4.2 AIR QUALITY

INTRODUCTION

This section discusses the potential short- and long-term air quality impacts of the construction and ongoing operation of the proposed project. Specifically, this section addresses short-term impacts during construction, including fugitive dust and equipment emissions.

The project site is located within the City of Long Beach (City), which is within the nondesert portion of Los Angeles County. Los Angeles County is part of the South Coast Air Basin (SCAB or Basin) and is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The air quality assessment for the proposed project includes estimating emissions associated with short-term construction and long-term operation of the proposed project.

A number of air quality modeling tools are available to assess air quality impacts of projects. In addition, certain air districts such as the SCAQMD have created guidelines and requirements to conduct air quality analyses. The SCAQMD's current guidelines, which are included in its California Environmental Quality Act (CEQA) Air Quality Handbook (April 1993), were adhered to in the assessment of air quality impacts for the proposed project.

4.2.1 EXISTING ENVIRONMENTAL SETTING

4.2.1.1 Regional Air Quality

Both the State of California and the federal government have established health-based ambient air quality standards (AAQS). As shown in Table 4.2.A, these pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead. PM includes particulate matter with a diameter of 10 microns or less (PM_{10}) and particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to setting out primary and secondary AAQS, the State has established a set of episode criteria for O_3, CO, NO_2, SO_2, and PM_{10}. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three. Table 4.2.B lists the primary health effects and sources of common air

Table 4.2.A: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (56 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (338 µg/m^3)		—		

Table 4.2.A: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3-Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		—	—	
Lead[8]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	
	Rolling 3- Month Average[9]	—		0.15 µg/m^3		
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer – visibility of ten miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[8]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: California Air Resources Board (ARB) (November 17, 2008).

See Footnotes on next page.

Table 4.2.A: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]

[1] California standards for ozone; carbon monoxide (except Lake Tahoe); sulfur dioxide (1- and 24-hour); nitrogen dioxide; suspended particulate matter - PM_{10}, $PM_{2.5}$, and visibility-reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth-highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25˚C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25˚C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent procedure that can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

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

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

[7] Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

[8] The ARB has identified lead and vinyl chloride as ‘toxic air contaminants’ with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[9] National lead standard, rolling 3-month average: final rule signed October 15, 2008.

ARB = California Air Resources Board EPA = United States Environmental Protection Agency
mg/m^3 = milligrams per cubic meter ppm = parts per million ºC = degrees Celsius $\mu g/m^3$ = milligrams per cubic meter

Table 4.2.B: Health Effects Summary of Some of the Common Pollutants Found in Air

Pollutant	Health Effects	Examples of Sources
Particulate Matter (PM_{10}: less than or equal to 10 microns)	• Increased respiratory disease • Lung damage • Premature death	• Cars and trucks, especially diesels • Fireplaces, wood stoves • Windblown dust from roadways, agriculture, and construction
Ozone (O_3)	• Breathing difficulties • Lung damage	• Formed by chemical reactions of air pollutants in the presence of sunlight; common sources are motor vehicles, industries, and consumer products
Carbon Monoxide (CO)	• Chest pain in heart patients • Headaches, nausea • Reduced mental alertness • Death at very high levels	• Any source that burns fuel such as cars, trucks, construction and farming equipment, and residential heaters and stoves
Nitrogen Dioxide (NO_2)	• Lung damage	• See carbon monoxide sources
Toxic Air Contaminants	• Cancer • Chronic eye, lung, or skin irritation • Neurological and reproductive disorders	• Cars and trucks, especially diesels • Industrial sources such as chrome platers • Neighborhood businesses such as dry cleaners and service stations • Building materials and products
Suspended Particulate Matter ($PM_{2.5}$ and PM_{10})	• Reduced lung function. • Aggravation of the effects of gaseous pollutants. • Aggravation of respiratory and cardiorespiratory diseases. • Increased cough and chest discomfort. • Soiling. • Reduced visibility.	• Stationary combustion of solid fuels. • Construction activities. • Industrial processes. • Atmospheric chemical reactions.
Sulfur Dioxide (SO_2)	• Aggravation of respiratory diseases (asthma, emphysema). • Reduced lung function. • Irritation of eyes. • Reduced visibility. • Plant injury. • Deterioration of metals, textiles, leather, finishes, coatings, etc.	Combustion of sulfur-containing fossil fuels. Smelting of sulfur-bearing metal ores. • Industrial processes.

Table 4.2.B: Health Effects Summary of Some of the Common Pollutants Found in Air

Pollutant	Health Effects	Examples of Sources
Lead (Pb)	• Impairment of blood function and nerve construction. • Behavioral and hearing problems in children.	• Contaminated soil (e.g., from leaded fuels and lead-based paints).

Source: ARB 2004.
ARB = California Air Resources Board

pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety (by the United States Environmental Protection Agency [EPA]), these health effects will not occur unless the standards are exceeded by a large margin or for a prolonged period of time. The State AAQS are more stringent than the federal AAQS. Among the pollutants, O_3, and $PM_{2.5}$, and PM_{10} are considered regional pollutants, while the others have more localized effects.

The California Clean Air Act (CCAA) provides the SCAQMD with the authority to manage transportation activities at indirect sources. Indirect sources of pollution are generated when minor sources collectively emit a substantial amount of pollution. Examples of this are the motor vehicles at an intersection, a mall, and on highways. The SCAQMD also regulates stationary sources of pollution throughout its jurisdictional area. Direct emissions from motor vehicles are regulated by the California Air Resources Board (ARB).

Climate/Meteorology. Air quality in the planning area is not only affected by various emission sources (mobile, industry, etc.), but is also affected by atmospheric conditions such as wind speed, wind direction, temperature, rainfall, etc. The combination of topography, low mixing height, abundant sunshine, and emissions from the second largest urban area in the United States gives the SCAB the worst air pollution problem in the nation.

Climate in the SCAB is determined by its terrain and geographical location. The SCAB is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern border, and high mountains surround the rest of the SCAB. The SCAB lies in the semipermanent high-pressure zone of the eastern Pacific; the resulting climate is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted; however, periods of extremely hot weather, winter storms, or Santa Ana wind conditions do occur.

The annual average temperature varies little throughout the SCAB, ranging from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than

inland areas. The climatological station closest to the site is the Long Beach Station.[1] The monthly average maximum temperature recorded at this station from April 1958 to June 2007 ranged from 66.9°F in January to 83.9°F in August, with an annual average maximum of 74.2°F. The monthly average minimum temperature recorded at this station ranged from 45.3°F in December to 64.9°F in August, with an annual average minimum of 54.8°F. January is typically the coldest month, and August is typically the warmest month in this area of the SCAB.

Most rainfall in the SCAB occurs between November and April. Summer rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the SCAB and along the coastal side of the mountains. The Long Beach Station monitored precipitation from April 1958 to June 2007. Average monthly rainfall during that period varied from 2.93 inches in February to 0.39 inch or less between May and October, with an annual total of 11.96 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

Although the SCAB has a semiarid climate, air near the surface is generally moist because of the presence of a shallow marine layer. With very low average wind speeds, there is a limited capacity to disperse air contaminants horizontally. The dominant daily wind pattern is an onshore 8- to 12-mile–per-hour (mph) daytime breeze and an offshore 3 to 5 mph nighttime breeze. The typical wind flow pattern fluctuates only with occasional winter storms or strong northeasterly (Santa Ana) winds from the mountains and deserts northeast of the SCAB. Summer wind flow patterns represent worst-case conditions because this is the period of higher temperatures and more sunlight, which results in O_3 formation.

During spring and early summer, pollution produced during any one day is typically blown out of the SCAB through mountain passes or lifted by warm, vertical currents adjacent to mountain slopes. Air contaminants can be transported 60 miles or more from the SCAB by ocean air during the afternoons. From early fall to winter, the transport is less pronounced because of slower average wind speed and the appearance of drainage winds earlier in the day. During stagnant wind conditions, offshore drainage winds may begin by late afternoon. Pollutants remaining in the SCAB are trapped and begin to accumulate during the night and the following morning. A low morning wind speed in pollutant source areas is an important indicator of air stagnation and the potential for buildup of primary air contaminants.

Temperature normally decreases with altitude, and a reversal of this atmospheric state, where temperature increases with altitude, is called an inversion. The height from the Earth to the inversion base is known as the mixing height. Persistent low inversions and cool coastal air tend to create morning fog and low stratus clouds. Cloudy days are less likely in the eastern portions of the SCAB and are about 25 percent more likely along the coast. The vertical

[1] Western Regional Climate Center, www.wrcc.dri.edu.

dispersion of air pollutants in the SCAB is limited by temperature inversions in the atmosphere close to the Earth's surface.

Inversions are generally lower in the nighttime when the ground is cool than during daylight hours when the sun warms the ground and, in turn, the surface air layer. As this heating process continues, the temperature of the surface air layer approaches the temperature of the inversion base, causing heating along its lower edge. If enough warming takes place, the inversion layer becomes weak and opens up to allow the surface air layers to mix upward. This can be seen in the middle to late afternoon on a hot summer day when the smog appears to clear up suddenly. Winter inversions typically break earlier in the day, preventing excessive contaminant buildup.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problem is accumulation of CO and oxides of nitrogen (NO_X) due to extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

Global Warming. Global warming is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. The Earth's average near-surface atmospheric temperature rose 0.6 ± 0.2 °Celsius (1.1 ± 0.4 °Fahrenheit) in the 20th Century. The prevailing scientific opinion on climate change is that "most of the warming observed over the last 50 years is attributable to human activities."[1] The increased amounts of carbon dioxide (CO_2) and other greenhouse gases (GHGs) are the primary causes of the human-induced component of warming. They are released by the burning of fossil fuels, land clearing and agriculture, etc. and lead to an increase in the greenhouse effect.

GHGs are present in the atmosphere naturally, released by natural sources, or formed from secondary reactions taking place in the atmosphere. They include CO_2, methane, nitrous oxide, and O_3. In the last 200 years, humankind has been releasing substantial quantities of GHGs into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, enhancing the natural greenhouse effect, which is believed to be causing global warming. While humanmade GHGs include CO_2, methane, and nitrous oxide, some (like the chlorofluorocarbons [CFCs]) are completely new to the atmosphere.

[1] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2001: The Scientific Basis*, http://www.grida.no/climate/ipcc_tar/wg1/index.htm.

Natural sources of CO_2 include the respiration (breathing) of animals and plants and evaporation from the oceans. Together, these natural sources release approximately 150 billion tons of CO_2 each year, far outweighing the 7 billion tons of humanmade emissions from fossil fuel burning, waste incineration, deforestation, and cement manufacture. Nevertheless, natural removal processes such as photosynthesis by land and ocean-dwelling plant species cannot keep pace with this extra input of man-made CO_2, and consequently the gas is building up in the atmosphere.

Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Man-made sources include the mining and burning of fossil fuels, digestive processes in ruminant animals such as cattle, rice paddies, and the burying of waste in landfills. Total annual emissions of methane are approximately 500 million tons, with man-made emissions accounting for the majority. As for CO_2, the major removal process of atmospheric methane—chemical breakdown in the atmosphere—cannot keep pace with source emissions, and methane concentrations in the atmosphere are increasing.

California is a substantial contributor of global GHGs, emitting over 400 million tons of CO_2 per year.[1] Climate studies indicate that California is likely to see an increase of 3–4°F over the next century. Because primary GHGs have a long lifetime in the atmosphere, accumulate over time, and are generally well mixed, their impact on the atmosphere is mostly independent of the point of emission.

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- Natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHGs and other gases to the atmosphere from volcanic eruptions)
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification)

The impact of anthropogenic activities on global climate change (GCC) is readily apparent in the observational record. For example, surface temperature data shows that 11 of the 12 years from 1995 to 2006 rank among the 12 warmest since 1850, the beginning of the instrumental

[1] California Energy Commission, *Inventory of California GHG Emissions and Sinks: 1990 to 2004,* 2006. http://www.energy.ca.gov/global_climate_change/inventory/documents/index.html.

record for global surface temperature.[1] In addition, the atmospheric water vapor content has increased since at least the 1980s over land and sea and in the upper atmosphere, consistent with the capacity of warmer air to hold more water vapor; ocean temperatures are warmer to depths of 3,000 feet (ft); and a marked decline has occurred in mountain glaciers and snow pack in both hemispheres, polar ice, and ice sheets in both the Arctic and Antarctic regions.

Air trapped by ice has been extracted from core samples taken from polar ice sheets to determine the global atmospheric variation of CO_2, CH_4 (methane), and N_2O (nitrous oxide) from before the start of industrialization (around 1750) to over 650,000 years ago. For that period, it was found that CO_2 concentrations ranged from 180 parts per million (ppm) to 300 ppm. For the period from around 1750 to the present, global CO_2 concentrations increased from a preindustrialization period concentration of 280 ppm to 379 ppm in 2005, with the 2005 value far exceeding the upper end of the preindustrial period range.
The primary effect of GCC has been a rise in the average global tropospheric temperature of 0.2°C per decade, determined from meteorological measurements worldwide between 1990 and 2005.[2] Climate change modeling using year 2000 emission rates shows that further warming would occur, which would induce further changes in the global climate system during the current century.[3] Changes to the global climate system and ecosystems and to California would include, but would not be limited to:

- The loss of sea ice and mountain snow pack, resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures[4]
- A rise in the global average sea level primarily due to thermal expansion and melting of glaciers and ice caps in the Greenland and Antarctic ice sheets[5]
- Changes in weather that include widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic and aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones[6]

1 Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis, Summary for Policymakers*, February 2007.
2 Ibid.
3 Ibid.
4 Ibid.
5 Ibid.
6 Ibid.

- A decline in Sierra snowpack, which accounts for approximately half of the surface water storage in California by 70 percent to as much as 90 percent over the next 100 years[1]
- An increase in the number of days conducive to O_3 formation by 25–85 percent (depending on the future temperature scenario) in high-O_3 areas of Los Angeles and the San Joaquin Valley by the end of the 21st Century[2]
- High potential for erosion of California's coastlines and seawater intrusion into the delta and levee systems due to the rise in sea level[3]

These changes to the environment as a result of climate change may affect the project site and the proposed project; however, the precise nature and extent of change cannot be predicted at this time without undue speculation.

Rising Ocean Levels. Rising ocean levels, more intense coastal storms, and warmer water temperatures may increasingly threaten the Los Angeles County coastal region. The Intergovernmental Panel on Climate Change (IPCC) reviewed several possible GCC scenarios, and under the higher warming scenario, the IPCC anticipates that ocean levels will rise 4–30 inches along the California coast by 2100. Based on information included in "The Impacts of Sea-level Rise on the California Coast" (Pacific Institute, March 2009),[4] under medium to medium-high GHG emissions scenarios, the mean sea level along the California coast is expected to rise from 3.28–4.59 ft by 2100. Elevations of the sea level may result in inundation of coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and other natural habitats.

1 California Environmental Protection Agency, *Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature (Executive Summary)*, March 2006.
2 Ibid.
3 Ibid.
4 Pacific Institute, California Climate Change Center, *The Impacts of Sea-Level Rise on the California Coast,* March 2009.

Rising sea levels may affect the natural environment in the coming decades by eroding beaches, converting wetlands to open water, exacerbating coastal flooding, and increasing the salinity of estuaries and freshwater aquifers. Coastal headlands and beaches are expected to erode at a faster pace in response to future sea level rise. The Pacific Institute (2009) estimates that 430,000 acres (ac) of wetlands exist along the California coast, but additional work is needed to evaluate the extent to which these wetlands would be degraded over time, or to what extent new wetland habitat would be created if those lands are protected from further development. Cumulatively, the effects of sea level rise may be combined with other potential long-term factors such as changes in sediment input and nutrient runoff. The cumulative impacts of physical and biological change due to sea level rise on the quality and quantity of coastal habitats are not well understood.[1] At the proposed project site, there is potential for the sea level change to adversely affect the ecosystem. The project site provides habitat for a variety of special-status (i.e., federally or State-listed as threatened, endangered, or candidate) species.

Rising sea levels may also affect the built environment, including coastal development such as buildings, roads, and infrastructure. The Pacific Institute (2009) estimates that nearly $1000 billion (in 2000 dollars) worth of property is at risk of flooding from a 100-year event with a 4.59 ft sea level rise if no adaption actions are taken. Potential effects to the existing and proposed built environment include increased risk of flooding from rainstorms and from the possible creation of an elevated base for storm surges to build upon. Potential increases in shore erosion could also contribute to increased flooding by removing protective beach area. The increased flooding could adversely affect the usability of some or all of the existing and planned land side improvements within the Marina, as well as adversely affect coastal access via roadways near the project site.

Under the higher warming scenario, the IPCC anticipates that ocean levels will rise 4–30 inches in Orange County by 2100. The Pacific Institute (2009) estimates a rise of 3.28–4.59 ft statewide by 2100. According to the Scenarios for Climate Change in California published by California Climate Change Center in 2006, Orange County is expected to experience a moderate to very extensive sea level rises within this century; ocean level rises are expected to substantially exceed the historical rate of ocean level rise. Elevations of this magnitude are known to inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and other natural habitats.

[1] Climate Change Science Program (CCSP) 4.1 January 15, 2009, 1 of 784 Final Report, United States CCSP, Synthesis and Assessment Product 4.1. Coastal Sensitivity to Seal Level Rise: A Focus on the Mid-Atlantic Region. Lead Agency: United States Environmental Protection Agency, Other Key Participating Agencies: United States Geological Survey, National Oceanic and Atmospheric Administration. Contributing Agencies: Department of Transportation.

In November 2006, California voters passed Propositions 1E and 84 to provide $4.9 billion in new flood management investments (which will help prepare for more frequent and intense floods and sea level rise) and nearly $1 billion in integrated regional water management and climate change evaluation and adaptation. Recommended actions in the Pacific Institute Report (2009) included integrating climate change into insurance policies and strategies, protecting wetlands and potential migratory paths, limiting development in areas at risk from rising seas, involving communities most vulnerable to harm in developing preparation and adaptation strategies, considering phased abandonment of low- and medium-density areas at high risk, protecting vital coastal-dependent resources, considering the cost-benefit of building coastal protection structures, improving disaster response and recovery in coastal communities, and considering adoption of a principle of "No Adverse Impact" when designing and permitting flood protection, beach nourishment, and other coastal protection projects.

Air Pollution Constituents and Attainment Status. The following describes the criteria air pollutants and their attainment status in the SCAB based on ARB Area Designations, Activities, and Maps (ARB 2006). Table 4.2.C summarizes the attainment status in the SCAB for the major criteria pollutants.

Table 4.2.C: Attainment Status of Criteria Pollutants in the South Coast Air Basin

Pollutant	State	Federal
O_3 1-hour	Nonattainment	Revoked June 2005
O_3 8-hour	Nonattainment	Severe 17 Nonattainment
PM_{10}	Nonattainment	Serious Nonattainment[1]
$PM_{2.5}$	Nonattainment	Nonattainment[2]
CO	Attainment	Attainment/Maintenance[3]
NO_2	Attainment	Attainment/Maintenance
All others	Attainment/Unclassified	Attainment/Unclassified

Source: California Air Resources Board (ARB), 2009 (http://www.arb.ca.gov/desig/desig.htm).

[1] In October 2006, the EPA, in its final rule revision, eliminated the annual PM_{10} standard.

[2] The $PM_{2.5}$ nonattainment designation is based on the 1997 standard. In 2006, the EPA revised the 24-hour standard. The 2006 $PM_{2.5}$ new standard of 35 $\mu g/m^3$ applies 1 year after the effective date of the new designation (April 2010).

[3] Effective June 11, 2007, the South Coast Air Basin was redesignated as attainment/maintenance for the federal CO standard.

CO = carbon monoxide NO_2 = nitrogen dioxide O_3 = ozone
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matte less than 2.5 microns in diameter

Ozone. O_3 (smog) is formed by photochemical reactions between nitrogen oxides (NO_X) and reactive organic gases (ROGs) rather than being directly emitted. O_3 is a pungent, colorless gas typical of Southern California smog. Elevated O_3 concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, the elderly, and young children. O_3 levels peak during summer and early fall. Effective June 15, 2005, the EPA revoked in full the federal 1-hour O_3 ambient air quality standard, including associated designations and classifications, in all areas except 14 early action compacts all outside California. The entire Basin is designated as a nonattainment area for the State 1-hour O_3 standard. The EPA has designated the status in the Basin for the 8-hour O_3 standard as "Severe 17," which means the Basin has until 2021 to attain the federal 8-hour O_3 standard. SCAQMD has requested that the Basin's federal designation be changed from severe to extreme nonattainment. This change would extend the attainment deadline to 2023.

Carbon Monoxide. CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. The entire Basin is designated as attainment/maintenance for the federal standard and attainment for the State CO standard.

Nitrogen Oxides. NO_2, a reddish brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NO_X. NO_X is a primary component of the photochemical smog reaction. It also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition (i.e., acid rain). NO_2 decreases lung function and may reduce resistance to infection. The entire Basin has not exceeded either federal or State standards for NO_2 in the past 5 years with published monitoring data. It is designated a maintenance area under federal standards and an attainment area under State standards.

Sulfur Dioxide. SO_2 is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight. The entire Basin is in attainment with both federal and State SO_2 standards.

Lead. Lead is found in old paints and coatings, plumbing, and a variety of other materials. Once in the bloodstream, lead can cause damage to the brain, nervous system, and other body

systems. Children are highly susceptible to the effects of lead. The entire Basin is in attainment for federal and State lead standards.

Particulate Matter. Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles, PM_{10}, derive from a variety of sources, including windblown dust and grinding operations. Fuel combustion and resultant exhaust from power plants and diesel buses and trucks are primarily responsible for fine particle, $PM_{2.5}$, levels. Fine particles can also be formed in the atmosphere through chemical reactions. PM_{10} can accumulate in the respiratory system and aggravate health problems such as asthma. The EPA's scientific review concluded that $PM_{2.5}$, which penetrates deeply into the lungs, is more likely than PM_{10} to contribute to the health effects listed in a number of recently published community epidemiological studies at concentrations that extend well below those allowed by current PM_{10} standards. These health effects include premature death and increased hospital admissions and emergency room visits (primarily the elderly and individuals with cardiopulmonary disease); increased respiratory symptoms and disease (children and individuals with cardiopulmonary disease such as asthma); decreased lung functions (particularly in children and individuals with asthma); and alterations in lung tissue and structure and in respiratory tract defense mechanisms. The entire Basin is a nonattainment area for federal and State PM_{10} and federal $PM_{2.5}$ standards. The $PM_{2.5}$ nonattainment designation is effective from April 5, 2005, and the conformity determination requirements are effective from April 5, 2006. In the 2007 AQMP, SCAQMD anticipated that the Basin will be in attainment for the $PM_{2.5}$ annual average federal air quality standard by the April 5, 2015, deadline.

Reactive Organic Compounds. Reactive organic compounds (ROCs) are formed from the combustion of fuels and evaporation of organic solvents. ROCs are not defined criteria pollutants but are a prime component of the photochemical smog reaction. Consequently, ROCs accumulate in the atmosphere more quickly during the winter, when sunlight is limited and photochemical reactions are slower. ROCs are also referred to as volatile organic compounds (VOCs).

4.2.1.2 Local Air Quality

The SCAQMD, together with the ARB, maintains ambient air quality monitoring stations in the SCAB. The air quality monitoring station closest to the site is the Long Beach East Pacific Coast Highway Station, and its air quality trends are representative of the ambient air quality in the project area. The pollutants monitored at this station are PM_{10} and $PM_{2.5}$.[1] The closest station that monitors CO, O_3, NO_2, and SO_2 is the North Long Beach Station. The

[1] Air quality data, 2006–2008; EPA and ARB Web sites.

ambient air quality data monitored at these two stations within the past 3 years is listed in Table 4.2.D.

The ambient air quality data in Table 4.2.D show that NO_2, SO_2, and CO levels are below the relevant State and federal standards. The State 1-hour O_3 standard was exceeded once in 2007. The federal 8-hour O_3 standard was not exceeded within the past 3 years. The State 24-hour PM_{10} standard was exceeded 9 to 19 times per year in the last 3 years but has not exceeded the federal 24-hour standard. The federal 24-hour $PM_{2.5}$ standard was exceeded one to six times per year in the last 3 years.

4.2.2 REGULATORY SETTING

4.2.2.1 Federal Regulations/Standards

Pursuant to the federal Clean Air Act (CAA) of 1970, the EPA established national ambient air quality standards (NAAQS) for six major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the federal and State governments have established AAQS, or criteria, for outdoor concentrations in order to protect public health.

Data collected at permanent monitoring stations are used by the EPA to classify regions as "attainment" or "nonattainment," depending on whether the regions met the requirements stated in the primary NAAQS. Nonattainment areas have additional restrictions as required by the EPA.

The EPA has designated the Southern California Association of Governments (SCAG) as the Metropolitan Planning Organization (MPO) responsible for ensuring the Basin's compliance with the CAA.

The EPA established new national air quality standards for ground-level O_3 and $PM_{2.5}$ matter in 1997. On May 14, 1999, the Court of Appeals for the District of Columbia Circuit issued a decision-ruling that the CAA, as applied in setting the new public health standards for O_3 and particulate matter, was unconstitutional as an improper delegation of legislative authority to the EPA. On February 27, 2001, the U.S. Supreme Court upheld the way the government sets air quality standards under the CAA. The court unanimously rejected industry arguments that the EPA must consider financial cost as well as health benefits in writing standards. The justices also rejected arguments that the EPA took lawmaking power from Congress when it set tougher standards for O_3 and particulate matter in 1997.

Table 4.2.D: Ambient Air Quality at the Long Beach Air Monitoring Stations

Pollutant	Standard	2006	2007	2008
Carbon Monoxide				
Max 1-hr concentration (ppm)		4.2	3.3	3.3
No. days exceeded: State	> 20 ppm/1-hr	0	0	0
Federal	> 35 ppm/1-hr	0	0	0
Max 8-hr concentration (ppm)		3.4	2.6	2.5
No. days exceeded: State	9.0 ppm/8-hr	0	0	0
Federal	9 ppm/8-hr	0	0	0
Ozone				
Max 1-hr concentration (ppm)		0.081	0.099	0.093
No. days exceeded: State	> 0.09 ppm/1-hr	0	1	0
Max 8-hr concentration (ppm)		0.058	0.074	0.074
No. days exceeded: Federal	> 0.075 ppm/8-hr	0	0	0
Particulates (PM_{10})				
Max 24-hr concentration ($\mu g/m^3$)		117	123	81
No. days exceeded: State	> 50 $\mu g/m^3$/24-hr	19	11	9
Federal	> 150 $\mu g/m^3$/24-hr	0	0	0
Annual Arithmetic Average ($\mu g/m^3$)		45	41	36
Exceeded: State	> 20 $\mu g/m^3$ ann. arth. avg.	Yes	Yes	Yes
Particulates ($PM_{2.5}$)				
Max 24-hr concentration ($\mu g/m^3$)		53.6	67.9	37.1
No. days exceeded: Federal	> 65 $\mu g/m^3$/24-hr	0	1	1
Annual Arithmetic Average ($\mu g/m^3$)		14.4	13.7	11.7
Exceeded: State	> 12 $\mu g/m^3$ ann. arth. avg.	Yes	Yes	No
Federal	> 15 $\mu g/m^3$ ann. arth. avg.	No	No	No
Nitrogen Dioxide				
Max 1-hr concentration (ppm)		0.102	0.107	0.125
No. days exceeded: State	> 0.25 ppm/1-hr	0	0	0
Annual arithmetic average concentration (ppm)		0.022	0.020	0.021
Exceeded: Federal	> 0.053 ppm ann. arth. avg.	No	No	No

Table 4.2.D: Ambient Air Quality at the Long Beach Air Monitoring Stations

Pollutant	Standard	2006	2007	2008
Sulfur Dioxide[2]				
Max 24-hr concentration (ppm)		0.010	0.010	0.012
No. days exceeded: State	> 0.04 ppm/24-hr	0	0	0
Federal	> 0.14 ppm/24-hr	0	0	0
Annual arithmetic average concentration (ppm)		0.001	0.003	0.002
Exceeded: Federal	> 0.030 ppm ann. arth. avg.	No	No	No

Source: ARB and EPA, 2006–2008.
1-hr = 1-hour
8-hr = 8-hour
24-hr = 24-hour
ann. arth. avg. = annual arithmetic average
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
ND = No Data (there was insufficient or no data available to determine the value)
ppm = parts per million
$\mu g/m^3$ = micrograms of pollutant per cubic meter of air

Nevertheless, the court threw out the EPA's policy for implementing new O_3 rules, saying that the agency ignored a section of the law that restricts its authority to enforce such rules.

In April 2003, the EPA was cleared by the White House Office of Management and Budget (OMB) to implement the 8-hour ground-level O_3 standard. The EPA issued the proposed rule implementing the 8-hour O_3 standard in April 2003. The EPA completed final 8-hour nonattainment status on April 15, 2004. The EPA revoked the one-hour O_3 standard on June 15, 2005.

The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004. The EPA issued final designations on December 14, 2004. The EPA lowered the 24-hour $PM_{2.5}$ standard from 65 to 35 micrograms per cubic meter ($\mu g/m^3$) and revoked the annual average PM_{10} standard in December 2006.

Climate Change. In February 2002, the United States government announced a comprehensive strategy to reduce the GHG intensity of the American economy by 18 percent over the 10-year period from 2002 to 2012. GHG intensity measures the ratio of GHG emissions to economic output. New and refined technologies offer great promise to reduce GHG emissions significantly. The federal government established the multiagency Climate

Change Technology Program (CCTP) in February 2002 to accelerate the development and deployment of key technologies.

In February of 2002, the United States government announced a climate change research initiative to focus on key remaining gaps in climate change science. To meet this goal, the Federal, multi-agency Climate Change Science Program (CCSP) was established to investigate natural and human-induced changes in the Earth's global environmental system; to monitor, understand and predict global change; and to provide a sound scientific basis for national and international decision-making. EPA's primary role in CCSP is evaluating the potential consequences of climate variability and the effects on air quality, water quality, ecosystems and human health in the United States.

Currently there are no adopted regulations to control GCC on a national level. However, recent statutory authority has been granted to the EPA that may change the voluntary approach taken under the current administration to address this issue. On April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate CO_2 emissions under the federal Clean Air Act (CAA). Consequently, the regulation of GHG emissions on a national level by the EPA is forthcoming.

Over a decade ago, most countries joined an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC), to begin to consider what can be done to reduce global warming and to cope with whatever temperature increases are inevitable. More recently, a number of nations have approved an addition to the treaty: the Kyoto Protocol, which has more powerful (and legally binding) measures.

Because it will affect virtually all major sectors of the economy, the Kyoto Protocol is considered to be the most far-reaching agreement on environment and sustainable development ever adopted. However, any treaty not only has to be effective in tackling a complicated worldwide problem, it must also be politically acceptable. Most of the world's countries eventually agreed to the Protocol, but some nations chose not to ratify it. Following ratification by Russia, the Kyoto Protocol entered into force on February 16, 2005.

As of February 2009, 183 countries had ratified the agreement with the United States taking the position of signing but not ratifying. Participating nations are separated into Annex 1 (i.e., industrialized) and Non-Annex 1 (i.e., developing) countries that have different requirements for GHG reductions. The goal of the Protocol is to achieve overall emissions reduction targets for six GHGs by the period of 2008 to 2012. The six GHGs regulated under the Protocol are CO_2, CH_4, N_2O, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons. Each nation has an emissions reduction target to reduce GHG emissions a certain percentage below 1990 levels (e.g., 8 percent reduction for the European Union, 6 percent reduction for Japan). The average reduction target for nations participating in the Kyoto Protocol is approximately 5 percent below 1990 levels. Although the United States has not ratified the Protocol, on February 14, 2002, it established a goal of an 18 percent reduction in GHG

emissions intensity by 2012. GHG intensity is the ratio of GHG emissions to economic output (i.e., gross domestic product).

4.2.2.2 State Regulations/Standards

The State of California began to set California ambient air quality standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The CAAQS are generally more stringent than the NAAQS. In addition to the six criteria pollutants covered by the NAAQS, there are CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are also listed in Table 4.2.A. In January 2007 the CAAQS for 1-hour NO_2 was reduced from 0.25 ppm to 0.18 ppm.

Originally, there were no attainment deadlines for CAAQS. However, the CCAA of 1988 provided a time frame and a planning structure to promote their attainment. The CCAA required nonattainment areas in the State to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan, as follows: moderate, if CAAQS attainment could not occur before December 31, 1994; serious, if CAAQS attainment could not occur before December 31, 1997; and severe, if CAAQS attainment could not be conclusively demonstrated at all.

The attainment plans are required to achieve a minimum 5 percent annual reduction in the emissions of nonattainment pollutants unless all feasible measures have been implemented. The SCAB is currently classified a nonattainment area for four criteria pollutants.

State Climate Change Policies and Regulations.

Title 24 (California Energy Code). The Energy Efficiency Standards for Residential and Nonresidential Buildings, commonly referred to as Title 24 of the California Code of Regulations (CCR), were established by the Energy Commission in 1978. All new projects in California are required to meet the standards, which are updated approximately every three years. The most current standards are from 2005 and superseded standards from 2001. Currently, the California Energy Commission proposes to adopt changes to the Building Energy Efficiency Standards contained in CCR, Title 24, Part 6, and associated administrative regulations in Part 1.

The current standards significantly reduce energy consumption as compared to previously constructed projects, particularly those built before 1990. Generally, standards from 2005 mandate efficient outdoor and indoor lighting, cool roofs, demand control ventilation, efficient space conditions systems and duct and pipe insulations, etc. The premise for the standards is that energy-efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for

water heating) results in GHG emissions. Therefore, increased energy efficiency in buildings results in fewer GHG emissions.

Assembly Bill 1493 Vehicular Emissions of Greenhouse Gases. In a response to the transportation sector accounting for more than half of California's CO_2 emissions, Assembly Bill (AB) 1493 (Pavley) was enacted on July 22, 2002. AB 1493 requires the California Air Resources Board (ARB) to set GHG emission standards for passenger vehicles, light duty trucks, and other vehicles determined to be vehicles whose primary use is noncommercial personal transportation in the State manufactured in 2009 and all subsequent model years. In setting these standards, the ARB considered cost effectiveness, technological feasibility, and economic impacts. ARB adopted the standards in September 2004. When fully phased in, the near-term (2009 to 2012) standards would result in a reduction of approximately 22 percent in GHG emissions compared to the emissions from the 2002 fleet, while the midterm (2013 to 2016) standards would result in a reduction of approximately 30 percent. Some currently used technologies that achieve GHG reductions include small engines with superchargers, continuously variable transmissions, and hybrid electric drives. To set its own GHG emissions limits on motor vehicles, California must receive a waiver from the EPA. The EPA approved the waiver in June 2009.

Executive Order S-03-05. In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order (EO) S-3-05. The EO established the following goals: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80 percent below 1990 levels by 2050. Furthermore, EO S-03-05 requires the Secretary of the California Environmental Protection Agency (Cal EPA) to evaluate the impacts of climate change and establish mitigation measures that would reduce potential impacts. These responsibilities are further delegated to the California Climate Action Team (CAT), which was also created in an effort to support the ARB in its responsibilities under the California Global Warming Solutions Act (described below). The CAT is chaired by the Secretary of Cal EPA and consists of representatives from major California agencies (Secretary of the Business, Transportation, and Housing Agency; Secretary of the Department of Food and Agriculture; Secretary of the Resources Agency; ARB Chairperson; Chairperson of the Energy Commission; and President of the Public Utilities Commission). The CAT is divided into 11 subgroups that develop various strategies to address aspects of global warming, including, but not limited to, land use, transportation, and planning.

Assembly Bill 32–California Global Warming Solutions Act of 2006. California's major initiatives for reducing GHG emissions are outlined in AB 32, the "Global

Warming Solutions Act," passed by the California State legislature on August 31, 2006, the 2005 EO discussed above, and a 2004 ARB regulation to reduce passenger car GHG emissions. The statute begins with several legislative findings and declarations of intent, including the following:

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts 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 incidences of infectious diseases, asthma, and other human health-related problems. (Health and Safety Code, Section 38501.)

The State goal is to reduce GHG emissions to 1990 levels by 2020, a reduction of approximately 25 percent, and then an 80 percent reduction below 1990 levels by 2050. The main strategies for making these reductions are outlined in the Scoping Plan, which when completed will include a range of GHG reduction actions that can include direct regulations, alternative compliance mechanisms, monetary and nonmonetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system.

Pursuant to the requirements of AB 32, the State's reduction in global warming emissions will be accomplished through an enforceable Statewide cap on global warming emissions that will be phased in starting in 2012. Additional early action items include a comprehensive framework of regulatory and nonregulatory elements that will result in significant and effective GHG emission reductions. ARB must prepare a plan demonstrating how the 2020 deadline can be met by January 1, 2009, or earlier. However, as immediate progress in reducing GHGs can and should be made, AB 32 directed ARB and the newly created CAT to identify a list of "discrete early action GHG reduction measures" that can be adopted and made enforceable by January 1, 2010. CAT is a consortium of representatives from State agencies who have been charged with coordinating and implementing GHG emission reduction programs that fall outside of ARB's jurisdiction.

AB 32 requires the ARB to adopt GHG emission limits and emission reduction measures by January 1, 2011, both of which are to become effective on January 1, 2012. The ARB must also evaluate whether to establish a market-based cap and trade system. AB 32 does not identify a significance level of GHG for CEQA purposes, nor has the ARB adopted such a significance threshold.

Executive Order S-01-07. EO S-01-07 was put forth by Governor Arnold Schwarzenegger on January 18, 2007. California further solidified its dedication to reducing GHGs above what was intended in EO S-03-05 by setting a new Low Carbon Fuel Standard for transportation fuels sold within the State. EO S-1-07 sets a declining standard for GHG emissions measured in CO_2 equivalent grams per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020. Essentially, the order mandates the following: (1) that a Statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and (2) that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California.

Executive Order S-13-08. EO S-13-08, pertaining to sea level rise assessment, was issued by Governor Arnold Schwarzenegger on November 14, 2008. There are four key actions in the EO, including: (1) initiate California's first Statewide climate change adaptation strategy that will assess the State's expected climate change impacts, identify where California is most vulnerable, and recommend climate adaptation policies by early 2009; (2) request that the National Academy of Science establish an expert panel to report on sea level rise impacts in California to inform State planning and development efforts; (3) issue interim guidance to State agencies for how to plan for sea level rise in designated coastal and floodplain areas for new projects; and (4) initiate a report on critical existing and planned infrastructure projects vulnerable to sea level rise. As a result of the EO, all State agencies are to consider a range of sea level rise scenarios for 2050 and 2100 in order to assess project vulnerability and, to the extent feasible, reduce expected risks. However, all projects that have filed a Notice of Preparation and/or are programmed for construction funding in the next five years, or are routine maintenance projects as of the date of the order, may, but are not required to, account for these planning guidelines.

The EO is intended to facilitate California's first comprehensive climate adaptation strategy. This effort will improve coordination within State government and adapt the way it works so that better planning can more effectively address climate impacts to human health, the environment, the State's water supply, and the economy. The EO is intended to provide consistency and clarity to State agencies on how to address sea level rise in current planning efforts, reducing time and resources unnecessarily spent on developing different policies using different scientific information.

Development of the State's comprehensive climate adaptation strategy is occurring concurrently with preparation of this Draft EIR for the proposed project; no strategy has yet been adopted. The City will comply with applicable requirements that result from the climate adaptation strategy as specific plans or regulations are specified in law or adopted by the State legislature.

Senate Bill 97. To address GHG emission and GCC in General Plans and CEQA documents, Senate Bill (SB) 97 (Chapter 185, 2007) requires the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines on how to address global warming emissions and mitigate project-specific GHG. OPR is required to prepare, develop, and transmit these guidelines on or before July 1, 2009. As described below, OPR has issued a Technical Advisory (TA) in advance of developing amendments to the CEQA Guidelines.

Senate Bill 375. SB 375, which was signed into law on October 1, 2008, provides emissions reduction goals and provides incentives for local governments and developers to follow new conscientiously planned growth patterns. SB 375 enhances the ARB's ability to reach AB 32 goals by directing the ARB to develop regional GHG emission reduction targets to be achieved by the automobile and light truck sectors for 2020 and 2035. The ARB will also work with California's 18 metropolitan planning organizations to align their regional transportation, housing and land use plans; prepare a "sustainable communities strategy" to reduce the number of vehicle miles traveled in their respective regions; and demonstrate the region's ability to attain its GHG reduction targets.

Additionally, SB 375 provides incentives for creating attractive, walkable, and sustainable communities and revitalizing existing communities. The bill exempts homebuilders from certain CEQA requirements if they build projects consistent with the new sustainable community strategies. It will also encourage the development of more alternative transportation options to promote healthy lifestyles and reduce traffic congestion.

OPR Guidelines. OPR issued a Technical Advisory titled "CEQA and Climate Change: Addressing Climate Change Through CEQA Review" on June 18, 2008. The TA was intended as a guide to planners and CEQA practitioners for addressing climate change in CEQA documents. The Advisory noted that neither the CEQA statute nor the CEQA Guidelines prescribe thresholds of significance or particular methodologies for performing an impact analysis. However, even in the absence of clearly defined thresholds for GHG emissions, the emissions from projects must be disclosed. OPR identified three basic steps for the GHG approach in CEQA documents: (1) Identify and quantify the GHG emissions; (2) assess the significance of the impact on climate change, and (3) if the impact is found to be significant, identify alternatives and/or mitigation measures that will reduce the impact below significance.

OPR released draft amendments to the CEQA Guidelines in January 2009, providing informal guidance for public agencies as they address the issue of climate change in

CEQA documents. The proposed draft amendments were prepared by OPR in collaboration with the California Resources Agency, Cal EPA, and the ARB. On April 13, 2009, OPR submitted to the Secretary for Natural Resources its proposed amendments to the State CEQA Guidelines for GHG emissions, as required by SB 97. These proposed CEQA Guideline amendments would provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The Natural Resources Agency will conduct formal rulemaking in 2009, prior to certifying and adopting the amendments, as required by SB 97. The proposed amendments are to 14 sections of the CEQA Guidelines, and it is anticipated that amended regulations will be adopted by 2010.

Waste Diversion. AB 75 was passed in 1999, and the State Agency Model Integrated Waste Management Act (Chapter 764, Statutes of 1999, Strom-Martin) took effect on January 1, 2000. This bill added new provisions to the Public Resources Code (PRC), mandating that State agencies develop and implement an Integrated Waste Management Plan (IWMP); AB 75 also mandated that community service districts providing solid waste services report disposal and diversion information to the city, county, or regional agency in which the community service district is located.

The provisions of AB 75 are listed below. Specifically, PRC Sections 40148, 40196.3, and 42920–42926 require State agencies to:

- Develop and submit an IWMP by July 15, 2000;
- Divert at least 25 percent of their solid waste from landfills or transformation facilities by January 1, 2002, and divert 50 percent on and after January 1, 2004; and
- Submit an annual report to the California Integrated Waste Management Board (CIWMB) on the previous year's diversion amounts and activities by April 1 of each year.

4.2.2.3 Regional Air Quality Planning Framework

The 1976 Lewis Air Quality Management Act established the SCAQMD and other air districts throughout the State. The federal CAA Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the federal standards in nonattainment areas of the state.

The ARB coordinates and oversees both State and federal air pollution control programs in California. It oversees activities of local air quality management agencies and is responsible for incorporating air quality management plans for local air basins into a State Implementation Plan (SIP) for EPA approval. The ARB maintains air quality monitoring stations throughout the State in conjunction with local air districts. Data collected at these

stations are used by the ARB to classify air basins as "attainment" or "nonattainment" with respect to each pollutant and to monitor progress in attaining air quality standards. The ARB has divided the State into 15 air basins. Significant authority for air quality control within them has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans.

Regional Air Quality Management Plan (AQMP). The SCAQMD and the SCAG are responsible for formulating and implementing the AQMP for the SCAB. Every 3 years the SCAQMD prepares a new AQMP, updating the previous plan and having a 20-year horizon. The SCAQMD adopted the 2003 AQMP in August 2003 and forwarded it to ARB for review and approval. The ARB approved a modified version of the 2003 AQMP and forwarded it to the EPA in October 2003 for review and approval.

The 2003 AQMP updates the attainment demonstration for the federal standards for O_3 and PM_{10}; replaces the 1997 attainment demonstration for the federal CO standard and provides a basis for a maintenance plan for CO for the future; and updates the maintenance plan for the federal NO_2 standard that the SCAB has met since 1992. The 2003 AQMP proposes policies and measures to achieve federal and State standards for healthful air quality in the SCAB.

This revision to the AQMP also addresses several State and federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. This AQMP is consistent with and builds upon the approaches taken in the 1997 AQMP and the 1999 Amendments to the O_3 SIP for the SCAB for the attainment of the federal O_3 air quality standard. However, this revision points to the urgent need for additional emission reductions (beyond those incorporated in the 1997/1999 Plan) to offset increased emission estimates from mobile sources and meet all federal criteria pollutant standards within the timeframes allowed under the federal Clean Air Act.

The SCAQMD adopted the 2007 AQMP on June 1, 2007, which it describes as a regional and multiagency effort (i.e., the SCAQMD Governing Board, ARB, SCAG, and EPA). State and federal planning requirements will include developing control strategies, attainment demonstration, reasonable further progress, and maintenance plans. The 2007 AQMP also incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. The ARB approved the 2007 AQMP on September 27, 2007, and adopted it as part of the 2007 SIP. SCAQMD has forwarded the 2007 AQMP to the EPA for its review and approval.

4.2.3 METHODOLOGY

A number of modeling tools are available to assess air quality impacts of projects. In addition, certain air districts, such as the SCAQMD, have created guidelines and requirements to conduct air quality analysis. Current SCAQMD guidelines (CEQA Air Quality Handbook, April 1993) were adhered to in the assessment of air quality impacts for the proposed project.

The air quality assessment includes estimating emissions associated with short-term construction and long-term operation of the proposed project. Criteria pollutants with regional impacts would be emitted by project-related vehicular trips as well as by emissions associated with stationary sources used on site.

The net increase in pollutant emissions determines the significance and impact on regional air quality as a result of the proposed project. The results also allow the local government to determine whether the proposed project will deter the region from achieving the goal of reducing pollutants in accordance with the AQMP in order to comply with federal and State AAQS.

SCAQMD has developed localized significance threshold (LST) methodology that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or State AAQS and are developed based on the ambient concentrations of that pollutant for each source receptor area. Current SCAQMD guidelines (Final Localized Significance Threshold Methodology, June 2003) were adhered to in the assessment of air quality impacts for the proposed project.

The LST mass rate look-up tables are used to determine whether the daily emissions for the proposed construction and operational activities could result in significant localized air quality impacts. The emissions of concern from construction activities are NO_X and CO combustion emissions from construction equipment and fugitive PM_{10} dust from construction site preparation activities. The primary emissions from operational activities include, but are not limited to, NO_X and CO combustion emissions from stationary sources and/or on-site mobile equipment. Off-site mobile emissions from the project are not included in the emissions compared to the LSTs.

4.2.4 THRESHOLDS OF SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project may be considered to have a significant adverse effect on air quality if the 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 cumulative 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 O_3 precursors)
- Expose sensitive receptors to substantial pollutant concentrations
- Create objectionable odors affecting a substantial number of people

In addition to the federal and State AAQS, there are daily and quarterly emissions thresholds for construction and operation of a proposed project in the SCAB. The SCAB is administered by the SCAQMD, and guidelines and emissions thresholds established by the SCAQMD in its CEQA Air Quality Handbook (April 1993) are used in the air quality analysis (Appendix B). The emission thresholds were established based on the attainment status of the air basin in regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety (EPA), these emission thresholds are regarded as conservative and would overstate an individual project's contribution to health risks.

4.2.4.1 SCAQMD Thresholds

Thresholds for Construction Emissions. The following CEQA significance thresholds for construction emissions have been established for the SCAB:

- 75 pounds per day (lbs/day) of ROCs
- 100 lbs/day of NO_X
- 550 lbs/day of CO
- 150 lbs/day of PM_{10}
- 55 lbs/day of $PM_{2.5}$
- 150 lbs/day of sulfur oxides (SO_X)

Projects in the SCAB with construction-related emissions that exceed any of the emission thresholds are considered to be significant short-term adverse air quality impacts under the SCAQMD guidelines and CEQA.

Thresholds for Operational Emissions. The daily operational emissions significance thresholds established for the SCAB by the SCAQMD are as follows.

Emission Thresholds for Pollutants With Regional Effects. Projects with operation-related emissions that exceed any of the emission thresholds listed below are considered significant under SCAQMD guidelines.

- 55 lbs/day of ROCs
- 55 lbs/day of NOX
- 550 lbs/day of CO
- 150 lbs/day of PM10
- 55 lbs/day of PM2.5
- 150 lbs/day of SO_X

Local Microscale Concentration Standards. The significance of localized project impacts under CEQA depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. If ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or federal standard, project emissions are considered significant if they increase 1-hour CO concentrations by 1.0 ppm or more or 8-hour CO concentrations by 0.45 ppm or more. The following are applicable local emission concentration standards for CO.

- California State 1-hour CO standard of 20.0 ppm
- California State 8-hour CO standard of 9.0 ppm

Thresholds for Localized Significance. For this project, the appropriate Source Receptor Area (SRA) for Localized Significance Thresholds (LST) is South Coastal Los Angeles County, according to the SRA/City Table on the SCAQMD LST website.[1] The size of the project phases and the distance to the nearest sensitive receptors vary throughout the construction schedule. In order to accommodate the Marina operations, no more than 1 ac of parking lot pavement area would be replaced and/or disturbed at any one time. The parking lot paving and the other on-site construction activities would occur simultaneously. Therefore, the conservative thresholds for a 2 ac site located within 50 meters (m) (164 ft) of the nearest sensitive receptor were applied to the project. The following thresholds apply for this project.

[1] www.aqmd.gov/ceqa/handbook/LST/LST.html.

Construction thresholds for a 2 ac site:

- 64 lbs/day of NO_X at 50 m
- 1,158 lbs/day of CO at 50 m
- 21 lbs/day of PM_{10} at 50 m
- 7 lbs/day of $PM_{2.5}$ at 50 m

Operational thresholds for a 2 ac site:

- 64 lbs/day of NO_X at 50 m
- 1,158 lbs/day of CO at 50 m
- 5 lbs/day of PM_{10} at 50 m
- 2 lbs/day of $PM_{2.5}$ at 50 m

Global Warming. Under CEQA, an EIR must identify and analyze the significant environmental effects of a project. Significant effect on the environment means a substantial, or potentially substantial, adverse change in the environment (PRC, Section 21068). CEQA further states that the CEQA Guidelines shall specify certain criteria that require a finding that a project may have a significant effect on the environment. That said, while the global impact of climate change has been widely recognized, the standards and methodologies for analyzing what a project's contribution to that impact may be, as well as assessing whether that impact is significant, is still substantially uncertain. As of the writing of this EIR, the agencies with jurisdiction over air quality regulation and GHG emissions such as the ARB and the SCAQMD have not adopted regulations, methodologies, significance thresholds, standards, or analysis protocols for the assessment of GHG emissions and climate change. OPR has issued very general guidance on how to approach GHG emissions, recommending that the agency (1) identify and quantify GHG emissions, (2) assess the significance of the impact on climate change, and (3) if significant, identify alternatives and/ or mitigation measures to reduce the impact below significance. In April 2009, proposed CEQA Guideline amendments released by OPR included the following direction regarding determination of significant impacts from GHG emissions (Section 15064.4):

> A lead agency may consider the following when assessing the significance of impacts from greenhouse gas emissions on the environment:
>
> (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.
>
> (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

> (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

These Guidelines have not been adopted. Thus, to date, there have been no prescribed thresholds of significance or a particular methodology for performing an impact analysis. CEQA Guidelines Section 15064(b) states that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

CEQA provides guidance on how to approach analysis of subject matters that are not well understood as yet, such as climate change. Sections 15144 and 15145 of the CEQA Guidelines address forecasting and speculation. Section 15144 notes that drafting an EIR necessarily involves some degree of forecasting, whereas Section 15145 deals with the difficulty of forecasting when reasonable investigation is unable to resolve the issues and thus may result in speculative answers. As stated in the CEQA Guidelines, the Lead Agency is not required to engage in speculation discussion but is required to inform the decision-makers of the potential impacts of the proposed activity. CEQA Guidelines Section 15002(a)(1) states that one of the basic purposes of CEQA is to "inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities." The Governor of California and the State Legislature have expressed their interest in, and the importance of, GCC to the citizens of California though the passage of AB 32 in the Legislature and the Governor's Executive Order (EOs), which call for reductions of GHG emissions. Therefore, the presented discussion is warranted to inform decision-makers of the potential effects of the proposed project.

Some policy makers and regulators suggest that a zero emissions threshold would be appropriate when evaluating GHGs and their potential effect on climate change. Such a rule appears inconsistent with the State's approach to mitigation of climate change impacts. AB 32 does not prohibit all new GHG emissions; rather, it requires a reduction in statewide emissions to a given level. Thus, AB 32 recognizes that GHG emissions will continue to occur; and that increases will result from certain activities, but that emissions reductions must be achieved overall. Moreover, if all economic development were to cease, the state would very likely be unable to fund the very measures that are needed to combat climate change.

This EIR analyzes whether the project's emissions should be considered significant. The proposed project may result in a significant GCC impact if it would impede achievement of the State's mandatory requirement under AB 32 to reduce statewide GHG emissions to 1990 levels by 2020.

4.2.5 STANDARD CONDITIONS

4.2.5.1 Construction Emissions

The project is required to comply with regional rules that assist in reducing short-term air pollutant emissions. SCAQMD Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 402 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the PM_{10} component). Compliance with these rules would reduce impacts on nearby sensitive receptors.

Applicable Rule 403 Measures.

- Water active sites at least twice daily. (Locations where equipment operations are to occur will be thoroughly watered prior to use.)
- All trucks hauling dirt, sand, soil, or other loose materials are to be covered, or should maintain at least two feet of freeboard in accordance with the requirements of California Vehicle Code (CVC) Section 23114 (freeboard means vertical space between the top of the load and top of the trailer).
- Traffic speeds on all unpaved areas shall be reduced to 15 miles per hour (mph) or less.
- Use low-sulfur fuel for stationary construction equipment. This is required by SCAQMD Rules 431.1 and 431.2.

4.2.6 IMPACTS AND MITIGATION MEASURES

Implementation of the proposed project would result in short-term construction impacts related to air quality. Once construction of the project has been completed, the on-site activities would return to preexisting levels. The following focuses on air quality impacts associated with the construction of the proposed project.

4.2.6.1 Less Than Significant Impacts

The following impacts that could result from implementation of the proposed project were evaluated and considered less than significant.

Long-Term Project-Related Emissions Impacts. Long-term air emission impacts are associated with any change in permanent use of the project site by on-site and off-site stationary and mobile sources that substantially increase emissions. Stationary source emissions include emissions associated with electricity consumption and natural gas usage. Mobile source emissions would result from on-road vehicle trips and watercraft associated with the proposed project. The proposed project would not result in any significant increase in emissions from long-term on-site stationary sources and would have minimal change in the off-site vehicle trips. Rehabilitation of the Alamitos Bay Marina would reduce the number of boat slips from 1,967 to 1,646. Therefore, no emissions were calculated for the proposed project from long-term mobile sources, watercraft, or stationary sources. The project's air quality impact would be less than significant because there would be no increase in stationary or mobile source emissions.

The primary mobile source pollutant of local concern is CO, which is a direct function of vehicle idling time caused by traffic conditions. CO transport is extremely limited; it disperses rapidly with distance from the source under normal meteorological conditions. Under certain extreme meteorological conditions, CO concentrations proximate to a congested roadway or intersection may reach unhealthy levels affecting local sensitive receptors (residents, schoolchildren, the elderly, hospital patients, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service (LOS) or with extremely high traffic volumes. According to the Traffic Impact Report prepared for the Seaport Marina Project in 2006, the two nearest project intersections along Marina Drive (Marina Drive/2nd Street and Marina Drive/Studebaker Road) both operate at an acceptable LOS. In areas with high ambient CO concentrations, modeling of CO concentrations is recommended in determining a project's effect on local CO levels. Because the proposed project would result in fewer slips and would have minimal additional off-site vehicle trips, if any, no significant CO contributions would occur in the project vicinity. Therefore, no CO "hot spots" are expected, and modeling of CO emissions is not necessary.

Air Quality Management Plan Consistency. An AQMP describes air pollution control strategies to be taken by a city, county, or region classified as a nonattainment area. The main purpose of an AQMP is to bring the area into compliance with federal and State air quality standards. CEQA requires that certain proposed projects be analyzed for consistency with the AQMP. For a project to be consistent with the AQMP adopted by the SCAQMD, the pollutants emitted from the project should not exceed the SCAQMD daily threshold or cause a significant impact on air quality, or the project must already have been included in the

AQMP projection. However, if feasible mitigation measures are implemented and shown to reduce the impact level from significant to less than significant, a project may be deemed consistent with the AQMP. The AQMP uses the assumptions and projections of local planning agencies to determine control strategies for regional compliance status. Since the AQMP is based on local General Plans, projects that are deemed consistent with the General Plan are found to be consistent with the AQMP. The proposed project would not result in any population growth and is consistent with the City's General Plan. In addition, the proposed project is not expected to result in any increase in long-term regional air quality emissions. Therefore, the project will not conflict with the AQMP, and no significant impact will result with respect to implementation of the AQMP.

4.2.6.2 Potentially Significant Impacts

Construction Air Quality Impacts. Construction activities produce combustion emissions from various sources such as utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, and motor vehicles transporting the construction crew. Exhaust emissions from construction activities envisioned on site would vary daily as construction activity levels change. The use of construction equipment on site would result in localized exhaust emissions.

Equipment Exhaust and Related Construction Activities. Construction within the Marina has been split into 12 separate phases, each requiring up to 6 months to complete. Each of these phases has been further divided into multiple subphases, such as the removal of the existing gangways, dredging and pile removal, sea wall and riprap repair, and parking lot paving. Phase 1A will occur concurrently with Phase 1 and will include the excavation and construction of the open space/habitat mitigation site. The maximum exhaust emissions generated within each of the construction phases are listed in Table 4.2.E and detailed in Appendix B. This table shows that construction equipment/vehicle emissions would exceed the NO_X threshold during Phases 2 and 3, primarily due to the transport of contaminated dredge materials to an off-site landfill. Implementation of Mitigation Measure 4.2-1 would reduce the vehicle exhaust emissions during construction. However, the impact would remain significant and unavoidable for the duration of construction activities in Phases 2 and 3.

Table 4.2.E: Peak-Day Construction Emissions by Phase (lbs/day)

Construction Activity	CO	VOC	NO_X	SO_X	PM_{10}[1]	$PM_{2.5}$[1]	CO_2
Phases 1 and 1A	197.1	72.9	73.8	0.1	8.5	4.3	8,805.9
Phases 2, **Phase 2 and 3 would be the same now so I think we need to subtract phase 2 from these #s.** and 4 through 12	169.0	68.4	33.7	0.1	6.5	2.6	4224.8
Phases 2 and 3	169.0	68.4	293.0	0.3	15.8	10.7	33,327.5
SCAQMD Emissions Threshold	**550**	**75**	**100**	**150**	**150**	**55**	**N/A**[2]
Exceed Significance?	**No**	**No**	**Yes**	**No**	**No**	**No**	**N/A**

Source: LSA Associates, Inc., July 2009.
[1] Total PM daily emission rates with fugitive dust mitigation measures implemented.
[2] N/A = not applicable; no threshold has been established
CO = carbon monoxide
lbs/day = pounds per day
NO_x = nitrogen oxides
O_3 = ozone
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matte less than 2.5 microns in diameter
SCAQMD = South Coast Air Quality Management District
SO_x = sulfur oxides
VOC = volatile organic compounds

Fugitive Dust. Fugitive dust emissions are generally associated with land clearing, exposure, and cut-and-fill operations. Dust generated daily during construction would vary substantially, depending on the level of activity, the specific operations, and weather conditions. Nearby sensitive receptors and on-site workers may be exposed to blowing dust, depending upon prevailing wind conditions. Fugitive dust would also be generated as construction equipment or trucks travel on unpaved areas of the construction site. Only the site preparation phase prior to paving the parking lots is anticipated to generate any measurable emissions of fugitive dust. PM_{10} and $PM_{2.5}$ emissions from grading operations during the site preparation phases are based on the LST analysis techniques published by the SCAQMD (see Appendix B). The PM_{10} and $PM_{2.5}$ emissions are included in construction emissions listed in Table 4.2.E. As shown, the emissions would not exceed the SCAQMD's thresholds. Therefore, no mitigation measures would be required.

Odors. Some objectionable odors may emanate from the operation of diesel-powered construction equipment during construction of the project. These odors, however, would be limited to the site only during the construction period and therefore would not be considered a significant impact.

During the dredging portion of Phases 2 and 3 of the proposed project, the contaminated dredged materials from Basin 1 will be spread out on site to dry before being hauled off site. It is anticipated that the dredged sediment will contain organic materials and that the decomposition of the organic matter when exposed to air may generate unpleasant odors. Therefore, the dredged material may result in odor impacts at the adjacent and nearby sensitive land uses. Implementation of Mitigation Measure 4.6-3 in Section 4.6, Hazards and Hazardous Materials, requires the application of a mixture of Simple Green and water to the excavated sediment as part of an overall Soil Management Plan. Simple Green accelerates the decomposition process and will have the overall result of shortening the duration of odor emissions. Therefore, with implementation of Mitigation Measure 4.6-3, potential impacts related to odors would be reduced to a less than significant level. No additional mitigation is required.

Localized Significance. The following analysis was performed per SCAQMD Final Localized Significance Threshold Methodology (June 2003). The closest sensitive receptors to the various construction phases are located at a distance of approximately 50 m (164 ft). Thus, LST values for 50 m were used. Table 4.2.F shows the construction-related emissions of NO_X, CO, PM_{10}, and $PM_{2.5}$ compared to the LSTs for South Coastal Los Angeles County at distances of 50 m.

Table 4.2.F: Summary of Construction Emissions, Localized Significance by Phase

Construction Activity	Emission Rates (lbs/day)			
	CO	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
Phases 1 and 1A	165.2	51.5	3.0	2.6
Phases 2, and 4 through 12	156.4	32.6	1.8	1.6
Phase 3	156.4	33.9	1.8	1.6
Localized Significance Threshold (at 50 m)	**1,158**	**64**	**21**	**7**
Exceed Significance?	**No**	**No**	**No**	**No**

Source: LSA Associates, Inc., July 2009.
CO = carbon monoxide lbs/day = pounds per day m = meters
NO_x = nitrogen oxides O_3 = ozone
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matte less than 2.5 microns in diameter

Table 4.2.F shows that the calculated emissions rates for the proposed construction activities are below the localized significance thresholds for NO_X, CO, PM_{10}, and $PM_{2.5}$. Therefore, the proposed construction activities would not cause any short-term, localized, significant air quality impacts. The overall project construction is below thresholds, and each phase of project construction would also be below thresholds. However, as stated above, the analysis was based on information provided by the project engineer indicating that no more than 1 ac of parking lot repaving would occur at any one time. Therefore, Mitigation Measure 4.2-2 has been proposed requiring that repaving areas do not exceed 1 ac at any one time. With implementation of Mitigation Measure 4.2-2, emission rates for each phase of project construction would remain below the thresholds, reducing potential impacts to a less than significant level.

Greenhouse Gas Emissions. Short-term GHG emissions would occur from construction activities, consisting primarily of emissions from equipment exhaust. The URBEMIS2007 model was used to calculate the CO_2 emissions that would be generated by the construction equipment. The emissions are summarized in Table 4.2.E. For this analysis only CO_2, is considered. This is due to the relatively large contribution of this gas in comparison to other GHGs produced during the project construction. Table 4.2.E indicates that the peak daily CO_2 emissions associated with construction equipment exhaust for the proposed project would be highest during Phases 2 and 3, generating up to 33,328 lbs/day of CO_2. Because construction activities are expected to generate an increase in CO_2 emissions, Mitigation Measure 4.2-3 has been proposed, requiring the Marine Bureau to incorporate CO_2 reduction measures in order to reduce CO_2 emissions associated with construction activities. Because GHG emissions during construction activities are relatively short term and would cease once construction activities end, construction-related GHG emissions are considered less than significant with incorporation of Mitigation Measure 4.2-3.

At build out, the proposed project would result in fewer boat slips than under existing conditions; it is likely that there will be an increase in larger vessels utilizing the slips. However, it would be speculative to forecast the usage patterns or engine efficiencies of the larger boats, similar to trying to predict the types of cars that utilize a given parking lot or the length of time that they would be parked. Therefore, it is too speculative to indicate that the change in the number or size of Marina slips would result in a change in contributions to GHG emissions, either positive or negative.

The proposed project includes renovations to all 13 restroom buildings on the project site. Ten of the 13 restroom facilities will be demolished and rebuilt, and 3 will be renovated in-place. All new projects in California are required to meet the standards of Title 24 (California Energy Code). The current standards significantly reduce energy consumption as compared to previously constructed projects, particularly those built before 1990, such as the existing restroom facilities on the project site. Compliance with these standards results in more

energy-efficient buildings that require less electricity, natural gas, and other fuels. Therefore, increased energy efficiency in the proposed buildings results in fewer GHG emissions.

The project will comply with all Title 24 requirements, thereby increasing the energy efficiency of all on-site restrooms. Therefore, the proposed project is not expected to result in a long-term increase in GHG emissions. Further, Mitigation Measures 4.2-4 and 4.2-5 have been proposed and will require the Marine Bureau to incorporate CO_2 reduction measures in order to reduce CO_2 emissions associated with building design and building operation/ maintenance to improve energy efficiency or reduce energy consumption. With implementation of Mitigation Measures 4.2-4 and 4.2-5, operation of the proposed project would not conflict with implementation of the GHG reduction goals under AB 32 or other State regulations. In addition, the proposed project is a less intense continuation of an existing land use. Therefore, with mitigation, operational GHG impacts are considered less than significant.

4.2.7 MITIGATION MEASURES

Implementation of the following mitigation measures will ensure that potential Air Quality impacts resulting from project implementation would be reduced to less than significant levels.

4.2-1 Prior to commencement of construction, the Marine Bureau Manager shall ensure that the final project plans and the construction contract include, but are not limited to, the following energy conservation and emission reduction measures:

Fugitive Dust Controls. The project construction contractor shall develop and implement dust-control methods that shall achieve this control level in a South Coast Air Quality Management District (SCAQMD) Rule 403 dust control plan, designate personnel to monitor the dust control program, and order increased watering, as necessary, to ensure a 90 percent control level. Their duties shall include holiday and weekend periods when work may not be in progress. Additional control measures to reduce fugitive dust shall include, but are not limited to, the following:

- Provide temporary wind fencing around sites being graded or cleared
- Cover truck loads that haul dirt, sand, or gravel or maintain at least 2 feet (ft) of freeboard in accordance with Section 23114 of the California Vehicle Code (CVC)
- Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off tires of vehicles and any equipment leaving the construction site

- Suspend all soil disturbance activities when winds exceed 25 miles per hour (mph) as instantaneous gusts or when visible dust plumes emanate from the site and stabilize all disturbed areas
- Appoint a construction relations office to act as a community liaison concerning on-site construction activity, including resolution of issues related to particulate matter less than 10 microns in diameter (PM_{10}) generation
- Sweep all streets at least once a day using SCAQMD Rule 1186, 1186.1 certified street sweepers or roadway washing trucks if visible soil materials are carried to adjacent streets (recommend water sweepers with reclaimed water)
- Apply water three times daily, or nontoxic soil stabilizers according to manufacturers' specifications, to all unpaved parking or staging areas or unpaved road surfaces or as needed to areas where soil is disturbed

Emission Controls for Nonroad Construction Equipment. Construction equipment shall meet the United States Environmental Protection Agency (EPA) Tier 4 nonroad engine standards, where feasible. The Tier 4 standards become available starting in 2012.

Best Management Practices (BMPs) for Construction Equipment. The construction contractor shall implement the following BMPs on construction equipment, where feasible, to further reduce emissions from these sources.

- Use of diesel oxidation catalysts and/or catalyzed diesel particulate traps, as feasible
- Maintain equipment according to manufacturer specifications
- Restrict idling of equipment and trucks to a maximum of 5 minutes (per California Air Resources Board [ARB] regulation)
- Use of high-pressure fuel injectors on diesel-powered equipment
- Use of electricity from power poles rather than temporary diesel- or gasoline-powered generators

Construction Traffic Emission Reductions. The construction contractor shall implement the following measures to further reduce emissions from construction.

- Trucks used for construction (a) prior to 2015 shall use engines certified to no less than 2007 nitrogen oxide (NO_x) emissions standards and (b) in 2015 and beyond shall meet EPA 2010 emission standards.

- Provide temporary traffic control such as a flag person during all phases of construction to maintain smooth traffic flow
- Schedule construction activities that affect traffic flow on arterial systems to off-peak hours where possible
- Reroute construction trucks away from congested streets or sensitive receptor areas
- Provide dedicated turn lanes for movement of construction trucks and equipment on and off site
- Configure construction parking to minimize traffic interference
- Improve traffic flow by signal synchronization
- All vehicles and equipment will be properly tuned and maintained according to manufacturer specifications.
- Reduce traffic speeds on all unpaved roads to 15 mph or less

Emission Controls for Construction Tugboats. All tugboats used in construction shall meet the EPA Tier 2 marina engine standards, and if feasible, use construction tugs that meet the EPA Tier 3 marine engine standards. The Tier 3 standards become available starting in 2009.

Construction Tugboat Home Fleeting. The construction contractor shall require all construction tugboats that home fleet in the San Pedro Bay Ports (SPBP) to (a) shut down their main engines, and (b) refrain from using auxiliary engines at dock or to use electrical shore power, if need be.

4.2-2 Prior to issuance of building permits, the Marine Bureau Manager shall ensure that the final construction drawings include the following building design energy conservation measures:

- **Green Building Design for Restroom Buildings:** Incorporate measures from the Leadership in Energy and Environmental Design (LEED) certification program and other green building guidelines that reduce greenhouse gas (GHG) emissions through either development density/ design and/or energy conservation. The LEED for Retail–New Construction and LEED for Commercial Interiors programs developed by the United States Green Building Council are good sources for identifying measures and examples of energy conservation measures, including the following:
  - Meet or exceed Title 24 requirements
  - Incorporate ENERGY STAR-rated windows

- Incorporate ENERGY STAR-rated space heating and cooling equipment
- Incorporate hot water systems that are energy efficient
- Incorporate ENERGY STAR-rated light fixtures
- Incorporate ENERGY STAR-rated appliances
- Install/operate renewable electric generation systems, as appropriate and economically feasible

4.2-3 Prior to issuance of building permits, the Marine Bureau Manager shall ensure that the final construction drawings of the building operations and maintenance plan include, but are not limited to, the following energy conservation measures:

- **Compact Fluorescent Light Bulbs:** All interior building lighting shall use compact fluorescent light bulbs. Fluorescent light bulbs produce less waste heat and use substantially less electricity than incandescent light bulbs.
- **Energy Audits:** Conduct a third-party energy audit every 5 years and install innovative power-saving technology where feasible, such as power factor correction systems and lighting power regulators. Such systems help to maximize usable electric current and eliminate wasted electricity, thereby lowering overall electricity use.

4.2-4 Prior to issuance of building permits, the Marine Bureau Manager shall ensure that the final construction drawings and the construction contract indicate that no more than 1 acre (43,560 square feet) of parking lot pavement area shall be under construction for replacement at any one time during each phase of the project.

4.2-5 During all phases of demolition, dredging, and construction, the Marine Bureau Manager shall ensure that the contract to construct complies with the following rules for construction and operation to minimize the air quality impacts from the proposed project. The following measures are required and will reduce or minimize air pollutants generated by construction vehicles and equipment and fugitive dust emissions associated with earthmoving or excavation operations, or other soil disturbances, as identified in South Coast Air Quality Management District (SCAQMD) Rules 402 and 403. The following measures shall be printed on all final plans and drawings associated with the project:

During earthmoving or excavation operations, fugitive dust emissions shall be controlled by regular watering or other dust-preventive measures using the following procedures:

- All material excavated shall be sufficiently watered to prevent excessive amounts of dust. Watering, with complete coverage, shall occur at least twice daily, preferably in the late morning and after work is done for the day.
- All earthmoving or excavation activities shall cease during periods of high winds (i.e., winds greater than 20 miles per hour [mph] averaged over 1 hour).
- All material transported off site shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.
- The area disturbed by earthmoving or excavation operations shall be minimized at all times.

After earthmoving or excavation operations, fugitive dust emissions shall be controlled using the following measures:

- Portions of the construction area to remain inactive longer than a period of 3 months shall be revegetated and watered until cover is grown.
- All active portions of the construction site shall be watered to prevent excessive amounts of dust.

At all times, fugitive dust emissions shall be controlled using the following procedures:

- On-site vehicle speed shall be limited to 15 mph.
- Road improvements shall be paved as soon as feasible, watered periodically, or chemically stabilized.

At all times during the construction phase, ozone precursor emissions from mobile equipment shall be controlled using the following procedures:

- Equipment engines shall be maintained in good condition and in proper tune according to manufacturer's specifications.
- On-site mobile equipment shall not be left idling for a period longer than 60 seconds.

Outdoor storage piles of construction materials shall be kept covered, watered, or otherwise chemically stabilized with a chemical wetting agent to minimize fugitive dust emissions and wind erosion.

4.2.8 CUMULATIVE IMPACTS

The cumulative study area for air quality is the SCAB. As discussed above, projected emissions of criteria pollutants as a result of the proposed project are expected to be below the emissions thresholds established for the region. Cumulative emissions are part of the emission inventory included in the AQMP for the project area. Therefore, there would be no cumulatively considerable net increase of the criteria pollutants that are in nonattainment status in the Basin.

Construction emissions associated with the project would exceed the SCAQMD threshold for NO_X. Construction of the project would contribute cumulatively to the local and regional air pollutants, together with other projects under construction. The project would result in significant construction-related air quality impacts. Thus, it is anticipated that these additional emissions would result in significant cumulative air quality impacts.

The project would not result in increases in long-term operational emissions because capacity of the Marina would not be increased with the proposed project, and no additional boats would be added to the Marina. Therefore, the project would not contribute cumulatively to long-term local and regional air quality degradation.

GHG emissions are considered for their potential to contribute to GCC. The proposed project will result in short-term emissions associated with the use of construction equipment. There will be no ongoing increase in contribution to global warming because there are no on-site stationary sources, and there is essentially no increase in the number of vehicular trips coming to and from the project site. Therefore, the proposed project's contribution to GCC in the form of GHG emissions is limited to construction equipment/vehicle emissions. The project will not result in a new, ongoing source of GHG emissions; therefore, the project's contribution to cumulative GHG emissions and GCC is less than significant.

4.2.9 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Compliance with SCAQMD rules and regulations and implementation of Mitigation Measures 4.2-1 through 4.2-5 would reduce the proposed project's air quality impacts to the extent feasible. However, construction vehicle emissions would exceed the NO_X threshold during Phase 3, primarily due to the transport of contaminated dredge materials to an off-site landfill. Implementation of Mitigation Measure 4.2-1 would reduce the vehicle exhaust emissions during construction. However, the impact would remain significant and unavoidable.