP (SCAQMD 1993, Page 12-3). As shown in Section 6.2, the Project could violate an air quality standard or contribute substantially to an existing or projected air quality violation. Therefore, the Project does not meet the first indicator.

6.1.2 - Control Measures

The next criterion is compliance with the control measures in the 2003 AQMP and the 2007 AQMP. The 2007 AQMP has been adopted by the SCAQMD and ARB, but has not been adopted by the U.S. EPA. Therefore, the two plans are discussed herein.

The 2003 AQMP contains a number of land use and transportation control measures including the following: the District's Stationary and Mobile Source Control Measures; State Control Measures proposed by ARB; and Transportation Control Measures provided by SCAG (AQMP 2003, Page 4-3). ARB's strategy for reducing mobile source emissions include the following approaches: new engine standards; reduce emissions from in-use fleet, require clean fuels, support alternative fuels and reduce petroleum dependency, work with EPA to reduce emissions from national and state sources, and pursue long-term advanced technology measures (AQMP 2003, Page 4-25).

Transportation control measures provided by SCAG include those contained in the Regional Transportation Plans (RTP), the most current version being the 2004 RTP (SCAG 2004). The RTP has control measures to reduce emissions from on-road sources by incorporating strategies such as high occupancy vehicle interventions, transit, and information-based technology interventions (AQMP 2003, Page 4-19). The measures implemented by ARB and SCAG effect the Project indirectly by regulating the vehicles that the residents may use and regulating public transportation. The Project indirectly will comply with the control measures set by ARB and SCAG.

The 2007 AQMP aims to attain the federal PM_{2.5} and 8-hour ozone standards by 2015 and 2024, respectively. This is done by building upon improvements from the previous plans and incorporating all feasible control measures while balancing costs and socioeconomic impacts. The 2007 AQMP indicates that PM_{2.5} is formed primarily secondarily. Therefore, instead of reducing fugitive dust, the strategy for reducing PM_{2.5} focuses on reducing precursor emissions of SO_x, directly-emitted PM_{2.5}, NO_x, and VOC. The Final 2007 AQMP control measures consist of four components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) ARB's Proposed State Strategy; 3) SCAQMD Staff's Proposed Policy Options to Supplement ARB's Control Strategy; and 4) Regional Transportation Strategy and Control Measures provided by SCAG.

The Project will comply with all of the SCAQMD's applicable rules and regulations. Therefore, the Project complies with this criterion.

6.1.3 - Compliance with the SCAQMD Regional Thresholds

Although there is no known guidance that correlates AQMP consistency with the SCAQMD regional thresholds, it is common to use the thresholds in assessing AQMP compliance. As shown in Section 5, the Project emissions would not exceed the SCAQMD regional thresholds. Therefore, the Project complies with this criterion.

6.1.4 - Summary

Level of Significance Before Mitigation

Potentially significant because the Project may contribute to air quality violations during grading without mitigation.

Mitigation Measures

Refer to mitigation measures AIR-1 through AIR-5.

Level of Significance After Mitigation

Less than significant. With mitigation, localized impacts during construction are less than the thresholds. Therefore, the Project complies with the AQMP with mitigation.

6.2 - Potential for Air Quality Standard Violation

The CEQA Guidelines indicate that a significant impact would occur if the proposed Project would violate any air quality standard or contribute substantially to an existing or projected air quality violation.

The South Coast Air Basin, the geographical area in which the Project is located, is in nonattainment for CO, PM₁₀, PM_{2.5}, and ozone. Levels of PM₁₀ and PM_{2.5} are locally high enough that contributions from new sources may add to the concentrations of those pollutants and contribute to a projected air quality violation. Although background levels of ozone are high in the basin, the Project alone

(without other cumulative sources) would not contribute substantially to a projected air quality violation of ozone. Project emissions of VOC and NO_x (ozone precursors) and their cumulative contribution to ozone concentrations are discussed in Cumulative Impacts below.

Although CO is still listed as a nonattainment pollutant, the basin has not exceeded the CO standard for the past several years. Additionally, as shown in Table 3, the Project's source receptor area has not violated the CO standard for the past several years.

Two criteria are used to assess the significance of this impact: 1) the localized construction analysis; and 2) the CO hotspot analysis. These analyses are contained in Section 5 above.

The localized construction analysis uses thresholds that represent the maximum emissions for a Project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area (SCAQMD 2003a). If the Project results in emissions under those thresholds, it follows that the Project would not cause or contribute to an exceedance of the standard. The localized construction analysis demonstrated that without mitigation, the Project would not exceed the localized thresholds for CO or nitrogen dioxide. However, without mitigation, the Project would exceed the localized thresholds for PM₁₀ and PM_{2.5}. Therefore, according to this criterion, the air pollutant emissions during construction would result in a significant impact.

A CO hotspot analysis is the appropriate tool to determine if Project emissions of CO during operation would exceed ambient air quality standards. The main source of air pollutant emissions during operation are from offsite motor vehicles traveling on the roads surrounding the Project. The CO hotspot analysis demonstrated that emissions of CO during operation would not deteriorate air quality. Therefore, according to this criterion, air pollutant emissions during operation would result in a less than significant impact.

PM₁₀ and PM_{2.5} emitted during operational activities are not at levels to exceed the air quality standards for those pollutants.

Level of Significance Before Mitigation

Potentially significant impact from PM₁₀ and PM_{2.5} released during grading activities.

Mitigation Measures

Refer to mitigation measures AIR-1 through AIR-5.

Level of Significance After Mitigation

Less than significant impact. Mitigation reduces impacts to less than significant.

6.3 - Cumulative Impacts

According to the checklist in the CEQA Guidelines, a proposed Project would create a significant impact if it would “result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).”

Section 15130(b) of the CEQA Guidelines states the following:

The following elements are necessary to an adequate discussion of significant cumulative impacts: 1) Either: (A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or areawide conditions contributing to the cumulative impact.

In accordance with CEQA Guidelines 15130(b), this analysis of cumulative impacts incorporates a summary of projections. The following tiered approach is to assess cumulative air quality impacts.

1. Consistency with the regional thresholds for non attainment pollutants;
2. Project consistency with existing air quality plans;
3. Assessment of the cumulative health effects of the pollutants.

6.3.1 - Regional Analysis

If an area is in nonattainment for a criteria pollutant, then the background concentration of that pollutant has historically been over the ambient air quality standard. It follows that if a Project exceeds the regional threshold for that non-attainment pollutant, then it would result in a cumulatively considerable net increase of that pollutant and result in a significant cumulative impact.

The South Coast Air Basin is in non attainment for CO, PM₁₀, PM_{2.5}, and ozone. Therefore, if the Project exceeds the regional thresholds for CO, PM₁₀, or PM_{2.5}, then it contributes to a cumulatively considerable impact for those pollutants. Additionally, if the Project exceeds the regional threshold for NO_x or VOC, then it follows that the Project would contribute to a cumulatively considerable impact for ozone.

The regional significance analysis of construction and operational emissions demonstrated that the emissions do not exceed the regional significance thresholds.

6.3.2 - Plan Approach

The geographic scope for cumulative air quality impacts is the South Coast Air Basin because that is the area in which the air pollutants generated by the sources within the basin circulate and are often

trapped. The SCAQMD is required to prepare and maintain an AQMP and a State Implementation Plan to document the strategies and measures to be undertaken to reach attainment of ambient air quality standards. While the SCAQMD does not have direct authority over land use decisions, it was recognized that changes in land use and circulation planning were necessary to maintain clean air. The SCAQMD evaluated the entire basin when it developed the AQMP.

According to the analysis contained in Section 6.1, the Project is not consistent with the most recent AQMP without mitigation. Therefore, the Project presents a significant impact according to this criterion.

6.3.3 - Cumulative Health Impacts

The basin is in non-attainment for ozone, PM₁₀, PM_{2.5}, and CO, which means that the background levels of those pollutants are at times higher than the ambient air quality standards. The air quality standards were set to protect public health, including the health of sensitive individuals (i.e., elderly, children, and the sick). Therefore, when the concentration of those pollutants exceeds the standard, it is likely that some sensitive individuals in the population experience health effects as described above in the sub-section, Air Pollutants. However, the health effects are a factor of the dose-response curve. Concentration of the pollutant in the air (dose), the length of time exposed, and the response of the individual are factors involved in severity and nature of health impacts. If a significant health impact results from Project emissions, it does not mean that 100 percent of the population would experience health effects.

The regional analysis of construction emissions indicates that emissions do not exceed the regional significance thresholds. Therefore, the Project would not significantly contribute to cumulative health impacts from air pollutants.

6.3.4 - Summary of Cumulative Impacts

Level of Significance Before Mitigation

Potentially significant.

Mitigation Measures

Refer to mitigation measures AIR-1 through AIR-5.

Level of Significance After Mitigation

Less than significant.

6.4 - Expose Sensitive Receptors to Substantial Pollutant Concentrations

The CEQA Guidelines indicate that a significant impact would occur if the proposed Project would expose sensitive receptors to substantial pollutant concentrations.

6.4.1 - Construction

The localized construction analysis uses thresholds that represent the maximum emissions for a Project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area (SCAQMD 2003a). The thresholds are also based on the location of the sensitive receptors. If the Project results in emissions under those thresholds, it follows that the Project would not cause or contribute to an exceedance of the standard. If the standards are not exceeded at the sensitive receptor locations, it follows that the receptors would not be exposed to substantial pollutant concentrations.

The localized construction analysis demonstrated that without mitigation, the Project would not exceed the localized thresholds for CO or nitrogen dioxide. However, the Project may exceed the localized thresholds for PM₁₀ and PM_{2.5}. Therefore, during construction, the Project could expose sensitive receptors to substantial pollutant concentrations of PM₁₀ and PM_{2.5}.

The construction equipment would emit diesel particulate matter, which is a carcinogen. However, the diesel particulate matter emissions are short term in nature. Determination of risk from diesel particulate matter is considered over a 70-year exposure time. The quantity of diesel particulate matter to be emitted over the course of construction is at a less than significant level.

6.4.2 - Operation

Operational activities associated with the Project would result in no regular truck deliveries by diesel-powered tractor-trailers, although the Signal and Boat House Buildings may receive occasional deliveries or pick-ups from trucks. Infrequent deliveries to these buildings might occur at different times during the day and would not be expected to occur more than five times in a given day. In addition, State law prohibits the idling of diesel trucks for more than 5 minutes in loading areas. Because of the infrequent number and distribution of deliveries throughout a given day, the distance between park-related air pollutant sources and the closest residential receptor, and the prohibition on extended idling, operational emissions of diesel particulate matter would not expose sensitive emissions of hazardous materials. Impacts would be less than significant.

A CO hotspot analysis is the appropriate tool to determine if Project emissions of CO during operation would exceed ambient air quality standards. The main source of air pollutant emissions during operation are from offsite motor vehicles traveling through the park on Wilshire Boulevard and on the roads surrounding the Project. As discussed in Section 5, the Project would not significantly worsen air quality. Therefore, according to this criterion, air pollutant emissions during operation would result in a less than significant impact.

The CARB Air Quality and Land Use Handbook contains recommendations that will “help keep California’s children and other vulnerable populations out of harm’s way with respect to nearby sources of air pollution” (CARB 2005), including recommendations for distances between sensitive

receptors and certain land uses. CARB recommends avoiding new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day. Epidemiological studies indicate that the distance from the roadway and truck traffic densities were key factors in the correlation of health effects, particularly in children. Roads adjacent to the Project assessed in the traffic study do not exceed a volume of 50,000 vehicles per day; therefore, the Project complies with this recommendation.

CARB recommends avoiding new sensitive land uses within 300 feet of a large fueling station (a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gas dispensing facilities. The Project is not within 300 feet of a fueling station; therefore, the Project complies with this recommendation.

CARB recommends avoiding siting new sensitive land uses within 300 feet of any dry cleaning operation that uses perchloroethylene. For operations with two or more machines, CARB recommends a buffer of 500 feet. For operations with three or more machines, CARB recommends consultation with the local air district. The Project is not near a dry cleaning operation; therefore, the Project complies with this recommendation.

In summary, the Project has the potential to expose sensitive receptors to substantial PM₁₀ and PM_{2.5} pollutant concentrations during grading.

Level of Significance Before Mitigation

Potentially significant from PM₁₀ and PM_{2.5} emitted during grading activities.

Mitigation Measures

Refer to mitigation measures AIR-1 through AIR-5.

Level of Significance After Mitigation

Less than significant.

6.5 - Odors

The CEQA Guidelines indicate that a significant impact would occur if the proposed Project would create objectionable odors affecting a substantial number of people.

Individual responses to odors are highly variable and can result in a variety of effects. Generally, the impact of an odor results from a variety of interacting factors such as frequency, duration, offensiveness, location, and sensory perception. The frequency is a measure of how often an individual is exposed to an odor in the ambient environment. The intensity refers to an individual's or group's perception of the odor strength or concentration. The duration of an odor refers to the elapsed time over which an odor is experienced. The offensiveness of the odor is the subjective rating of the pleasantness or unpleasantness of an odor. The location accounts for the type of area in

which a potentially affected person lives, works or visits; the type of activity they are engaged in, and the sensitivity of the impacted receptor.

Sensory perception has four major components—detectability, intensity, character, and hedonic tone. The detection (or threshold) of an odor is based on a panel of responses to the odor. There are two types of thresholds—the odor detection threshold and the recognition threshold. The detection threshold is the lowest concentration of an odor that will elicit a response in a percentage of the population, typically presented as the mean (or 50 percent of the population) but is sometimes indicated as 100 percent or 10 percent. The recognition threshold is the minimum concentration that is recognized as having a characteristic odor quality by x percent (usually 50 percent) of the population (AIHA 1989). The intensity refers to the perceived strength of the odor. The odor character is what the substance smells like. The hedonic tone is a judgment of the pleasantness or unpleasantness of the odor. The hedonic tone varies based on subjective experience, frequency, odor character, odor intensity, and duration.

Land uses typically considered to be associated with odors include wastewater treatment facilities, waste-disposal facilities, or agricultural operations. The proposed Project does not contain land uses typically associated with emitting objectionable odors.

Diesel exhaust and VOCs will be emitted during construction of the Project, which are objectionable to some; however, emissions will disperse rapidly from the Project site and therefore should not be at a level to induce a negative response.

Level of Significance Before Mitigation

Less than significant.

SECTION 7: CLIMATE CHANGE ANALYSIS

This section assesses the Project’s impact on climate change from its emissions of greenhouse gases on a Project and cumulative basis. This section also briefly discusses secondary impacts from climate change on the Project.

7.1 - Project Level Analysis

There are no Project-level thresholds to measure the significance of a Project’s impact on global climate change. Nevertheless, the following approach is used to address greenhouse gas thresholds and assess the significance of the Project’s contribution to climate change:

1. Inventory: An inventory of greenhouse gas emissions generated by the Project is presented for informational purposes.
2. Compliance with Strategies: Project compliance with the current California strategies to reduce greenhouse gases is assessed.
3. Opportunities for reducing greenhouse gases are explored.
4. A significance finding is determined.

Inventory

The Project would emit greenhouse gases from combustion of fuels from worker vehicles and construction equipment. The Project emissions of carbon dioxide from Project construction are shown in Table 13 below. Emissions of nitrous oxide and methane are negligible. As shown in Table 13, construction would emit approximately 224 tons of carbon dioxide or 203 metric tons of carbon dioxide equivalent (MTCO_{2e}).

Table 13: Construction Greenhouse Gas Emissions

Activity	Carbon Dioxide Emissions (tons)	MTCO _{2e} * Per Year
Demolition	15.1	13.7
Grading	75.9	68.9
Building	132.4	120.1
Coating	0.3	0.3
Total	223.7	202.9

Source: URBEMIS output, Appendix A.
* Metric tons of carbon dioxide equivalent converted from tons of carbon dioxide by multiplying by 0.9072 .

During operation of the Project, greenhouse gas emissions would result from motor vehicles (cars and small trucks visiting the Project site) and increased emissions due to increased landscaping. The

Project may also use more electricity from the increased lighting, which may result in negligible indirect emissions from the generation of electricity. The Project would emit approximately 165 tons of carbon dioxide, or 150 MTCO₂e per year from mobile vehicles that would access the site. The Project would also emit approximately one MTCO₂e per year from landscape emissions, for a total of 151 MTCO₂e per year.

California Climate Action Team Strategies

In 2005 the Governor's Executive Order S-3-05 set greenhouse gas emission reduction targets as follows:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels;
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels (CA 2005).

Similar to Executive Order S-3-05, AB 32 requires that by January 1, 2008, the ARB shall determine what the statewide greenhouse gas emissions level was in 1990, and approve a statewide greenhouse gas emissions limit that is equivalent to that level, to be achieved by 2020.

The 2006 CAT Report is not in response to AB 32; however, the 2006 CAT Report introduces strategies that can be implemented by the ARB and other California agencies to reduce California's emissions to 1990 levels by 2020, which is the same target for AB 32. In addition, the 2006 CAT Report is consistent with the intent of AB 32. AB 32 contains a timeline for development and approval of strategies to reduce state emissions. The bulk of the strategies are not yet developed. Therefore, in the absence of climate change thresholds and standards, the strategies published in the 2006 CAT Report in response to Executive Order S-3-05 are used for this analysis because it contains the most complete list of strategies as of the date of this analysis.

Some of the State strategies in the 2006 CAT Report could be used to reduce greenhouse gas emissions from the proposed Project, as shown in Table 14. Most of the strategies do not apply to the proposed Project because they deal with statewide issues and are not directly intended to guide specific individual projects. Some of the strategies, however, have components that could be used with respect to specific individual projects. Table 14 therefore sets forth those strategies that are not applicable as well as those that could be applied and analyzes the proposed Project's consistency or applicability to each of the strategies.

Table 14: Greenhouse Gas Reduction Strategy Consistency Analysis

Agency	Greenhouse Gas Emission Reduction Strategy	Consistency Analysis
California Air Resources Board	Vehicle Climate Change Standards AB 1493 required the State to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of climate change emissions emitted by passenger vehicles and light-duty trucks. Regulations were adopted by the ARB in September 2004.	Consistent: The vehicles that access the Project will be in compliance with adopted ARB vehicle standards.
California Air Resources Board	Diesel Anti-Idling In July 2004, the ARB adopted a measure to limit diesel-fueled commercial motor vehicle idling.	Consistent: The City prohibits commercial vehicles from idling by posting signs at loading docks and by indicating in City contracts. This will apply to trucks that use the park site.
	Hydrofluorocarbon Reduction (1) Ban retail sale of HFC in small cans; (2) require that only low GWP refrigerants be used in new vehicular systems; (3) adopt specifications for new commercial refrigeration; (4) add refrigerant leak-tightness to the pass criteria for vehicular inspection and maintenance programs; (5) enforce federal ban on releasing HFCs.	Consistent: This measure applies to consumer products. When ARB adopts regulations for these reduction measures, any products that the regulations apply to will comply with the measures.
	Transportation Refrigeration Units (TRUs), Off-Road Electrification, Port Electrification Strategies to reduce emissions from TRUs, increase off-road electrification, and increase use of shore-side/port electrification.	Consistent: The Project is not expected to have TRUs visiting the Project site, but the City restricts idling of delivery trucks through the posting of signs and in City contracts.
	Heavy-Duty Vehicle Emission Reduction Measures Increased efficiency in the design of heavy-duty vehicles and an education program for the heavy-duty vehicle sector.	Consistent: These are ARB-enforced standards; vehicles that access the Project that are required to comply with the standards will comply with the strategy.
	Achieve 50% Statewide Recycling Goal Achieving the State's 50 percent waste diversion mandate as established by the Integrated Waste Management Act of 1989 (AB 939, Sher, Chapter 1095, Statutes of 1989) will reduce climate change emissions associated with energy-intensive material extraction and production as well as methane emission from landfills. A diversion rate of 48% has been achieved on a statewide basis. Therefore, a 2% additional reduction is needed.	Consistent: As indicated in the City's website, the City has implemented an aggressive recycling and waste diversion measures which will be applied during the construction and operation phases of the Project.

Table 14: Greenhouse Gas Reduction Strategy Consistency Analysis (Cont.)

Agency	Greenhouse Gas Emission Reduction Strategy	Consistency Analysis
Department of Forestry	Urban Forestry A new statewide goal of planting 5 million trees in urban areas by 2020 would be achieved through the expansion of local urban forestry programs.	Consistent: The park contains extensive landscaping including hundreds of trees that are expected to be both low emitters of VOC and efficient users of water.
Department of Water Resources	Water Use Efficiency Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce greenhouse gas emissions.	Consistent: The City has implemented a series programs intended to promote sustainability through trip reduction and energy and water conservation throughout the City. The Project will implement these measures as appropriate (e.g., renovated buildings, soccer field requires no irrigation, etc.).
California Energy Commission	Building Energy Efficiency Standards in Place and in Progress Public Resources Code 25402 authorizes the CEC to adopt and periodically update its building energy efficiency standards (that apply to newly constructed buildings and additions and alterations to existing buildings).	Consistent: The City has implemented a number of aggressive energy and water conservation programs, which will be implemented as part of the Project as appropriate.
	Appliance Energy Efficiency Standards in Place and in Progress Public Resources Code 25402 authorizes the Energy Commission to adopt and periodically update its appliance energy efficiency standards (that apply to devices and equipment using energy that are sold or offered for sale in California).	Consistent: The City requires energy efficient equipment and appliances in its facilities as they are reconstructed or for new construction. These will be implemented as appropriate in the Project.
Building, Transportation, and Housing Agency	Smart Land Use and Intelligent Transportation Systems (ITS) Smart land use, demand management, ITS, and value pricing are critical elements in this plan for improving mobility and transportation efficiency. Specific strategies include promoting jobs/housing proximity and transit-oriented development; encouraging high density residential/commercial development along transit/rail corridor; valuing and congestion pricing; implementing intelligent transportation systems, traveler information/traffic control, and incident management; accelerating the development of broadband infrastructure; and comprehensive, integrated, multimodal/intermodal transportation planning.	Consistent: The Proposed Project is not an in-fill Project or a mixed-use Project. However, it is designed to provide a pedestrian-oriented recreational environment for City residents that is readily accessible by bicycle and public transit. The Project is located within walking distance of many commercial uses and even downtown Los Angeles.

Table 14: Greenhouse Gas Reduction Strategy Consistency Analysis (Cont.)

Agency	Greenhouse Gas Emission Reduction Strategy	Consistency Analysis
	Measures to Improve Transportation Energy Efficiency Builds on current efforts to provide a framework for expanded and new initiatives including incentives, tools, and information that advance cleaner transportation and reduce climate change emissions.	Consistent: The Proposed Project promotes fuel conservation by encouraging pedestrian traffic and use of public transit.
State Consumer Services Agency	Green Buildings Initiative Green Building Executive Order, S-20-04 (CA 2004), sets a goal of reducing energy use in public and private buildings by 20 percent by the year 2015, compared with 2003 levels. The Executive Order and related action plan spell out specific actions State agencies are to take with state-owned and -leased buildings. The order and plan also discuss various strategies and incentives to encourage private building owners and operators to achieve the 20 percent target.	Consistent: The City has implemented a number of green building programs, and these will be applied to the Proposed Project as appropriate and where they will not conflict with guidelines for the renovation of historic structures.
Source: California Climate Action Team, 2006 (CAT 2006).		

Greenhouse Gas Reduction Opportunities

There are several voluntary greenhouse gas reduction opportunities that the Project can participate in, as discussed below.

The Leadership in Energy and Environmental Design (LEED) for Existing Buildings Rating System helps building operators maximize operational efficiency and minimize environmental impacts. LEED for Existing Buildings addresses cleaning and maintenance issues (including chemical use), recycling programs, exterior maintenance programs, and systems upgrades. If the Project were to participate in the LEED rating system, it would reduce the building’s energy and water use, improve the indoor environment, and identify operational inefficiencies. It would be efficient to instigate this LEED certification now, while the building is undergoing renovation, because it would be easier to change practices while the renovation process is occurring.

By reducing energy use, the Project could reduce existing indirect emissions associated with electricity generation. By reducing water use, the Project could reduce existing indirect emissions associated with the electricity required to pump water to the Project.

The applicable and feasible greenhouse gas reduction opportunities are contained in this report as Mitigation Measures AIR-6 through AIR-10.

Level of Significance

This Project would be revitalizing MacArthur Park, which could prevent nearby residents from seeking out other recreational locations farther away from home. The Project is going to improve the facilities at the park and provide more recreational opportunities for the nearby community.

Therefore, it is anticipated that the Project may actually reduce vehicle miles traveled and therefore greenhouse gas emissions. The emissions from the Project are inconsequential or negligible relative to the global amount of greenhouse gases being emitted, and Project-level emissions will be reduced to the extent practical by the other proposed mitigation measures. The Project complies with state strategies to reduce greenhouse gas emissions to 1990 levels by the year 2020. In summary, the Project results in a less than significant impact to climate change.

7.2 - Impacts to Project from Climate Change

AB 32 indicates that “the potential effects of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snow pack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidence of infections, disease, asthma, and other health-related problems” (State of California 2006, AB 32, section 38501(a)).

The California Climate Change Center (CCCC 2006) published a report that assesses the risks of climate change to California. The following is a summary of the potential risks to California from that report:

- A reduction in the Sierra snow pack could result a reduction in hydropower, which comprises about 15 percent of California’s in-state electricity production.
- A reduction in the Sierra snow pack could result in a loss of winter recreation from insufficient snow for skiing and snowboarding.
- A decrease in water supply could also negatively impact the food supply that depends on that water for use.
- Climate change could also increase temperatures, leading to decreased supply of certain agricultural products such as wine, fruit, nuts, and milk. California farmers may also have to face increasing threats from pests and pathogens.
- Climate change could also result in increasing wildfires. If temperatures rise into the medium range, the risk of fires in California could increase as much as 55 percent.
- Climate change could result in plant and animal species relocating to cooler more habitable “up slope” locations.

- Climate change could negatively affect the health and productivity of California's forests. The productivity of mixed conifer forests is expected to diminish as much as 18 percent by the end of the century.
- A rise in sea levels could result in increased coastal floods and shrinking beaches.

Essentially, the main problems associated with climate change to the Project are from water shortages and increased fire hazards. The Project is not in a region susceptible to wildland fire impacts. Additionally, the Project is proposing to install artificial turf, which would reduce the quantity of water needed as opposed to live grass. Additional mitigation as contained below would reduce water use. Therefore, secondary impacts to the Project from climate change are less than significant.

7.3 - Cumulative Impacts

It is anticipated that the Project would result in a less than significant cumulative impact. The Project-level impact is less than significant. In addition, the Project would be providing additional recreational uses, which may reduce vehicle miles traveled by providing a local park with desired amenities.

SECTION 8: REFERENCES

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Document Preparers

Cori Wilson, Air Quality Specialist
Kent Norton, Project Manager

Appendix A:URBEMIS Output

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: S:\Client\0901 LA City Parks\0028 MacArthur Park MP EIR\Air Quality\0901 MacArthur Park.urb924

Project Name: MacArthur Park Construction

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2009 TOTALS (lbs/day unmitigated)	17.02	80.27	46.67	0.02	51.78	4.14	55.92	10.82	3.81	14.63	8,760.42
2009 TOTALS (lbs/day mitigated)	17.02	80.27	46.67	0.02	5.26	4.14	9.41	1.11	3.81	4.92	8,760.42

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
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Time Slice 1/1/2009-1/9/2009 Active Days: 7	9.71	<u>80.27</u>	<u>46.67</u>	<u>0.02</u>	<u>51.78</u>	<u>4.14</u>	<u>55.92</u>	<u>10.82</u>	<u>3.81</u>	<u>14.63</u>	<u>8,760.42</u>
Building 01/01/2009-07/31/2009	1.55	10.43	12.48	0.01	0.04	0.66	0.70	0.01	0.61	0.62	1,742.54
Building Off Road Diesel	1.30	9.79	4.94	0.00	0.00	0.63	0.63	0.00	0.58	0.58	893.39
Building Vendor Trips	0.02	0.20	0.16	0.00	0.00	0.01	0.01	0.00	0.01	0.01	34.01
Building Worker Trips	0.24	0.44	7.38	0.01	0.04	0.02	0.06	0.01	0.02	0.03	815.14
Demolition 01/01/2009-01/09/2009	4.74	40.65	19.06	0.00	1.72	2.03	3.75	0.36	1.87	2.23	4,315.02
Fugitive Dust	0.00	0.00	0.00	0.00	1.71	0.00	1.71	0.35	0.00	0.35	0.00
Demo Off Road Diesel	4.53	38.60	16.35	0.00	0.00	1.94	1.94	0.00	1.79	1.79	3,858.12
Demo On Road Diesel	0.14	1.93	0.74	0.00	0.01	0.08	0.09	0.00	0.07	0.08	239.15
Demo Worker Trips	0.06	0.12	1.97	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.75
Mass Grading 01/01/2009-03/31/2009	3.42	29.20	15.13	0.00	50.02	1.45	51.47	10.45	1.33	11.78	2,702.87
Mass Grading Dust	0.00	0.00	0.00	0.00	50.00	0.00	50.00	10.44	0.00	10.44	0.00
Mass Grading Off Road Diesel	3.18	26.46	12.98	0.00	0.00	1.33	1.33	0.00	1.23	1.23	2,247.32
Mass Grading On Road Diesel	0.20	2.67	1.03	0.00	0.01	0.11	0.12	0.00	0.10	0.11	331.13
Mass Grading Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43

Phase Assumptions

Phase: Demolition 1/1/2009 - 1/9/2009 - Demolition of Boat House

Building Volume Total (cubic feet): 16250

Building Volume Daily (cubic feet): 4062.5

On Road Truck Travel (VMT): 56.42

Off-Road Equipment:

- 1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
- 1 Crushing/Processing Equip (142 hp) operating at a 0.78 load factor for 8 hours per day
- 1 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day
- 1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day
- 1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day
- 2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Mass Grading 1/1/2009 - 3/31/2009 - Grading of Areas

Total Acres Disturbed: 5

Maximum Daily Acreage Disturbed: 5

Fugitive Dust Level of Detail: Default

10 lbs per acre-day

On Road Truck Travel (VMT): 78.12

Off-Road Equipment:

- 1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day
- 1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day
- 1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
- 1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 1/1/2009 - 7/31/2009 - Renovation, Installation of other Park Features, construction of Boat House

Off-Road Equipment:

- 1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day
- 2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

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1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 7/1/2009 - 7/31/2009 - Interior Painting of Signal Building; Painting of Boat House

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
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Time Slice 1/1/2009-1/9/2009 Active Days: 7	9.71	80.27	46.67	0.02	5.26	4.14	9.41	1.11	3.81	4.92	8,760.42
Building 01/01/2009-07/31/2009	1.55	10.43	12.48	0.01	0.04	0.66	0.70	0.01	0.61	0.62	1,742.54
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Building Vendor Trips	0.02	0.20	0.16	0.00	0.00	0.01	0.01	0.00	0.01	0.01	34.01
Building Worker Trips	0.24	0.44	7.38	0.01	0.04	0.02	0.06	0.01	0.02	0.03	815.14
Demolition 01/01/2009-01/09/2009	4.74	40.65	19.06	0.00	1.72	2.03	3.75	0.36	1.87	2.23	4,315.02
Fugitive Dust	0.00	0.00	0.00	0.00	1.71	0.00	1.71	0.35	0.00	0.35	0.00
Demo Off Road Diesel	4.53	38.60	16.35	0.00	0.00	1.94	1.94	0.00	1.79	1.79	3,858.12
Demo On Road Diesel	0.14	1.93	0.74	0.00	0.01	0.08	0.09	0.00	0.07	0.08	239.15
Demo Worker Trips	0.06	0.12	1.97	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.75
Mass Grading 01/01/2009-03/31/2009	3.42	29.20	15.13	0.00	3.50	1.45	4.95	0.73	1.33	2.07	2,702.87
Mass Grading Dust	0.00	0.00	0.00	0.00	3.48	0.00	3.48	0.73	0.00	0.73	0.00
Mass Grading Off Road Diesel	3.18	26.46	12.98	0.00	0.00	1.33	1.33	0.00	1.23	1.23	2,247.32
Mass Grading On Road Diesel	0.20	2.67	1.03	0.00	0.01	0.11	0.12	0.00	0.10	0.11	331.13
Mass Grading Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 1/1/2009 - 3/31/2009 - Grading of Areas

For Soil Stabilizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stabilizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stabilizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Soil Stabilizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Detail Report for Annual Construction Unmitigated Emissions (Tons/Year)

File Name: S:\Client\0901 LA City Parks\0028 MacArthur Park MP EIR\Air Quality\0901 MacArthur Park.urb924

Project Name: MacArthur Park Construction

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

	<u>CO2</u>
2009	234.29
Building 01/01/2009-07/31/2009	132.43
Building Off Road Diesel	67.90
Building Vendor Trips	2.58
Building Worker Trips	61.95
Demolition 01/01/2009-01/09/2009	15.10
Fugitive Dust	0.00
Demo Off Road Diesel	13.50
Demo On Road Diesel	0.84
Demo Worker Trips	0.76
Mass Grading 01/01/2009-03/31/2009	86.49
Mass Grading Dust	0.00
Mass Grading Off Road Diesel	71.91
Mass Grading On Road Diesel	10.60
Mass Grading Worker Trips	3.98
Coating 07/01/2009-07/31/2009	0.26
Architectural Coating	0.00
Coating Worker Trips	0.26

Phase Assumptions

Phase: Demolition 1/1/2009 - 1/9/2009 - Demolition of Boat House

Building Volume Total (cubic feet): 16250

Building Volume Daily (cubic feet): 4062.5

On Road Truck Travel (VMT): 56.42

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Crushing/Processing Equip (142 hp) operating at a 0.78 load factor for 8 hours per day

1 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Mass Grading 1/1/2009 - 3/31/2009 - Grading of Areas

Total Acres Disturbed: 5

Maximum Daily Acreage Disturbed: 5

Fugitive Dust Level of Detail: Default

10 lbs per acre-day

On Road Truck Travel (VMT): 78.12

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

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Phase: Building Construction 1/1/2009 - 7/31/2009 - Renovation, Installation of other Park Features, construction of Boat House

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

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Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

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Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: S:\Client\0901 LA City Parks\0028 MacArthur Park MP EIR\Air Quality\0901 MacArthur Park Operational.urb924

Project Name: MacArthur Park - Operation

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	0.26	0.02	1.60	0.00	0.00	0.00	2.75

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	0.89	1.33	10.93	0.01	1.56	0.31	931.80

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	1.15	1.35	12.53	0.01	1.56	0.31	934.55

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth - No Summer Emissions							
Landscape	0.13	0.02	1.60	0.00	0.00	0.00	2.75
Consumer Products	0.00						
Architectural Coatings	0.13						
TOTALS (lbs/day, unmitigated)	0.26	0.02	1.60	0.00	0.00	0.00	2.75

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

<u>Source</u>	<u>ROG</u>	<u>NOX</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM25</u>	<u>CO2</u>
Soccer Field, Playground, etc.	0.89	1.33	10.93	0.01	1.56	0.31	931.80
TOTALS (lbs/day, unmitigated)	0.89	1.33	10.93	0.01	1.56	0.31	931.80

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2009 Temperature (F): 80 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Soccer Field, Playground, etc.		100.00	acres	1.00	100.00	897.30
					100.00	897.30

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	49.0	2.0	97.6	0.4
Light Truck < 3750 lbs	10.9	3.7	90.8	5.5
Light Truck 3751-5750 lbs	21.7	0.9	98.6	0.5
Med Truck 5751-8500 lbs	9.5	1.1	98.9	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.6	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.5	77.1	22.9	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	10.0	80.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Soccer Field, Playground, etc.				2.0	1.0	97.0

Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

File Name: S:\Client\0901 LA City Parks\0028 MacArthur Park MP EIR\Air Quality\0901 MacArthur Park Operational.urb924

Project Name: MacArthur Park - Operation

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	0.13	0.00	0.00	0.00	0.00	0.00	0.00

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	1.02	1.59	10.75	0.01	1.56	0.31	847.26

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	1.15	1.59	10.75	0.01	1.56	0.31	847.26

2/23/2008 1:04:42 PM

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping - No Winter Emissions							
Consumer Products	0.00						
Architectural Coatings	0.13						
TOTALS (lbs/day, unmitigated)	0.13	0.00	0.00	0.00	0.00	0.00	0.00

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

<u>Source</u>	<u>ROG</u>	<u>NOX</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM25</u>	<u>CO2</u>
Soccer Field, Playground, etc.	1.02	1.59	10.75	0.01	1.56	0.31	847.26
TOTALS (lbs/day, unmitigated)	1.02	1.59	10.75	0.01	1.56	0.31	847.26

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2009 Temperature (F): 60 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Soccer Field, Playground, etc.		100.00	acres	1.00	100.00	897.30
					100.00	897.30

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	49.0	2.0	97.6	0.4
Light Truck < 3750 lbs	10.9	3.7	90.8	5.5
Light Truck 3751-5750 lbs	21.7	0.9	98.6	0.5
Med Truck 5751-8500 lbs	9.5	1.1	98.9	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.6	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.5	77.1	22.9	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	10.0	80.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Soccer Field, Playground, etc.				2.0	1.0	97.0

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: S:\Client\0901 LA City Parks\0028 MacArthur Park MP EIR\Air Quality\0901 MacArthur Park Operational.urb924

Project Name: MacArthur Park - Operation

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>CO2</u>
TOTALS (tons/year, unmitigated)	0.50

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>CO2</u>
TOTALS (tons/year, unmitigated)	164.91

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>CO2</u>
TOTALS (tons/year, unmitigated)	165.41

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	<u>CO2</u>
Natural Gas	0.00
Hearth	0.00
Landscape	0.50
Consumer Products	
Architectural Coatings	
TOTALS (tons/year, unmitigated)	0.50

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	<u>CO2</u>
Soccer Field, Playground, etc.	164.91
TOTALS (tons/year, unmitigated)	164.91

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2009 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Soccer Field, Playground, etc.		100.00	acres	1.00	100.00	897.30
					100.00	897.30

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	49.0	2.0	97.6	0.4
Light Truck < 3750 lbs	10.9	3.7	90.8	5.5
Light Truck 3751-5750 lbs	21.7	0.9	98.6	0.5
Med Truck 5751-8500 lbs	9.5	1.1	98.9	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.6	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.5	77.1	22.9	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	10.0	80.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Soccer Field, Playground, etc.				2.0	1.0	97.0