2.2.5 Air Quality

The information and analysis within this section is taken from the Gerald Desmond Bridge Air Quality Technical Study (Parsons, 2009d).

2.2.5.1 Regulatory Setting

Many statutes, regulations, plans, and policies have been adopted that address air quality issues. For purposes of summarization, both federal and non-federal regulatory measures are discussed in this section. The proposed project site and vicinity are subject to air quality regulations developed and implemented at the federal, state, and local levels. Adherence to these measures has produced substantial progress in improving air quality in South Coast Air Basin (SCAB or Basin) over the past 30 years. Relevant plans, policies, and regulations applicable to the proposed project are discussed below

Federal Regulation/Standards

The Federal Clean Air Act. The CAA was passed in 1970 and last amended in 1990. It forms the basis for the national air pollution control effort. Basic elements of the CAA include national ambient air quality standards (NAAQS) for criteria air pollutants, hazardous air pollutants (HAPs) emission standards, state attainment plans, motor vehicle emissions standards, stationary source emission standards and permits, acid rain control measures, stratospheric ozone (O_3) protection, and enforcement provisions.

The NAAQS have two tiers: primary standards to protect public health and secondary standards to prevent environmental degradation (e.g., damage to vegetation and property, and visibility impairment). The CAA mandates that the state submit and implement a State Implementation Plan (SIP) for areas not meeting the NAAQS. These plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 Amendments to the CAA identify specific emission reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. The sections of the CAA that are most applicable to the project include Title I (Nonattainment Provisions) and Title II (Mobile Source Provisions).

Title I of the CAA identifies attainment, nonattainment, and unclassifiable areas with regard to the criteria pollutants, and it sets deadlines for all areas to reach attainment for the following criteria pollutants: O_3, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulates less than ten microns in diameter (PM_{10}), carbon monoxide (CO), and Pb. The NAAQS were amended in July 1997 to include the 8-hour O_3 standard and an NAAQS for fine particulates less than 2.5 microns in diameter ($PM_{2.5}$). Table 2.2.5-1 presents the standards that are currently in effect for all criteria pollutants. Table 2.2.5-2 includes the potential health effects resulting from exposure to these pollutants.

Title II of the CAA contains a number of provisions with regard to mobile sources, including motor vehicle emission standards (e.g., new tailpipe emissions standards for cars and trucks, and nitrogen oxide [NO_X] standards for heavy-duty vehicles), fuel standards (e.g., requirements for reformulated gasoline), and a program for cleaner fleet vehicles.

EPA amended the NAAQS in 1997 to include an 8-hour standard for O_3 (0.08 parts per million [ppm]) and to adopt new NAAQS for $PM_{2.5}$. EPA reviews the most up-to-date scientific information and the standard for each pollutant every 5 years and obtains advice from the Clean Air Scientific Advisory Committee on each review. Based on these reviews, EPA considers revision to the NAAQS accordingly. The NAAQS for particulate matters were amended by EPA in September 2006 to strengthen the 24-hour $PM_{2.5}$ standard from 65 micrograms per cubic meter (µg/m^3) to 35 µg/m^3 and revoke the annual PM_{10} NAAQS due to a lack of evidence linking health problems to long-term exposure to coarse particulate pollution. The area designation for the new $PM_{2.5}$ standard became effective in October 2009. Furthermore, based on new scientific studies and several health risk assessment results, EPA revised the lead NAAQS to provide increased protection for children and other at-risk populations against adverse health effects, most notably including neurological effects in children. The revised standard level is 0.15 µg/m^3 over rolling 3-month periods. The final rule was signed on October 15, 2008. The area designation/classification based on the new standard will become effective within 2 years (i.e., 2010), and attainment demonstration SIPs will be due by 2013. Additionally, on March 12, 2008, EPA strengthened the 8-hour O_3 NAAQS based on new scientific evidence about the effects of ground-level O_3 on public health and the environment. The new standard (primary and secondary) is 0.075 ppm. Nonattainment

Table 2.2.5-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [a,c] Concentration	National Standards [b,c]	
			Primary	Secondary
Ozone (O_3)	1 Hour	0.09 ppm (180 μg/m^3)	—	—
	8 Hour	0.07 ppm (137 μg/m^3)	0.075 ppm (147 μg/m^3) [d]	—
Respirable Particulate Matter (PM_{10})	24 Hour	50 μg/m^3	150 μg/m^3	Same as Primary
	Annual Average (AAM)	20 μg/m^3	— [e]	
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	No Separate State Standard	35 μg/m^3 [f]	Same as Primary
	Annual Average (AAM)	12 μg/m^3	15 μg/m^3	
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	—
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual Average (AAM)	0.030 ppm (56 μg/m^3)	0.053 ppm (100 μg/m^3)	Same as Primary
	1 Hour	0.18 ppm (338 μg/m^3)	—	
Sulfur Dioxide (SO_2)	Annual Average (AAM)	—	0.030 ppm (80 μg/m^3)	—
	24 Hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)	—
	3 Hour	—	—	0.5 ppm (1,300 μg/m^3)
	1 Hour	0.25 ppm (655 μg/m^3)	—	—
Lead (Pb)[g]	30-Day Average	1.5 μg/m^3		—
	Rolling 3-Month [h]	—	0.15 μg/m^3	Same as Primary
Visibility Reducing Particles	8 Hour	In sufficient amount to produce extinction coefficient of 0.23 per kilometer due to particles when relative humidity is less than 70%	No Federal Standards	
Sulfates	24 Hour	25 μg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m^3)		
Vinyl Chloride[g]	24 Hour	0.01 ppm (26 μg/m^3)		

[a] California standards for O_3, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, 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 CCR.

[b] National standards (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above150 μg/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 3 years, are equal to or less than the standard.

[c] 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 these reference conditions; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] The new standard of 0.075 ppm (previously 0.08 ppm) was adopted on March 12, 2008, and became effective in June.

[e] The annual standard of 50 μg/m^3 was revoked by EPA in December 2006 due to lack of evidence linking health problems to long-term exposure to coarse particulate pollution.

[f] Based on 2004-2006 monitored data, EPA tightened the 24-hour standard of $PM_{2.5}$ from the previous level of 65μg/m^3. The updated area designation became effective in October 2009.

[g] The California Air Resources Board (CARB) has identified Pb and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[h] Final rule for the new federal standard was signed on October 15, 2008.

AAM – Annual Arithmetic Mean; mg/m^3 – milligrams per cubic meter; μg/m^3 – micrograms per cubic meter; ppm – parts per million

Source: California Air Resources Board, 2010a.

Table 2.2.5-2
Health Effects Summary for Air Pollutants

Pollutant	Sources	Primary Effects
Ozone (O_3)	Atmospheric reaction of organic gases with nitrogen oxides in the presence of sunlight.	Aggravation of respiratory diseases; irritation of eyes; impairment of pulmonary function; plant leaf injury.
Nitrogen Dioxide (NO_2)	Motor vehicle exhaust; high temperature; stationary combustion; atmospheric reactions.	Aggravation of respiratory illness; reduced visibility; reduced plant growth; formation of acid rain.
Carbon Monoxide (CO)	Incomplete combustion of fuels and other carbon-containing substances, such as motor vehicle exhaust; and natural events, such as decomposition of organic matter.	Reduced tolerance for exercise; impairment of mental function; impairment of fetal development; impairment of learning ability; death at high levels of exposure; aggravation of some cardiovascular diseases (angina).
Particulate Matter (PM_{10} and $PM_{2.5}$)	Fuel combustion in vehicles, equipment, and industrial sources; construction activities; industrial processes; residential, agricultural burning; atmospheric chemical reactions.	Reduced lung function; aggravation of the effects of gaseous pollutants; aggravation of respiratory and cardio-respiratory diseases; increased cough and chest discomfort; soiling; reduced visibility.
Sulfur Dioxide (SO_2)	Combustion of sulfur-containing fossil fuels; smelting of sulfur-bearing metal ores; industrial processes.	Aggravation of respiratory and cardiovascular diseases; reduced lung function; carcinogenesis; irritation of eyes; reduced visibility; plant injury; deterioration of materials (e.g., textiles, leather, finishes, coating).
Lead (Pb)	Contaminated soil.	Impairment of blood function and nerve construction; behavioral and hearing problems in children.

Source: EPA, 2006a.

designations are categorized by EPA into seven levels of severity: basic, marginal, moderate, serious, severe-15, severe-17, and extreme.

The South Coast Air Basin (SCAB or Basin) is currently classified as a nonattainment area for O_3 and fine particulates (PM_{10} and $PM_{2.5}$). Based on 1990 CAA Amendments (CAAAs), the SCAB nonattainment designations are as follows: nonattainment for $PM_{2.5}$, requiring attainment by 2014; and "severe-17" for O_3, requiring attainment with the 8-hour O_3 standard by 2021 (the former 1-hour O_3 standard was revoked by EPA on June 15, 2005; thus, it is no longer in effect for the state of California).

The SCAB was in serious nonattainment status for PM_{10} until 2006. The Basin met the PM_{10} standards at all stations except for western Riverside County, where the annual PM_{10} standard was not met as of 2006. The annual standard was then revoked by EPA in December 2006 due to a lack of evidence linking health problems to long-term exposure to coarse particulate pollution. The 24-hour PM_{10} standard is retained at its existing value. Currently, the Basin meets the 24-hour average federal standard. When exceedances do occur, they are usually associated with high wind natural events or exceptional events due to wildfires.

For CO, attainment demonstrations were previously submitted to EPA in 1992, 1994, and 1997 to bring the SCAB into attainment with the federal standard in 2000. In 2001, the CO standard was exceeded in the SCAB on 3 days, thus leaving the basin in nonattainment status. In January 2005, the California Air Resources Board (CARB) declared CO attainment for the SCAB based on air quality data collected during 2001 through 2003. The redesignation was approved by the State Office of Administrative Law and became effective on July 23, 2004. The 2005 CO Redesignation Request and Maintenance Plan for SCAB was reviewed and approved by EPA, and the federal CO attainment status for SCAB became effective on June 11, 2007.

All nonattainment areas are subject to a "transportation conformity" measure, requiring local transportation and air quality officials to coordinate their planning to ensure that transportation projects do not hinder an area's ability to reach its clean air goals. These requirements become effective 1-year after an area's nonattainment designation.

For a nonattainment area, the CAA provides voluntary reclassification of the area to a higher classification by submitting a request to EPA. For O_3, SCAQMD has requested (as part of its 2007 Air Quality Management Plan [AQMP] submittal to EPA), a reclassification of the Basin from "severe-17' to "extreme" nonattainment. This would extend the 8-hour O_3 attainment date to 2024 and allow attainment demonstration to rely on emission reductions from measures that anticipate the development of new technologies or improving of existing control technologies.

Furthermore, SCAQMD has proposed an extension for attainment demonstration of the federal new standard for 24-hour $PM_{2.5}$ by 2015 instead of 2014.

Transportation Conformity Rule. The CAA mandates that the state submit and implement an SIP for each criteria pollutant that violates the applicable NAAQS. These plans must include pollution control measures that demonstrate how the standards will be met. Conformity to the SIP is defined under the 1990 CAA amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of these standards. EPA has two types of SIP conformity guidelines: transportation conformity rules that apply to transportation plans and projects, and general conformity rules that apply to all other federal actions.

The Transportation Conformity Rule, as defined in 40 CFR Parts 51 and 93, was established by EPA and the United States Department of Transportation (DOT) on November 30, 1993, to implement the federal CAA conformity provisions. The CAAAs of 1990 require that transportation plans, programs, and projects that are funded by or approved under Title 23 U.S.C. or the Federal Transit Act conform to state or federal air quality plans for achieving NAAQS. The Southern California Association of Governments (SCAG) is the federally designated Metropolitan Planning Organization (MPO) responsible for transportation planning in the SCAB. The transportation conformity process establishes the major connection between transportation planning and emission reductions from transportation sources. In addition, the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 (revised in 1998 as TEA-21) linked compliance with conformity requirements to continued FHWA and Federal Transit Administration (FTA) funding of transportation plans, programs, and projects. These requirements were not changed with enactment of SAFETEA-LU on August 10, 2005. Conformity with the CAA takes place on both regional and local levels.

In March 2006, the Transportation Conformity Rule was updated to include regulations for performing qualitative analysis of PM_{10} and $PM_{2.5}$ hot-spot impacts. Only projects that are considered "Projects of Air Quality Concern" (POAQC) are required to perform an analysis. POAQCs are defined, generally, as: (1) new or expanded highway projects that have a significant number of or significant increase in diesel vehicles, (2) projects affecting intersections that are LOS D, E, or F with a significant number of diesel vehicles, (3) new or expanded bus and rail terminals and transfer points with a significant number of diesel vehicles congregating in a single location, and (4) projects in or affecting locations, areas, or categories of sites that are identified in the PM_{10} or $PM_{2.5}$ applicable implementation plan as sites of possible violation.

Regional Conformity Determination

In determining whether a project conforms with an approved air quality plan, agencies must use current emission estimates based on the most recent population, employment, travel, and congestion estimates determined by an area's MPO. The MPOs are required to develop and maintain long-term and short-term plans and programs such as 20-year RTPs and 4-year RTIPs. These plans set out transportation policies and programs for the region. A conforming RTIP/TIP model outcome projects that the regulated pollutants will be reduced to acceptable levels within time frames that meet the NAAQS.

SCAG, as the MPO for the project region, is responsible for developing the RTP and RTIP for the region, including Los Angeles, Orange, San Bernardino, Riverside, Imperial, and Ventura counties. The RTP provides a long-term vision of regional transportation goals, policies, objectives, and strategies; assesses current and projected demand for travel and goods movement; and identifies necessary actions to meet the region's mobility and accessibility needs. The Final 2008 RTP was adopted by SCAG on May 8, 2008; and it was approved by FHWA and FTA on June 5, 2008. The 2008 RTP presents the transportation vision for the region through the year 2035.

The 2008 RTIP was developed in accordance with state and federal requirements. Under state law, county transportation commissions have the responsibility of proposing county projects, using policies, programs, and projects of the current RTP as a guide, from among submittals by cities and local agencies. The local priority lists of projects were forwarded to SCAG for review. From these lists, SCAG developed the 2008 RTIP based on consistency with the current RTP, inter-county connectivity, financial constraints, and conformity requirements. The 2008 RTIP is SCAG's compilation of state, federal, and local funded transportation projects and includes a listing of all transportation projects proposed over a 6-year period, Fiscal Years (FY) 2008/09 – 2013/14. The 2008 RTIP was adopted by SCAG on July 17, 2008, and it was approved by FHWA and FTA on November 17, 2008.

To be in conformance, a project must be included in the list of projects of the federally approved transportation plans and programs.

<u>Project-Level Conformity</u>

A project-level conformity determination is required for projects in CO, PM_{10}, and $PM_{2.5}$ nonattainment and maintenance areas. As discussed previously, a region is a nonattainment area if one or more monitoring stations in the region fail to attain the relevant NAAQS. Areas that were previously designated as nonattainment, but have recently met the NAAQS, are called maintenance areas. In general, projects must not cause the CO standard to be violated, and in nonattainment areas, the project must not cause any increase in the number and severity of violations.

Furthermore, based on the 2006 update of the Transportation Conformity Rule, specifically section 40 CFR 93.105 (c)(1)(i), an interagency consultation for project-level conformity of the proposed project is required. Pursuant to this requirement, a qualitative PM hot-spot analysis was performed and submitted to SCAG for conformity determination.

EPA Rule on Control of Mobile Source Air Toxics. Controlling air toxic emissions became a national priority with the passage of the CAAA, whereby Congress mandated that EPA regulate 188 air toxics, also known as HAPs. Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined in the CAA as HAPs. MSATs are compounds emitted from roadway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Airborne toxic metals can also result from engine wear or from impurities in oil or gasoline (see document No. EPA420-R-00-023, December 2000). EPA has assessed the expansive list of HAPs in their latest rule on the *Control of Hazardous Air Pollutants from Mobile Sources* (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their *Integrated Risk Information System* (IRIS) (www.epa.gov/ncea/iris/index.html). In addition, EPA identified 6 compounds with significant contributions from mobile sources (FHWA, 2006) that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). The list of priority MSATs was revised in the 2009 Update Memorandum (FHWA, 2009), which added one more compound to the previous list. The priority MSATs are acrolein, benzene, 1,3-butadiene, diesel particulate matter (DPM) plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules. Of these pollutants, DPM, 1,3-Butadiene, and benzene account for approximately 89 percent of the total toxic air pollutants for potential excess cancer risk. DPM accounts for 71.2 percent of the total toxic air pollutants for potential excess cancer risk (FHWA, 2009; FHWA, 2006a; CARB, 2000).

FHWA released interim guidance on February 3, 2006, determining when and how to address MSAT impacts in the NEPA process for transportation projects. The guidance document was updated on September 30, 2009 (FHWA, 2009). FHWA has identified three levels of analysis:

1) No analysis for exempt projects or projects with no potential for meaningful MSAT effects;
2) Qualitative analysis for projects with low potential MSAT effects; and
3) Quantitative analysis for projects with higher potential MSAT effects.

Under Category 1, three types of projects are included: (a) projects qualifying as a categorical exclusion under 23 CFR 771.117(c); (b) projects exempt under the CAA conformity rule under 40 CFR 93.126; and (c) other projects with no meaningful impacts on traffic volumes or vehicle mix.

The types of projects included in Category 2 are those that serve to improve operations of highway, transit, or freight movement without adding substantial new capacity or without creating a facility that is likely to meaningfully increase emissions. This category covers a broad range of projects. Any projects not meeting the threshold criteria for higher potential effects set forth in Category 3 below and not meeting the criteria in Category 1 should be included in this category. Examples of these types of projects are minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic is not projected to meet the "140,000 to 150,000 annual average daily traffic (AADT)" criterion.

Category 3 includes projects that have the potential for meaningful differences among project alternatives. Only a limited number of projects meet this two-pronged test. To fall into this category, projects must.

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of DPM in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000, or greater, by the design year; and
- Projects proposed to be located in proximity to populated areas or in rural areas in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

EPA Emission Standards for Off-Road and On-Road Diesel Engines. EPA has established a series of increasingly strict standards to reduce emissions from new off-road diesel engines, culminating in the Tier 4 Final Rule of June 2004. Tier 1 standards were phased in from 1996 to 2000 (manufacture year), depending on the engine horsepower category. Tier 2 standards were phased in from 2001 to 2006. Tier 3 standards are being phased in from 2006 to 2008. Tier 4 standards, which likely will require supplemental emission control equipment to attain them, will be phased in from 2008 to 2015 (69 FR 38957-39273; June 29, 2004). These standards apply to construction equipment for the proposed project.

EPA has also established a series of increasingly strict standards to reduce emissions from new on-road heavy-duty diesel engines starting in 1988. The final and cleanest standards were established with the *2007 Heavy-Duty Highway Rule* (EPA, 2007). These emission standards, which were promulgated on December 21, 2000, require a 0.01 gram per horsepower-hour (g/hp-hr) for the new heavy-duty vehicles beginning with model year 2007. In addition, the NO_X and non-methane hydrocarbons (NMHC) standards of 0.20 g/hp-hr and 0.14 g/hp-hr, respectively, will be phased in between 2007 and 2010, on a percent-of-sales basis: 50 percent from 2007 to 2009 and 100 percent in 2010 (gasoline engines are subject to these standards based on a phase-in requiring 50 percent compliance in 2008 and 100 percent compliance in 2009). These standards result in substantial reduction in emissions of VOCs, and approximately 90 percent reduction in DPM and NO_X emissions for new heavy-duty trucks. Furthermore, with these rules, sulfur emissions from heavy-duty highway vehicles for the 2007 model year and newer will be reduced by more than 90 percent. The estimated future diesel truck emissions that are reported in the estimation of project emissions have factored in these regulations because they are incorporated in the CARB emissions model EMFAC2007, which was released in November 2006.

Climate Change. Climate change is analyzed in Chapter 3. Neither EPA nor FHWA has promulgated explicit guidance or methodology to conduct project-level GHG analysis. As stated on FHWA's climate change Web site[7], climate change considerations should be integrated throughout the transportation decision-making process – from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will facilitate decision making and improve efficiency at the program level, and it will inform the analysis and stewardship needs of project-level decision making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because there have been more requirements set forth in California legislation and executive orders regarding climate change, the issue is addressed

[7] http://www.fhwa.dot.gov/hep/climate/index.htm

in Chapter 3 of this environmental document and may be used to inform the NEPA decision. The four strategies set forth by FHWA to lessen climate change impacts do correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours traveled.

State Regulation/Standards

California Clean Air Act. The State of California began to set California Ambient Air Quality Standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The California Clean Air Act (CCAA) was enacted on September 30, 1988, and it became effective January 1, 1989. The CCAA requires all areas of the state to achieve and maintain the CAAQS by the earliest practicable date. Table 2.2.5-1 shows the CAAQS for criteria pollutants, as well as the other pollutants recognized by the state. As shown in this table, the CAAQS are generally more stringent than the NAAQS for most of the criteria air pollutants. In addition, the CAAQS include standards for other pollutants recognized by the state. These include sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Moreover, on April 28, 2005, CARB approved a new 8-hour-average O_3 standard of 0.070 ppm to further protect California's most vulnerable population (i.e., children) from the adverse health effects associated with ground-level O_3. The standard went into effect in early 2006.

According to the CAAQS, the SCAB is classified as an extreme nonattainment area for O_3 and nonattainment area for PM_{10} and $PM_{2.5}$. The SCAB complies with the state standards for sulfates, hydrogen sulfide, and vinyl chloride, but it is unclassified for the California standard for visibility-reducing particles. Table 2.2.5-3 provides the Basin's attainment status with respect to federal and state standards.

Table 2.2.5-3
South Coast Air Basin Attainment Status

Pollutant	Attainment Status Basis	
	National Standard	California Standard
Ozone (O_3), 1-hour average	N/A [a]	Extreme
Ozone (O_3), 8-hour average	Severe-17 [b]	Nonattainment
Carbon Monoxide (CO)	Attainment/Maintenance [c]	Attainment [c]
Nitrogen Dioxide (NO_2)	Attainment/Maintenance	Nonattainment [d]
Sulfur Dioxide (SO_2)	Attainment	Attainment
PM_{10}	Serious	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Lead (Pb)	Attainment [e]	Nonattainment
Sulfates (SO_4^{2-})	N/A	Attainment

N/A = not applicable

[a] The National 1-hour O_3 standard was revoked on June 15, 2005.

[b] A request for reclassification status to "extreme" nonattainment was submitted to EPA in September 2007.

[c] The SCAB was redesignated by EPA as attainment for CO effective June 11, 2007.

[d] State NO_2 standard was amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm The Office of Administrative Law approved the proposed amendments, and the new standards became effective March 20, 2008.

[e] In August 2009, CARB submitted a recommendation for nonattainment status of the Los Angeles County portion of SCAB based on the new federal lead standard (0.15 μg/m^3 rolling 3-month concentration).

Source: EPA, 2010; CARB, 2010b; SCAQMD, 2007.

California Diesel Fuel Regulations. This rule sets sulfur limitations for diesel fuel sold in California for use in on-road and off-road motor vehicles (CARB, 2004). Harbor-craft and intrastate locomotives were originally excluded from the rule but they were later included by a 2004 rule amendment (CARB, 2005). Under this rule diesel fuel used in motor vehicles, except harbor-craft and intrastate locomotives, has been limited to 500 ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm beginning September 1, 2006. (A federal diesel rule similarly limited sulfur content nationwide for on-road vehicles to 15 ppm beginning October 15, 2006.) Diesel fuel used in harbor craft in the SCAB also was limited to 500 ppm of sulfur starting January 1, 2006, and 15 ppm of sulfur by September 1, 2006. Diesel fuel used in intrastate locomotives (i.e., switch locomotives) was limited to 15 ppm of sulfur starting January 1, 2007.

Heavy-Duty Diesel Truck Idling Regulation. This CARB rule became effective February 1, 2005, and it prohibits heavy-duty diesel trucks from idling for longer than 5 minutes at a time, unless they are queuing, and provided that the queue is located beyond 100 ft (30.5 m) from any homes or schools (CARB, 2006).

California Drayage Truck Rule. In December 2007, CARB approved a new regulation to reduce emissions from heavy-duty drayage trucks (i.e., trucks committed to container cargo transport) at ports and intermodal railyards. This regulation includes an accelerated phase-out of existing vehicles to trucks that meet 2007 emission standards by 2014 (CARB, 2009). The regulation requires all drayage trucks that operate at ports and railyards to be registered in a “drayage truck registry” (DTR) by September 30, 2009. The rule sets two compliance deadlines:

- Phase 1: By January 1, 2010, all pre-1993 model year (MY) engines are to be retired and all drayage trucks with 1994-2003 MY engines would be required to be equipped with a CARB-approved Level 3 verified diesel emission control system (VDECS), such as a particulate filter.
- Phase 2: By January 1, 2014, all trucks would be required to further reduce emissions to meet the 2007 MY California or federal heavy-duty diesel-fueled on-road emission standards.

The regulation is expected to significantly reduce emissions of DPM and NO_X. In 2010, after full implementation of Phase 1, DPM emissions from drayage trucks would be reduced by 86 percent and NO_X emissions would be reduced by approximately 3 percent from 2007 levels. In 2014, after full implementation of Phase 2, NO_X emissions would be reduced by nearly 56 percent from 2007 levels. The regulation is expected to prevent approximately 1,200 premature deaths, with significant health cost savings of $8.7 billion through 2020.

California Climate Change Regulations. Climate change regulations and analysis are addressed in Chapter 3 of this EIR/EA.

Local Plans and Regulations

Regional Air Quality Plan. CARB coordinates and oversees state and federal air pollution control programs in California. CARB has divided the state into 15 air basins. Authority for air quality control within each basin has been given to local Air Pollution Control Districts (APCD) or Air Quality Management Districts (AQMD) to regulate stationary source emissions and develop local plans for achieving and maintaining attainment.

SCAQMD is the agency responsible for attaining state and federal clean air standards in the SCAB. SCAQMD works directly with SCAG, county transportation commissions, and local governments, and it cooperates actively with all state and federal government agencies. SCAQMD regulates stationary source emissions and has been given the authority to regulate mobile emissions as an indirect source. As such, it also has transportation-related programs aimed primarily at reducing the number of cars on the road and promoting the use of cleaner fuels and vehicles. In addition, SCAQMD is responsible for developing and adopting an AQMP that serves as the blueprint for all future rules necessary to bring the SCAB into compliance with federal and state clean air standards. CARB regulates motor vehicles and fuels.

SCAQMD is required to update its plans on a regular basis. Updates may be in the form of a new plan or an amendment. Plans range in scope from the regional AQMP to plans dealing with specific pollutants in specific geographic locales. Every 3 years, SCAQMD prepares an overall plan for air quality improvement. Each update of the plan includes revisions and amendments to the previous plan and has a 20-year horizon. The currently applicable Plan is the 2007 AQMP. It employs the most recent scientific findings, primarily in the form of updated emission inventories, ambient measurements, new meteorological episode data, and new modeling tools. The 2007 AQMP also incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, area sources, and on-road and off-road mobile sources.

The 2007 AQMP was adopted by the SCAQMD Governing Board on June 1, 2007. The 2007 AQMP Transportation Conformity Budgets were adopted by the Board on July 13, 2007, and they forwarded to CARB for its approval and subsequent submittal to EPA. Furthermore, on June 22, 2007, a state strategy was proposed by the AQMD Board that recommended more-aggressive actions to reduce emissions from mobile sources that contribute more than 80 percent of the particulate matter pollution in the region. On September 27, 2007, CARB adopted the revised State Strategy for the 2007 SIP and the 2007 AQMP as part of the SIP.

The Final 2007 AQMP builds upon improvements accomplished from previous plans, and it aims to incorporate all feasible control measures while balancing costs and socioeconomic impacts. The 2007 AQMP outlines the air pollution control measures needed to meet federal health-based standards for O_3 (8-hour standard) by 2024 and $PM_{2.5}$ by 2015. Because it will be more difficult to achieve the 8-hour O_3 standard compared to the 1-hour standard, the 2007 AQMP contains a substantial number of additional and improved emission reduction measures. The basic PM (PM_{10} and $PM_{2.5}$) control strategy contained in the 1997 and 2003 Plans, augmented by the additional $PM_{2.5}$ control measures included in this Plan revision (2007 AQMP), appears to be adequate to demonstrate attainment of the new federal $PM_{2.5}$ standard. The emissions reductions are expected to be achieved through implementation of new and advanced control technologies, as well as improvement of existing control techniques.

The 2007 AQMP includes 31 stationary and 30 mobile source control measures. These measures are derived from:

- SCAQMD Stationary and Mobile Source Control Measures;
- State Control Measures proposed by CARB;
- SCAQMD staff-proposed Policy Options to supplement CARB's Control Strategy; and
- Transportation Strategy and Control Measures provided by SCAG.

The AQMP control strategy for stationary and mobile source emissions is based on the following approaches:

- Energy efficiency and conservation;
- Equipment and facility modernization;
- Good management practices;
- Area source emission control programs;
- Market incentive/compliance flexibility; and
- Mobile source emission reduction programs.

AQMP control measures include further emission reductions from large VOC sources and in-use off-road vehicles and equipment, an Emission Fee Program for Port-related mobile sources, strengthening of high-occupancy vehicle (HOV) measures, introducing and enhancing transit and system management measures, establishing information-based transportation strategies, accelerating retirement of older high-emitting vehicles, improving smog checks, and modifying stationary source monitoring requirements.

The AQMP specifically listed control measures for Marine Vessels and Port Equipment. It indicated that through implementation of the cost-effective SCAQMD and CARB programs, the emissions have been reduced significantly. Currently, the California Maritime Air Quality Technical Working Group, which is comprised of CARB, EPA, SCAQMD, and the Ports, is exploring promising retrofit technologies to be used on marine vessels. The group has identified technologies that can reduce up to 90 percent of NO_X and PM emissions. For portside equipment, the new technologies that are being studied can have the potential to reduce VOC emissions by up to 40 percent and PM emissions up to 90 percent.

SCAQMD has published a handbook (*CEQA Air Quality Handbook, November 1993*) that provides local governments with guidance for analyzing and mitigating project-specific air quality impacts. This handbook provides standards, methodologies, and procedures for conducting air quality analyses in EIRs, and it was used extensively in the preparation of this analysis. In addition, SCAQMD has published a guidance document *(Localized Significance Threshold Methodology for CEQA Evaluations, June 2003b*) for evaluating localized effects from mass emissions during construction. This document was also used in the preparation of this analysis. The localized significance threshold (LST) methodology was provisionally adopted by the Governing Board in October 2003 and formally approved by SCAQMD's Mobile Source Committee in February 2005. SCAQMD currently recommends LSTs for PM_{10}, NO_2, and CO. LSTs represent the maximum level of pollutant emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard. The significance thresholds are developed based on: (1) the ambient concentrations of the pollutants for each source receptor area, and (2) the distance to the nearest sensitive receptor. For PM_{10}, LSTs were derived based on requirements in SCAQMD Rule 403 – *Fugitive Dust*.

On October 6, 2006, the SCAQMD Governing Board adopted the "*Final Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Threshold*". The document provides guidelines to estimate regional and localized $PM_{2.5}$ emissions and includes $PM_{2.5}$ LSTs for projects in SCAQMD jurisdiction.

SCAQMD adopts rules and regulations to implement portions of the AQMP. Several of these rules may apply to construction or operation of the project. The most pertinent SCAQMD rules to the proposed project are listed below.

- **Rule 402 – Nuisance**: A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.
- **SCAQMD Rule 403 – Fugitive Dust:** This rule prohibits emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area that remains visible beyond the emission source property line. During proposed project construction, best available control measures identified in the rule would be required to minimize fugitive dust emissions from proposed earth-moving and grading activities. These measures would include site pre-watering and re-watering as necessary to maintain sufficient soil moisture content. Additional requirements apply to construction projects on property with 50 or more acres of disturbed surface area, or for any earth-moving operation with a daily earth-moving or throughput volume of 5,000 cu yd or more three times during the most recent 365-day period. These requirements include submittal of a dust control plan, maintaining dust control records, and designating an SCAQMD-certified dust control supervisor.
- **Rule 431.2 – Sulfur Content of Liquid Fuels:** This rule is established to limit the sulfur content in diesel and other liquid fuels for the purpose of reducing the formation of sulfur oxides and particulates during combustion and to enable the use of add-on control devices for diesel-fueled internal combustion engines. The Rule applies to all refiners, importers, and other fuel suppliers such as distributors, marketers, and retailers, as well as users of diesel, low-sulfur diesel, and other liquid fuels for stationary source applications in the District. The Rule also affects diesel fuel supplied for mobile source applications. Low-sulfur diesel fuel (less than 15 ppm by weight sulfur) should also be utilized in all diesel-powered construction equipment.
- **Rule 1113 – Architectural Coatings:** Compliance with SCAQMD Rule 1113 on the use of architectural coatings and asphalt operations shall be implemented to reduce VOC emissions, as feasible. The rule limits the VOC content of architectural coatings and asphalt off-gas in the Basin so that these emissions do not exceed the allowable specified limits.
- **SCAQMD Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities:** The purpose of this rule is to limit emissions of asbestos, which is a toxic air contaminant, from structural demolition/renovation activities. The rule requires people to notify SCAQMD of proposed demolition/renovation activities and to survey these structures for the presence of ACMs. The rule also includes notification requirements for any intent to disturb ACM; emission control measures; and ACM removal, handling, and disposal techniques. All proposed structural demolition activities associated with proposed project construction would need to comply with the requirements of Rule 1403.

POLB/POLA Vessel Speed Reduction Program (VSRP). The Ports began this voluntary program in May 2001 for ships that call at the Ports to reduce their speed to 12 knots (kts) or less within 20 nautical miles (nm) of the Point Fermin Lighthouse. A reduction in vessel speed in the offshore shipping lanes (up to 13 kts for the largest container ships) can substantially reduce emissions from the main propulsion engines of the ships. The Clean Air Action Plan (CAAP) adopted the VSRP as control measure OGV-1, and it expands the program out to 40 nm from the Point Fermin Lighthouse.

POLB Clean Trucks Program (CTP). The POLB approved the Ports-specific CTP on February 19, 2008. The CTP was developed in collaboration with POLA and became a part of the CAAP. The POLB CTP requires drayage truck owners to scrap and replace old-model polluting trucks (approximately 16,000 trucks) working at the ports, with the assistance of a Port-sponsored grant or loan subsidy. Under the POLB "concession" plan, truckers can lease to own a new truck at an affordable rate, for as little as $500 per month. They can choose to work as employees or owner-operators.

Beginning October 1, 2008, pre-1989 trucks were banned. Beginning January 1, 2010, 1993 and older trucks will be banned, and 1994-2003 trucks will need to be retrofitted or replaced. The program progressively bans all trucks that do not meet 2007 EPA emission standards by 2012. To finance the $2 billion truck replacement program, POLB started a fee plan on loaded containers ($35 per loaded TEU and smaller; $70 for larger containers) since October 1, 2008.

Port of Long Beach Green Port Policy.
In November 2004, the POLB Board of Harbor Commissioners (BHC) directed the Port to develop a policy that would provide guidance for decision making and to establish a framework for environmentally friendly Port operations. The POLB Green Port Policy (GPP) was based on the previous Healthy Harbor Program, with environmental enhancement goals including air quality policies that would reduce harmful air emissions from Port activities (Ports, 2006b). As a means to implement the GPP, the POLB, in conjunction with POLA, adopted a Clean Air Action Plan for the Ports.

San Pedro Bay Clean Air Action Plan. The Ports jointly prepared the *San Pedro Bay Ports CAAP* in cooperation with SCAQMD, CARB, and EPA. The CAAP was developed to define implementation strategies to meet shared air quality improvement goals for both Ports. The CAAP includes a comprehensive set of goals, implementation strategies, and initiatives to reduce emissions from trucks, locomotives, harbor craft, and cargo-handling equipment.

CAAP Goals include a set of commitments (i.e., Foundations) that are addressed to achieve improved air quality and reduced health risks, while at the same time facilitating growth in regional economic benefits generated by the Ports. Accompanying the Foundations are a set of standards that apply to San Pedro Bay as a whole, individual projects proposed within the two Ports, and specific emissions sources. The latter standards apply to heavy-duty trucks, ocean-going vessels, cargo-handling equipment, harbor craft, and railroad locomotives. Implementation strategies embodied in the CAAP include lease requirements, changes in tariff policies, CEQA mitigations, incentives, voluntary measures, credit trading, capital lease-backs, government-backed loan guarantees, third-party discount leasing/ purchasing, franchises, joint powers authority trucking entity, environmental mitigation fee, and a recognition program.

The Ports released the Draft CAAP on June 28, 2006, for public review, and the revised Final Plan was approved by both the Los Angeles and Long Beach Board of Harbor Commissioners on November 20, 2006. The CAAP focuses on reducing emissions with two main goals: (1) reduce Port-related air emissions in the interest of public health; and (2) accommodate growth in trade. The Plan includes near-term measures implemented largely through the CEQA/NEPA process, tariffs, and new leases at both Ports.

The Port has negotiated and signed environmentally friendly "green" leases with several terminal customers. These "green" leases require environmental compliance that is above requirements by federal and state law. As a landlord port, leases are the primary mechanism for the Port to implement its environmental initiatives, including the CAAP.

The Port measures progress toward the goals of its air quality program by: (1) development of periodic annual emission inventories of Port operations (years 2002 and 2005 to date); and (2) updates to the CAAP. These efforts allow the Port, the community, and regulators to assess the progress of air quality programs and determine the best use of resources to address air quality problems. In addition, the Port maintains air monitoring locations in the Port to provide the community with information on current air quality conditions.

San Pedro Bay Standards. The POLB and the POLA are in the process of establishing the San Pedro Bay Standards (SPBS), which they will use as tools for future air quality planning. The SPBS will help the ports and air agencies to better understand and evaluate the long-term cumulative effects of future ports projects in conjunction with implementation of CAAP measures and existing regulations.

There are two components to the SPBS: (1) the Health Risk Reduction Standard, which proposes to reduce health risks from Port-related DPM emissions in residential areas surrounding the Ports by 85 percent in year 2023 compared to 2005 levels; and (2) the Emission Reduction Standard, which proposes to achieve a "fair share" reduction of Ports-related air emissions. These components address the primary air quality goals of the Port to reduce health risks to local communities from Port operations and to assist the region in attaining the ambient air quality standards. Once the SPBS are adopted, the Port will commit to revising the CAAP to require implementation of additional emissions control measures for purposes of achieving these goals.

The SPBS includes methodologies that can be used to assess whether a project is consistent with the SPBS. Based on the current draft methodologies, a project would be consistent with the Health Risk and Emission Reduction Standards if:

- The project environmental analysis is consistent with assumptions regarding the projected growth of operations at the Ports and the effect of existing CAAP and regulatory measures that were used to develop the Standards;
- The project complies with all of the applicable laws and regulations;
- The project implements all applicable Project-Specific and Source Specific Standards in the then-existing version of the CAAP; and
- The project environmental analysis assesses potentially practicable new emission reduction technologies beyond those required under the then-existing version of the CAAP and imposes a requirement that the project use any such technologies found to be feasible, available, and effective at reducing emissions as needed to achieve the Standards.

Development of the SPBS is a complex process that includes input from several members of the SPBS Technical Working Group (TWG), which is comprised of representatives from CARB, SCAQMD, and EPA. The Ports recently completed the Draft SPBS, which is currently under review by members of the SPBS TWG. The Ports anticipate that agreement between the TWG and the Ports on the SPBS will be achieved shortly, and at that time the Standards would be available for public review. These standards and guidelines are mainly related to the proposed project construction. The project air quality utilized all applicable standards and methodologies and is consistent with the SBPS.

POLB Climate Change/Greenhouse Gas Strategic Plan. The Port's commitment to protecting the environment from the harmful effects of Port operations, as stated in the Green Port Policy, necessitates the development of programs and projects to reduce GHG emissions. In addition to CARB's actions to formalize GHG regulations for the goods movement sector, the Port has begun work in this area.

The Ports Climate Change Program is discussed further in Section 3.3 of this EIR/EA.

The analysis conducted for this EIR/EA assumes that the proposed project will comply with the CAAP. Project mitigation measures applied to reduce air emissions and public health impacts are consistent with, and in some cases exceed, the emission-reduction strategies of the CAAP.

2.2.5.2 Affected Environment

Regional Setting

The Port is located within the 6,745-sq-mi (17,469-sq-km) SCAB. The SCAB is defined as encompassing all of Orange County; Los Angeles County, with the exception of Antelope Valley; and the non-desert portions of Riverside and San Bernardino counties. It consists of a coastal plain with interconnecting broad valleys and low hills. Elevations range from sea level to more than 11,000 ft (3,353 m) above MSL. SCAQMD has jurisdiction over air quality issues within the SCAB.

The project site is located within a major ocean port, characterized by heavy industrial and transportation uses, including ocean-going vessels; heavy-duty on-road and off-road vehicles; and light-duty motor vehicles. There is little open space or recreational and residential land use in the project vicinity. The applicable general plans (City of Long Beach and Port) envision future intensification of cargo-handling activities within the Port.

The climate of the project region is categorized as Mediterranean, characterized by warm, dry summers, low precipitation, and mild winters. The average daily winter temperature is 56 degrees Fahrenheit (^{o}F) (13.3°C), and the average daily summer temperature is 75^{o}F (23.9^{o}C). More than two-thirds of the annual rainfall occurs from December through March, with approximately 90 percent occurring between December and April.

The mean annual precipitation in the Long Beach area over a 50-year period (1958-2007) was 11.96 in (304 mm). In nearly all months of the year, evaporation exceeds precipitation.

Topography is a major factor influencing wind direction over the project area. The predominant daily winds in the Long Beach area are onshore morning flows from the southwest at a mean speed of 7.3 mph (11.75 kilometers per hour [km/hr]). The afternoon and evening winds are generally northeasterly at speeds ranging from 0.2 to 4.7 mph (0.3 to 7.6 km/hr). There is little seasonal variability in this pattern. Occasionally during autumn and winter, "Santa Ana" conditions develop from a high-pressure zone to the east, bringing dry, high-velocity winds from the deserts over Cajon Pass to the coastal region. These winds, gusting to more than 80 mph (129 km/hr), can reduce relative humidity to less than 10 percent. Generally, the worst air quality in the coastal area occurs during Santa Ana winds, as they transport contaminated air from the east to the ocean.

The Palos Verdes Hills, located north of the project site, have a major influence on wind flow in the Port area. For example, during afternoon southwesterly sea breezes, the Palos Verdes Hills often block this flow and create a zone of lighter winds in the inner harbor area. During strong sea breezes, this flow can bend around the north side of the hills and end up as a northwest breeze in the inner harbor area. This topographic feature also deflects northeasterly land breezes that flow from the coastal plains to northerly direction through both San Pedro Bay Ports.

The SCAB experiences a persistent temperature inversion (i.e., increasing air temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical mixing and dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground, the lower air layer is warmed and its temperature approaches that of the base of the inversion (upper) layer until the inversion layer finally breaks, which allows vertical mixing with the lower layer. This phenomenon is observed in the mid to late afternoon on hot summer days, when the smog appears to clear up suddenly. Winter inversions frequently break by mid morning.

The greatest air pollution impacts throughout the Basin occur from June through September. This condition is generally attributed to the large amount of pollutant emissions, light winds, and shallow vertical atmospheric mixing. This frequently reduces pollutant dispersion, thus causing elevated air pollution levels. Pollutant concentrations in the Basin vary with location, season, and time of day. O_3 concentrations, for example, tend to be lower along the coast, higher in the near inland valleys, and lower in the far inland areas of the Basin and adjacent desert.

Existing Ambient Air Quality

Criteria Pollutants. A network of air quality monitoring stations, located throughout the SCAB, characterize the air quality environment in the Basin by measuring and recording pollutant concentrations in the local ambient air. The Basin is divided into 38 source/receptor areas (SRAs), and the project is located in SRA number 4, South Coastal Los Angeles County. The nearest SCAQMD air monitoring station to the project site is the North Long Beach Monitoring Station (Station No. 072), which is located at 3648 Long Beach Boulevard, approximately 4 mi (6.4 km) northeast of the project site. All criteria pollutants are monitored at this station (i.e., O_3, CO, NO_2, Pb, SO_2, PM_{10}, and $PM_{2.5}$). Federal and state standards that have been established represent the maximum allowable atmospheric concentrations of these pollutants (see Table 2.2.5-1).

Ambient air quality data from the North Long Beach monitoring station for the past 4 years (2005 through 2009), are summarized in Table 2.2.5-4. The table includes maximum recorded pollutant levels and the number of days in each year that the pollutant level exceeded the national and state standards.

Table 2.2.5-4 also shows that exceedances of the California standards, as recorded at the North Long Beach station for O_3 (1-hour, California standard), PM_{10} (24-hour and annual), and $PM_{2.5}$ (24-hour and annual) on one or more occasions from 2005 through 2008. The national standards were exceeded only for $PM_{2.5}$ (24-hour and annual). No exceedances of either the state or national standards were recorded for SO_2, Pb, NO_2, or CO.

In 2006, the Ports initiated air monitoring studies to collect representative ambient pollutants and meteorological data within the Ports' operational region of influence (ROI). The POLB air monitoring stations are located in two areas at the Port: one in the Inner Harbor area, near West Long Beach, and a second in the Outer Harbor area, near the breakwater at the end of Navy Mole Road. These monitoring stations were developed to expand upon and complement other regional air monitoring efforts. The data gathered at these

Table 2.2.5-4
Summary of Criteria Pollutants Data
(Measured at North Long Beach Monitoring Station)

Pollutant	Averaging Time	Standard	2005	2006	2007	2008	2009
Ozone (O_3)	(1-Hour)	Maximum Concentration (ppm)	0.09	0.08	0.1	0.09	0.09
		Days > CAAQS (0.09 ppm)	0	0	**1**	0	0
	(8-Hour)	Maximum Concentration (ppm)	0.069	0.058	0.073	0.074	0.067
		Days > NAAQS (0.08 ppm)	0	0	0	0	0
		Days > CAAQS (0.07 ppm)[a]	0	0	**1**	**1**	0
Particulate Matter (PM_{10})	(24-Hour)	Maximum Concentration ($\mu g/m^3$)	66	78	75*	62	62
		Days > NAAQS (150 $\mu g/m^3$)	0	0	0	0	0
		Days > CAAQS (50 $\mu g/m^3$)	**24**	**30**	**30**	**6**	n/a
	(Annual)	National Annual Average (50 $\mu g/m^3$)[b]	30	31	34	29	n/a
		State Annual Average (20 $\mu g/m^3$)b	**30**	**31**	**31**	**31**	n/a
Particulate Matter ($PM_{2.5}$)	(24-Hour)	Maximum Concentration ($\mu g/m^3$)	54	59	83	57	63
		Days > NAAQS (35 $\mu g/m^3$)[c]	**12**	**5**	**14**	**8**	**6**
		98th Percentile ($\mu g/m^3$)	41	35	41	39	34
		3-year Avg 98th Percentile ($\mu g/m^3$)[d]	45	41	39	38	37
	(Annual)	Annual Arithmetic Mean (15 $\mu g/m^3$)	**15.9**	14.1	14.6	14.1	13.6
Carbon Monoxide (CO)	(1-Hour)	Maximum Concentration (ppm)	4.2	4.2	3.3	3.3	2.9
		Days > NAAQS (35 ppm)	0	0	0	0	0
		Days > CAAQS (20 ppm)	0	0	0	0	0
	(8-Hour)	Maximum Concentration (ppm)	3.5	3.4	2.6	2.5	2.2
		Days > NAAQS (9 ppm)	0	0	0	0	0
		Days > CAAQS (9.0 ppm)	0	0	0	0	0
Nitrogen Dioxide (NO_2)	(1-hour)	Maximum Concentration (ppm)	0.14	0.10	0.11	0.13	0.11
		Days > CAAQS (0.25 ppm)[e]	0	0	0	0	0
	(Annual)	Maximum Concentration (ppm)	0.024	0.022	0.020	0.021	0.021
		Days > NAAQS (0.053 ppm)	0	0	0	0	0
Sulfur Dioxide (SO_2)	(24-hour)	Maximum Concentration (ppm)	0.010	0.010	0.010	0.012	0.005
		Days > CAAQS (0.04 ppm)	0	0	0	0	0
		Days > NAAQS (0.14 ppm)	0	0	0	0	0
	(Annual)	Annual Arithmetic Mean (0.03 ppm)	0.002	0.001	0.003	0.002	n/a

Exceedances shown in **bold;** ppm – parts per million; $\mu g/m^3$ – micrograms per cubic meter; n/a – not available

* The data reported for 2007 represent the second high value. The first high value measured at the station (232 $\mu g/m^3$) is flagged as “exceptional event” and occurred on October 21, 2007, which coincides with southern California wildfires in 2007.

[a] The new California 8-hour-average O_3 standard was adopted by CARB on April 28, 2005; therefore, the exceedance statistics are not applicable before this date.

[b] State statistics are based on California-approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.

[c] Based on 2004-2006 monitored data, EPA tightened the 24-hour standard of $PM_{2.5}$ from the previous level of 65 $\mu g/m^3$. The updated area designation became effective in October 2009.

[d] Attainment condition for $PM_{2.5}$ is that the 3-year average of the 98th percentile of 24-hour concentrations at each monitor within an area must not exceed the standard (35 $\mu g/m^3$).

[e] NO_2 standard was amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. The Office of Administrative Law approved these amendments, and the new standards became effective March 20, 2008.

Source: CARB, 2009a; and EPA, 2009.

stations are available from September 2006 (POLB, 2008b). These data are considered in context with the North Long Beach monitoring station for comparison purposes and to ensure the use of representative ambient data. Table 2.2.5-5 presents the maximum pollutant concentrations measured at these stations for the past 3 years (2007 to 2009). It should be noted that according to the POLB monitoring Web site, all available data is preliminary (as of July 2010). At the time of preparation of this EIR/EA, the POLB meteorological monitoring program had not finalized a completed set of annual meteorological data. Of the four POLA monitoring stations, the annual data currently available from the POLA Wilmington Community site (located at the Saints Peter and Paul School) are the most representative of the project area conditions. These data were used as input for the dispersion modeling and health risk analysis in determining potential project impacts.

Toxic Air Contaminants: Toxic air contaminants (TACs) consist of a variety of compounds, including metals, minerals, hydrocarbon-based chemicals, and soot. There are hundreds of different types of air toxics, with varying degrees of toxicity. Sources of TACs include industrial processes, such as petroleum refining and chrome-plating operations; commercial operations, such as gasoline stations and dry cleaners; and motor vehicle exhaust. TACs are a concern in the SCAB because of the large number of mobile sources and industrial facilities throughout the basin. Toxicity of TACs is studied by the California Office of Environmental Health Hazard Assessment (OEHHA).

California regulates TACs through its Air Toxics Program, which is mandated in Chapter 3.5 – Toxic Air Contaminants of the Health and Safety Code (H&SC Section 39660 *et seq.*) and Part 6 – Air Toxics "Hot Spots" Information and Assessment (H&SC Section 44300 *et seq.*).

The regulatory approach used in controlling TAC levels relies on a quantitative risk assessment process rather than on ambient air conditions to determine allowable emissions from the source. In addition, for carcinogenic air pollutants, there is no safe concentration in the atmosphere. Local concentrations can pose a health risk and are termed "toxic hot spots".

Table 2.2.5-5
Maximum Pollutant Concentrations
Measured at POLB Air Monitoring Stations from 2007 to 2009**

Pollutant (Concentration Unit)	Averaging Period	National Standard	State Standard	Inner Port Station Data			Outer Port Station Data		
				2007	2008	2009	2007	2008	2009
Ozone (ppm)	1-hour	— [a]	0.09	0.093	**0.106**	**0.100**	**0.1**	**0.397**	**0.127**
	8-hour	0.075	0.07	0.067	0.068	0.055	0.064	0.068	0.072
PM_{10} ($\mu g/m^3$)	24-hour	150	50	**175** [c]	**161**	**579** **	**119** [c]	**133**	**201** [c]
$PM_{2.5}$ ($\mu g/m^3$)	24-hour	35[b]	—	60 [c]	56	**105** [c,**]	61 [c]	**67**	**66**
CO (ppm)	1-hour	35	20	12.3	**24.5**	17.8	—[d]	—[d]	—[d]
	8-hour	9	9.0	8.8	7.9	4.4	—[d]	—[d]	—[d]
NO_2 (ppm)	1-hour	—	0.18	0.123	0.135	0.123	0.159	0.123	0.23
SO_2 (ppm)	1-hour	—	0.25	**0.31**	**0.35**	0.23	**0.32**	**0.33**	
	24-hour	0.14	0.04	0.039	0.026	0.022	0.030	0.031	0.026

Exceedances shown in ***bold***

** *According to the POLB monitoring Website all data is preliminary (accessed July 8, 2010).*

[a] *The National 1-hr ozone standard was revoked on June 15, 2005.*

[b] *Based on 2004-2006 monitored data, EPA tightened the 24-hour standard of $PM_{2.5}$ from the previous level of 65$\mu g/m^3$. The updated area designation will became effective in October 2009.*

[c] *Excludes elevated values that were recorded during wildfires.*

[d] *Data are not available.*

Source: POLB, 2010.

SCAQMD conducted the most comprehensive study on air toxics in the SCAB called *Multiple Air Toxics Exposure Study* (MATES-II [March 2000] and MATES III [January 2008]). The monitoring program measured more than 30 air toxics, including gaseous and particulate TACs. The monitoring program was accompanied by a computer modeling study in which SCAQMD estimated the risk of cancer from breathing toxic air pollution throughout the region, based on emissions and weather data. MATES-II found that the average cancer risk in the region from carcinogenic air pollutants ranged from approximately 1,100 in a million to 1,750 in a million, with an average regional risk of approximately 1,400 in a million. The higher risk levels were found in the urban core areas in south central Los Angeles County, in Wilmington adjacent to the Port, and near freeways.

Overall, the study showed that airborne DPM contributed approximately 70 percent of the total cancer risk. Mobile sources accounted for approximately 90 percent of that risk, and industries and other stationary sources accounted for the remaining 10 percent.

In January 2008, a draft study report of MATES III became available for a 90-day public review and comment period, which ended April 4, 2008. The study is a follow-up to MATES II and focuses on the carcinogenic risk from exposure to air toxics. The Draft MATES III Report was revised after the public review period; the revised document, the Final MATES III Report, was released in September 2008. The results indicate that:

- Across the Basin, the population-weighted risk was 853 in one million, which is approximately 8 percent lower compared to the MATES II period of 931 per million;
- The overall average lifetime risk from TACs in the Ports area experienced an approximate 17 percent increase in risk. The 2005 average population-weighted air toxics risk in the Ports area was estimated to be approximately 1,415 per million, compared with 1,208 per million lifetime cancer risk as estimated for the MATES II period (1998-1999);
- Mobile source toxics account for 94 percent of risk; and
- Diesel accounts for 84 percent of air toxics risk.

As described above, the Ports' CAAP is designed to substantially reduce DPM emissions and health risks from the operations of port-related ships, trains, trucks, terminal equipment, and harbor craft (Ports, 2006a). The CAAP proposes to cut DPM emissions from port-related sources by at least 47 percent within 5 years (i.e., by 2011) (Ports, 2006a).

Based on the finding that DPM is a significant contributor to cancer risk in the region, SCAQMD has approved fleet rules to limit diesel exhaust emitted by municipal vehicle fleets, trash trucks, street sweepers, taxis, shuttles, and buses in the region. That rule will be one of many measures outlined in a comprehensive plan to reduce toxic air pollution from mobile and stationary sources. Other programs to reduce diesel emissions include SCAQMD grant programs that cover conversion of diesel equipment to alternative fuels.

AB 1807 (Tanner) set up a statewide process to determine the need for methods to set standards for TACs. The process includes identification of TACs, determination of emissions and ambient levels of the identified compounds, preparation of regulatory needs documents, and establishment of minimum statewide emission control standards by CARB.

Asbestos. According to the California Division of Mines and Geology (CDMG), the project location is not an area of naturally occurring asbestos. Naturally occurring asbestos areas are identified based on the type of rock found in the area. Asbestos-containing rocks found in California are ultramafic rocks, including serpentine rocks, which are not present in the project area (CDMG, 2003). Based on the project's ISA study, the bridge and appurtenances may have ACM in the form of expansion joint compound (Diaz Yourman & Associates, 2007). ACM has been identified as a hazardous airborne contaminant; therefore, demolition of the existing Gerald Desmond Bridge would be subject to the applicable rules and regulations, as listed earlier in this section. These regulations require demolition activities to minimize asbestos released into the air. The ISA also suggests that all buildings requiring demolition should be screened for ACM.

Secondary $PM_{2.5}$ Formation. Primary $PM_{2.5}$ particles are directly emitted into the atmosphere, while secondary particulates are formed through atmospheric chemical reactions of precursor gases. Primary $PM_{2.5}$ includes diesel soot, fossil fuel combustion products, road dust, and other fine particles. Secondary $PM_{2.5}$, which includes products such as sulfates, nitrates, and complex carbon compounds, are formed from reactions with directly emitted NO_X, SO_X, VOCs, and ammonia (SCAQMD *et al.,* 2006). Project-generated emissions of NO_X, SO_X, and VOCs would contribute toward secondary $PM_{2.5}$ formation some distance downwind of the emission sources; however, the air quality analysis in this EIR/EA focuses on the effects of direct $PM_{2.5}$ emissions generated by the proposed project and their ambient impacts. This approach is consistent with the recommendations of SCAQMD (SCAQMD, 2006d).

Ultrafine Particles. Although EPA and the State of California currently regulate and monitor respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$), there is an increased level of interest on the health impacts of the smallest size fraction of particulates, namely the ultrafine particles (UFP). UFPs are defined as the particles with diameter of less than or equal to 0.1 micron (μm). UFPs are formed mainly during a combustion cycle, independent of fuel type. With diesel fuel, UFPs can be formed directly during combustion. With gasoline and natural gas (liquefied or compressed), the UFPs are derived mostly from the lubricant oil. UFPs are emitted directly from the tailpipe as solid particles, such as soot (i.e., elemental carbon) and metal oxides; and semi-volatile compounds (e.g., sulfates and hydrocarbons) that coagulate to form particles.

The research regarding UFPs is in its infancy but suggests that UFPs might be more hazardous to human health than the larger PM_{10} and $PM_{2.5}$ particles (termed fine particles) due to size and shape. Because of the smaller size, UFPs are able to travel more deeply into the lung (i.e., the alveoli) and are deposited in the deep lung regions more efficiently than fine particles. UFPs are inert; therefore, normal bodily defense mechanisms do not recognize the particle. UFPs might have the ability to travel across cell layers and enter into the bloodstream and/or into individual cells. With a large surface area-to-volume ratio, other entities might attach to the particle and travel into the cell as a kind of "hitchhiker." Current UFP research primarily involves roadway exposure. Preliminary studies suggest that more than 50 percent of an individual's daily exposure is from driving on highways. Levels appear to drop off rapidly as one moves away from major roadways. Little research has been done directly on ships and off-road vehicles. CARB is currently measuring and studying UFPs at the San Pedro Bay Ports. Work is being done on filter technology, including filters for ships, which appears promising. The Port actively participates in the CARB testing at the Port and will comply with all future regulations regarding UFPs. In addition, measures included in the CAAP aim to reduce all emissions Port-wide.

Atmospheric Deposition. The fallout of air pollutants to the surface of the earth is known as atmospheric deposition. Atmospheric deposition occurs in both a wet and dry form. Wet deposition occurs in the form of precipitation or cloud water and is associated with the conversion in the atmosphere of directly emitted pollutants into secondary pollutants such as acids. Dry deposition occurs in the form of directly emitted pollutants or the conversion of gaseous pollutants into secondary PM. Atmospheric deposition can produce watershed acidification, aquatic toxic pollutant loading, deforestation, damage to building materials, and respiratory problems.

The CARB and the SWRCB are in the process of examining the need to regulate atmospheric deposition for the purpose of protecting fresh and saltwater bodies from pollution. Port emissions deposit into local waterways and regional land areas. Emission sources from the proposed project alternatives would produce DPM, which contains trace amounts of toxic chemicals. Through the CAAP, the Port will reduce air pollutants from its future operations, which will work towards the goal of reducing atmospheric deposition for purposes of water quality protection. The CAAP will reduce air pollutants that generate acidic and toxic compounds, including emissions of DPM, NO_X, and SO_X.

Sensitive Receptors. Some population groups, such as children, the elderly, and acutely and chronically ill persons, especially those with cardio-respiratory problems, are considered more sensitive to air pollution than others. Sensitive receptor locations, as defined by SCAQMD (2006), include schools, residential areas, day-care centers, convalescent homes, hospitals, and rehabilitation centers. Residential areas are considered sensitive to air pollution because residents, including children and the elderly, tend to be at home for extended periods of time, resulting in sustained exposure to pollutants. The nearest residences are located east of the eastern project limit.

Sensitive receptors in the project vicinity are shown in Exhibit 2.2.5-1. The nearest schools to the project area include Cesar Chavez (730 W. 3rd Street) and Edison Elementary Schools (625 Maine Avenue), located approximately 0.3-mi and 0.35-mi (483 m and 567 m) east of the project site, respectively. The nearest daycare facility is the Childtime Learning Center (1 World Trade Center), 0.5-mi (800 m) east of the project site. The nearest medical facility is the St. Mary Medical Center (432 E. 10th Street) approximately 1.3 mi (2 km) northeast of the eastern project limit.

2.2.5.3 Environmental Consequences

The NEPA baseline conditions for determining project impacts is based on the No Action Alternative, which is defined as activities associated with the existing bridge maintenance, and it would not require federal permits or funding. Impacts associated with the proposed project are determined by comparing the project-related emissions level to the No Action Alternative conditions (i.e., the incremental difference). Comparison of the project-related emissions with the year 2005 (year of the notice of preparation [NOP] of the environmental document – CEQA Baseline) is also provided in this analysis; however, discussion of the results in terms of CEQA effects and the significance of these effects when compared to the CEQA Baseline or thresholds are provided in Chapter 3 of this EIR/EA. Any references to CEQA, state, or local agency thresholds have been included for consideration of the potential impacts pursuant to CEQA provided in Chapter 3 (Section 3.2.2 [Air Quality]).

Applicable CAAP Control Measures. As part of the Port's commitment to promote the GPP and implement CAAP, the proposed project construction and operation would employ all applicable control measures included in the CAAP. The measures employed by the project to reduce air pollutant emissions include:

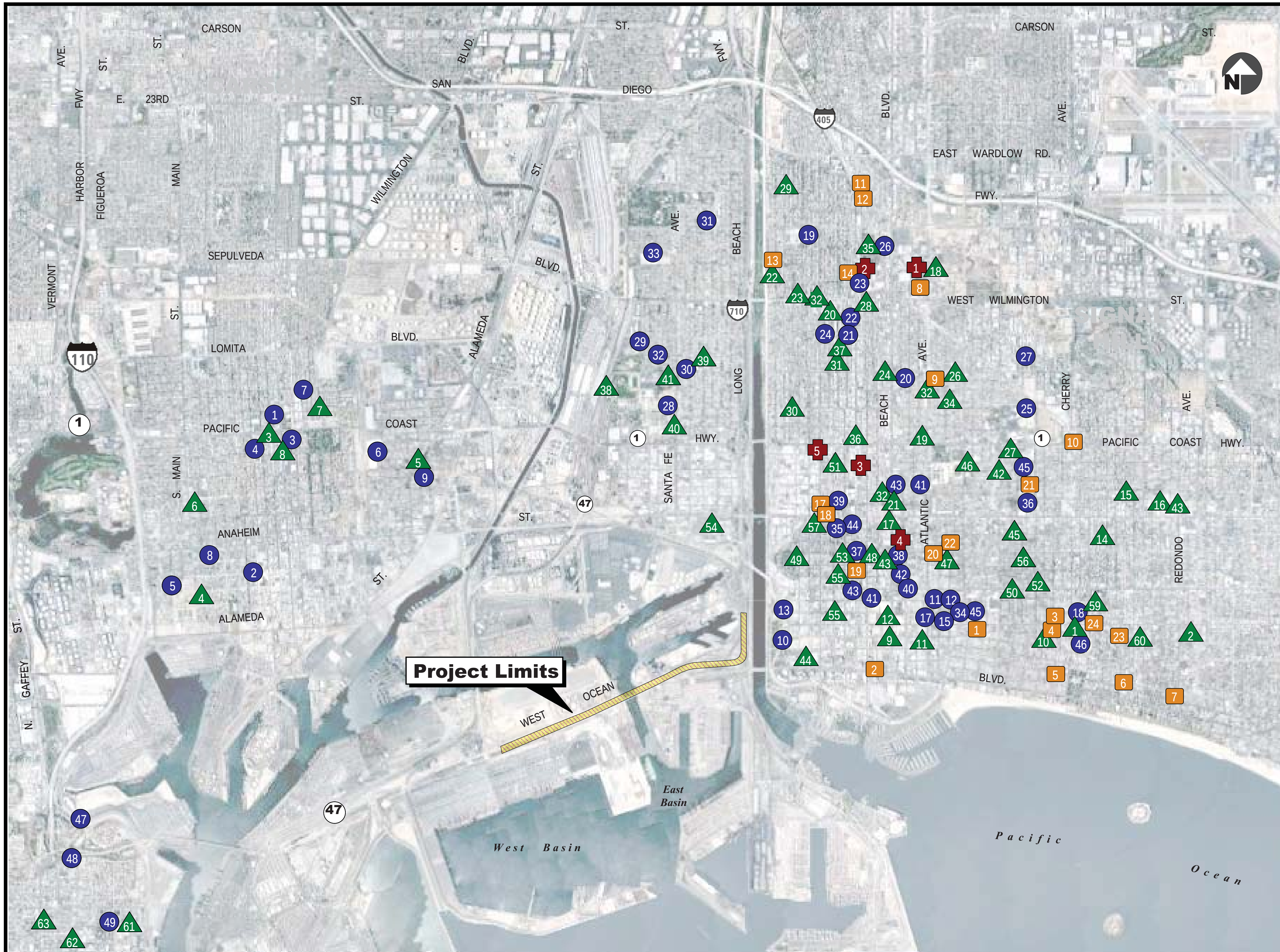
- Project construction contractors would use construction equipment that, at a minimum, would achieve EPA Tier 3 non-road equivalent standards.
- Project heavy-duty construction equipment would use clean fuels, such as ultra-low sulfur fuel or compressed natural gas, and oxidation catalyst.
- On-road heavy-duty trucks during construction, as well as the heavy-duty trucks that call at the Port's terminals, would comply with the CAAP control measure HDV1, which would replace or retrofit the existing Port's truck fleet by 2012 to comply with the "clean" truck measure. The control measure requires trucks of model year 1992 and older to meet or be cleaner than the EPA 2007 on-road truck emission standard (0.01 g/bhp-hr for PM) and have the cleanest available NO_X emission rate at the time of replacement or retrofit, but not greater than the 2007 NO_X emission standards.
- In the event that tugboats are used in construction activities, they would be of EPA Tier 2 through 4 standards, which is with the highest standards available at the time of project construction.

Furthermore, construction of the proposed project would comply with SCAQMD applicable rules and regulations, such as Rule 403 (Fugitive Dust Control), to reduce regional and localized PM_{10} and $PM_{2.5}$ emissions associated with earthwork activities; Rule 1113 (Architectural Coatings) to limit the amount of VOC emissions from paving, asphalt, concrete curing, and cement coating operations; and Rule 1403, to control asbestos emissions from demolition activities.

Air Quality Assessment Methodology

This air quality analysis is based on the methodology and assumptions which are consistent with the requirements of NEPA, CEQA, the CAAAs of 1990, the CCAA of 1988, and the CAAP. The study also utilizes guidelines and procedures provided in applicable air quality analysis protocols such as *Air Quality and Risk Assessment Protocol for Projects at the Port of Long Beach* (POLB, 2007c); *Transportation Project-Level Carbon Monoxide Protocol (CO Protocol)* (Caltrans, 1998a [UCD-ITS-RR-97-21, 1997]); *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (Guidelines)* (EPA, 2006a); and *Interim Guidance Update on Air Toxics Analysis in NEPA Documents* (FHWA, 2009).

Construction Emissions. Construction impact analysis is not required by Caltrans and FHWA, pursuant to NEPA for projects having a construction schedule not longer than 5 years. The proposed project has an estimated construction schedule that extends into a fifth year if demolition of the existing bridge is included; therefore, it would qualify for quantitative analysis under that criterion. However, Caltrans, as a matter of policy, does not provide quantitative construction impact analysis, except for projects proposed within the San Joaquin Valley, where it is required by regulation. The POLB, which is the local agency sponsor for the proposed project, requires such an analysis for all of its projects; therefore, a quantitative construction impact analysis is included pursuant to POLB CEQA requirements.



SENSITIVE RECEPTORS

Child Care Centers

1. Our Saviour's Lutheran Preschool
2. Phases An Early Learning Comp.
3. Munchkin Center
4. New Harbor Vista Child Development Center
5. Wilmington Park Children's Center
6. Yvette's Daycare
7. Sanchez Family Child Care
8. Voa/Cesar Chavez Head Start
9. A Love 4 Learning Academy
10. Carousel Preschool
11. YMCA Fairfield 3rd Street Preschool
12. Young Horizon's Child Development Centers
13. Coronado Head Start Child Care Center
14. First Foursquare Church Preschool
15. Huntington Academy Preschool
16. Simply Kare Child Development Center
17. 12th Street Head Start
18. Long Beach Day Nursery
19. Atlantic Headstart
20. Comprehensive Child Development
21. Elm Street Head Start
22. Fords Family Daycare
23. Kelly's Kids Daycare Center
24. Long Beach Blvd. Head Start
25. Long Beach Center For Child Development
26. Long Beach Child Development Center
27. Long Beach City College Child Development
28. Oakwood Children's Center
29. Old King Cole Day Care
30. P.A.L. Family Day Care
31. Pacific Head Start
32. Ruiz Family Daycare
33. Signal Hill Head Start
34. Smart & Manageable
35. Tender Child Care
36. Young Horizons Child Development Centers
37. Young Horizons Child Development Centers
38. Cabrillo Child Development Center
39. Garfield Child Head Start
40. Job Corp Head Start
41. West Child Development Center
42. Bundle of Joy Day Care 2
43. Child Care Center at St. Mary Medical Center
44. Childtime Learning Center
45. Gabiota Head Start
46. Jenkins Day Care
47. Kelly's Care
48. Little Lighthouse Educational Childcare Center
49. Lucy's Baby Care
50. My Three Kids Tons Of Fun Day Care
51. N2 Lil Folkz
52. Ole King Cole Dev Center
53. Pine Head Start
54. Play House, The
55. Progressive Steps Children Center
56. Vincent Family Child Care
57. West Anaheim Child Care Center
58. Young Horizons/Lel Jardin De La Felicidad
59. Bethany Preschool
60. Great Beginnings
61. World of Tots LA

Schools

1. Avalon High School
2. Banning New Elementary School #1
3. First Baptist Christian School
4. Fries Ave. Elementary School
5. Hawaiian Avenue Elementary School
6. Holy Family Preschool and Elementary School
7. Phineas Banning Senior High School
8. Saints Peter & Paul School
9. Wilmington Park Elementary School
10. Cesar Chavez Elementary
11. Constellation Community Charter Middle
12. Saint Anthony High School
13. Edison Elementary
14. Franklin Classical Middle
15. Saint Anthony Preschool/Elementary
16. Select Community Day (Secondary)
17. Stevenson Elementary
18. City Christian School
19. Birney Elementary
20. Burnett Elementary
21. Cambodian Christian
22. Holy Innocent Elementary School
23. Jackie Robinson Academy
24. Lafayette Elementary School
25. Mary Butler Elementary
26. Oakwood Academy
27. Signal Hill Elementary School
28. Cabrillo (Juan Rodriguez) High School
29. Hudson Daycare and Elementary School
30. James A. Garfield Elementary
31. Muir Elementary
32. Saint Lucy School
33. Stephens Middle
34. Abraham Lincoln Elementary School
35. Artesia Well Preparatory Academy
36. Creative Arts Daycare and Elementary School
37. First Baptist Church School
38. First Lutheran Daycare, Preschool & Elementary School
39. George Washington Middle School
40. Long Beach Montessori School
41. Polytechnic High School
42. Renaissance High School for the Arts
43. Roosevelt Academy
44. The New City School
45. John G. Whittier Elementary School
46. Burbank Elementary
47. Harbor Occupational Center
48. Barton Hill Elementary School
49. Port of LA High School & Charter School

Hospitals

1. Miller Children's Hospital; Long Beach Memorial Medical Center
2. Pacific Hospital of Long Beach
3. Long Beach Doctors Hospital
4. St Mary Medical Center
5. Tom Redgate Memorial Hospital

Convalescent Homes

1. Bellagio Manor
2. Breakers Of Long Beach, The
3. Colonial Care Center
4. Crofton Mannor Inn
5. Wells House
6. Broadway By The Sea
7. Villa Via Redondo Care Home
8. Atlantic Memorial Care Center
9. Caruthers Royale Care
10. Courtyard Care Center
11. Deluxe Guest Home
12. Deluxe Guest Home II
13. Rmr Residential Care Facility, LLC
14. Royal Care Skilled Nursing Center
15. Burnett Home Care
16. Loram Mannor
17. Harbor View Rehabilitation Center
18. Regency High School
19. Healthview Pine Villa Assisted Living
20. Olive Tree Home
21. Skylight Convalescent Hospital
22. Villa Maria Care Center
23. Edgewater Convalescent Hospital
24. Ruby's Guest House

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Exhibit 2.2.5-1 Sensitive Receptor Locations

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Federal guidance is not available for calculating construction impacts. Accordingly, the screening criteria, significance thresholds, and analysis methodologies in SCAQMD's guidance document *CEQA Air Quality Handbook, November 1993* (Handbook) were used to calculate air pollutant emissions from construction of the proposed project and to determine the significance of construction emissions. SCAQMD has promulgated daily emission thresholds for construction and operational activities. SCAQMD thresholds are set at a level that either promotes or maintains regional attainment of the relevant ambient air quality standards. Based on the Handbook guidelines, daily emissions were calculated for a worst-case day. The worst-case day represents the maximum or peak daily emissions that can reasonably be expected during any phase of construction. The construction schedule and information needed to perform emissions analysis were provided by the project construction engineers. This information include type and number of pieces of equipment used in each phase, amount or area of soil disturbance and cut and fill material, number of haul trucks and construction workers, and average trip length of haul trucks and workers commuting to and from the jobsite.

To estimate peak daily construction emissions, daily emissions were forecast for a period with most-intensive construction activities wherein a relatively large amount of construction would occur from overlapping construction phases during each year of construction.

The CARB OFFROAD 2007 model was used to develop exhaust emission factors for the various types of off-road construction equipment that would be used for the project construction. The EMFAC2007 model was used to develop the emission factors for on-road trucks and employee vehicles. Fugitive dust emission factors were based on guidance from SCAQMD.

The localized effects from the onsite portion of the mass daily emissions to the offsite sensitive receptors were evaluated for each phase of construction using the guidelines in the *Localized Significance Threshold Methodology for CEQA Evaluations* (SCAQMD, 2003b). It should be noted again that Caltrans does not utilize these thresholds, and they have been included for purposes of CEQA impact analysis discussed in Section 3.2.2.

Operational Emissions. For operational emissions, the impacts of the project-related air pollutant emissions from direct and indirect sources were considered in the analysis.

Regional air quality impacts directly associated with operation of the project would include emissions from vehicle traffic along the study area roadways. The Bridge Replacement Alternatives would provide a new bridge with more vertical clearance than the existing bridge. In general, this could affect vessel traffic by allowing the passage of taller, larger marine vessels through the Back Channel, and could indirectly affect local air quality; however, as discussed below, vehicular emissions would constitute the primary emission source associated with operation of the proposed project. The direct emissions associated with vehicle traffic were estimated based on the daily traffic volumes and vehicle miles traveled (VMT) within the project study area, using the modeled emission factors from EMFAC2007.

For this study, the operational emissions were estimated for the opening year 2015 and the horizon year 2030. Evaluation of the local impacts includes the following analysis.

Localized CO Analysis. The localized CO impacts from project operations were evaluated following the guidelines and procedures of the Caltrans CO Protocol (UC Davis, 1997). Supporting documentation, including the screening procedure for determining the project-level conformity requirements, applicable to the proposed project, are provided in Appendix B2 of the Air Quality Technical Study. Following the screening procedure, the localized concentrations of CO were calculated using the CALINE4 microscale dispersion model, which was developed by Caltrans, in combination with EMFAC2007 emission factors for the project analysis years. EMFAC2007 is the latest EPA-approved emission inventory model that calculates emission inventories and emission rates for motor vehicles operating on roads in California. Traffic volumes from the project traffic study (Iteris, 2009) were used to estimate CO concentrations at a distance of 10 ft (3 m) from the study intersections. The annual VMT data, also provided by the traffic report, were used to estimate regional emissions.

Particulate Matter Hot-Spot Analysis. To implement the PM hot-spot analysis requirements of the March 10, 2006, final rule, the *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (Guidance)* [EPA420-B-06-902, March 2006a], which was developed by EPA and FHWA, was used to perform a qualitative hot-spot analysis and conduct an interagency consultation with SCAG for project conformity determination.

Mobile Source Air Toxics Emissions. MSATs are released as part of vehicle exhaust emissions and include benzene, naphthalene, acrolein, 1,3-butadiene, formaldehyde, DPM and diesel exhaust organic gases, and polycyclic organic matter (POM) (FHWA, 2009). Prolonged exposure to MSATs may cause cancer and/or other serious health effects, such as reproductive problems and birth defects. Such effects are also influenced by other variables, such as distance between sources of MSAT and sensitive receptors. The extent of potential health effects of MSATs can only be determined by conducting a detailed health risk assessment (HRA) to assess carcinogenic risks and acute and chronic non-cancer health effects. For assessment of project-specific health impacts from MSATs, the currently available tools and techniques are limited (FHWA, 2006a). FHWA has prepared a guidance document and its update for when and how to analyze MSATs in the NEPA process: *Interim Guidance on Air Toxics Analysis in NEPA Documents* (FHWA, 2006a) and *Interim Guidance Update on Air Toxics Analysis in NEPA Documents* (FHWA, 2009). Analysis of potential impacts of MSAT emissions was conducted using these Guidance documents to determine in which category the proposed project falls (i.e., no analysis, qualitative analysis, or quantitative analysis). The analysis then uses the prototype language or provided data as prescribed in the Update Guidance document.

Based on the review of the Interim Guidance, and in consideration of the project alternatives, the proposed project would be in Category 2 and qualifies for a qualitative MSAT analysis; however, because of (1) the high percentage of diesel trucks using the local roadways in the project area, and (2) the enhanced capacity of the project corridor, a more conservative approach of a quantitative MSAT analysis was completed for the project. This conservative approach is consistent with the approach of the Schuyler Heim Bridge Replacement Project, which is similar to and in close proximity to the proposed Gerald Desmond Bridge Replacement Project. As previously discussed, there are only a few sensitive receptors in close proximity to the proposed project corridor.

Because evaluation of the project-level impact of MSATs for transportation projects is an emerging process, guidance manuals and protocols to assess air quality impacts are currently in the development stage. For instance, UC Davis and Caltrans developed a methodology and a Spreadsheet Tool for estimation of the project-level MSAT emissions in 2006 (UC Davis-Caltrans, 2006). In 2008, the spreadsheet tool was replaced with the CT-EMFAC version 2.6 (UC Davis-Caltrans, 2008), which is a model to estimate transportation projects emissions. CT-EMFAC is an interpretation of the CARB EMFAC model that simplifies the process of getting composite emission factors. It also extends EMFAC to include the priority MSATS, which otherwise require off-model speciation of total organic gases (TOG) when the standard EMFAC model is used (as used in the 2006 Spreadsheet Tool). The model is capable of estimating project-level emissions of MSATs, as well as criteria pollutants and CO_2. It includes two main modules: an *Emissions Factors* module that creates emission factors from EMFAC2007 for pollutants based on the project location (county, air basin, or statewide), and analysis year(s); and an *Emission Calculations* module that uses the estimated emission factors from the Emission Factor run, combined with the user-provided travel activities, to generate project-level emissions values for selected pollutants. CT-EMFAC version 2.6, which was released on May 29, 2008, was used to provide an estimate of the MSAT emissions along the project segments and project corridor for the base year 2005 and the future years (opening year 2015, and horizon year 2030) for the build and no-build alternatives. It should be noted that at the time of preparation of this EIR/EA, there was not an update to the 2008 release of CT-EMFAC to include data for the revised priority MSAT list.

Air Quality Analysis

Transportation Conformity

The Transportation Conformity Rule requires a regional emission analysis to be performed by the MPO for projects within its jurisdiction. The regional emissions analysis includes all projects listed in the RTP and RTIP. Projects listed in the RTP and RTIP are considered to have met the requirement for regional emissions conformity. Both plans must support an affirmative conformity finding to obtain FHWA approval.

The currently approved plans are the 2008 RTP and the 2008 RTIP. The 2008 RTP was adopted by SCAG on May 8, 2008, as Resolution #08-497-2, and it was approved by FHWA and FTA on

June 5, 2008. The 2008 RTIP was adopted by SCAG on July 17, 2008, and was federally approved on November 17, 2008.

The Gerald Desmond Bridge Replacement Project is included in the 2008 RTP and RTIP, and assumptions in SCAG's regional emissions analysis. The originally proposed project, which is referenced in the Project Listing Report of the 2008 RTP within the "2008 RTP – Los Angeles County RTIP Projects" list, and in the "Final 2008 RTIP – Los Angeles County Local Highways Project List" under the conformity category "non-exempt," includes the bridge replacement portion of the project. The project description in the Final 2008 RTP and in the most recent 2008 RTIP, including Amendments #1 through 43, includes the bridge replacement portion of the project. The Port, in coordination with Caltrans, is in the process of updating the RTIP description to include the improvements along Ocean Boulevard and freeway ramps. The revised project description is one of the projects in the 2008 RTIP Amendment #44, which was submitted to SCAG on June 21, 2010. SCAG approval is anticipated by early August. The following revised description is in the formal amendment request submitted to SCAG:

> *Project ID: LA000512*
> *Description: Ocean Boulevard, from the Los Angeles River over UPRR and Back Channel, to 0.1 mile E of State Route 47, replace existing 5 lane Gerald Desmond Bridge with new 6 lane bridge (3 lane in each direction); other improvements include construction of relocated approach structures and roads, reconstruction of existing horseshoe interchange ramp connectors, reconstruction of the existing connectors to SR-710, and reconstruction of two ramp connections to Pico Avenue*.

The design concept and scope of the preferred alternative is consistent with the revised project description. Subsequent to approval of Amendment #08-44, FHWA will issue a project-level conformity determination in accordance with the requirements of the Transportation Conformity Rule.

The 2008 RTIP was federally approved on November 17, 2008, and it is also consistent with the 2008 State Transportation Improvement Program (STIP) cycle and incorporates the SCAG portion of the 2008 STIP. Given that the proposed project is consistent with the 2008 RTP and included in the 2008 RTIP, it will not interfere with the timely implementation of all Transportation Control Measures (TCMs) identified in the currently approved SIP. Because the proposed project is included in the regional analysis for determining emissions budgets of the RTIP, the project meets the regional air quality conformity criteria.

Construction/Demolition Impacts

<u>No Action Alternative</u>

The No Action Alternative assumes that the bridge structure and interchanges within the project area would remain unchanged. This alternative would not include any planned construction activities. Periodic maintenance activities would be provided to keep the bridge open to traffic; therefore, there would be no impacts associated with construction emissions.

<u>North-side Alignment Alternative</u>

Construction Process. Project's construction-related emissions are based on equipment emission factor data and the magnitude of daily construction activities. The total amount and duration of construction and the intensity of construction activities could have a substantial effect upon the daily emissions level, pollutant concentrations, and the resulting impacts occurring at any one time. The emission forecasts provided in this analysis reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction is occurring in a relatively intensive manner. Because of these conservative assumptions, actual construction emissions would be, in all probability, less than those forecasted. Exhibit 2.2.5-2 shows an outline of the estimated construction schedule and worst-case day with maximum concurrent construction activities (see Section 1.6.1.3 [Proposed Construction and Phasing]). The last phase of construction (Phase 5) consists of tie-in activities and demobilization of equipment, and air quality issues would not be of general concern.

At this time, it is envisioned that there would be two potential contractor staging areas. One could be located in or around the lumberyard located on the southwest side of the existing Gerald Desmond Bridge on Pier T Avenue, and the other is the current location of the Port Maintenance Yard on the east side of the existing bridge on Broadway. The Port Maintenance Yard is proposed to be relocated prior to construction of the Gerald Desmond Bridge. Emissions associated with the demolition of Port Maintenance Yard buildings were accounted for within Phase I of the construction phasing.

Regional Construction Air Quality Effects. Construction of the proposed project has the potential to affect regional air quality through the use of heavy-duty construction equipment within the construction site, and through vehicle trips generated from construction workers traveling to and from the project site. In addition, fugitive dust emissions would result from earthwork (e.g., excavation and demolition) and onsite construction activities. Off-road (onsite) mobile source emissions, primarily NO_X, would result from the use of construction equipment such as bulldozers, cranes, and loaders. During the finishing phase, paving operations and the application of architectural coatings and other building materials would release reactive organic compounds and off-gassing products (e.g., paints and asphalt). Construction emissions can vary substantially from day to day, depending on the level of activity, the specific mix of construction equipment and, for dust, the prevailing weather conditions. The assessment of construction air quality impacts considers each of these potential sources.

Based on the expected construction schedule, calculation of the peak daily construction emissions were based on three timelines during construction and one timeline during demolition. Each timeline represents maximum daily activities from overlapping construction subphases. The three selected timelines during construction of the proposed new bridge include:

- month 9 of construction Year 1,
- month 9 of construction Year 2, and
- month 3 of construction Year 3.

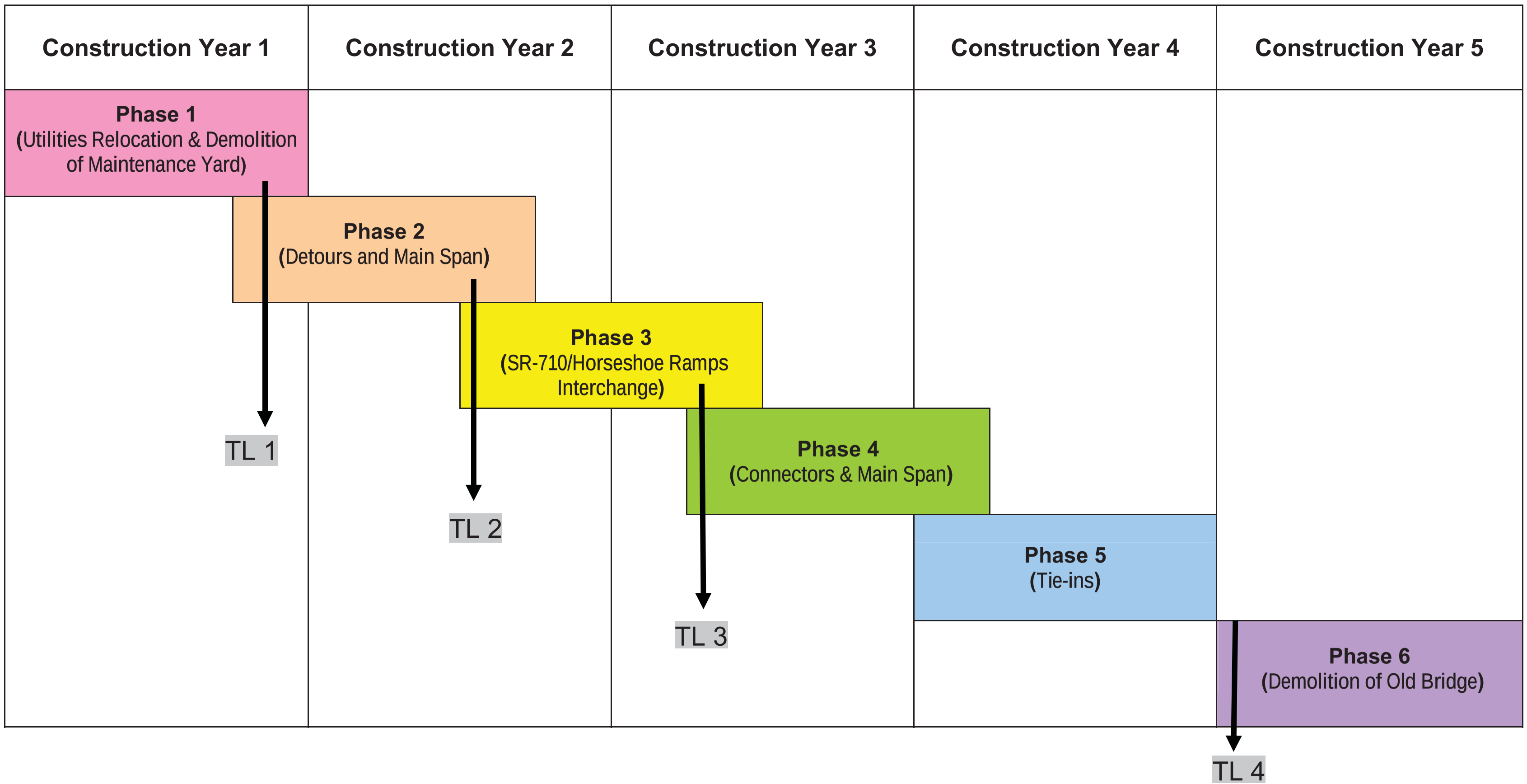
Estimation of the peak daily emissions during demolition of the old bridge (which would occur subsequent to completion of the new bridge) was also included in the impact analysis (see Exhibit 2.2.5-2).

Table 2.2.5-6 summarizes the estimates of unmitigated mass daily emissions for the selected timelines. Emissions exceeding the SCAQMD regional threshold criteria are shown in bold type. As shown, Year 2 of construction activities would include the highest peak daily pollutant emissions. Table 2.2.5-6 also indicates that the unmitigated daily emissions of NO_X would exceed the SCAQMD regional significance threshold during peak overlapping activities of each year of construction of new bridge. Peak daily emissions of other criteria pollutants would not exceed the SCAQMD significance thresholds. Peak daily emissions during demolition of the old bridge would not exceed the significance thresholds for any criteria pollutant. In conclusion, without mitigation, the regional construction emissions of NO_X would result in a short-term adverse effect during construction of the new bridge.

Localized Air Quality Construction Effects. The localized effects from onsite construction emissions were evaluated to determine whether the proposed project concentration would result in offsite ambient air pollutant concentrations that would exceed an SCAQMD threshold of significance. A screening analysis was conducted using the methodology promulgated by SCAQMD in its LST Methodology for CEQA Evaluations (SCAQMD, 2003a). It was estimated that the project's maximum daily disturbed area during any construction phase would be 4 to 5 acres (1.5 to 2 ha). This corresponds with the lookup tables in the LST document for projects that have maximum disturbance areas at any time of less than or equal to 5 acres (2 ha). The project onsite construction emissions of NO_X, CO, PM_{10}, and $PM_{2.5}$ were compared with the threshold values in lookup tables C-1, C-2, C-4, and C-5 of the 2005-2007 LSTs, respectively.

Localized construction emissions were estimated using the peak onsite mass daily emissions. The closest sensitive receptors to the construction site include the residences located northeast of Ocean Boulevard and West Broadway, approximately 0.3-mi (500 m) from the project's eastern boundary; and the Cesar Chavez Elementary School, which is also approximately 0.3-mi (500 m) northeast of the project corridor. The projected maximum daily localized emissions are provided in Table 2.2.5-7. As shown, the screening analysis indicates that at the nearest sensitive receptors, the estimated localized mass daily emissions would exceed the SCAQMD daily significance thresholds for NO_X during the second and third years of construction. As such, potential localized impacts of construction NO_X emissions at the nearest sensitive receptors may be significant during these years of construction; however, given the specific project construction site boundaries and the fact that concurrent construction activities take place at two separate sites (at the east and west portions of the project corridor) during years 2 and 3 of construction, a more refined dispersion modeling analysis using the EPA AERMOD program was performed for NO_X emissions during peak construction activities. Table 2.2.5-8 presents the maximum ambient offsite impact estimated for unmitigated project construction NO_2 emissions during year 2 of construction. It should

Exhibit 2.2.5-2
Outline of Construction Schedule



TL #: Analyzed timeline in a month (of each construction year) with maximum concurrent construction activities; selected to estimate worst-case daily emissions.

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Table 2.2.5-6
Estimate of Unmitigated Peak Daily Regional Construction Emissions [a] – North- and South-Side Alignment Alternatives (pounds/day)

Construction Year - Stage	CO	NO_X	VOC	PM_{10} [b]	$PM_{2.5}$
Year 1: Peak Construction Activities (month 9)					
Onsite	33	88	7.5	97	23
Offsite [c]	29	20	3.6	1	1
Total [d]	62	108	11	98	24
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(488)	**8**	(64)	(52)	(31)
Exceed Threshold?	No	Yes	No	No	No
Year 2: Peak Construction Activities (month 9), worst case					
Onsite	304	731	67	122	50
Offsite [c]	36	19	4	1	1
Total [d]	340	750	71	123	51
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(210)	**650**	(4)	(27)	(4)
Exceed Threshold?	No	**YES**	NO	NO	NO
Year 3: Peak Construction Activities (month 3)					
Onsite	187	426	40	108	37
Offsite [c]	32	16	4	1	1
Total [d]	219	442	44	109	38
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(331)	**342**	(31)	(41)	(17)
Exceed Threshold?	No	**YES**	No	No	No
Demolition of Old Bridge – New Bridge Opening Year, 2015					
Peak Construction Activities (month 8)					
Onsite	24	38	4	8	3
Offsite [c]	5	8	1	<1	<1
Total [d]	29	46	5	8	3
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(521)	(54)	(70)	(142)	(52)
Exceed Threshold?	No	No	No	No	No

Note: Exceedances from thresholds are shown in bold type.

[a] Compiled using the CEQA Air Quality Handbook and the emissions inventory from OFFROAD model. The equipment mix and use assumption for each phase is provided by the construction engineer, a list of which is included in Appendix A.

[b] Onsite PM_{10} emissions estimates are based on compliance with SCAQMD Rule 403 requirements for fugitive dust suppression.

[c] Offsite emissions include motor vehicle emissions associated with construction equipment transport to site, workers' commute, and debris hauling activities.

[d] Maximum annual construction emissions of GHGs (based on peak-day construction activities) were calculated and provided below. The emissions are presented in metric ton per year of CO_2 equivalent (MT CO_2e):

Construction year	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Demolition of old bridge (opening year)*
GHG emission (MT CO_2e)	*1,187*	*10,771*	*4,503*	*2,845*	*307*

Source: Parsons, 2009d.

Table 2.2.5-7
Estimated Unmitigated Peak Daily Localized Construction Emissions [a] – North- and South-Side Alignment Alternatives (pounds/day)

Analyzed Construction Stage/Phase	Maximum Onsite Pollutants Emissions			
	CO	NO_X	PM_{10}	$PM_{2.5}$
Nearest Sensitive Receptors [a] – 500 meters from project eastern boundary				
Year 1	33	88	98	23
Year 2	304	**731**	122	50
Year 3	187	**426**	108	37
Gerald Desmond Bridge Demolition	24	38	8	3
SCAQMD Localized Daily Significance Threshold [b]	*10,198*	*143*	*191*	*120*
Exceed Threshold?	No	**YES**	No	No

[a] The nearest sensitive receptors include Cesar Chavez Elementary School and the multi-family residences that are located approximately 0.30-mi (483 m) to the east of the construction site boundary. The project site is located in SCAQMD SRA No. 4. This analysis assumed that no more than 5 acres (2 ha) would actively be disturbed at one time. The LSTs are for a 5-acre site with a receptor at a 1,640-ft (500-meter) distance in SRA No. 4. Construction assumptions and equipment list for peak daily construction activities in each year are presented in Appendix A.

[b] The project site is located in SCAQMD SRA No. 4. It was estimated that the project's maximum daily disturbed area during any construction phase would be 4 to 5 acres (1.5 to 2 ha) (see Appendix A). The localized significance thresholds (LST) in the table are from the lookup tables for a 5-acre (2-ha) site at 1,640-ft (500-m) distance in SRA No. 4, South Coastal LA County; Tables C-1, C-2, C-4, and C-5 of the 2005-2007 lookup tables were used for LSTs of NO_X, CO, PM_{10}, and $PM_{2.5}$, respectively.

Source: Parsons, 2009d.

Table 2.2.5-8
Localized NO_2 Concentration during Peak Construction Activities

Receptor Type	Nearest Receptors	Project Impact at the Nearest Sensitive Receptors (μg/m^3)	Distance from Construction Site Boundary (m)	Maximum Project Impact + Background (μg/m^3)	SCAQMD Threshold (μg/m^3)
School	Cesar Chavez Elementary	31	457	269	338
	Edison Elementary	27	488	265	
Daycare	Childtime Learning Center	41	663	279	
	Lucy's Baby Care	64	1,178	302	
Hospital	St Mary Medical Center	52	2,200	290	
Convalescent	The Breakers of Long Beach	27	1,557	265	

a As recommended by SCAQMD, offsite haul truck transport emissions are considered offsite emissions and were not included in the modeling; however, onsite truck emissions were included in the modeling (SCAQMD. 2005).

b NO_2 concentrations were calculated using the conversion rate from NO_x to NO_2 based on the distance of the receptor from the construction site boundary (SCAQMD, 2003).

Table 2-4. NO_2-to-NO_X Ratio as a Function of Downwind Distance

Downwind Distance (m)	NO2/NOx Ratio
20	0.053
50	0.059
70	0.064
100	0.074
200	0.114
500	0.258
1000	0.467
2000	0.75
3000	0.9
4000	0.978
5000	1

c Background concentration of 238 μg/m^3 was estimated based on the ambient concentration trends and the last 3 years of monitored data at the POLB Inner Harbor Monitoring Station (http://polb.airsis.com/HistoricalSummary.aspx). These data are preliminary; however, the estimate provides a conservative value that is higher than the North Long Beach Monitoring Station (215 μg/m^3).

Source: Parsons, 2010.

be noted that the shape and location of the construction site for years 2 and 3 of construction activities are similar; therefore, the modeling was performed for year 2 with highest mass daily NO_2 emissions level as a worst-case scenario.

Table 2.2.5-8 shows that construction concentrations of NO_2 at the nearest sensitive receptors remain below the CAAQS for 1-hour NO_2 during the peak construction activities; therefore, no significant localized impact would occur as a result of project construction activities.

Toxic Air Contaminants The potential for TAC emissions during construction would be related to DPM emissions associated with heavy equipment operations. The analysis of construction impacts on air quality, provided above, shows that the peak daily emissions of PM_{10} (surrogate for diesel PM, OEHHA, 2003) at both the regional and localized levels would be expected to be below the significance thresholds established by SCAQMD. This indicates that even the worst-case daily emission of construction-related DPM is not at a significant level. Further analysis and discussion are provided in the HRA section of this EIR/EA. The analysis concludes that potential impacts related to TAC emissions during construction of the proposed project alternatives would be well below the criterion for adverse health effects.

Odors. During project construction, objectionable odors would be mainly related to operation of diesel-powered equipment and to off-gas emissions during road-building activities, such as paving and asphalting. Objectionable odors may also occur as a result of construction in marine sediments during drilling and auguring activities for the support piers for the bridge if contaminated sediments and/or soils that would release odorous gases to the atmosphere were encountered. Such odors, however, would be short-term and limited to the area where the specific activity is occurring. The perception of these odors would be dependent upon climatic conditions such as temperature, humidity, wind speed, and wind direction.

SCAQMD Rule 1113 (Architectural Coatings) limits the amount of VOCs from paving, asphalt, concrete curing, and cement coating operations. Construction of the proposed project would be performed in compliance with SCAQMD Rules, which limits VOC emissions. In addition, construction activities would be located within fenced, secured sites as far from receptors as feasible, with no public access. Due to the relatively short-term nature of construction odors, controlled access, and the distance to the nearest receptors, odors are not likely to affect a substantial number of people. No adverse effects from odors associated with construction are anticipated.

<u>South-Side Alignment Alternative</u>
The construction activities and associated air quality emissions for this alternative would be the same as those of the North-side Alignment Alternative.

<u>Rehabilitation Alternative</u>

Construction emissions from the Rehabilitation Alternative were estimated in a similar way as the Bridge Replacement Alternatives. The assessment of maximum daily emissions was based on the expected construction schedule, the level of activity, and the specific mix of construction equipment for a worst-case with maximum daily activities from overlapping construction subphases.

The daily activity was assumed on an 8-hour per day schedule, based on the fact that the equipment used during the day (i.e., activities other than the bridge deck replacement) would be different from those employed during nighttime bridge deck replacement activities. Table 2.2.5-9 summarizes the estimates of unmitigated mass daily emissions from construction activities of the Rehabilitation Alternative. As shown, peak daily emissions associated with construction of the Rehabilitation Alternative would not exceed the thresholds for any criteria pollutant; therefore, no adverse air quality impacts would be anticipated during construction of the Rehabilitation Alternative.

Operational Impacts

Regional and localized operational emissions were evaluated for the project corridor. The considered project corridor extends along Ocean Boulevard from just west of Navy Way/Seaside Avenue on Terminal Island to Pine Avenue in downtown Long Beach; as well as connector ramps along the project segments of Ocean Boulevard.

<u>No Action and Rehabilitation Alternatives</u>

The Rehabilitation Alternative would include retrofit activities only and would be operationally equivalent to the No Action Alternative.

Operational analysis for the Rehabilitation Alternative would be the same as the No Action Alternative; therefore, it would not result in any operational air quality effects

Table 2.2.5-9
Estimate of Peak Daily Construction Emissions [a] – Rehabilitation Alternative (pounds/day)

Construction Year – Stage	CO	NO_X	VOC	PM_{10} [b]	$PM_{2.5}$
Regional Emissions					
Peak Construction Activities (September 2012)					
Onsite	27	57	5	90	21
Offsite [c]	15	13	2	1	<1
Total	42	70	7	91	21
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(508)	(30)	(68)	(59)	(34)
Exceed Threshold?	No	No	No	No	No
Localized Emissions					
Nearest Sensitive Receptors [d] – 500 meters from project eastern boundary					
Maximum Construction Onsite Emissions	27	57	—	91	21
SCAQMD Localized Daily Significance Threshold [e]	*10,198*	*179*	—	*191*	*120*
Exceed Threshold?	No	No	—	No	No

[a] Compiled using the CEQA Air Quality Handbook and the emissions inventory from OFFROAD model. The equipment mix and use assumption for each phase is provided by the construction engineer, a list of which is included in the Air Quality Technical Study Report and Appendix A.
[b] Onsite PM_{10} emissions estimates are based on compliance with SCAQMD Rule 403 requirements for fugitive dust suppression. A copy of Rule 403 is provided in Appendix A.
[c] Offsite emissions include motor vehicle emissions associated with construction equipment transport to site, workers commute, and debris hauling activities .
[d] The nearest sensitive receptors include Cesar Chavez Elementary School and the multi-family residences that are located approximately 0.3-mi (483 m) to the east of the construction site boundary.
[e] The project site is located in SCAQMD SRA No. 4. In regard to the LST lookup tables, this analysis assumed that no more than 5 acres (2 ha) would actively be disturbed at one time. The LSTs are for a 5-acre (2-ha) site with a receptor at 1,640 ft (500 m) distance in SRA No. 4.
Source: Parsons, 2009d.

North- and South-side Alignment Alternatives

Operational emissions were estimated for the opening year 2015 and the horizon year 2030. Air quality impacts from operational emissions of the proposed project were assessed by comparing the No Action Alternative with build emissions, for each year analyzed. The North and South-side Alignment Alternatives would operate the same and are referenced as the Build Alternatives.

Direct Operational Emissions. Project direct operational emissions are mainly from vehicular traffic within the project area. The amount of pollutant emission from vehicle traffic is proportional to VMT. The peak-hour VMT data and projected average vehicle speeds along segments of the project corridor were provided by the project Traffic Study (Iteris, 2009). Vehicle emission factors at the average travel speeds were obtained using the EMFAC2007 model (CARB, 2007).

Indirect Operational Emissions. The existing Gerald Desmond Bridge provides a vertical clearance of 156 ft (47.5 m) above MHWL with two through lanes and a truck climbing lane in each direction. The Bridge Replacement Alternative would provide a higher vertical clearance of 200 ft (61 m), and provide additional capacity along Ocean Boulevard (three through lanes in each direction). As discussed in Section 2.1.2 (Growth Inducement), the Bridge Replacement Alternative would have the potential to indirectly influence growth when considered in the context of future cumulative development that is likely to occur within the Ports and the surrounding communities associated with the traffic congestion relief and redistribution of trips on roadways within the vicinity of the Port to the new bridge and the potential for increased throughput associated with larger vessel access to the back channel; however, predicting air quality effects associated with the potential indirect growth is too speculative for further analysis of air quality emissions to provide credible evaluation of these indirect effects.

For this reason, the possible impact of vessel-produced indirect emissions was not quantified in this analysis.

2005 Base Year. The 2005 base year emissions are established based on the existing roadways and traffic. This is also used for CEQA analysis to determine changes in air quality associated with the alternatives from 2005 through the horizon year 2030. See Chapter 3 for CEQA air quality analysis.

Year 2015 – New Bridge Opening Year. For all of the alternatives, the facility is scheduled to be opened to traffic in the year 2015. For the Build Alternatives, there would be two distinct activities during the opening year. First, all traffic would be rerouted from the old bridge onto the new facility. Second, the old bridge structure would be demolished and the debris would be disposed of. The demolition and removal activities would be completed by the end of the year. A worst-case for daily emissions during opening year would be associated with emissions from the simultaneous demolition of the Gerald Demand Bridge and operational emissions during the overlapping period for the Build Alternatives.

Year 2030 – Horizon Year. Operation phase motor vehicle emissions would result from vehicle exhaust and fugitive particulate emissions. Operational phase motor vehicle emissions were calculated for the No Action Alternative future and for the future with implementation of the proposed Build Alternatives.

Regional Operational Air Quality Effects. To determine the regional direct operational impact, the roadway traffic emissions along the segments of the project corridor were estimated for the base year 2005, opening year 2015, and horizon year 2030. The peak-hour VMT data and projected average vehicle speeds along each roadway segment were provided by the project Traffic Study (Iteris, 2009). Vehicle emission factors at the average travel speeds were obtained using the EMFAC2007 model (CARB, 2007). The re-entrained road dust emission factor was computed using the equation provided in the fifth edition of EPA's AP-42 document.[8]

For the opening year, the emissions associated with demolition of the old bridge structure were added to the operational emissions to evaluate the peak daily project emissions. The results of project operational emissions analysis are summarized in Table 2.2.5-10.

For the future analyzed years (i.e., 2015 and 2030), the data in Table 2.2.5-10 show that:

- For the No Action/Rehabilitation Alternative, the daily operational emissions for all criteria pollutants would be less than the operational emission levels during the base year 2005.
- For the Bridge Replacement Alternative, the project daily operational emissions of CO, NO_X, VOCs, SO_2 and $PM_{2.5}$ would be less than the operational emission levels during the base year 2005, and only the daily emissions of PM_{10}, including the re-entrained road dust, show a relatively small increase in the future analyzed years compared with the 2005 emissions; however, the emission increments remain well below the SCAQMD daily threshold and would decrease with time (2015 versus 2030).

The emissions reduction over time is due to modeled emission factors (from EMFAC 2007) that incorporate newer vehicle fleet composition and compliance with adopted regulations in the AQMP that are aimed at controlling emissions from mobile sources. Compliance measures include the use of alternative or reformulated fuels, retrofit control on engines, and installing or encouraging the use of new engines and cleaner in-use heavy-duty vehicles. In conclusion, the estimated operational emissions show reductions for all pollutants except PM_{10} as compared with the 2005 daily emissions. The increase of PM_{10} operational emission during future analyzed years, compared with the 2005 level would be well below the SCAQMD daily operational threshold.

The data in Table 2.2.5-10 also show a net increase in daily operational emissions for the Bridge Replacement Alternative compared to the No Action/Rehabilitation Alternative during the opening year 2015 and horizon year 2030. The net increase in daily operational emissions is due to increases in ADT. The net increases of project operational emissions relative to the No Action Alternative emissions would be relatively small, with the exception of NO_X. The net change in NO_x emissions between proposed Project and No Action Baseline during 2015 is estimated to be approximately 154 pounds per day, which would exceed the SCAQMD threshold. During the horizon year 2030, the net change in daily emissions would be below the SCAQMD thresholds for all criteria pollutants.

[8] The AP-42 emission factor assumes that road dust emissions are proportional to VMT, roadway silt loading, and average vehicle weight.

Table 2.2.5-10
Summary of Project Daily Operational Emissions

Project Scenario/Roadway Segments	Emissions (pounds/day)					
	CO	NOx	VOC	SO_2	PM_{10}	$PM_{2.5}$
Base Year 2005						
Ocean Boulevard						
Navy Way to Pier S Avenue	277	250	8	2	26	11
Pier S Avenue to Terminal Island Freeway	124	79	14	<1	9	5
Terminal Island Freeway to Horseshoe Ramps	339	334	18	3	32	15
Gerald Desmond Bridge	446	436	16	3	44	18
NB SR 710 Connector Ramp	112	146	9	1	12	6
SB SR 710 Connector Ramp	41	60	4	<1	4	2
Ocean Boulevard Connector Ramps to Downtown	88	31	4	<1	8	2
Total Year 2005	**1,428**	**1,337**	**73**	**11**	**136**	**59**
Year 2015 – Opening Year – No Action/Rehabilitation Alternative						
Ocean Boulevard						
Navy Way to Pier S Avenue	96	124	8	<1	21	7
Pier S Avenue to Terminal Island Freeway	97	111	7	<1	21	7
Terminal Island Freeway to Horseshoe Ramps	65	69	7	<1	11	4
Gerald Desmond Bridge	275	308	26	1	48	17
NB SR 710 Connector Ramp	58	90	5	<1	12	5
SB SR 710 Connector Ramp	27	50	3	<1	6	2
Ocean Boulevard Connector Ramps to Downtown	33	17	1	<1	8	2
Total Year 2015 – No Action/Rehabilitation	**651**	**770**	**57**	**3**	**127**	**45**
Net Change from 2005	**-777**	**-607**	**-16**	**-8**	**-9**	**-14**
Year 2015 – Opening Year – North- and South-side Alignment Alternatives						
Ocean Boulevard						
Navy Way to Pier S Avenue	98	123	8	<1	21	7
Pier S Avenue to Terminal Island Freeway	114	132	8	<1	25	8
Terminal Island Freeway to Horseshoe Ramps	60	62	6	<1	10	4
New Bridge	267	353	22	1	55	19
NB SR 710 Connector Ramp	68	108	6	<1	14	6
SB SR 710 Connector Ramp	49	86	5	<1	10	4
Ocean Boulevard Connector Ramps to Downtown	48	24	2	<1	11	3
Total On-Road – Operational Emissions	*704*	*887*	*57*	*3*	*147*	*51*
Demolition of Old Bridge – Construction Emissions	*23*	*37*	*5*	*<1*	*8*	*3*
Total Year 2015 – Project Opening Year	**727**	**924**	**62**	**3**	**155**	**54**
Net Change from 2005	-701	-414	-11	-8	19	-5
Net Change from No Action Alternative	76	<u>154</u>	5	<1	28	11
Horizon Year 2030 – No Action/Rehabilitation Alternative						
Ocean Boulevard						
Navy Way to Pier S Avenue	50	53	4	<1	22	6
Pier S Avenue to Terminal Island Freeway	45	44	3	<1	20	5
Terminal Island Freeway to Horseshoe Ramps	31	29	3	<1	11	3
Gerald Desmond Bridge	130	129	14	1	44	12
NB SR 710 Connector Ramp	27	33	2	<1	11	3
SB SR 710 Connector Ramp	14	19	1	<1	5	2
Ocean Boulevard Connector Ramps to Downtown	14	5	<1	<1	8	2
Total Year 2030 – No Action/Rehabilitation Alternative	**310**	**311**	**27**	**3**	**121**	**33**
Net Change from 2005	**-1,118**	**-1,026**	**-46**	**-8**	**-15**	**-26**

Table 2.2.5-10
Summary of Project Daily Operational Emissions

Project Scenario/Roadway Segments	Emissions (pounds/day)					
	CO	NOx	VOC	SO_2	PM_{10}	$PM_{2.5}$
Horizon Year 2030 – North- and South-side Alignment Alternatives						
Ocean Boulevard						
Navy Way to Pier S Avenue	52	53	4	<1	23	6
Pier S Avenue to Terminal Island Freeway	54	53	4	<1	24	6
Terminal Island Freeway to Horseshoe Ramps	25	25	3	<1	9	3
New Bridge	126	136	11	1	53	14
NB SR 710 Connector Ramp	33	42	3	<1	13	4
SB SR 710 Connector Ramp	25	33	2	<1	9	3
Ocean Boulevard Connector Ramps to Downtown	21	7	<1	<1	12	2
Total Year 2030 – With Project	**335**	**349**	**28**	**3**	**143**	**39**
Net Change from 2005	-1,092	-989	-45	-7	7	-20
Net Change from No Action Alternative	25	38	1	<1	22	6
SCAQMD Daily Significance Thresholds	550	55	55	150	150	55

Notes: NB: northbound; SB: southbound.

— Exceedances from thresholds are shown in **bold, underlined** type.

— Emissions are calculated using emission factors from EMFAC2007, at the projected average speed, and VMT of each roadway segment within the study area (from Traffic Study).

— Estimates of *directly emitted PM emissions include tailpipe, tire wear, break wear, and the contribution from road dust emissions. The Paved Road Dust emission factor was calculated using EPA's empirical equation (AP-42):*

$$E = k \left(\frac{sL}{2}\right)^{0.65} \times \left(\frac{W}{3}\right)^{1.5} \times \left(1 - \frac{P}{4N}\right)$$

Where, E= particulate emission factor; k=particle size multiplier; sL=road surface silt loading; W=average weight (tons) of vehicles traveling the road; P=number of days per year with >0.01 inch rain; N=days per period (365 days /year).

— The emissions data are rounded to the nearest integer number; thus, the "total" values in table may differ 1 unit from the added numbers as presented.

— Calculation worksheets are provided in Appendix B of project's Air Quality/HRA Technical Study Report.

Source: Parsons, 2009d.

It should be noted that as described in the analysis methodology, the emission results are obtained using the emission factors generated from the EMFAC2007 model run (with the exception of re-entrained road dust emission factors). The model was released in November 2006 and, as such, only the control and mitigation measures that were approved by that time were incorporated in the development of the available version of the model; however, after 2007, the Port truck fleet has begun experiencing changes due to implementation of the Ports CAAP, and specifically the Port CTP, with the goal of eliminating "dirty trucks" from the fleet and regional roadways. Specific commitments of the Port CTP were not incorporated into the project truck fleet profiles to capture these important improvements in the project build-out years 2015 and 2030.

Furthermore, according to the California Drayage regulation, by January 1, 2014, 100 percent of Port trucks will meet the 2007 model year standards that will result in reduction of diesel PM and NO_X by 86 percent and 56 percent, respectively.

Moreover, Port replacement/retrofit programs will encourage alternatively fueled vehicles, such as LNG trucks. As a result, the project emissions in Table 2.2.5-10 present a worst-case scenario and over-estimates the actual project operational emissions.

Localized Operational Air Quality Impacts. The local analysis is commonly referred to as project-level air quality or hot-spot analysis. The primary focus is the operational impact on air quality created by the proposed improvement. The analysis for localized NO_X impacts was conducted for the project opening year, 2015, when the Build Alternative would generate NO_X in excess of the SCAQMD regional threshold. The year 2015 represents the time with the highest project emissions, and the analysis is consistent with SCAQMD requirements. For CO, PM_{10}, and $PM_{2.5}$, the analysis years consist of the project opening year and the design or horizon year, consistent with the federal transportation conformity requirements.

NO_X Local Effects

The 2015 roadway emissions from project operations were combined with the emissions from demolition of the old bridge to determine the highest potential pollutant concentrations at the offsite sensitive receptor locations. A dispersion modeling analysis using the EPA-approved AERMOD model was performed to estimate NO_2 local concentrations in the vicinity of the project corridor. The meteorological data used in the model were from POLA's Wilmington Community Station, which is located at the Saints Peter and Paul School, as the available data most representative of the ambient data for the project site and vicinity. The closest sensitive receptors to the project corridor are the residences located east of SR 710 across the Los Angeles River approximately 0.3-mi (485 m) from the project corridor. Vehicle movements in each segment of the project corridor were simulated as a line source in the modeling analysis and represented as a series of separated volume sources. Mobile source NO_X emissions along each segment of the project corridor were used for model inputs. The details of model inputs and assumptions are provided in Appendix D.

To determine whether project emissions create significant adverse localized NO_2 impacts, the emissions contribution from the project is added to ambient concentrations and the total is then compared to the most stringent applicable state and/or federal ambient air quality standards for NO_2. The modeled incremental impacts from project activities were added to the background values to estimate the peak impacts downwind of the activities.

Table 2.2.5-11 presents comparison of the SCAQMD significance thresholds with the estimated maximum localized NO_2 concentrations at the nearest sensitive receptors to the project corridor. As shown, the local concentrations would not exceed the localized operational thresholds; therefore, project local NO_2 impact is considered less than adverse.

CO and PM Local Effects

Table 2.2.5-10 indicates that the project-related emissions of other criteria pollutants, including CO, PM_{10}, and $PM_{2.5}$, would not exceed the SCAQMD regional significance threshold at any future operating year of the project; however, following the requirements of transportation conformity, the local effects of CO and PM are provided here to ensure the local conformity of the project with CAA standards.

Based on the project traffic study (Iteris, 2009), some local roadways would have an increase in traffic volume in excess of 5 percent. Tables 2.2.5-12 and 2.2.5-13 summarize the ADT volumes with and without the project for the opening year 2015 and the horizon year 2030, respectively. According to the CO Protocol, these increases would be sufficient to warrant the preparation of a quantitative CO analysis.

Table 2.2.5-11
Estimate of NO_2 Local Operational Impacts

Averaging Time	Background NO_2 Concentration[a] ($\mu g/m^3$)	Maximum Ambient NO_2 Impact at the Nearest Sensitive Receptors[b,c]								SCAQMD Significance Threshold[d]
		Residential		School		Medical		Daycare		
		Project Increment	NO_2 Conc. ($\mu g/m^3$)	Project Increment	NO_2 Conc. ($\mu g/m^3$)	Project Increment	NO_2 Conc. ($\mu g/m^3$)	Project Increment	NO_2 Conc. ($\mu g/m^3$)	
1-hour	226	22	248	19	245	27	253	28	254	338
Annual	43	2.5	45.5	1.2	44.2	2.9	46	1.9	44.9	56

[a] The thresholds for CO and NO_2 are combined thresholds; therefore, impacts from project emissions plus background pollutant concentrations are compared to the thresholds.

[b] The nearest sensitive receptors include single-family residences located approximately 500 m northeast of the project and east of SR 710; Cesar Chavez Elementary School and Edison Elementary School, both located within 500 m east of the project eastern limit; Childtime Learning Center located approximately 1,000 m east of the project corridor; and Saint Mary Medical Center located approximately 2,000 m northeast of project site.

[c] NO_2 concentrations were calculated using the conversion rate from NO_X to NO_2 based on the distance of receptor from the emission source . NO_2/NO_x ratios were obtained using Figure 2-5 and Table 2-4 in the LST Methodology document (SCAQMD, 2003).

[d] Estimated based on ambient concentration trends and the last 4 years of recorded data at the North Long Beach Monitoring Station.

Source: Parsons, 2009.

Table 2.2.5-12
Comparison of Roadway Segments Traffic Conditions for the No Action/Rehabilitation and Build Alternatives (Opening Year 2015)

Roadway Segment	Traffic Direction	AADT[1] (All Vehicles)			Truck AADT[1]		
		No Action[2]	Build[3]	% Change	No Action	Build	% Change
Ocean Boulevard							
Navy Way to Pier S Avenue	EB	41,910	43,440	3.7	12,810	12,860	0.4
	WB	37,910	38,980	2.8	11,400	11,530	1.1
Pier S Avenue to Terminal Island Freeway	EB	35,660	32,030	11.3	7,900	8,660	9.6
	WB	30,750	32,200	4.7	5,650	5,960	5.5
Terminal Island Freeway to Horseshoe Ramps	EB	37,780	42,260	11.9	10,130	11,440	12.9
	WB	33,700	36,690	8.9	7,380	9,170	24.3
Between SR 710 Connector Ramps and Downtown Long Beach	EB	9,040	10,248	13.4	96	120	25.0
	WB	12,196	12,712	4.2	2,084	2,148	3.1
Gerald Desmond Bridge/New Bridge	EB	40,870	46,070	12.7	12,240	14,000	14.4
	WB	36,200	40,660	12.3	10,550	12,100	14.7
NB SR 710 Connector Ramp	-	14,092	20,480	45.3	8,472	9,792	15.6
SB SR 710 Connector Ramp	-	12,840	17,880	39.3	8,844	11,796	33.3

[1] AADT: annual average daily traffic
[2] No Action Alternative traffic numbers are equivalent to the Rehabilitation Alternative traffic numbers.
[3] Build traffic numbers are equivalent to North- and South-side Alignment Alternative traffic numbers.
Source: Iteris, 2009.

Table 2.2.5-13
Comparison of Roadway Segments Traffic Conditions for the No Action/ Rehabilitation and Build Alternatives (Horizon Year 2030)

Roadway Segment	Traffic Direction	AADT[1] (All Vehicles)			Truck AADT[1]		
		No Action[2]	Build[3]	% Change	No Action	Build	% Change
Ocean Boulevard							
Navy Way to Pier S Avenue	EB	59,540	62,410	4.8	22,020	22,220	0.9
	WB	57,720	59,620	3.3	22,650	22,580	-0.3
Pier S Avenue to Terminal Island Freeway	EB	48,310	51,210	6.0	15,540	21,960	41.3
	WB	49,230	51,820	5.3	16,730	17,470	4.4
Terminal Island Freeway to Horseshoe Ramps	EB	54,350	58,830	8.2	19,840	21,840	10.1
	WB	56,030	58,340	4.1	21,300	19,130	-10.2
Between SR 710 Connector Ramps and Downtown Long Beach	EB	9,912	11,824	19.3	104	116	11.5
	WB	12,956	13,948	7.7	2,104	2,124	1.0
Gerald Desmond Bridge/New Bridge	EB	62,170	68,850	10.7	26,280	29,120	10.8
	WB	62,500	67,080	7.3	28,080	30,610	9.0
NB SR 710 Connector Ramp	-	18,300	21,056	15.1	9,944	12,300	23.7
SB SR 710 Connector Ramp	-	14,040	19,136	36.3	10,424	14,200	36.2

[1] AADT: annual average daily traffic
[2] No Action Alternative traffic numbers are equivalent to the Bridge Rehabilitation traffic numbers.
[23] Build traffic numbers are equivalent to North and South-side Alignment Alternative traffic numbers.
Source: Iteris, 2009.

Localized CO Analysis. Localized CO effects were assessed by estimating the maximum ambient CO concentrations near the intersections with the greatest potential for hot-spot generation. The concentration estimates were conducted for the opening and horizon years of 2015 and 2030, respectively. The predicted concentrations were compared to the NAAQS and CAAQS for CO. SCAQMD recommends a hot-spot evaluation of potential localized CO impacts at intersections when an intersection decreases in LOS by one level beginning when LOS changes from C to D, and at intersections with LOS D or worse where LOS does not change but v/c ratio increases by 2 percent or more. Intersections were selected for analysis based on information provided in the project Traffic Study (Iteris, 2009). Tables 2.2.5-14 and 2.2.5-15 provide comparison of intersection traffic conditions for the No Action and Build Alternatives for the base year (2005), opening year (2015), and horizon year (2030).

Tables 2.2.5-14 and 2.2.5-15 show that traffic conditions under the project Build Alternatives would improve compared to the No Action Alternative at all of the studied intersections except three. As shown, at the intersection of Navy Way and Seaside Avenue, either a peak-hour LOS would decline (MD peak hour during 2015) or the LOS would be the same, but the v/c ratio would increase by 2 percent or more. The intersection of Ocean Boulevard and Magnolia Avenue would be affected during the morning peak hour in 2015 (increase in v/c) and during AM, mid-day, and PM peak hours in 2030 (decline in LOS) by the proposed project. The intersection of Ocean Boulevard and Golden Shore Street is projected to be affected only during the PM peak hour in 2030 (LOS decline). These intersections and three other intersections projected to operate at LOS E or F were analyzed for potential CO hot-spot generation during opening year 2015 and horizon year 2030.

CO concentrations were projected using the CALINE 4 traffic pollutant dispersion model. Tables 2.2.5-16 and 2.2.5-17 show the concentrations at 10 ft (3 m) from the studied intersections, projected for the years 2015 and 2030, respectively. As indicated, 1-hour CO concentrations would range from approximately 5.4 ppm to 6.9 ppm in 2015 and from 5.3 ppm to 6.0 ppm in 2030. Eight-hour CO concentrations are anticipated to range from approximately 4.1 ppm to 5.2 ppm in 2015 and from 4.0 ppm to 4.6 ppm in 2030. The state and federal 1- and 8-hour standards would not be exceeded. No localized operational adverse air quality CO effect is anticipated.

Localized Particulate Matter (PM_{10} and $PM_{2.5}$) Analysis. Pursuant to Federal Conformity Regulations (specifically, 40 CFR 93.105 [c] [1][i]), a qualitative analysis of the localized PM emissions was conducted following the methodology provided in the EPA Guidelines (EPA, 2006a). The qualitative PM hot-spot analysis was submitted to the SCAG Transportation Conformity Working Group (TCWG) and was discussed among representatives at their meeting on February 27, 2007. The TCWG determined that the "analysis [was] deemed acceptable for NEPA circulation." A copy of the TCWG conformity determination (from the minutes of the work group meeting) is provided in Appendix A. The qualitative analysis is presented in this section.

a) Standards and Conformity Conditions

PM_{10} nonattainment and maintenance areas are required to attain and maintain two standards:

- **24-hour standard: 150 μg/m^3:** The 24-hour PM_{10} standard is attained when the average number of exceedances in the previous 3 calendar years is less than or equal to one. An exceedance occurs when a 24-hour concentration of greater than the standard 150 μg/m^3 is measured at a monitoring site near the project site. The annual PM_{10} standard is attained if the average of the annual arithmetic means for the previous 3 calendar years is less than or equal to 50 μg/m^3.
- **Annual standard: 50 μg/m^3:** This standard was revoked by EPA on December 17, 2006, due to a lack of evidence linking health problems to long-term exposure to coarse particulate pollution (EPA, 2006b); however, the 2006 RTIP conformity determination for PM_{10} was made on October 2, 2006, and it was based on the previous annual standard of 50 μg/m^3. To maintain consistency with the conformity determination, the PM_{10} hot-spot analysis includes an analysis of the annual PM_{10} standard.

$PM_{2.5}$ nonattainment and maintenance areas are required to attain and maintain two standards as well. The standards are described below.

- **24-hour standard: 35 μg/m^3:** The standard, as established in 1997, was 65 μg/m^3. Based on 2004-2006 monitored ambient data, EPA strengthened the standards for $PM_{2.5}$. This standard became effective on December 17, 2006. It is expected that EPA will designate the new 24-hour $PM_{2.5}$ nonattainment areas by November 2009, and they will become effective April 2010. A SIP revision will be due to EPA by April 2013 demonstrating an attainment date of April 2015 with a possible extension to

Table 2.2.5-14
Comparison of Intersection Traffic Conditions for the No Action/Rehabilitation and Build Alternatives (Opening Year 2015)

Intersection	Peak Hour	Base Year 2005			Opening Year – 2015					
		CEQA Baseline			No Action [1]			Build Alternatives[2]		
		LOS	v/c	Delay/ Vehicle	LOS	v/c	Delay/ Vehicle	LOS	v/c	Delay/ Vehicle
Terminal Island Interchange Ramps / Ocean Boulevard	AM	C	0.792	-	B	0.661	-	B	0.648	-
	MD	D	0.833	-	E	0.966	-	D	0.899	-
	PM	E	0.912	-	D	0.865	-	D	0.813	-
Pier S Avenue / Ocean Boulevard	AM	C	0.709	-	B	0.681	-	B	0.679	-
	MD	C	0.700	-	C	0.761	-	B	0.656	-
	PM	D	0.824	-	B	0.650	-	A	0.597	-
Pier S Avenue / New Dock Street	AM	A	0.327	-	A	0.328	-	A	0.352	-
	MD	A	0.350	-	A	0.420	-	A	0.432	-
	PM	A	0.356	-	A	0.337	-	A	0.337	-
Navy Way / Seaside Avenue	AM	A	0.474	-	C	0.735	-	C	0.776	-
	MD	A	0.414	-	C	0.753	-	**D**	0.768	-
	PM	A	0.581	-	E	0.914	-	E	0.935	-
Pico Avenue Pier B Street / 9th Street	AM	A	0.428	-	B	0.606	-	A	0.594	-
	MD	A	0.455	-	A	0.594	-	B	0.613	-
	PM	A	0.494	-	A	0.575	-	A	0.588	-
Pico Avenue / Pier C Street	AM	A	0.309	-	A	0.376	-	A	0.378	-
	MD	A	0.340	-	A	0.309	-	A	0.306	-
	PM	A	0.343	-	A	0.306	-	A	0.308	-
Pico Avenue / Pier D Street	AM	B	-	10.1	C	-	23.3	A	0.492	-
	MD	B	-	11.3	C	-	19.2	A	0.432	-
	PM	B	-	10.7	C	-	15.5	A	0.399	-
Pico Avenue / Pier E Street	AM	A	-	9.9	B	-	12.4	A	0.331	-
	MD	B	-	11.8	B	-	14.0	A	0.410	-
	PM	B		11.3	C	-	18.9	A	0.582	-
Terminal Island Freeway SB Off-Ramp/ New Dock Street	AM	B	-	10.8	B	-	12.2	B	-	10.8
	MD	A	-	9.1	B	-	13.3	B	-	12.1
	PM	A	-	9.3	B	-	10.5	B	-	10.3
Terminal Island Freeway NB On-Ramp/ New Dock Street	AM	A	-	7.4	A	-	9.1	A	-	8.9
	MD	A	-	7.6	B	-	11.9	B	-	11.1
	PM	A	-	7.9	B	-	10.8	B	-	10.1
Pico Avenue / Broadway	AM	B	-	10.6	B	-	10.6	B	-	10.3
	MD	B	-	11.2	A	-	9.8	A	-	9.9
	PM	B	-	10.5	A	-	9.3	A	-	10.0
Ocean Boulevard/ Golden Shore Street	AM	A	0.570	-	B	0.628	-	B	0.637	-
	MD	A	0.569	-	B	0.691	-	C	0.708	-
	PM	A	0.593	-	B	0.693	-	C	0.719	-
Ocean Boulevard/ Magnolia Avenue	AM	B	0.693	-	E	0.907	-	**E**	0.929	-
	MD	A	0.575	-	C	0.741	-	C	0.785	-
	PM	B	0.601	-	C	0.771	-	C	0.765	-

[1] No Action Alternative intersection conditions are equivalent to the Bridge Rehabilitation intersection conditions.
[2] Build intersection conditions are equivalent to North- and South-side Alignment Alternative intersection conditions.
Notes: SB – southbound; NB – northbound; AM – morning peak hour; MD – mid-day peak hour; PM – afternoon peak hour
v/c – Vehicle to capacity ratio, presents traffic conditions for signalized intersections.
Delay/Vehicle – delay per vehicle in seconds, presents traffic conditions for unsignalized intersections.
LOS of intersections that are not improved by the proposed project are shown in **bold** type.
Source: Iteris, 2009.

Table 2.2.5-15
Comparison of Intersection Traffic Conditions for the No Action/Rehabilitation and Build Alternatives (Horizon Year 2030)

Intersection	Peak Hour	Base Year 2005			Horizon Year – 2030					
		CEQA Baseline			No Action[1]			Build Alternatives[2]		
		LOS	v/c	Delay/ Vehicle	LOS	v/c	Delay/ Vehicle	LOS	v/c	Delay/ Vehicle
Terminal Island Interchange Ramps / Ocean Boulevard	AM	C	0.792	-	F	1.255	-	F	1.130	-
	MD	D	0.833	-	F	1.471	-	F	1.304	-
	PM	E	0.912	-	F	1.181	-	F	1.170	-
Pier S Avenue / Ocean Boulevard	AM	C	0.709	-	F	1.110	-	F	1.008	-
	MD	C	0.700	-	F	1.274	-	F	1.202	-
	PM	D	0.824	-	F	1.114	-	F	1.011	-
Pier S Avenue / New Dock Street	AM	A	0.327	-	B	0.678	-	A	0.591	-
	MD	A	0.350	-	D	0.843	-	C	0.739	-
	PM	A	0.356	-	B	0.684	-	A	0.588	-
Navy Way / Seaside Avenue	AM	A	0.474	-	E	0.904	-	**E**	0.931	-
	MD	A	0.414	-	D	0.854	-	**D**	0.875	-
	PM	A	0.581	-	F	1.091	-	**F**	1.125	-
Pico Avenue Pier B Street / 9th Street	AM	A	0.428	-	C	0.766	-	C	0.708	-
	MD	A	0.455	-	D	0.897	-	B	0.640	-
	PM	A	0.494	-	B	0.688	-	B	0.625	-
Pico Avenue / Pier C Street	AM	A	0.309	-	A	0.442	-	A	0.446	-
	MD	A	0.340	-	A	0.385	-	A	0.381	-
	PM	A	0.343	-	A	0.402	-	A	0.402	-
Pico Avenue / Pier D Street	AM	B	-	10.1	F	-	55.1	B	0.630	-
	MD	B	-	11.3	E	-	42.0	A	0.529	-
	PM	B	-	10.7	E	-	36.8	A	0.543	-
Pico Avenue / Pier E Street	AM	A	-	9.9	C	-	18.7	A	0.465	-
	MD	B	-	11.8	C	-	23.9	A	0.559	-
	PM	B		11.3	E	-	47.6	C	0.782	
Terminal Island Freeway SB Off-Ramp / New Dock Street	AM	B	-	10.8	F	-	95.1	E	-	48.2
	MD	A	-	9.1	E	-	47.3	D	-	29.6
	PM	A	-	9.3	C	-	15.4	C	-	15.3
Terminal Island Freeway NB On-Ramp / New Dock Street	AM	A	-	7.4	C	-	15.9	B	-	13.9
	MD	A	-	7.6	D	-	30.6	C	-	22.5
	PM	A	-	7.9	D	-	32.7	C	-	21.7
Pico Avenue / Broadway	AM	B	-	10.6	B	-	11.9	B	-	11.9
	MD	B	-	11.2	B	-	10.7	B	-	11.3
	PM	B	-	10.5	B	-	10.3	B	-	11.4
Ocean Boulevard/ Golden Shore Street	AM	A	0.570	-	B	0.658	-	B	0.670	-
	MD	A	0.569	-	C	0.733	-	C	0.735	-
	PM	A	0.593	-	C	0.739	-	**D**	0.801	-
Ocean Boulevard/ Magnolia Avenue	AM	B	0.693	-	E	0.982	-	**F**	1.099	-
	MD	A	0.575	-	D	0.869	-	**E**	0.912	-
	PM	B	0.601	-	D	0.865	-	**E**	0.930	-

[1] No Action Alternative intersection conditions are equivalent to the Bridge Rehabilitation intersection conditions.
[2] Build intersection conditions are equivalent to North- and South-side Alignment Alternative intersection conditions.
Notes: SB – southbound; NB – northbound; AM – morning peak hour; MD – mid-day peak hour; PM – afternoon peak hour
v/c – Vehicle to capacity ratio, presents traffic conditions for signalized intersections.
Delay/Vehicle - delay per vehicle in seconds, presents traffic conditions for unsignalized intersections.
LOS of intersections that are not improved by the proposed project are shown in **bold** type.
Source: Iteris, 2009.

Table 2.2.5-16
Year 2015 Localized Carbon Monoxide Concentrations

Intersection	Peak Hour	1-hour Concentration (ppm)			8-hour Concentration (ppm)		
		Base Year 2005	No Action[1]	Build Alternatives[2]	Base Year 2005	No Action	Build Alternatives
Navy Way and Seaside Avenue	AM	8.1	6.6	6.7	6.1	5.0	5.0
	MD	8.1	6.4	6.5	6.1	4.8	4.9
	PM	9.1	6.8	6.9	6.8	5.1	5.2
Ocean Boulevard and Pier S Avenue	AM	8.2	5.7	5.8	6.2	4.3	4.4
	MD	8.2	5.9	5.8	6.2	4.5	4.4
	PM	8.7	5.9	5.8	6.5	4.5	4.4
Ocean Boulevard and Terminal Island Freeway	AM	8.3	6.1	6.0	6.2	4.6	4.5
	MD	8.2	6.4	6.4	6.2	4.8	4.8
	PM	9.0	6.8	6.6	6.7	5.1	5.0
SB Off-Ramp/ New Dock Street and Terminal Island Freeway	AM	6.3	5.5	5.4	4.8	4.2	4.1
	MD	6.3	5.5	5.4	4.8	4.2	4.1
	PM	6.4	5.4	5.4	4.9	4.1	4.1
Ocean Boulevard/ Golden Shore Street	AM	8.8	6.4	6.4	6.6	4.8	4.8
	MD	8.2	6.2	6.3	6.1	4.7	4.7
	PM	8.3	6.2	6.2	6.2	4.7	5.2
Ocean Boulevard/ Magnolia Avenue	AM	8.4	6.2	6.2	6.3	4.7	4.7
	MD	7.8	6.0	6.0	5.9	4.5	4.5
	PM	7.9	6.0	6.0	5.9	4.5	4.5
State Standard (ppm)		20			9.0		
Federal Standard (ppm)		35			9.0		

[1] No Action Alternative concentrations are equivalent to the Bridge Rehabilitation concentrations.

[2] Build concentrations are equivalent to North- and South-side Alignment Alternative concentrations.

Notes: Total CO concentrations include background 1-hour and 8-hour concentrations of 5.1 and 3.9 ppm, respectively, based on SCAQMD projected future concentration for Long Beach monitoring station in SRA number 4 (SCAQMD, 2007).

Base-year CO levels refer to 2005 and include worst-case background concentrations of 5.9 ppm, 1-hour average, and 4.55 ppm, 8-hour average. Background concentrations are based on a 3-year average of the highest 1-hour and 8-hour concentrations measured at the Central Los Angeles (Main Street) air monitoring station. This scenario presents conditions for CEQA thresholds.

AM – morning peak hour; MD – mid-day peak hour; PM – afternoon peak hour; ppm – parts per million

Source: Parsons, 2009d.

Table 2.2.5-17
Year 2030 Localized Carbon Monoxide Concentrations

Intersection	Peak Hour	1-hour Concentration (ppm)			8-hour Concentration (ppm)		
		Base Year 2005	No Action[1]	Build Alternatives[2]	Base Year 2005	No Action	Build Alternatives
Navy Way and Seaside Avenue	AM	8.1	6.0	6.0	6.1	4.5	4.5
	MD	8.1	5.9	5.9	6.1	4.5	4.5
	PM	9.1	6.1	6.1	6.8	4.6	4.6
Ocean Boulevard and Pier S Avenue	AM	8.2	5.5	5.5	6.2	4.2	4.2
	MD	8.2	5.6	5.6	6.2	4.3	4.3
	PM	8.7	5.6	5.6	6.5	4.3	4.3
Ocean Boulevard and Terminal Island Freeway	AM	8.3	5.7	5.7	6.2	4.3	4.3
	MD	8.2	5.7	5.7	6.2	4.3	4.3
	PM	9.0	6.0	5.9	6.7	4.5	4.5
SB Off-Ramp/ New Dock Street and Terminal Island Freeway	AM	6.3	5.5	5.4	4.8	4.2	4.1
	MD	6.3	5.4	5.4	4.8	4.1	4.1
	PM	6.4	5.3	5.3	4.9	4.0	4.0
Ocean Boulevard/ Golden Shore Street	AM	8.8	5.7	5.7	6.6	4.3	4.3
	MD	8.2	5.6	5.6	6.1	4.2	4.2
	PM	8.3	5.6	5.6	6.2	4.2	4.2
Ocean Boulevard/ Magnolia Avenue	AM	8.4	5.6	5.6	6.3	4.2	4.2
	MD	7.8	5.5	5.6	5.9	4.1	4.2
	PM	7.9	5.5	5.6	5.9	4.1	4.2
State Standard (ppm)		20			9.0		
Federal Standard (ppm)		35			9.0		

[1] No Action Alternative concentrations are equivalent to the Bridge Rehabilitation concentrations.
[2] Build concentrations are equivalent to North- and South-side Alignment Alternative concentrations.
Notes: Total CO concentrations include background 1-hour and 8-hour concentrations of 5.1 and 3.9 ppm, respectively, based on SCAQMD projected future concentration for Long Beach monitoring station in SRA number 4 (SCAQMD, 2007).
Base-year CO levels refer to 2005 and include worst-case background concentrations of 5.9 ppm, 1-hour average, and 4.55 ppm, 8-hour average. Background concentrations are based on a 3-year average of the highest 1-hour and 8-hour concentrations measured at the Central Los Angeles (Main Street) air monitoring station. This scenario presents conditions for CEQA thresholds.
AM – morning peak hour; MD – mid-day peak hour; PM – afternoon peak hour; ppm – parts per million
Source: Parsons, 2009d.

April 2020. The $PM_{2.5}$ conformity for the proposed project is based on trend analysis and is applicable to the current standard and the previous 24-hour standard of 65 µg/m^3.

- **Annual standard: 15.0 µg/m^3:** The 24-hour $PM_{2.5}$ standard is based on a 3-year average of the 98th percentile of 24-hour recorded concentrations; the annual standard is based on a 3-year average of the annual arithmetic mean $PM_{2.5}$ recorded at the monitoring station. A $PM_{2.5}$ hot-spot analysis must consider both standards unless it is determined for a given area that meeting the controlling standard would ensure that CAA requirements are met for both standards.

b) Project Compliance with CFR 93.116 and 93.123

Section 93.116 (a) of 40 CFR states that an FHWA/FTA project must not cause or contribute to any new localized $PM_{2.5}$ violations or increase the frequency or severity of any existing PM_{10} or $PM_{2.5}$ violations in nonattainment or maintenance areas. The regulations further state that projects may satisfy this requirement without an analysis of their potential to create particulate matter hot spots, provided that they do not meet the criteria set forth in Section 93.123 (b) for "Project of Air Quality Concern (POAQC)."

A project may be considered to have one of three types of status: (1) Exempt; (2) Not be exempt but not be a POAQC based on the specific parameters established in the regulations; and (3) It may be a POAQC, which requires that a qualitative hot-spot analysis be conducted. The Gerald Desmond Bridge Replacement Project does not meet the definition of an exempt project under Section 93.126 or 93.128.

The 2006 Final Transportation Conformity Rule defines a POAQC that requires PM_{10} and $PM_{2.5}$ hot-spot analysis in 40 CFR 93.123(b)(1) as:

i) New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;

ii) Projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;

iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;

iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and

v) Projects in or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ and PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The proposed project falls within the category of new or expanded highway projects with a significant number of diesel vehicles, and it would be affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles. The proposed project is a POAQC based on the criteria listed in the final conformity rule (40 CFR 93.123 (b)(1)); therefore, a qualitative project-level hot-spot assessment was conducted to assess whether the project would cause or contribute to any new localized PM_{10} or $PM_{2.5}$ violations, or increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{10} or $PM_{2.5}$ NAAQS.

c) Analysis Methodology and Types of Emissions Considered

As mentioned above, the qualitative PM hot-spot analysis was performed following the EPA document *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (Guidelines - EPA, March 2006b).

The analysis was based on directly emitted $PM_{2.5}$ emissions, including tailpipe, brake wear, and tire wear. Secondary particles formed through $PM_{2.5}$ precursors take several hours to form in the atmosphere and would be dispersed beyond the immediate project vicinity; therefore, they are not considered in a hot-spot analysis. Secondary emissions are included in the regional emission analysis prepared for the conforming RTP and TIP. Vehicles cause dust from paved and unpaved roads to be re-entrained or re-suspended in the atmosphere. According to the 2006 Final Rule, road dust emissions are to be considered for PM_{10} hot-spot analysis. For $PM_{2.5}$, road dust emissions are only to be considered in hot-spot analysis if EPA or the state air agency has made a finding that such emissions are a significant contributor to the $PM_{2.5}$ air quality problem (40 CFR 93.102(b)(3)). EPA and CARB have not made such findings; therefore, these emissions are not included in this analysis.

Additionally, the proposed project construction would last less than 5 years; therefore, temporary construction emissions are not considered in this analysis.

Trend Analysis, For performing the trend analysis, PM_{10} and $PM_{2.5}$ ambient air quality data from monitoring stations within the proposed project area were utilized. This data was compared with PM_{10} and $PM_{2.5}$ NAAQS and also examined for trends to predict future conditions in the project vicinity. In the following sections, the project impacts, as well as the likelihood of these impacts interfering with the ambient $PM_{2.5}$ and PM_{10} levels to cause hot spots, are discussed. The opening year (2015), as well as the horizon year of 2030, were considered for the analysis.

d) Data Consideration

Recent data available from the North Long Beach Monitoring Station include the years 1999 to 2006. Table 2.2.5-17 and Exhibit 2.2.5-3 show the particulate concentrations and their historical trend (both PM_{10} and $PM_{2.5}$), as recorded at this monitoring station. Table 2.2.5-18 provides the measured concentrations and the number of days that the applicable NAAQS was exceeded. Exhibit

2.2.5-3 includes normalized concentrations and shows the trend of the pollutant changes in the area. Normalized concentrations represent the ratio of the highest measured concentrations in a given year to the applicable national standard; therefore, normalized concentrations lower than one indicate that the measured concentrations were lower than the ambient air quality standard. The monitored data show the following trends:

- Respirable Particulate Matter (PM_{10}) – During the recorded period of 1999 to 2006, both the 24-hour maximum and the annual average monitored data were well below the NAAQS. The highest recorded 24-hour concentration during the period of 1999 to 2006 was 91 µg/m^3, which was recorded in 2001. The highest annual average was 39 µg/m^3 for 1999. The NAAQS were not exceeded at any time during the last 8 years at the monitoring station.
- Fine Particulate Matter ($PM_{2.5}$) – During the recorded period of 1999 to 2006, the 24-hour 98th percentile concentration, which was averaged over 3 years, remained below the NAAQS (57 to 45 µg/m^3, or between 88 percent and 70 percent of the standard level), with a higher declining rate since 2002. The annual mean $PM_{2.5}$ concentration exceeded the NAAQS every year; however, the data show a declining trend. Specifically, from 2001 to 2003 the annual average concentrations show an approximate 8.5 percent reduction rate, which is very little change from 2003 and 2004, and a higher reduction rate of approximately 12 percent from 2004 to 2005 (17.9 µg/m^3 to 15.9 µg/m^3) concentrations. The data indicate a general declining trend for the ambient $PM_{2.5}$ concentrations in the project area.

Future Air Quality Trends. The area surrounding the project is mostly built out and consists primarily of industrial and Port-related uses. The climate and meteorology at the project site are typical of coastal areas, with variable winds during the day that facilitate the dispersion of pollutants better than in the inland areas; therefore, future air quality is expected to improve per the trend shown in Table 2.2.5-18, Exhibit 2.2.5-3, and in the SIP.

The proposed project is included in the RTP; thus, it is included in the SCAB air quality modeling efforts for the region, as provided in the 2007 AQMP.

Basin Trends. SCAQMD's 2007 AQMP includes modeled estimates of future air quality levels within the SCAB. The modeling results that are reported in the 2007 AQMP indicate that particulate matter emissions and other criteria pollutants have decreased significantly with implementation of new air quality standards and more stringent rules and regulations. Additionally, comparisons with recent year projections show that the air quality is improving at a greater rate than what was projected by the models.

Table 2.2.5-18
Particulate Matter Data Summary (North Long Beach Monitoring Station)

Pollutant	Standard (µg/m^3)	Recorded Concentrations (µg/m^3)							
		1999	2000	2001	2002	2003	2004	2005	2006
Respirable Particulate Matter (PM_{10})	(24-Hour)								
	1st Maximum Concentration	79	105	91	74	63	72	66	51
	Days > NAAQS (150 µg/m^3)	0	0	0	0	0	0	0	0
	(Annual Average)								
	Annual Arithmetic Mean (50 µg/m^3)	39	38	37	36	33	33	30	31
Fine Particulate Matter ($PM_{2.5}$)	(24-Hour)								
	1st Maximum Concentration	67	82	73	63	115	67	54	59
	98th Percentile of 24-hour Concentration	51	64	49	47	47	46	41	50
	Days > NAAQS (65 µg/m^3)	0	0	0	0	0	0	0	0
	3-year Average 98th Percentile [a]	55	57	55	53	48	47	45	46
	(Annual Average)								
	Annual Arithmetic Mean (15 µg/m^3)	**20.7**	**19.7**	**21.2**	**19.5**	**18.0**	**17.9**	**15.9**	**15.2**

[a] Attainment condition for $PM_{2.5}$ is that the 3-year average of the 98th percentile of 24-hour concentrations at each monitor within an area must not exceed 65 µg/m^3. Annual exceedances are shown in **bold** type.

Source: CARB, 2008.

Exhibit 2.2.5-3
Normalized Monitored PM Concentrations – 1999 to 2006, North Long Beach Monitoring Station

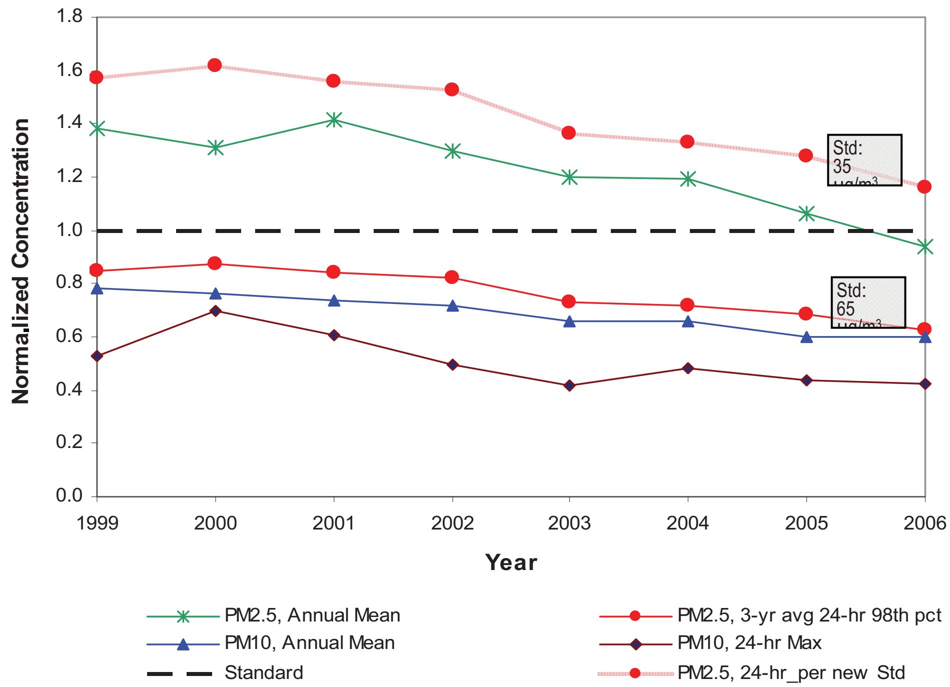


Table 2.2.5-19
Comparison of Particulate Matter Ambient Concentrations (SCAB)

Pollutant (Averaging Time)		Standard (µg/m³)	2005		2015 [a]		2021	
			Observed Max Value (µg/m³)	% Above Standard	Projected Max Value (µg/m³)	% Above Standard	Projected Max Value (µg/m³)	% Above Standard
PM_{10} (24-hour)		150	131	Met	117	Met	111	Met
$PM_{2.5}$ (Annual)		15	21	40	15	Met	<15	Met
$PM_{2.5}$ (24-hour)	Current	65	133	104	57	Met	52	Met
	New	35	133	279	57	63	52	49

[a] Projected data include the 2007 Control Strategies.

Source: SCAQMD, 2007 AQMP, Chapter 10.

Table 2.2.5-19, which was derived from Chapter 10 (Looking beyond Current Requirements) of the 2007 AQMP, provides a comparison of the monitored 2005 PM levels to the model predicted values for 20015 and 2021. As shown, the projected data indicate a trend of decreasing ambient PM concentrations from 2005 to 2021.

The monitored PM ambient concentrations at the Long Beach Station, shown in Table 2.2.5-18, support the modeled predicted trends, as the recorded PM_{10} and $PM_{2.5}$ levels at the monitoring station between the years 1999 and 2006 for both the 24-hour levels and average annual values show a general declining trend.

e) Traffic Condition Effects

The proposed project would replace the existing physically and functionally deficient Gerald Desmond Bridge with a new structure that would be able to carry the projected traffic volume increase in the area. In addition, the project includes reconfiguration of freeway interchanges within the project limits and some arterial street intersections; therefore, the project would improve traffic operations along the project corridor, including segments of Ocean Boulevard over the new bridge, and freeway ramps and interchanges, as well as intersections within the study area. The effects of the Build Alternatives on the roadway segment and intersections are discussed below.

Roadway Segments. The existing bridge has two travel lanes in each direction, with a truck-climbing lane approach grade of 6 percent up to the crest of the bridge where they merge back to the two-lane configuration. The need for the truck climbing lanes, coupled with traffic congestion during the morning and afternoon peak operation hours, has resulted in traffic congestion along the bridge. The Gerald Desmond Bridge Replacement Project would accommodate current and future car and truck traffic volumes by providing three travel lanes and shoulders in each direction. The addition of the third lane, combined with the reduced approach grade, would eliminate the current merging movement and improve LOS. In addition, the roadway shoulders would reduce nonrecurring congestion in the project area. Nonrecurring congestion is traffic congestion related to automobile crashes, disabled vehicles, work zones, adverse weather events, and planned special events (FHWA, 2006b). The addition of a 9.8-ft-wide (3-m) outside shoulder and an 11.8-ft-wide (3.6-m) inside shoulder at the approaches of the new bridge would provide room for emergency response vehicles, roadway maintenance personnel, and disabled automobiles without causing major congestion/roadway closures to occur. These improvements in access would reduce delays in traffic, thereby providing the benefit of improved air quality in the project area. Furthermore, the proposed improved 5 percent approach grade would help reduce emissions of pollutants from faster-moving trucks in comparison to the emissions from the slower truck traffic and higher revolution-per-minute trucks to climb uphill on the existing steep grade of the climbing lane.

Intersections. As a result of the proposed project, delays due to traffic congestion at most of the studied intersections in the project area would be greatly reduced, and the average vehicle travel speed would slightly increase. Both of these effects would translate into a decrease in vehicle emissions. In 2030, the LOS at the intersections within the project area would be improved with implementation of the Build Alternatives. Tables 2.2.5-14 and 2.2.5-15 compare the peak-hour intersection conditions of the No Action Alternative to the Build Alternatives for 2015 and 2030, respectively. Among the 13 intersections that were analyzed, the LOS of the Build Alternatives would improve at all but three intersections when compared to the No Action Alternative.

The intersection of Navy Way and Seaside Avenue would have a worse v/c compared to the No Action Alternative. The effect would be more significant for the AM peak hour during the opening year. The mid-day and PM peak-hour LOS would not change and would result in only a slight increase in v/c. The two intersections of Ocean Boulevard at Golden Shore Street and at Magnolia Avenue would have worse v/c and/or LOS compared with the No Action Alternative. The effect at these two intersections would be more significant for the horizon year, when the PM LOS at Golden Shore Street and Ocean Boulevard changes from C to D, and the LOS at the intersection of Magnolia Avenue and Ocean Boulevard would decline at all peak hours.

An increase of PM emissions would occur if the project significantly increased ADT in the project area and at locations where there are more traffic delays. Traffic delays would occur at intersections where vehicles are accumulating and idling. It is unlikely that PM hot spots would be associated with the proposed project because local accumulation and delay of vehicles would be reduced by the project. For all intersections except one, LOS would improve under the Build Alternatives when compared to the No Action Alternative. Potential localized PM increases associated with the increase in ADT would be offset by the increase of vehicle speed in the project area, which is an indication of reduced congestion and idling of vehicles. Thus, the project is not expected to cause an adverse affect with respect to localized concentrations of $PM_{2.5}$ or PM_{10}, at any nearby sensitive receptor.

Emissions Calculation

Table 2.2.5-10 presents emissions, including PM_{10} and $PM_{2.5}$, from vehicles traveling along the project corridor for the years 2005, 2015, and 2030. The particulate emissions in Table 2.2.5-10 include PM emissions from vehicle exhaust, brake wear, tire wear, and re-entrained road dust. The emission inventories presented in the SCAQMD 2007 AQMP show that emissions from paved roads are a significant contributor to directly emitted PM_{10} and $PM_{2.5}$. Because the 2007 AQMP is incorporated as part of the California 2007 SIP, PM from re-entrained roads was included in the hot-spot analysis. Re-entrained road dust was estimated based on VMT, and Chapter 13.2.1 of *AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors* (EPA, 2006c).

As shown in Table 2.2.5-10, estimates of PM_{10} and $PM_{2.5}$ emissions for base, opening, and horizon years show that project implementation would not generate significant additional daily emissions. Because the VMT and the number of trucks (not percentage) are predicted to increase with time, the paved road dust emissions would also increase with time. This finding is consistent with the emission inventories reported in the SCAQMD 2007 AQMP, which also shows an increase of road dust emissions with time. Because paved road emissions are included in the 2007 AQMP and the $PM_{2.5}$ SIP, paved road emissions have been accounted for as part of the $PM_{2.5}$ attainment plan; therefore, the proposed project is not expected to cause new violations or increase the frequency or severity of any existing violations, or delay timely attainment of the NAAQS.

In conclusion, the proposed project would improve the operations of the intersections and increase vehicle speeds in the project area, compared to the No Action scenario. Accordingly, it is reasonable to conclude that PM emissions associated with the proposed action would not generate high concentrations of PM (hot spots); therefore, the project meets the project-level conformity requirements for PM_{10} and $PM_{2.5}$ as defined in 40 CFR Sections 93.116 and 93.123.

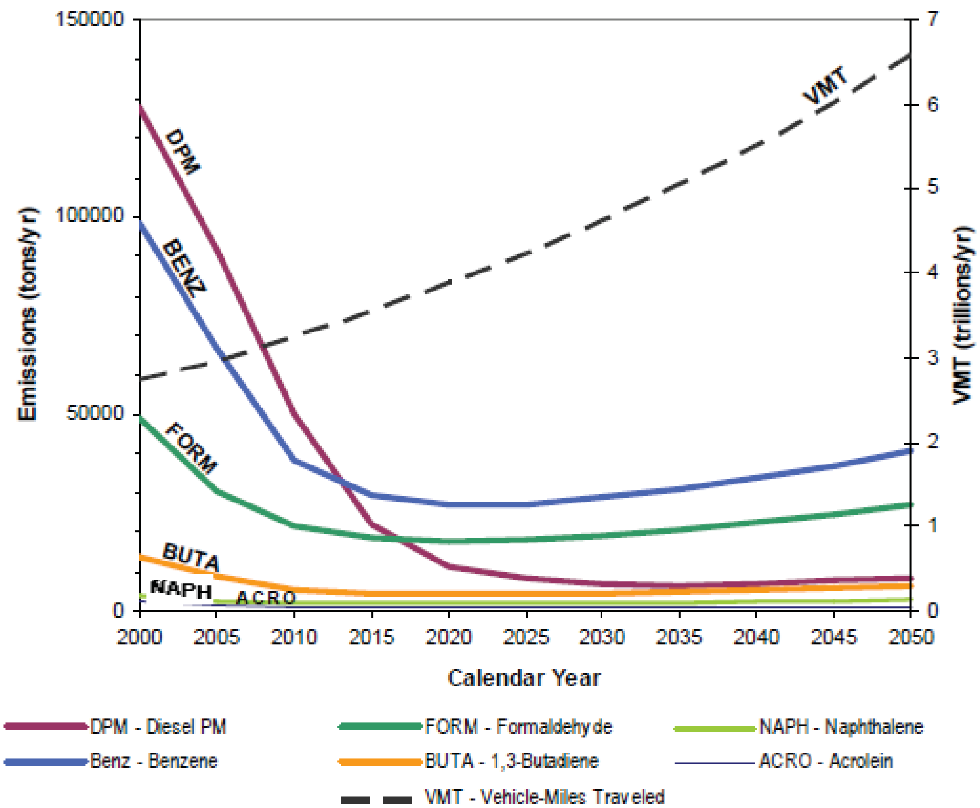
Mobile Source Air Toxics. As described in Section 2.2.5.1, EPA issued a Final Rule on *Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, 66 FR 17229* (March 29, 2001). Furthermore, several studies have concluded that mobile sources (i.e., on-road and non-road combined) are responsible for most of the excess cancer risk associated with exposure to urban air toxics. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. Currently, the tools and techniques for assessing project-specific health impacts from MSATs are limited. Moreover, EPA has not established regulatory concentration targets for the relevant MSAT pollutants appropriate for use in the project development process. For the same reason, states are not required to achieve an identified level of air toxics in the ambient air or to identify air toxics reduction measures in the SIP. Developing strategies for reduction of MSATs is a cooperative effort between federal and local authorized agencies. The CAA provides EPA with the authority to establish and regulate emission standards for engines and vehicles. The State of California also has the right to adopt its own emission regulations, which are often more stringent than the federal rules. To reduce mobile source emissions, mandatory and incentive-based programs are developed in conjunction with new engine emission regulations; additional emission testing requirements (i.e., supplemental emission test [SET], not-to-exceed [NTE] limits); and limiting fuel sulfur content. These programs are implemented by all levels of government: federal, state, and local (Dieselnet, 2007). Currently, FHWA's interim guidance update (FHWA, 2009) is used for analysis of potential impacts of MSATs to be included in environmental documents.

The 2007 EPA rule mentioned in Section 2.1.1.3 requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in Exhibit 2.2.5-4.

California's vehicle emission control and fuel standards are more stringent than federal standards and are effective sooner, so the effect of combined state and federal regulations is expected to result in a greater reduction of MSATs sooner than the FHWA analysis predicts.

Based on FHWA's tiered approach in their interim guidance document, the proposed project would be considered to have minimal potential MSAT effects. The following analysis provides an assessment of project local MSAT effects. The analysis was conducted using the projected traffic data, including local roadway traffic volumes and VMT, vehicle mix, traffic diversion data, average speed, and associated changes in MSATs for the project alternatives.

Exhibit 2.2.5-4
National MSAT Emissions Trend, 1999 - 2050
for Vehicles Operating on Roadways



Notes: (1) The projected data were estimated using EPA's MOBILE6.2 Model run August 20, 2009.
(2) Annual emissions of polycyclic organic mater are projected to be 561 tons per year for 1999, decreasing to 373 tons per year for 2050.
(3) Trends for specific location may be different, depending on locally derived information representing VMT, vehicle speeds, vehicle mix, fuels, emission control programs, methodology, and other factors.

Source: FHWA, 2009.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs. Research into the health impacts of MSATs is ongoing. For different emission types, a variety of studies show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of many of EPA's efforts. Most notably, the agency conducted the NATA in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

As described in Section 2.2.5.2, SCAQMD conducted a comprehensive study on air toxics within the SCAB. The MATES-II and MATES-III Studies (SCAQMD, 2000 and 2008, respectively), which monitored more than 30 toxic air pollutants, included estimates of cancer risk from exposure to DPMs. The MATES studies identified particulate emissions, attributed mostly to diesel engines, as an important cancer risk factor. According to MATES-III, DPMs accounted for approximately 84 percent of the total cancer risk associated with the investigated group of air pollutants. MATES studies also provided regional trends in estimated outdoor cancer risk from air toxics emissions.

EPA is in the process of assessing the risks of various kinds of exposures to MSAT emissions. The EPA IRIS is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as a human carcinogen by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure. **Naphthalene,** which is the replacement for acetaldehyde in the 2009 update memorandum, is also a probable human carcinogen based on observations of respiratory tumors in mice after inhalation and oral exposure. Noncancer effects of concern in humans exposed to naphthalene include hemolytic anemia, cataract, and respiratory toxicity.
- **Diesel exhaust (DE)** is likely to be carcinogenic to humans by inhalation from environmental exposures. DE, as reviewed in this document, is the combination of DPM and DE organic gases. **DE** also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.
- **Polycyclic Organic Matter (POM)** consists of a mixture of hundreds of chemicals, including polycyclic aromatic hydrocarbons (PAHs), their oxygenated products, and their nitrogen analogs (nitro-PAHs). Sources of airborne POM include various mobile-source combustion, industrial, and domestic processes. Occupational and community studies suggest that exposure to mixtures containing POM (and specifically PAHs) is associated with carcinogenic and reproductive effects, although it is not possible specifically to implicate POM or its individual components as being causally related to these health effects. Recent evidence from occupational epidemiologic studies indicated that exposure to high concentrations of PAHs is associated with mortality from respiratory and cardiovascular effects.

Other studies have addressed MSAT health impacts in proximity to roadways. The Health Effects Institute, which is a nonprofit organization funded by EPA, FHWA, and the industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

SCAQMD’s MATES studies offer an opportunity to estimate air toxics-related health risks from roads; however, while at the regional scale the studies approximate air toxics-related health risk from roads, they were not designed to provide accurate approximations of risk as a function of proximity to roads. Monitoring data near freeways were limited to three sites, and modeling results were not finely resolved to provide concentration gradients near roads. The MATES monitoring results are consistent with other research indicating that pollutant concentrations are often close to or approximately the same as background conditions beyond 328 ft (100 m) from a road. Furthermore, the studies caution that results are highly dependent upon the unit risk factors assumed, particularly for DPM, for which uncertainties are an order of magnitude or more. At the microscale, neither MATES-II nor MATES-III was designed to effectively assess changes in pollutant concentrations with varying distance from roadways; therefore, the available methodology and techniques need to be refined so that they provide tools and information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of the health impacts specific to this project.

MSAT Effect Analysis

Emissions of priority MSATs were estimated along the project corridor. Emissions were estimated for opening year 2015 and the horizon year 2030, as well as for the CEQA baseline base year 2005. The 2005 emissions are included to show the effect of current VMT levels and the degree of control plans on MSAT emissions.

The analysis was conducted for six air toxics that are identified as priority MSATs by EPA. The EMFAC2007 model was used to provide the emission factors of total organic gas (TOG) and PM in Los Angeles County for the analysis years (i.e., base year 2005, year 2015, and horizon year 2030). The PM data from EMFAC provide information for DPM. For the remaining priority MSATs (i.e., acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene), CARB-supplied speciation factors can be used to obtain each MSAT compound as a fraction of TOG data.

It should be noted that because at the time of this writing the methodology for MSAT estimation was not updated to include the revised MSAT list as defined in FHWA's 2009 Update Guidance document, the analysis is provided for the six MSATs identified in the 2006 Guidelines. Furthermore, this analysis was conducted using EMFAC2007 and the UC-Davis Spreadsheet Tool, and because the methodology is similar to the use of CT-EMFAC, the results presented herein would be valid for the purpose of comparison and evaluation of the MSAT effects.

As described in Section 2.2.5.3, the UC Davis-Caltrans Project-Level MSAT Analysis Spreadsheet Tool (UC-Davis and Caltrans, 2006), was used to provide a comparison of MSAT emissions for the local roadways with and without the proposed project. The analysis was conducted for the project corridor along Ocean Boulevard and the Gerald Desmond Bridge. The traffic volumes and average speeds during peak and non-peak hours, percent of trucks, and VMT were used as input data. The spreadsheet tool applies the traffic activity data to the emission factors and estimates MSAT emissions for different scenarios.

Exhibit 2.2.5-5 and Table 2.2.5-20 present the results from the spreadsheet tool for estimated daily emissions for the analyzed roadway segment. As shown, a significant decrease in MSAT emissions can be expected for the proposed project from the base year (2005) levels through future year levels. This decrease is prevalent for all of the priority MSATs, and it is consistent with EPA's study. For all studied roadways, MSAT emissions are projected to decline markedly in the future (i.e., compared to base year 2005). This is directly due to the improved pollution emission performance of a modernizing fleet of all diesel-fueled vehicles, which is a trend that is anticipated to continue throughout the planning horizon. The estimated emission increase along the project corridor for the opening year 2015 (3.9 percent compared to No Action) and horizon year 2030 (4.7 percent compared to No Action) is due to an increase in ADT.

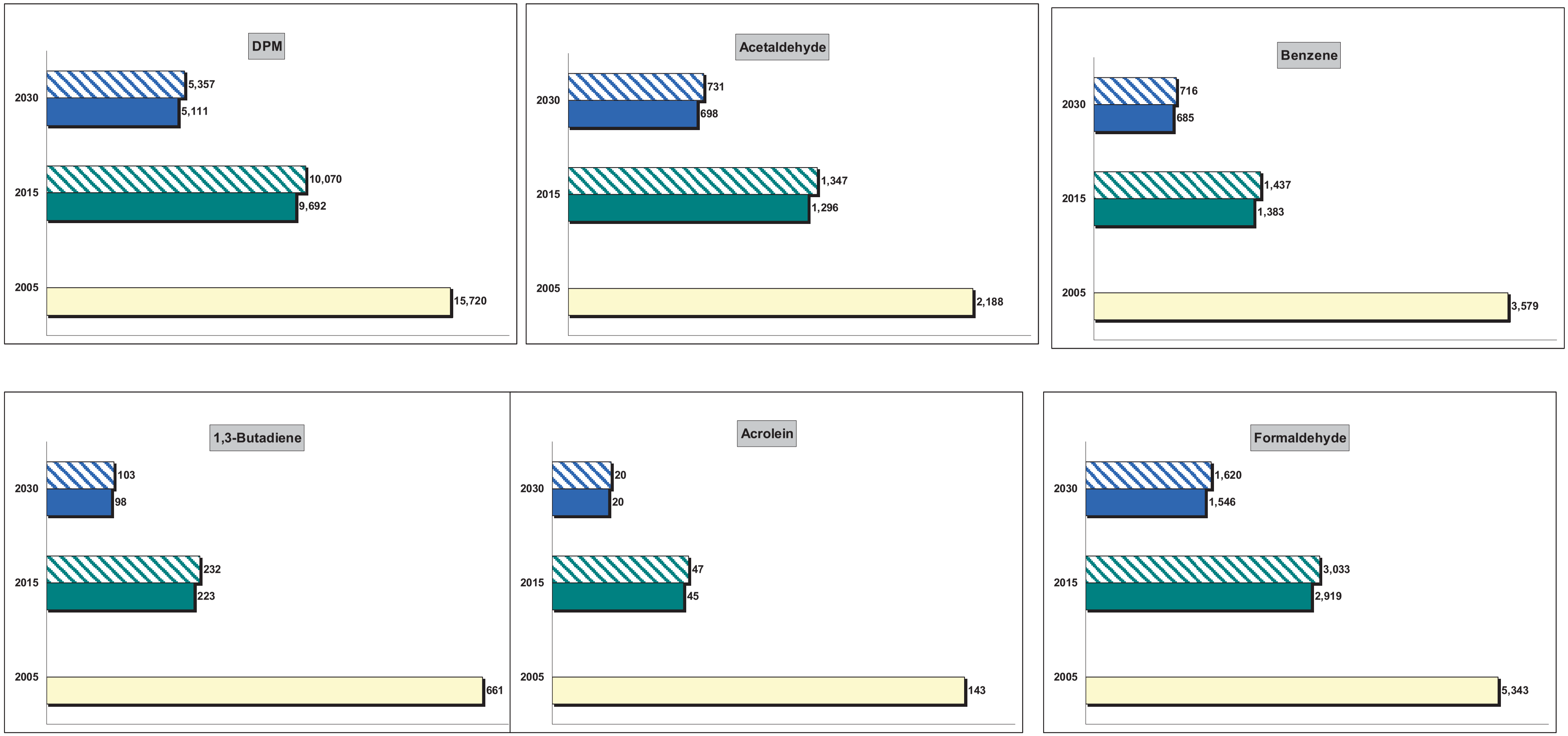
2.2.5.4 Human Health Risk

The previous section presented the MSAT emissions analysis for compliance with FHWA's NEPA guidance. This section provides the HRA that is prepared for the Port to use in their CEQA analysis.

As previously discussed under Project-Level Construction Air Quality Effects and Mobile Air Source Toxics, combined emissions from project construction and operations would include TACs that could affect public health; therefore, an HRA was conducted to evaluate the health effects of project-related TAC emissions on the public.

The HRA was conducted in accordance with the *Air Quality and Health Risk Assessment Analysis Protocol for Proposed Projects at the Port of Long Beach* (HRA Protocol) (POLB, 2007c). In general, the Protocol follows the methods for preparing Tier 1 risk assessments described in *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA, 2003); *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588)* (SCAQMD, 2005); and *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions* (SCAQMD, 2002). The methods in these guidance documents are incorporated into the Hotspots Analysis and Reporting Program (HARP) model released by CARB in December 2003 (CARB, 2003a). In May 2009, OEHHA released a revision to their 2003 Air Toxics Hot Spots Risk Assessment Guidelines, titled *Technical Support Document for Cancer Potency Factors: Methodologies for derivations, listing of available values, and adjustments to allow for early life stage exposures* (OEHHA, 2009). The revised document provides procedures to consider the increased susceptibility of infants and children compared to adults to carcinogens.

Exhibit 2.2.5-5
Local Area Emissions of Priority MSATs from Ocean Boulevard Segment for Scenario Years CEQA Base Year (2005), Opening Year (2015), and Horizon Year (2030)



Legends:

NOP Year 2005; Opening Year 2015 (No Action and Rehabilitation Alternative); Opening Year 2015 (Project Build Alternatives);

RTP Horizon Year 2030 (No Action and Rehabilitation Alternative); RTP Horizon Year 2030 (Project Build Alternatives);

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Table 2.2.5-20
Estimate of Priority MSATs Emissions for the Project Corridor along Ocean Boulevard (grams/day)

Year/Scenario	DPM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde	Total MSATs
Baseline – 2005	15,720	3,579	661	2,188	143	5,343	27,634
Opening Year 2015 – No Action[1]	9,692	1,383	223	1,296	45	2,919	15,558
Opening Year 2015 –Build Alternatives[2]	10,070	1,437	232	1,347	47	3,033	16,166
Horizon Year 2030 – No-Action	5,111	685	98	698	20	1,546	8,158
Horizon Year 2030 – Build Alternatives	5,357	716	103	731	20	1,620	8,547

[1] No Action Alternative MSAT emissions are equivalent to the Bridge Rehabilitation conditions.
[2] Build MSAT emissions are equivalent to North- and South-side Alignment Alternative conditions.

Source: Parsons, 2009d.

This HRA used the HARP model to perform all health risk calculations. Furthermore, the most recent OEHHA guidelines (OEHHA, 2009) were used to incorporate the age-specific weighting factors in calculating cancer risk from exposures of infants, children, and adolescents to reflect their anticipated special sensitivity to carcinogens. The HRA estimated the individual lifetime cancer risks, cancer burden, and chronic and acute non-cancer hazard indices associated with the proposed project. The complete HRA report is provided in Appendix D of the Air Quality Technical Study (under separate cover).

The HARP model, as was originally developed, includes a hard-coded version of EPA's ISCST3 (Industrial Source Complex Short-Term Version 3) model for calculating pollutant dispersion; however, since November 2006, AERMOD (American Meteorological Society/EPA Regulatory Model Improvement Committee MODEL) became EPA's preferred dispersion model. Consequently, CARB has developed the program "HARP On-Ramp," which converts AERMOD air dispersion output files into text files that can be imported by the HARP Risk Module for performing the risk analysis (CARB 2007b). Thus, AERMOD was used for conducting the air dispersion analysis for this HRA in conjunction with the risk module in HARP.

Individual lifetime cancer risk represents the chance that an individual would contract cancer after a lifetime of exposure to the TACs of concern. The CEQA threshold for significance, used to evaluate the impact of exposure to TACs is 10 excess cancer cases per one million ($10x10^{-6}$). This threshold is recommended by SCAQMD and CARB explicitly to determine project-specific health risk impacts. Although Caltrans has not adopted HRA thresholds and is not subject to local jurisdictions or their thresholds of significance, Caltrans supports the Port's efforts and remains committed to thoroughly analyzing air quality impacts and incorporating measures to avoid, minimize and if necessary mitigate them.

Cancer burden is an estimate of the number of persons that would contract cancer from exposure to project TAC emissions within the project's zone of influence (ZOI). SCAQMD considers a cancer burden of 0.5 or higher associated with a proposed project to be significant.

For non-cancer health effects, estimates of chronic and acute hazard indices represent predicted long- and short-term health impacts from exposure to certain TACs, respectively. The hazard indices are calculated by dividing model-predicted TAC concentration by the TAC reference exposure levels (RELs) established by OEHHA. A health hazard index (HHI) equal to or greater than one indicates the potential for adverse health effects. These include cardiovascular or respiratory diseases, exacerbation of asthma, bronchitis, decrease in lung function, and mortality.

Estimates of project health effects include the evaluation of operational emissions associated with the Gerald Desmond Bridge Replacement Project.

The HRA methodology includes four procedural steps to estimate health impact results:

1. Quantify project-generated emissions;
2. Identify ground-level receptor locations that may be affected by the emissions (including a regular grid of receptors and any special sensitive receptor locations, such as schools, hospitals, convalescent homes, and child-care centers);
3. Perform dispersion modeling analyses to estimate ambient TAC concentrations at each receptor location; and
4. Use a risk characterization model (i.e., HARP) to estimate the potential health risk at each receptor location.

The following describes in detail the methods used to develop each step of the project HRA.

Emission Sources

The proposed project is a transportation corridor and the emission sources are vehicles traveling along the roadways affected by the project implementation. The emissions considered for HRA include vehicle engine exhaust, tire wear, and brake wear. The project corridor was modeled as a system of 12 roadway links/segments, each with uniform width, traffic volume, vehicle fleet mix, and average speed. The distinct links were selected based on the project traffic analysis report (Iteris, 2009). Table 2.2.5-21 lists the roadway links as the emission sources for the HRA.

For the determination of significance from a NEPA standpoint, this HRA determined the incremental increase in health effects values associated with the proposed project by estimating the net change in impacts between the proposed Build Alternatives and the No Action/Rehabilitation Alternative scenario (NEPA Baseline). These project increments (proposed Build Alternatives minus No Action Alternative) were compared with the SCAQMD thresholds to determine if an adverse effect on human health would occur.

The determination of health risks in this HRA required the calculation of 70-year average and maximum annual TAC emission rates. The HRA used 70-year annual average emission rates to determine individual lifetime cancer risks. The 70-year averaging period coincided with 2015 through 2084, or project years one through 70.

Table 2.2.5-21
Identified Project Emission Sources for HRA

Link [a] ID (as used in AERMOD)	Description of Line Source as the Vehicle Traffic along the Link
OCBL1	Ocean Boulevard Segment 1 – between Navy Way off-ramp and the EB and WB horseshoe ramps
OCBL2	Ocean Boulevard Segment 2 (includes New Bridge) – between Horseshoe ramps and SR 710 connector ramps
OCBL3	Ocean Boulevard Segment 3 – from SR 710 connector ramps to Downtown Long Beach
NWYOF	Off-ramp from WB Ocean Boulevard to Navy Way
OFFEB	Off-Ramp from EB Ocean Boulevard to EB Seaside Avenue
ONEB	Horseshoe ramp from WB Seaside Avenue to EB Ocean Boulevard
OFFWB	Horseshoe ramp from WB Ocean Boulevard to Seaside Avenue
ONWB	On-ramp from Seaside Avenue to WB Ocean Boulevard
ONPICO	Connector on-ramp, from SB Pico Avenue to WB Ocean Boulevard
OFFPICO	Connector off-ramp, from WB Ocean Boulevard to NB Pico Avenue
NBRAMP	SR 710 NB Connector Ramp – WB Ocean Boulevard off-ramp to NB SR 710
SBRAMP	SR 710 SB Connector Ramp – on-ramp to WB Ocean Boulevard from SB SR 710

[a] Roadway link is defined as a discrete segment of roadway with unique estimates for the vehicle-fleet specific population and average speed. A roadway link is classified as a highway, ramp, major arterial, minor arterial, or collector/connector.

Emissions Characterization

The emissions from project sources included in the HRA are vehicle engine exhaust emissions and tire wear and brake wear. As previously described, emissions from vehicle movement along each roadway link were simulated as line source emissions in the modeling analysis and represented as a series of separated volume sources. Volume source emissions were simulated by AERMOD to mimic the initial lateral dispersion of emissions by the exhaust stack's movement through the atmosphere. Key model parameters for volume sources include emission rate, source release height, and initial lateral and vertical dimensions of volumes.

The HRA analyzed the risk from combined emissions from all individual roadway links using the link-specific data and assumptions as described above. Emissions from trucks were assigned a release height of 15 ft (4.5 m) and for automobiles an initial release height of 3 ft (0.6-m). The width of the volume sources were set equal to the width of the roadway link plus 10 ft (3 m) in each side. The base elevations were adjusted for the elevated portions of the project corridor, such as the Gerald Desmond Bridge and the Horseshoe off-ramp from WB Ocean Boulevard to Seaside Avenue.

Mobile source emissions along each link were estimated based on link-specific vehicle activity data including fleet mix, traffic volumes and VMT for each vehicle type, and peak and average travel speed. Vehicle emissions factors at the average link speed and at peak-hour speed (for acute hazard effects analysis) were obtained using the EMFAC2007 model. The total emission rate of each link (line source) was then divided by the number of volume sources in that link to obtain emissions per volume source. It should be noted that the construction emissions of DPM were not included in the health risk analysis, because of the temporary and intermittent nature of construction emissions and because (1) even based on the peak daily emissions of DPM, the total construction DPM emissions is only approximately 5 to 6 percent of the operational emissions of DPM; (2) the main portion of construction activities occur prior to the opening year of the new bridge to traffic; and (3) the duration of construction activities is only 5 years. As such, the risk from construction emissions of toxics would be considerably lower than the estimated sensitive receptors risk (9-year period); therefore, construction emissions would not cause adverse risk impacts to nearby schools and other sensitive receptors.

Based on project traffic, vehicle mix within the project corridor was assumed to consist of heavy-duty diesel trucks and PCEs, for non-diesel trucks. Emissions of TACs from project operational sources include exhaust emissions from diesel trucks, gasoline-fueled PCEs, and particulate emissions from vehicles tire wear and brake wear.

For diesel truck engines, exhaust PM_{10} (modeled as DPM) is the only pollutant analyzed as a surrogate for diesel exhaust TACs. The cancer and chronic non-cancer toxicity factors established by the OEHHA for the assessment of DPM emissions include consideration of all toxic compounds associated with diesel combustive emissions. Although no specific risk factors have been developed for UFP, they are major constituents of DPM emissions resulting from transportation sources. DPM emissions are analyzed in the HRA, and they include the entire range of diesel particulate sizes, including UFP, and the risk factors established for DPM for use in health risk analysis incorporated all DPM constituents during the regulatory review process.

Gasoline vehicle exhaust TAC emissions were speciated to the MSAT pollutants benzene, acrolein, acetaldehyde, 1-3 butadiene, and formaldehyde. The TOG speciation factors for gasoline vehicles were identified and taken from the most recent Caltrans inventory tool for MSATs (UC Davis, 2006).

For vehicle tire and brake wear, fugitive PM_{10} emissions were speciated into their respective TAC components using CARB profiles.

In accordance with CARB recommendations, speciation profiles developed for the California Emission Inventory and Reporting System (CEIDARS) were used in this study (CARB 2002 and 2003b). In this study, TOG emissions were derived from VOC emissions using conversion factors provided with the TOG speciation profiles.

The estimates of TAC emissions for the No Action/ Rehabilitation Alternative and Build Alternative scenarios, and speciation profiles are provided in Appendix D.

Risk Characterization and Assessment Approach

Risk characterization involves the evaluation of potential health risks based on the amount of exposure to TACs in exposed individuals and the exposure scenario (i.e., the environment in which receptors are exposed). For this HRA, the main exposure pathway is inhalation.

Two types of cancer risks were estimated in this HRA: individual excess cancer risk and population cancer burden. The individual excess cancer risk represents the potential risk to a single maximally exposed individual who may be exposed over a 70-year lifetime to a facility's emissions for a residential exposure (or a 40-year work lifetime for occupational exposure). Population cancer burden is an estimate of the increased number of cancer cases in a population as a result of exposure to emitted substances. The excess cancer burden for a population unit is the product of the exposed population and the estimated individual risk of that population (i.e., exposure concentrations are based on the average over that population presumed to be at the population centroid) associated with exposure through all exposure routes of emissions from the facility. The effect on the public would be considered adverse if the predicted cancer burden is greater than 0.5.

To estimate the cancer risk effect, source emissions were projected over a 70-year period, from 2015 through 2084. The 70-year projection of activity levels requires incorporation of traffic volume increase based on project area development and associated changes in truck trips, and vehicle travel speeds. Traffic numbers were provided for all alternatives for 2005 (baseline year), 2015 (opening year), and 2030 (horizon year). Due to the difficulty in predicting beyond 2030 and the fact that POLB would reach build-out traffic conditions for Port-generated land uses by the year 2030, the analysis assumed build-out constant traffic activities beyond the horizon year; however, for the CEQA baseline scenario, activity levels in the baseline year of 2005 were held constant over the entire 70-year period.

Pursuant to the recently released Technical Support Document for Cancer Potency Factors: (OEHHA, 2009), the cancer risk values were adjusted to consider the increased susceptibility to carcinogens of infants and children compared to adults. The study concludes that based on the analysis of the potency by lifestage at exposure (using the recent toxicological and epidemiological studies), OEHHA proposes weighting cancer risk by a factor of 10 for exposures that occur from the third trimester of pregnancy to 2 years of age, and by a factor of 3 for exposures that occur from 2 years through 16 years of age. The proposed adjustments were incorporated in the estimated cancer risks for residential and sensitive receptors, including schools and daycare centers.

Cancer burden was determined with the approach used by CARB in the HARP program (CARB, 2003a). To estimate cancer burden, the incremental cancer risk was determined for each census block within the project's ZOI, which is defined as the area within the isopleth representing a one in one million ($1x10^{-6}$) cancer risk increment.

To estimate project non-cancer effects, the HRA focused on operations in year 2015. This was determined based on annual emissions to represent the year with the greatest incremental impact between the operational and baseline conditions.

The HRA evaluated cancer risks and chronic and acute hazard indices to residential, occupational, and sensitive receptors (e.g., schools, child-care centers, and elderly care facilities). Each receptor type has specific exposure duration, breathing rate, and other parameters for risk assessment. Cancer burden was calculated using residential exposure assumptions.

Table 2.2.5-22 presents estimates of maximum individual cancer risk, and chronic and acute non-cancer hazard indices increments associated with the proposed project. The projected values for each receptor type correspond to the receptor with the maximum increment. All other incremental health impacts within the modeling domain would be less than those shown in Table 2.2.5-22. Estimation of project-related incremental cancer burdens is also included in the table.

Health Risk Effects

Table 2.2.5-22 shows that the maximum project-related increment for residential cancer risk at the nearest residential area (northeast of project corridor) is predicted to be less than 1.5 in one million (1.42×10^{-6}). This risk value is well below the adverse effect criterion of 10 in one million (10×10^{-6}) excess cancer risk; therefore, no adverse effect on any residential receptor is anticipated.

The maximum project-related increment for occupational (workers) cancer risk is projected to be less than one in one million ($0.33 x 10^{-6}$), and the maximum increment for cancer risk at a sensitive receptor, including schools and daycare centers, is estimated to be less than 1 in a million ($0.5 x 10^{-6}$). The estimated risk values are all well below the adverse effect criterion of 10 in one million (10×10^{-6}) excess cancer risk.

Table 2.2.5-22 also shows that the estimated maximum project-related increments for the chronic and acute hazard indices are substantially (by orders of magnitude) less than one at all receptors; therefore, the non-cancer short- or long-term health effects of the proposed project would be negligible and are not adverse. Additionally, as presented in Table 2.2.5-22, the cancer burden for all receptors would also be well below the adverse effect threshold of 0.5.

Table 2.2.5-22
Estimate of Maximum Heath Impacts due to the Proposed Project

Health Impact	Receptor Type	Proposed Project	No Action	Project-Related Increment	CEQA[b] Baseline	CEQA Increment	Significance Threshold
Cancer Risk [a]	Residential	4.94×10^{-6}	3.52×10^{-6}	1.42×10^{-6}	8.87×10^{-6}	-3.93×10^{-6}	10×10^{-6}
	Occupational	1.44×10^{-6}	1.11×10^{-6}	0.33×10^{-6}	2.79×10^{-6}	-1.35×10^{-6}	
	Sensitive	1.82×10^{-6}	1.32×10^{-6}	0.50×10^{-6}	3.34×10^{-6}	-1.52×10^{-6}	
Chronic Hazard Index	Residential	0.0029	0.0021	0.0008	0.0033	-0.0004	1.0
	Occupational	0.009	0.007	0.002	0.011	-0.006	
	Sensitive	0.0012	0.0009	0.0003	0.013	-0.001	
Acute Hazard Index	Residential	0.0004	0.0003	0.0001	0.0034	-0.003	1.0
	Occupational	0.0006	0.0005	0.0001	0.0057	-0.005	
	Sensitive	0.0002	0.0002	0.00	0.0017	-0.0015	
Cancer Burden				0.003		-0.011	0.5

[a] The estimated cancer risks include OEHHA default age sensitivity factors (ASF) to adjust for higher risks to infants and children as follows:

Adjustment Period	ASF
third trimester to age 2 years	10
age 2 to age 16 years	3
age 16 to 70 years (for residential)	1

Source: OEHHA, 2009 – page 61

No adjustment used for occupational risk estimates.

[b] Health Impacts Pursuant to CEQA are discussed in Chapter 3.

Source: Parsons, 2010.

As Table 2.2.5-22 shows, the future health risk compared to the base year 2005 show significant reduction. This is primarily attributed to the reduction in TAC emissions from the use of new controls and regulations.

Uncertainties in Risk Evaluation Results

Risk assessment procedure requires the integration of many variables and assumptions. Uncertainties in HRAs arise from the limitations of methodologies and data accuracy used in estimating health risks. The estimated TAC concentrations and risk levels produced by a risk assessment are based on assumptions, many of which are designed to be health protective so that potential risks to individuals are not underestimated. They are also the product of many factors affecting each component of the risk assessment process, including: (1) projection of emission rates; (2) air dispersion modeling uncertainties; (3) exposure assessment, and (4) toxicity assessment uncertainties. These factors generally include, at a minimum, measurement errors, conservative exposure and modeling assumptions, and uncertainty and variability of the toxicity values used in the assessment. The compounding effects of these uncertainties can be two orders of magnitude or more.

Furthermore, the cancer risk values of the 70-year average emissions scenario are likely overestimated due to the conservative assumptions used in the analysis. The analysis used traffic projections and the regulatory programs that were approved by the time of performing this analysis. It is highly likely that over the next 70 years additional regulations will be adopted, mandating increasingly stringent motor vehicle emissions standards that will substantially reduce emissions profiles. The 70-year average emissions scenario did not consider the emergence of new technology for goods movement transport aimed at reducing vehicle traffic and combustion emissions, although it can be anticipated that technology will improve over the next decades and that emission profiles will be substantially reduced.

In conclusion, a quantitative assessment of the effects of air toxic emission impacts on human health cannot be made with a high level of confidence at the project level. Risk estimates generated by an HRA should not be interpreted as the expected rates of disease in the exposed population, but rather as estimates of potential risk based on current knowledge and many assumptions. Additionally, the uncertainty factors integrated within the estimates of non-cancer RELs are meant to overestimate the risk on the side of public health protection. Risk assessment is best used as a tool to compare one source with another and to prioritize concerns. Consistent approaches to risk assessment are necessary to fulfill this function (OEHHA, 2003).

Caltrans believes that in the future some of this uncertainty may be overcome and the value and/or confidence in the use of results of HRAs may be increased through an analysis of this study, along with other recent and future project-level HRAs that are completed using different analytical approaches. The approaches and results can be compared and assessed as to their explanatory value, as well as the time and cost involved with their preparation. Caltrans believes that this process will help to establish the outlines of a broader HRA analysis framework for transportation projects that can be used to gather multi-agency input and to gain consensus from other regional, state, and federal partner agencies on the need for these studies and the usefulness of different HRA options.

2.2.5.5 Avoidance, Minimization and/or Mitigation Measures

Temporary Measures

North- and South-side Alignment Alternatives

AQ-C1: Construction processes shall adhere to all applicable SCAQMD rules and regulations concerning the operation of construction equipment and dust control.

Emissions of NO_X are mainly associated with exhaust emissions from the heavy-duty construction equipment that would operate simultaneously onsite. Because the analysis assumes that the use of alternative clean fuels for off-road (i.e., construction) equipment would be incorporated as a project feature, few feasible mitigation measures are available to reduce exhaust emissions in a more efficient manner. The following mitigation measures include the best management practices (BMP) for construction equipment use and maintenance. These measures would provide a further 5 to 15 percent reduction.

AQ-C2: Construction equipment shall be properly tuned and maintained in accordance with manufacturer's specifications.

AQ-C3: During construction, trucks and vehicles in loading and unloading queues must be kept with their engines off when not in use to reduce vehicle emissions. Construction emissions shall be phased and scheduled to avoid emissions peaks, where feasible, and discontinued during second-stage smog alerts.

AQ-C4: To the extent feasible, use electricity from power poles rather than temporary diesel or gasoline power generators.

AQ-C5: As part of the Port's commitment to promote the Green Port Policy and implement CAAP, the proposed project construction would employ all applicable control measures included in the CAAP and relevant clean air technologies. Project heavy-duty construction equipment would use clean fuels, such as ultra-low sulfur fuel, or compressed natural gas and oxidation catalysts.

AQ-C6: Construction activities that affect traffic flow on the arterial roadways shall be scheduled to off-peak hours to the extent possible. Additionally, construction trucks shall be directed away from congested streets or sensitive receptor areas.

AQ-C7: During the construction period, temporary traffic controls, such as flaggers and improved signal flow for synchronization to maintain smooth traffic flow, shall be provided.

The following mitigation measures would further reduce the combustive emissions from construction equipment.

AQ-C8: Trucks used for construction prior to 2015 shall use engines with the lowest certified NO_X emission levels, but not greater than the 2007 NO_X emission standards.

AQ-C9: Where feasible, construction equipment shall meet the EPA Tier 4 non-road engine standards. The equipment with Tier 4 engine standards becomes available starting in year 2012.

Rehabilitation Alternative

No measures required.

Permanent Measures

- No permanent measures required; however, the Port is committed to promote the Green Port Policy and implement CAAP. The proposed project would employ all applicable control measures included in the CAAP and relevant clean air technologies. On-road heavy-duty trucks that call at the Port's terminals would comply with the CAAP control measure HDV1, which would replace or retrofit the existing Port's truck fleet by 2012 to comply with the "clean" truck measure.

As described earlier, the POLB CTP, which aims to reduce truck emissions, includes measures that will provide further reduction than CARB's current requirements for clean trucks. The CTP has set a replacement/retrofit program as follows:

- Ban pre-1993 trucks by January 2010;
- Ban un-retrofitted trucks of model years 1994-2003 by January 2010; and
- Ban all trucks that do not meet the EPA *2007 Heavy-Duty Highway Rule* emission standards by January 2012.

Although not quantified in the analysis of the operational emissions mitigation for the project, these programs would result in reduction in air pollutants from project corridor operation.