5. AIR QUALITY

This EIR chapter describes the impacts of the proposed Hercules Bayfront Project on local and regional air quality. The chapter was prepared using methodologies and assumptions recommended within the air quality impact assessment guidelines of the Bay Area Air Quality Management District (BAAQMD).[1] In keeping with these guidelines, the chapter describes existing air quality, potential short-term construction-related impacts, potential direct and indirect long-term emissions associated with the proposed project, the impacts of these emissions on both the local and regional scale, and mitigation measures warranted to reduce or eliminate any identified significant impacts.

5.1 SETTING

5.1.1 Air Basin Characteristics

The amount of a given pollutant in the atmosphere is determined by the amount of pollutant released and the atmosphere's ability to transport and dilute the pollutant. The major determinants of transport and dilution are wind, atmospheric stability, terrain and, for photochemical pollutants, sunshine.

The project area is located in the City of Hercules, Contra Costa County. Its location adjacent to San Pablo Bay and near San Francisco Bay strongly influences the climate and air quality of the area. Bay breezes from the west dominate the area during the spring and summer months. The dominance of the Bay or sea breeze results in a mild climate. Low clouds during the late night and early morning are common in spring and summer.

The prevailing wind direction is from the southwest. Average wind speed (measured in nearby San Pablo) is 7.3 miles per hour (mph) annually, with summer having the highest average wind speed and winter having the lowest.[2] The project vicinity often experiences persistent afternoon winds in the spring and summer months.

Temperatures are mild. January is the coolest month with an average maximum temperature in the range of 50 to 60 degrees Fahrenheit (F), while July and August are the warmest with an average maximum of near 80 degrees F. Precipitation is about 20 inches per year.

The pollution potential of the project site is moderate compared to other portions of the Bay Area. Ventilation is relatively good; however, pollutant transport from upwind urban areas is common. During periods of light or calm winds, which typically occur in the fall and winter months, the entire Bay Area air basin is subject to stagnation and poor air quality where particulate levels become elevated.

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[1]Bay Area Air Quality Management District, BAAQMD CEQA Air Quality Guidelines, June 2010.

[2]California Air Resources Board, California Surface Wind Climatology, June 1984.

5.1.2 Current Regulatory Environment

The Federal Clean Air Act (CAA) governs air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. At the federal level, the United States Environmental Protection Agency (EPA) administers the Clean Air Act. The California Clean Air Act is administered by the California Air Resources Board (CARB) and by the air quality management districts at the regional and local levels. The Bay Area Air Quality Management District (BAAQMD) regulates air quality at the regional level, which includes the nine-county Bay Area.

(a) United States Environmental Protection Agency (EPA). The EPA is responsible for enforcing the federal CAA. The EPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). The NAAQS are required under the 1977 Clean Air Act and subsequent amendments. The EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. The agency has jurisdiction over emission sources outside state waters (e.g., beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by the CARB.

(b) California Air Resources Board (CARB). In California, the CARB, which is part of the California Environmental Protection Agency, is responsible for meeting the state requirements of the federal Clean Air Act, administering the California Clean Air Act, and establishing the California Ambient Air Quality Standards (CAAQS). The California Clean Air Act, as amended in 1992, requires all air districts in the state to endeavor to achieve and maintain the CAAQS. The CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. The CARB established passenger vehicle fuel specifications, which became effective on March 1996. CARB has recently established regulations that reduce emissions from construction equipment and trucks. The CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

(c) Bay Area Air Quality Management District (BAAQMD). In 1955, the California Legislature created the BAAQMD. The agency's role is to achieve clean air to protect public health and the environment, with a primary responsibility of attaining and maintaining national and California ambient air quality standards. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, and conducting public education campaigns, as well as many other activities. The BAAQMD has jurisdiction over much of the nine-county Bay Area, including Contra Costa County.

5.1.3 Air Pollutants and Ambient Standards

Air pollutant levels are typically described in terms of "concentrations," which refers to the amount of pollutant material per volumetric unit of air. Concentrations are measured in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The federal and California Clean Air Acts have established ambient air quality standards for different pollutants. NAAQS were established by the federal Clean Air Act for six criteria pollutants, including ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulates (PM_{10} and $PM_{2.5}$), and lead (Pb). Pollutants regulated under the California Clean Air Act are similar to those regulated under the Federal Clean Air Act. The federal and California ambient air quality standards are summarized in Table 5.1. The CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. The standards are health-based and designed to protect against excessive levels of pollutants. Both the EPA and the CARB review ambient air quality standards on a regular basis and make necessary adjustments in response to updated scientific information.

(a) Ozone (O_3). Ground-level ozone is the principal component of smog. Ozone is not directly emitted into the atmosphere, but instead forms through a photochemical reaction of reactive organic gases (ROG) and nitrogen oxides (NO_X), which are known as ozone precursors. Ozone levels are highest from late spring through autumn when precursor emissions are high and meteorological conditions are warm and stagnant. Motor vehicles create the majority of reactive organic gas and nitrogen oxide emissions in the Bay Area.

Exposure to levels of ozone above current ambient air quality standards can lead to human health effects such as lung inflammation and tissue damage and impaired lung functioning. Ozone exposure is also associated with symptoms such as coughing, chest tightness, shortness of breath, and the worsening of asthma symptoms. The greatest risk for harmful health effects belongs to outdoor workers, athletes, children, and others who spend greater amounts of time outdoors during smoggy periods. Elevated ozone levels can reduce crop and timber yields, as well as damage native plants. Ozone can also damage materials such as rubber, fabrics, and plastics.

In April 2005, the CARB approved a new 8-hour standard of 0.070 ppm and retained the one-hour ozone standard of 0.09 ppm after an extensive review of the scientific literature. Evidence from the reviewed studies indicate that significant harmful health effects could occur among both adults and children if exposed to levels above these standards. In 2008, the EPA adopted a new 8-hour NAAQS for ozone of 0.075 ppm. In early 2010, EPA announced plans to adopt a new ozone 8-hour NAAQS of between 0.060 and 0.070 ppm. Final rule-making is expected in 2010.

(b) Carbon Monoxide (CO). CO is a non-reactive pollutant that is highly toxic, invisible, and odorless. It is formed by the incomplete combustion of fuels. The largest sources of CO emissions are motor vehicles, wood stoves, and fireplaces. Unlike ozone, CO is directly emitted to the atmosphere. The highest CO concentrations occur during the nighttime and early mornings in late fall and winter. CO levels are strongly influenced by meteorological factors such as wind speed and atmospheric stability.

Table 5.1
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Federal Primary Standard[1]	State Standard[2]
Ozone (O_3)	8-Hour	0.075 ppm	0.070 ppm
	1-Hour	---	0.09 ppm
Carbon Monoxide (CO)	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 ppm	0.030 ppm
	1-Hour	0.100 ppm	0.18 ppm
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	---[3]	---
	24-Hour	---[3]	0.04 ppm
	1-Hour	0.075[3]	0.25 ppm
Particulates (PM_{10})	Annual Arithmetic Mean	---	20 $\mu g/m^3$
	24-Hour	150 $\mu g/m^3$	50 $\mu g/m^3$
Particulates ($PM_{2.5}$)	Annual Arithmetic Mean	15 $\mu g/m^3$	12 $\mu g/m^3$
	24-Hour	35 $\mu g/m^3$	--
Lead (Pb)	3 month	1.5 $\mu g/m^3$	--
	30 day	--	1.5 $\mu g/m^3$

SOURCE: California Air Resources Board, Ambient Air Quality Standards and http://www.arb.ca.gov.aqs/aaqs2.pdf.

ppm = Parts Per Million; $\mu g/m^3$ = Micrograms Per Cubic Meter.

[1] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[2] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, and PM_{10} are values that are not to be exceeded. The standards for lead are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average, then some measurements may be excluded. In particular, measurements are excluded that the CARB determines would occur less than once per year on the average.

[3] On June 2, 2010, the US EPA established a new 1-hour SO_2 standard and revoked the annual and 24-hour SO_2 standards (effective August 23, 2010).

The health threat from elevated ambient levels of CO is most serious for those who suffer from heart disease, such as angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at relatively low levels may cause chest pain and reduce that person's ability to exercise; repeated exposure may contribute to other cardiovascular effects. High levels of CO can affect even healthy people. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death. Measured CO levels in the Bay Area are well below the health-based standards.

(c) Nitrogen Dioxide (NO_2). NO_2 is a combustion by-product, but it can also form in the atmosphere by chemical reaction. NO_2 is a reddish-brown colored gas often observed during the same conditions that produce high levels of O_3 and can affect regional visibility. NO_2 is one compound in a group of compounds consisting of oxides of nitrogen (NO_x). As described above, NO_x is an O_3 precursor compound. Home heaters and stoves using natural gas produce NO_2 in indoor settings.

The major health effect from exposure to high levels of NO_2 is the risk of acute and chronic respiratory disease. Besides causing adverse health effects, NO_2 is responsible for the visibility-reducing reddish-brown tinge seen in smoggy air in California. NO_2 is a reactive, oxidizing gas capable of damaging cells lining the respiratory tract. Studies suggest that NO_2 exposure to levels near the current standard may worsen the effect of allergens in allergic asthmatics, especially in children. Levels measured in the Bay Area are well below current air quality standards.

(d) Sulfur Dioxide (SO_2). SO_2 is a colorless gas with a pungent, irritating odor. Its major sources are diesel vehicle exhaust, oil-powered power plants, and various industrial processes. SO_2 can aggravate "chronic obstruction" lung disease and increase the risk of acute and chronic respiratory disease.

(e) Particulate Matter (PM_{10} and $PM_{2.5}$). Particulate matter (PM) is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals (including lead), soot, soil, and dust. Particles 10 microns or less in diameter are defined as "respirable particulate matter" or "PM_{10} ". Particles that are 2.5 microns or less in diameter are defined as "fine particulate matter" or "$PM_{2.5}$". Both PM_{10} and $PM_{2.5}$ can contribute significantly to regional haze and reduction of visibility. Inhalable particulates come from smoke, dust, aerosols, and metallic oxides. Although particulates are found naturally in the air, most particulate matter found in the Bay Area are emitted either directly or indirectly by motor vehicles, industry, construction, agricultural activities, and wind erosion of disturbed areas. Most $PM_{2.5}$ is comprised of combustion products such as smoke.

Extensive research reviewed by the CARB indicates that exposure to outdoor PM_{10} and $PM_{2.5}$ levels exceeding current ambient air quality standards is associated with increased risk of hospitalization for lung and heart-related respiratory illness, including emergency room visits for asthma. PM exposure is also associated with increased risk of premature deaths, especially in the elderly and people with pre-existing cardiopulmonary disease. In children, studies have shown associations between PM exposure and reduced lung function and increased respiratory symptoms and illnesses. Besides reducing visibility, the acidic portion of PM (nitrates, sulfates) can harm crops, forests, and aquatic and other ecosystems.

In 1983, the CARB replaced the standard for "suspended particulate matter" with a standard for suspended PM_{10}. This standard was set at 50 µg/m3 for a 24-hour average and 30 µg/m3 for an annual average. The CARB revised the annual PM_{10} standard in 2002, pursuant to the Children's Environmental Health Protection Act. The revised PM_{10} standard is 20 $\mu g/m^3$ for an annual average. $PM_{2.5}$ standards were first promulgated by the EPA in 1997 and were revised in 2006 to lower the 24-hour $PM_{2.5}$ standard to 35 $\mu g/m^3$. That same action by EPA revoked the annual PM_{10} standard due to lack of scientific evidence correlating long-term exposures of ambient PM_{10} with health effects. The CARB has only adopted an annual average $PM_{2.5}$ standard, which is set at 12 $\mu g/m^3$. This is more stringent than the NAAQS of 15 $\mu g/m^3$.

(f) Toxic Air Contaminants (TAC). TACs are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer or serious illness) and include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., benzene near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level. The identification, regulation, and monitoring of TACs is relatively new compared to that for criteria air pollutants that have established ambient air quality standards. TACs are regulated or evaluated on the basis of risk to human health rather than comparison to an ambient air quality standard or emission-based threshold.

(g) Diesel Particulate Matter (DPM). DPM is the predominant TAC in urban air, with the potential to cause cancer. It is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). According to the CARB, diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the state's Proposition 65 or under the federal Hazardous Air Pollutants programs. California has adopted a comprehensive diesel risk reduction program, and the CARB has adopted many of the rules to implement this plan. The EPA and CARB have adopted low-sulfur diesel fuel standards that will reduce diesel particulate matter substantially. These standards went into effect in June 2006. CARB recently adopted a series of rules to reduce DPM, most notably rules that require replacement or retrofitting of construction equipment and truck fleets.

5.1.4 Current Air Quality

The BAAQMD operates a network of monitoring sites throughout the Bay Area. The closest monitoring station to the project site is in San Pablo. Table 5.2 summarizes air quality data from this monitoring site during the five-year period 2004-2008. Table 5.3 shows the number of days that the state or federal standard was exceeded for several major pollutants, both in San Pablo and throughout the Bay Area.

(a) Hercules (San Pablo Monitoring Station). As shown in Tables 5.2 and 5.3, the ambient air quality standards are met in San Pablo on most days. Attainment of air quality standards are usually evaluated based on the most recent three-year set of data. From 2005 through 2008, the CAAQS and NAAQS (O_3) standard was not exceeded in Hercules. PM_{10} is measured every sixth day. The state PM_{10} standard was exceeded on 0 to 2 measurement days per year

Table 5.2
SUMMARY OF AIR QUALITY DATA FOR HERCULES (SAN PABLO MONITORING STATION), 2004-2008

		Measured Air Pollutant Levels				
Pollutant	Average Time	2004	2005	2006	2007	2008
Ozone (O_3)	1-Hour	**0.11 ppm**	0.066 ppm	0.061 ppm	0.074 ppm	0.084 ppm
	8-Hour	0.07 ppm	0.057 ppm	0.050 ppm	0.051 ppm	0.063 ppm
Carbon Monoxide (CO)	1-Hour	3.2 ppm	2.8 ppm	2.5 ppm	2.4 ppm	2.5 ppm
	8-Hour	1.8 ppm	1.3 ppm	1.4 ppm	1.2 ppm	1.3 ppm
Nitrogen Dioxide (NO_2)	1-Hour	0.06 ppm	0.05 ppm	0.06 ppm	0.05 ppm	0.07 ppm
	Annual	0.013 ppm	0.012ppm	0.013ppm	0.012ppm	0.012ppm
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	--[1]	--	--	--	--
	Annual	--	--	--	--	--
Respirable Particulate Matter (PM_{10})	24-Hour	**64** $\mu g/m^3$	42 $\mu g/m^3$	**62** $\mu g/m^3$	**57** $\mu g/m^3$	44 $\mu g/m^3$
	Annual	**21** $\mu g/m^3$	19 $\mu g/m^3$	**21** $\mu g/m^3$	**21** $\mu g/m^3$	**21** $\mu g/m^3$

SOURCE: BAAQMD Air Pollutant Summaries for 2004, 2005, 2006, 2007, and 2008.

Notes: Values reported in bold exceed ambient air quality standard.

ppm = Parts Per Million; $\mu g/m^3$ = Micrograms Per Cubic Meter.

[1] Fine particulate matter is not measured at the San Pablo Monitoring Station.

Table 5.3
SUMMARY OF MEASURED AIR QUALITY EXCEEDANCES

Pollutant	Standard[a]	Monitoring Station	Days Exceeding Standard 2004	2005	2006	2007	2008
Ozone (O_3)	NAAQS 8-hr	San Pablo	0	0	0	0	0
		Bay Area	7	5	17	2	12
	CAAQS 1-hr	San Pablo	1	0	0	0	0
		Bay Area	7	9	18	4	9
	CAAQS 8-hr	San Pablo	--	0	0	0	0
		Bay Area	--	9	22	9	20
Fine Particulate Matter (PM_{10})	NAAQS 24-hr	San Pablo	0	0	0	0	0
		Bay Area	0	0	0	0	0
	CAAQS 24-hr	San Pablo	1	2	2	1	--
		Bay Area	7	6	15	4	--
Respirable Particulate Matter ($PM_{2.5}$)	NAAQS 24-hr	San Pablo	--	--	--	--	--
		Bay Area	1	0	10	14	12
All Other (CO, NO_2, Lead, SO_2)	All Other	San Pablo	1	0	2	2	0
		Bay Area	0	0	0	0	0

SOURCE: BAAQMD Air Pollutant Summaries for 2004, 2005, 2006, 2007, and 2008.

[a] NAAQS = National Ambient Air Quality Standard; CAAQS = California Ambient Air Quality Standard.
[b] US EPA revoked the 1-hour NAAQS for ozone in June 2005.

(equating to 0 to 12 days of exceedances per year). Monitoring for $PM_{2.5}$ is not conducted in San Pablo or near the project site.

(b) San Francisco Bay Air Basin. Throughout the Bay Area, the 8-hour ozone NAAQS was exceeded from 2 to 12 days annually, while the more stringent 8-hour CAAQS was exceeded on 9 to 22 days. The 1-hour ozone CAAQS was exceeded on 4 to 18 days over the last five years. Most exceedances of the ozone standard in the Bay Area occur in downwind portions of the basin, such as Livermore, Concord, and Gilroy. The NAAQS for PM_{10} is not exceeded anywhere in the Bay Area, but the more stringent CAAQS is routinely exceeded in the Bay Area and most other parts of the state. The new NAAQS for $PM_{2.5}$ is exceeded at about half of the monitoring stations in the Bay Area, with most exceedances occurring in Vallejo and San Jose. Some monitors in the Bay Area exceed the State annual $PM_{2.5}$ standard. No other air quality standards are exceeded in the Bay Area.

(c) Toxic Air Contaminants (TAC). BAAQMD has monitored selected TACs throughout the Bay Area. As part of BAAQMD's Community Air Risk Evaluation (CARE) program, a study of inhalation health risks associated with exposure to TACs was conducted.[1] The modeled inhalation cancer risk in Hercules generally ranged from 300 to 400 cases per million. Areas along portions of I-80 and State Highway 4 have higher risks. More densely urbanized portions of the Bay Area, such as eastern San Francisco and western Oakland, had higher risks of 1,000 in a million. With all diesel risk reduction measures implemented, the CARB predicts that the overall inhalation health risk in the Bay Area will decrease substantially. BAAQMD estimates that diesel particulate matter comprises approximately 80 percent of the emissions that contribute to the inhalation cancer risk in the Bay Area.

5.1.5 Existing Pollutant Sources and Sensitive Receptors in the Project Vicinity Area

The largest existing sources of pollutants in the project vicinity are vehicles on the local roadway network. In addition, commercial businesses and residences in the vicinity contribute air pollutants through fume-producing operations and the combustion of fuels for space heating and water heating.

Some groups of people are more affected by air pollution than others. The CARB has identified the following people who are most likely to be affected by air pollution: children under 14, the elderly (over 65), athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as "sensitive receptors." Locations near the project site that may contain a high concentration of these sensitive population groups include residential areas (primarily to the south) and parks.

5.2 PERTINENT PLANS AND POLICIES

5.2.1 Regional Air Quality Plans

In 1991, the BAAQMD, Metropolitan Transportation Commission (MTC), and Association of Bay Area Governments (ABAG) prepared the first Bay Area 1991 Clean Air Plan, or CAP. This air quality plan addresses the California Clean Air Act. Updates are developed approximately

[1] BAAQMD, Workshop Draft Options Report--California Environmental Quality Act Threshold of Significance, April 2009; Figure 3, page 32.

every three years. The plans were initially intended to demonstrate progress toward meeting the more stringent 1-hour ozone CAAQS. The latest update to the plan, which was adopted on September 15, 2010, is called the *Bay Area 2010 Clean Air Plan*. This plan includes a comprehensive strategy to reduce emissions from stationary, area, and mobile sources. The plan objective is to indicate how the region would make progress toward attaining the stricter state air quality standards, as mandated by the California Clean Air Act. The plan is designed to achieve a region-wide reduction of ozone precursor pollutants through the expeditious implementation of all feasible measures. The plan includes expanded implementation of transportation control measures (TCMs) and programs such as "Spare the Air." The 2010 update addresses not only ozone, but also include controls for particulate matter and greenhouse gases (GHGs) that lead to climate change.

The Bay Area 2001 Ozone Attainment Plan was prepared as the Bay Area's part of the State Implementation Plan to achieve the 1-hour NAAQS for ozone. Since that plan was submitted to the EPA, the region was designated "marginally nonattainment" for the 8-hour ozone NAAQS, and the 1-hour ozone NAAQS was revoked. The commitments in the plan will continue to apply.

The clean air planning efforts for ozone will also reduce PM_{10} and $PM_{2.5}$, since a substantial amount of this air pollutant comes from combustion emissions such as vehicle exhaust. In addition, BAAQMD adopts and enforces rules to reduce particulate matter emissions and develops public outreach programs to educate the public to reduce PM_{10} and $PM_{2.5}$ emissions (e.g., Winter Spare the Air Program). Senate Bill (SB) 656 required further action by the CARB and air districts to reduce public exposure to PM_{10} and $PM_{2.5}$. Efforts identified by BAAQMD in response to SB 656 primarily target reductions in wood smoke emissions and adoption of new rules to further reduce NOx and particulate matter from internal combustion engines and reduce particulate matter from commercial charbroiling activities. Controls on ozone precursor emissions, which include NOx and ROG, would reduce particulate matter concentrations in winter. NOx emissions also contribute to ammonium nitrate formation that resides in the atmosphere as particulate matter. The Bay Area experiences the highest PM_{10} and $PM_{2.5}$ concentrations in winter when wood smoke and ammonium nitrate contributions to particulate matter are highest.

A key element in air quality planning is to make reasonably accurate projections of future human activities that are related to air pollutant emissions. Most important is vehicle activity. The BAAQMD uses population projections formulated by ABAG (see chapter 14 of this EIR) and vehicle use trends made by the MTC to formulate future air pollutant emission inventories. The basis for these projections comes from cities and counties.

5.2.2 Attainment Status

The federal Clean Air Act and California Clean Air Act require that the CARB, based on air quality monitoring data, designate portions of the state where the federal or state ambient air quality standards are not met as "nonattainment areas." Due to the differences between the national and state standards, the designation of nonattainment areas is different under the federal and state legislation.

(a) Federal. The EPA has designated the San Francisco Bay Area as a "marginal nonattainment" area for the federal 8-hour ozone standard. The EPA has determined that the Bay Area has met this standard, but a formal redesignation request and maintenance plan

would have to be submitted before redesignation could be made. In May 2008, the EPA lowered the 8-hour O_3 standard from 0.08 to 0.075 ppm. Final designations based upon the new NAAQS are expected to be made in 2010. The BAAQMD is not likely to make a redesignation request for the older standard since that will be revoked after designations are made with the newer standard.

The EPA recently designated the Bay Area air basin as "nonattainment" for the 2006 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$ as recent monitoring data indicate levels above the standard in San José and Vallejo. The region would likely have until 2012 to develop a plan to attain the standard and until 2014 to attain the standard.

The Bay Area has met the CO standards for over a decade and is classified "attainment maintenance" by the EPA. The EPA grades the region as "unclassified" for all other air pollutants, which include PM_{10}.

(b) State. Under the California Clean Air Act, the Bay Area is a nonattainment area for ozone PM_{10} and $PM_{2.5}$. The County is either an attainment area or unclassified for other pollutants. The California Clean Air Act requires local air pollution control districts in ozone nonattainment areas to prepare air quality attainment plans. These plans must provide for district-wide emission reductions of five percent per year averaged over consecutive three-year periods or, if not, provide for adoption of "all feasible measures on an expeditious schedule."

5.2.3 Hercules General Plan

The adopted Hercules General Plan *Open Space and Conservation Element* (1996) contains the following policies related to air quality and pertinent to consideration of the air quality impacts of the proposed Project:

- *Development within the City shall be conditioned to reduce air quality impacts during construction and subsequent operation.* (Policy 11a)
- *Incorporate BAAQMD recommendations into General Plan policies for directing regional growth and development.* (Program 11a.1)
- *Implement a dust abatement program for new development* [that includes BAAQMD CEQA Guidelines Feasible PM_{10} Dust Control Measures]. (Program 11b.1).

5.3 IMPACTS AND MITIGATION MEASURES

5.3.1 Significance Criteria

Based on the CEQA Guidelines,[1] BAAQMD impact assessment guidelines[2] and current state and federal ambient air quality standards,[3] the proposed project and/or its anticipated growth-inducing effects would be considered to have a significant impact if it results in any of the following:

(a) conflict with or obstruct implementation of the applicable air quality plan;

(b) violate any air quality standard or contribute substantially to an existing or projected air quality violation (i.e., contribute to carbon monoxide [CO] concentrations exceeding the State Ambient Air Quality Standard of 9 parts per million [ppm] averaged over 8 hours, or 20 ppm for one hour, or emit a cumulatively considerable amount of ozone precursors or particulate matter as described in [c] below);

(c) result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard, including releasing emissions which exceed quantitative thresholds for ozone precursors (i.e., generate criteria air pollutant emissions in excess of the BAAQMD annual or daily thresholds; the current thresholds are 10 tons/year or 54 pounds/day for reactive organic gases [ROG], nitrogen oxides [NO_x], or $PM_{2.5}$, and 15 tons/year or 82 pounds/day for PM_{10}.);

(d) expose sensitive receptors to substantial pollutant concentrations, including, but not limited to, substantial levels of toxic air contaminants; or

(e) create objectionable odors affecting a substantial number of people.

In addition, for construction-period air emissions impacts, the BAAQMD significance threshold for construction dust impacts are based on the appropriateness of construction dust controls. The BAAQMD guidelines provide feasible control measures for construction emission of PM_{10}. If the appropriate construction controls are to be implemented, then fugitive dust (i.e., PM_{10} and $PM_{2.5}$) emissions for construction activities would be considered less-than-significant.

In June 2010, BAAQMD adopted Air Quality Guidelines with updated thresholds for projects and plans. The changes to the guidelines that would affect this analysis include quantified thresholds for construction period emissions and revised thresholds for direct and indirect emissions from project operation.

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[1]CEQA Guidelines, Appendix G, item III(a-e).

[2]Bay Area Air Quality Management District, BAAQMD CEQA Air Quality Guidelines, June 2010.

[3]See Table 5.1 above.

5.3.2 Relevant Project Characteristics

The land uses proposed by the project are described in chapter 3, Project Description, and chapter 12, Land Use and Planning, of this Draft EIR. In summary, the project proposes development of:[1]

- up to 1,392 multi-family residential units (125 of which may be replaced with a 125-room hotel);
- up to 115,000 square feet of office uses, which could include commercial or conference space;
- up to 90,000 square feet of retail uses; and
- up to 134,000 square feet of "flex uses" that may be developed as residential, office (including live/work), and/or retail space, of which no more than 67,000 square feet would be retail uses. In addition, if all 134,000 square feet of flex space were developed with residential uses, the maximum number of housing units would be 134.

5.3.3 Impacts and Mitigation Measures

Impact 5-1: Construction-Related Air Quality Impacts. Project-related construction activities may generate construction period exhaust emissions and fugitive dust that could temporarily but noticeably affect local air quality. This would represent a ***potentially significant impact*** (see criteria [b], [d], and [e] in subsection 5.3.1, "Significance Criteria," above).

Construction activities associated with project may include grading, trenching, new building construction, utility and infrastructure improvements, and paving. Such construction would generate pollutants intermittently.

Generally, the most substantial air pollutant emissions would be dust generated from demolition or site grading. The amount of dust generated would be highly variable and would depend on the size of the area disturbed, the amount of activity, soil conditions, and meteorological conditions. In addition to the dust created during demolition, substantial dust emissions could be created as debris is loaded into trucks for disposal. Without adequate dust control measures, visible dust clouds extending beyond the construction or demolition site could occur. Wind erosion and disturbance to exposed (graded) ground areas would also be sources of dust emissions. Dust can continue to affect local air quality during construction and can contribute to regional PM_{10} and $PM_{2.5}$ emissions.

Construction activities can also generate exhaust emissions from vehicles/equipment and fugitive particulate matter emissions that would affect local air quality. Exhaust from

[1]Consistent with CEQA and the EIR Project Description, in order to calculate "worst-case" GHG emissions for the proposed project, the following potential buildout option was assumed: 1,267 multi-family residential units; 182,000 square feet of office uses; 157,000 square feet of retail uses; and a 125-room hotel. This buildout option would result in up to approximately 3,839 new residents and 1,061 new employees (see EIR chapter 14, Population and Housing).

construction equipment and associated heavy-duty truck traffic emits diesel particulate matter, which is an identified toxic air contaminant. Off-road construction equipment is also a source of NOx emissions, which can contribute to ground-level ozone in the region.

Construction activities are also a source of organic gas emissions. Solvents in adhesives, non-water-based paints, thinners, some insulating materials, and caulking materials can evaporate into the atmosphere and participate in the photochemical reaction that creates urban ozone. Asphalt used in paving is also a source of organic gases for a short time after its application.

Existing land uses in the project vicinity, including residential areas, could be adversely affected by construction emissions. If uncontrolled, such emissions could lead to both health and nuisance impacts. Although temporary, such effects would represent a *potentially significant adverse impact* on local air quality.

BAAQMD has proposed emission-based thresholds that apply to exhaust and evaporative emissions from construction projects. Project construction is likely to occur over a period of several years, where some years may have considerable construction emissions and other years may have little or no construction. Exhaust construction emissions would be dependent on the year that construction occurs, the type of activity, and the age of the construction fleet used, especially for large construction equipment. Recent State law requires retrofit or replacement of construction equipment, which will result in substantial decreases in future nitrogen oxide (NOx) and particulate matter (including diesel particulate matter) emissions from construction equipment. In addition, State law would also require retrofitting or replacement of large trucks that are typically used in construction.

The URBEMIS2007 model was used to provide a preliminary estimate of construction emissions. This model was originally developed by the CARB and has included numerous updates. The latest version of the model, URBEMIS2007, version 9.2.4, includes emissions databases generated by CARB's EMFAC2007 on-road mobile source emission factor model and CARB's OFFROAD2007 emission factor model for off-road sources such as construction equipment. This model is recommended by BAAQMD for analysis of construction and operational emissions produced by development projects.

A buildout scenario of eight years was assumed in the modeling, where grading and trenching of the entire project site would occur during the first year of construction. Building construction and uses of architectural coatings were assumed to occur during the following seven years. The project land uses as described in chapter 3 (Project Description) of this EIR were entered into the model. Default model assumptions for Contra Costa County were used; however, more recent BAAQMD analysis of architectural coatings (to account for lower VOC content in latex-based paints) was entered into the model. Projected daily construction emissions are listed in Table 5.4.

The amount of future construction that could occur on any one day cannot be predicted; however, Table 5.4 indicates that grading activities could exceed the emissions thresholds for NOx of 54 pounds per day.[1] Therefore, given the size of the project, emissions that exceed the draft BAAQMD Air Quality Guidelines emission thresholds are possible. As a result, exhaust emissions during construction would be *potentially significant.*

[1]Note that BAAQMD emissions thresholds apply to average daily emissions for a construction phase.

The emissions shown in Table 5.4 would result from exhaust or evaporative emissions. Dust would be generated, especially during site grading. These emissions could contribute to unhealthy levels of PM_{10}. Program 11b.1 of the Hercules General Plan *Open Space and Conservation Element* includes dust abatement measures to reduce PM_{10} emissions to less-than-significant levels (see subsection 5.2.3, herein). BAAQMD considers PM_{10} dust emission to be less-than-significant if appropriate control measures are implemented. If uncontrolled, construction emissions associated with fugitive dust and construction equipment could lead to both health and nuisance impacts. Although temporary, such effects would represent a *potentially significant adverse impact* on local air quality.

Table 5.4
DAILY CONSTRUCTION EXHAUST OR EVAPORATIVE EMISSIONS FROM CONSTRUCTION OF THE PROPOSED PROJECT[1]

	Daily Emissions (in pounds per day)			
Assumed Construction Year	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
2011	18	114	6	6
2012	40	44	2	2
2013-2019	39-36	40-21	2-1	2-1
BAAQMD Project-Level Thresholds	*54*	*54*	*82*	*54*

SOURCE: Illingworth & Rodkin, Inc., 2010.

[1] Based on a conservative (i.e., accelerated) total construction period of eight years, compared to a potentially 10-year construction period, for worst-case analysis consistent with CEQA.

ROG = reactive organic gases; NOx = oxides of nitrogen; PM_{10} and $PM_{2.5}$ = particulate matter.

Mitigation 5-1. For all discretionary (e.g., requiring a permit) grading or construction activity associated with the project, require implementation of the following BAAQMD-identified dust control measures by construction contractors, where applicable:

During ***all construction phases:***

- Water all active construction areas at least twice daily.
- Water or cover stockpiles of debris, soil, sand, or other materials that can be blown by the wind.
- Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all active paved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Consult with BAAQMD prior to demolition of any structures suspected to contain asbestos to ensure that demolition/construction work is conducted in accordance with BAAQMD rules and regulations.

The following are measures to control emissions by diesel-powered construction equipment used by construction contractors, where applicable:

(continued)

Mitigation 5-1 (continued):

- Develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project-wide fleet-average 20 percent NOx reduction and 45 percent PM reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.

- Limit grading to 6.5 acres per day or develop plans to demonstrate that average daily emissions during the grading period would not exceed 54 pounds of NOx per day. Note that the URBEMIS2007 modeling assumed 11.3 acres per day of grading, so reducing NOx equipment emissions by 20 percent and adjusting the grading area to 6.5 acres would result in emissions of less than 54 pounds of NOx per day.

- Ensure that visible emissions from all on-site diesel-powered construction equipment do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired or replaced immediately.

- The contractor shall install temporary electrical service whenever possible to avoid the need for independently powered equipment (e.g., compressors).

- Signs shall be posted to ensure that all diesel equipment and trucks standing idle for more than five minutes shall be turned off. This would include trucks waiting to deliver or receive soil, aggregate, or other bulk materials. Rotating drum concrete trucks could keep their engines running continuously as long as they were on-site and away from residences.

- Properly tune and maintain equipment for low emissions.

- Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Implementation of these measures would reduce daily NOx emissions below 54 pounds per day and implement feasible PM_{10} control measures that are consistent with BAAQMD recommendations. Therefore, the project construction-related air quality impact would be reduced to a ***less-than-significant level***.

Long-Term Changes in Local Carbon Monoxide Levels. The project would generate new vehicle trips and change traffic patterns. Along local streets, this new traffic would affect concentrations of carbon monoxide. Concentrations of carbon monoxide are typically greatest near intersections and roadways with congested traffic. Such carbon monoxide emissions can be a problem in wintertime when stagnant meteorological conditions occur (i.e., very little vertical or horizontal mixing of air in the lower atmosphere). Within the regional air basin, projected-generated trips would add to the pollution burden.

Screening calculations (using the BAAQMD method) indicate that the highest existing 8-hour carbon monoxide level at intersections in Hercules near the project site is 6.0 ppm. Under project conditions (existing plus project--see EIR chapter 16, Transportation and Circulation), the highest (worst-case) 8-hour carbon monoxide level would be 6.2 ppm. The corresponding 1-hour carbon monoxide level would be 7.6 ppm. The existing plus project scenario assumes current emission rates would be applied to existing and project traffic conditions. Under cumulative traffic conditions (year 2035) with the project, the highest 8-hour concentration would be 4.0 ppm and the corresponding 1-hour concentration would be 5.3 ppm; this reduction compared to existing and project conditions would be due primarily to mandated lower vehicle emission rates over time. As a result, carbon monoxide levels under the existing plus project and cumulative plus project traffic scenarios would be below the State and federal air quality standards (9.0 ppm daily/20.0 ppm 1-hour--see Table 5.1), and the project's impact on local carbon monoxide levels is therefore considered to be ***less-than-significant***.

Mitigation. No significant local carbon monoxide impact has been identified; no mitigation is required.

Odor Impacts on Sensitive Receptors. Project-proposed retail development could involve food service uses (e.g., restaurants) that could result in intermittent localized objectionable odors. Also, the proposed commercial flex-space on the ground floor of the project's live-work units would allow artisan uses, which could potentially result in the use of paints, glues, and other materials that could emit fumes and cause odor problems for residential uses directly above and near these uses.

The adopted WDMP expressly prohibits most operations that would produce noxious fumes; for example, general manufacturing and hair/nail salons which produce noxious fumes are not allowed in Restricted use live-work flex-space, and hair and nail salons are conditionally allowed in Limited and Open use flex-space areas. With mandatory implementation of the use restrictions in the adopted WDMP, potential impacts from objectionable odors would be considered ***less-than-significant*** (see criterion [e] in subsection 5.3.1, "Significance Criteria," above).

Mitigation. No significant impact has been identified; no mitigation is required.

Impact 5-2: Long-Term Regional Emissions Increases. Project development would generate area- and traffic-related regional air pollutant emissions increases that would exceed the project thresholds of significance for reactive organic gases (ROG), oxides of nitrogen (NO_x), and particulate matter (PM_{10}). This project-related effect is considered to represent a ***significant project and cumulative impact*** (see criteria [a] through [d] in subsection 5.3.1, "Significance Criteria," above).

Vehicle trips generated by project uses would result in new mobile air pollutant emissions increases affecting the overall San Francisco Bay Air Basin. In addition, emissions resulting from the increased use of consumer products by new residents, natural gas consumption, and landscaping activities would also result in additional emissions.

Project-generated air pollutant emissions were evaluated using the URBEMIS2007 model (version 9.2.4). The model calculates emissions from vehicle travel and area sources such as space/water heating and landscape equipment. The model was used to compute emissions for the land uses described in chapter 3 (Project Description) of this EIR.

Inputs to the model included size and types of land uses proposed, geographic region, season, and year of analysis. Model defaults for Contra Costa County were used. The modeling incorporated project-specific trip generation as described in chapter 16 (Transportation and Circulation). The adjustments identified in chapter 16 for internal trips and transit reduction were included in the model. Transit reductions were computed to result in a 4.4 percent reduction of project-generated mobile source emissions. The modeling results are shown in Table 5.5.

Guidelines for the evaluation of project impacts issued by the BAAQMD consider daily emissions of 54 pounds for ROG, NOx and $PM_{2.5}$, and 82 pounds for PM_{10}, as significant. The currently adopted thresholds are listed in Table 5.5. The BAAQMD CEQA Guidelines recognize that no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards, and that a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. Accordingly, by developing the thresholds of significance for air pollutants identified in this chapter (see subsection 5.3.1), BAAQMD has already considered the emission levels for which a project's individual emissions would be considered to make a considerable contribution to a cumulative air quality impact.

In addition to the emissions sources listed in Table 5.5, commercial buildings associated with the project may include emergency generators powered by diesel fuel, natural gas, or propane. These generators, especially diesel generators, would be a source of air pollutant emissions during routine testing. Emergency generators are typically tested for 15 minutes to one hour each month. The primary emissions would be NOx and diesel particulate matter. Since these generators could exceed 50 horsepower, they would be subject to BAAQMD permitting requirements. In addition, these generators could emit more than 5 pounds per day of NOx for each day that they are tested. This would increase the total emissions for the project, contributing incrementally to the significant regional air quality impact.

Any generator engine would have to meet CARB emission standards, and the BAAQMD would be required to ensure that health risks associated with diesel particulate matter

Table 5.5
FUTURE INCREMENTAL PROJECT EMISSIONS

Emissions Source	Daily Emissions (in pounds per day) ROG	NOx	PM_{10}	$PM_{2.5}$
Area Sources (e.g., natural gas usage, consumer products, coatings, landscaping)	78.50	19.74	0.06	0.06
Mobile Sources (e.g., external car and truck traffic generation)	61.21	59.14	104.74	22.00
Total Project Emissions	**139.71**	**78.88**	**104.80**	**22.06**
BAAQMD Project-Level Thresholds	*54*	*54*	*82*	*54*

SOURCE: Illingworth & Rodkin, Inc., 2010.

Notes:

URBEMIS2007 Model considered an eight-year buildout period, or 2020.
Internal and transit trip reductions were included in the modeling (see EIR chapter 16, Transportation and Circulation).
ROG = reactive organic gases; NOx = oxides of nitrogen; PM_{10} and $PM_{2.5}$ = particulate matter.

emissions would be acceptable.[1] Sources of air pollutant emissions complying with all applicable BAAQMD regulations generally will not be considered to have an individual significant air quality impact. Similarly, stationary sources that are exempt from BAAQMD permit requirements due to low emissions would not be considered to have a significant air quality impact.

Potential project development is expected to generate increases over existing conditions in reactive organic gases (ROG), oxides of nitrogen (NO_x), and particulate matter (PM_{10}) that would exceed the BAAQMD thresholds of significance. This would represent a *significant project and cumulative impact.*

[1]BAAQMD risk policy requires that these sources have a cancer risk of less than 10 in one million, which is the same as BAAQMD's recommended CEQA threshold.

Mitigation 5-2: To support the pedestrian, bicycle, and transit-oriented provisions included in the proposed project and reduce associated potential ROG, NO_x, and PM_{10} emissions, the project shall also include the following measures:

1. Develop and implement a comprehensive transportation demand management (TDM) plan that includes the following measures to further encourage alternative modes of transportation:

- Construct transit amenities, such as bus pull-outs, bus shelters, and kiosks that provide transit information (these should be coordinated with the ITC project);
- Work with 511 Contra Costa to provide transit incentives;
- Support/coordinate ridesharing, including preferential parking for car or van pools at office facilities;
- Provide bicycle amenities that include secure bicycle storage/parking for all uses and showers/lockers for commercial facilities;
- Consider a pricing strategy for non-residential parking places; and
- Work with Bay Area Car-Share programs to implement the program within the project.

2. If feasible, require that new buildings be energy efficient, by requiring Leadership in Energy and Environmental Design (LEED) certification, or demonstration of design to equivalent standards in terms of energy efficiency, that reduces energy consumption by at least 20 percent compared to typical new buildings. (The proposed project has received a "Gold" LEED rating, but not based on Green Building standards.)

3. Provide exterior electrical outlets to encourage use of electric powered landscape equipment.

It should be noted that a majority of the ROG emissions from the proposed project would be produced from consumer products (e.g., paints, solvents, hairsprays, charcoal fluids, etc.). There are no project-specific mitigation measures to reduce these emissions. The CARB controls these emissions by setting standards for various products, so these emissions are anticipated to be reduced in the future; however, the URBEMIS2007 model does not account for these anticipated reductions.

(continued)

Mitigation 5-2 (continued):

Implementation of these measures would reduce project-related and cumulative impacts on long-term regional ROG, NO_x, and PM_{10} emission levels by up to 8 percent, depending on the specific measures enacted; however, since reductions of over 30 percent would be required to bring project-related regional emission increases to below draft BAAQMD significance thresholds, the project and cumulative effects on ROG, NO_x, and PM_{10} emission levels would represent a ***significant unavoidable project and cumulative impact***.

Project Relationship to Applicable Clean Air Plan (CAP). The most current Clean Air Plan (CAP), the *2010 Bay Area Clean Air Plan*, was adopted by BAAQMD on September 15, 2010. This plan is based on population projections compiled by the Association of Bay Area Governments (ABAG). The project proposes new residences, retail uses, and office uses for a site that has been envisioned in the Hercules General Plan for these types of uses. The project site, as described in the Waterfront District Master Plan, would be consistent with ABAG projections for the Waterfront District.[1] As a result, the project would not increase population greater than anticipated under current planning assumptions, which are used to develop clean air planning strategies. Therefore, the project would not affect population forecasts that would affect regional air quality planning efforts. The proposed project is considered consistent with the CAP, and this impact is considered ***less-than-significant*** (see criterion [a] in subsection 5.3.1, Significance Criteria, above).

Mitigation. No significant impact has been identified; no mitigation is required.

[1]ABAG, Projections and Priorities 2009: Building Momentum, August 2009, page 58.