

## I. AIR QUALITY

This section has been prepared using methodologies and assumptions recommended by the Bay Area Air Quality Management District (BAAQMD)<sup>1</sup> and the *CEQA Guidelines*. In keeping with these guidelines, this section describes existing air quality, and the potential effects of the Master Plan on air quality, including impacts of traffic on local carbon monoxide levels and regional pollutant levels. Mitigation measures to reduce potentially significant air quality impacts are identified, where appropriate.

### 1. Setting

The following discussion provides an overview of existing air quality conditions in the region and Foster City area. Ambient standards and the regulatory framework relating to air quality are summarized. Climate, air quality conditions, and typical air pollutant types are also described below.

**a. Air Quality Standards, Regulatory Framework and Attainment Status.** Air quality standards, the regulatory framework, and State and federal attainment status are discussed below.

**(1) National and State Ambient Air Quality Standards.** As required by the Federal Clean Air Act, National Ambient Air Quality Standards (NAAQS) have been established for seven major air pollutants: carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), ozone (O<sub>3</sub>), respirable particulate matter (PM<sub>10</sub>), fine particulate matter (PM<sub>2.5</sub>), sulfur oxides, and lead. Pursuant to the California Clean Air Act, the State of California has also established the California Ambient Air Quality Standards (CAAQS). These standards are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility-reducing particles. Both State and federal standards are summarized in Table V.I-1. The “primary” standards have been established to protect the public health. The “secondary” standards are intended to protect the nation’s welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation and other aspects of the general welfare. Because CAAQS are more stringent than NAAQS, CAAQS are used as the comparative standard in this analysis.

**(2) Regulatory Framework.** 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 (U.S. EPA) administers the CAA. The California Clean Air Act is administered by the California Air Resources Board (CARB) at the State level 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. Key regulatory agencies and air quality plans are discussed briefly below.

**United States Environmental Protection Agency.** The U.S. EPA is responsible for enforcing the Federal CAA. The U.S. EPA is also responsible for establishing the NAAQS. NAAQS are required under the 1977 Clean Air Act and subsequent amendments. The U.S. 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

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<sup>1</sup> BAAQMD, 1999. CEQA Guidelines for Assessing Air Quality Impacts from Projects and Plans.

**Table V.I-1: Ambient Air Quality Standards**

Pollutant	Averaging Time	California Standards	National Standards <sup>a</sup>	
			Primary <sup>b,c</sup>	Secondary <sup>b,d</sup>
Ozone	8-hour	0.070 ppm	0.075 ppm	—
	1-hour	0.09 ppm	— <sup>e</sup>	Same as primary
Carbon monoxide	8-hour	9.0 ppm	9 ppm	—
	1-hour	20 ppm	35 ppm	—
Nitrogen dioxide	Annual	0.03 ppm	0.053 ppm	Same as primary
	1-hour	0.18 ppm	0.030 ppm	—
Sulfur dioxide	Annual	—	0.03 ppm	—
	24-hour	0.04 ppm	0.14 ppm	—
	3-hour	—	—	0.5 ppm
	1-hour	0.25 ppm	—	—
PM <sub>10</sub>	Annual	20 $\mu\text{g}/\text{m}^3$	— <sup>f</sup>	Same as primary
	24-hour	50 $\mu\text{g}/\text{m}^3$	150 $\mu\text{g}/\text{m}^3$	Same as primary
PM <sub>2.5</sub>	Annual	12 $\mu\text{g}/\text{m}^3$	15 $\mu\text{g}/\text{m}^3$	—
	24-hour	—	35 $\mu\text{g}/\text{m}^3$ <sup>f</sup>	—
Lead	Calendar quarter	—	1.5 $\mu\text{g}/\text{m}^3$	Same as primary
	30-day average	1.5 $\mu\text{g}/\text{m}^3$	—	—

<sup>a</sup> Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

<sup>b</sup> Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.

<sup>c</sup> Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the U.S. EPA.

<sup>d</sup> Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

<sup>e</sup> The national 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005. A new 8-hour standard was established in May 2008.

<sup>f</sup> The annual PM<sub>10</sub> standard was revoked by U.S. EPA on September 21, 2006 and a new PM<sub>2.5</sub> 24-hour standard was established.

Source: Illingworth and Rodkin, 2008.

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 CARB.

**California Air Resources Board.** In California, CARB, which is part of the California Environmental Protection Agency, is responsible for meeting the State requirements of the CAA, administering the California Clean Air Act, and establishing the CAAQS. The California Clean Air Act requires all air districts in the State to endeavor to achieve and maintain CAAQS. 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. CARB has established passenger vehicle fuel specifications and 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. CARB also conducts or supports research into the effects of air pollution on the public and develops innovative approaches to reducing air pollutant emissions.

**Bay Area Air Quality Management District.** BAAQMD is primarily responsible for assuring that the national and State ambient air quality standards are attained and maintained in the Bay Area. 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. BAAQMD has jurisdiction over much of the nine-county Bay Area.

**Bay Area Clean Air Plan.** BAAQMD, along with the other regional agencies (i.e., Association of Bay Area Governments and the Metropolitan Transportation Commission), has prepared an Ozone Attainment Plan to address the 1-hour NAAQS for ozone. Although U.S. EPA revoked the 1-hour NAAQS, commitments made in the Ozone Attainment Plan along with emissions budgets remain valid until the region develops an attainment demonstration/maintenance plan for the 8-hour NAAQS for ozone. The region will be required to submit a maintenance plan and demonstration of attainment with a request for redesignation to U.S. EPA in when the 8-hour ozone NAAQS is met. A Carbon Monoxide Maintenance Plan was approved in 1998 by U.S. EPA, which demonstrates how NAAQS for CO standard would be maintained.

Air quality plans addressing the California Clean Air Act are developed about every 3 years. The plans are meant to demonstrate progress toward meeting the more stringent 1-hour ozone CAAQS. The latest plan, which was adopted in January 2006, is called the *Bay Area 2005 Ozone Strategy*. This plan includes a comprehensive strategy to reduce emissions from stationary, area, and mobile sources. The plan indicates 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 proposes expanded implementation of transportation control measures (TCMs) and programs such as Spare the Air. Spare the Air is a public outreach program designed to educate the public about air pollution in the Bay Area and promote individual behavior changes that improve air quality. Some of these measures or programs rely on local governments for implementation.

The clean air planning efforts for ozone will also reduce PM<sub>10</sub> and PM<sub>2.5</sub>, since a substantial amount of these air pollutants come 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<sub>10</sub> and PM<sub>2.5</sub> emissions (e.g., Spare the Night Program). Senate Bill (SB) 656 requires further action by CARB and air districts to reduce public exposure to PM<sub>10</sub> and PM<sub>2.5</sub>. Efforts identified by BAAQMD in response to SB 656 are primarily targeted reductions in wood smoke emissions and adoption of new rules to further reduce NO<sub>x</sub> and particulate matter from internal combustion engines and reduce particulate matter from commercial charbroiling activities. Currently, BAAQMD is proposing a rule to address residential wood burning. The rule would restrict operation of any indoor or outdoor fireplace, fire pit, wood or pellet stove, masonry heater or fireplace insert on specific days during the winter when air quality conditions are forecasted to exceed the NAAQS for PM<sub>2.5</sub>. The proposed rule would also limit excess visible emissions from wood burning devices and require clean burning technology for wood burning devices sold (or resold) or installed in the Bay Area. NO<sub>x</sub> emissions contribute to ammonium nitrate formation that resides in the atmosphere as particulate matter, so a reduction in NO<sub>x</sub> emissions would

also reduce wintertime PM<sub>2.5</sub> levels. The Bay Area experiences the highest PM<sub>10</sub> and PM<sub>2.5</sub> in winter when wood smoke and ammonium nitrate contributions to particulate matter are highest.

**(3) Attainment Status.** Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The Bay Area as a whole does not meet State or federal ambient air quality standards for ground level ozone and State standards for PM<sub>10</sub> and PM<sub>2.5</sub>. Recent PM<sub>2.5</sub> monitoring data for Vallejo and San Jose suggest that the new national PM<sub>2.5</sub> standards for 24-hour exposures are exceeded. The U.S. EPA plans to designate the entire Bay Area as nonattainment for PM<sub>2.5</sub> by 2009. Most nonattainment areas would have until 2015 to attain the standards, with some extensions to 2020 possible.

Under the Federal CAA, the U.S. EPA has classified the region as marginally nonattainment for the 8-hour ozone standard. U.S. EPA required the region to attain the standard by 2007. Monitoring data indicate that the Bay Area has met the 8-hour ozone standard of 0.08 ppm that was established in 1997. However, the BAAQMD and CARB have not made a formal redesignation request to U.S. EPA. Recently, U.S. EPA adopted a more stringent 8-hour ozone standard of 0.075 ppm. An attainment designation for this standard will be made by March 2010. An attainment designation for an area signifies that pollutant concentrations did not exceed the standard for a specific pollutant in that area. The Bay Area has met the CO standards for over a decade and is classified attainment maintenance by the U.S. EPA. The U.S. EPA grades the region unclassified for all other air pollutants, which include PM<sub>10</sub> and PM<sub>2.5</sub>.

At the State level, the region is considered under serious nonattainment status for ground level ozone and nonattainment status for PM<sub>10</sub> and PM<sub>2.5</sub>. California ambient air quality standards are more stringent than the national ambient air quality standards. The region is required to adopt plans on a triennial basis that show progress towards meeting the State ozone standard. The area is considered attainment or unclassified for all other pollutants.

**b. Existing Climate and Air Quality.** The ambient air quality in a given area depends on the quantities of pollutants emitted within the area, transport of pollutants to and from surrounding areas, local and regional meteorological conditions, as well as the surrounding topography of the air basin. Air quality is described by the concentration of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). The significance of a pollutant concentration is determined by comparing the concentration to an appropriate ambient air quality standard. The standards represent the allowable pollutant concentrations designed to ensure that the public health and welfare are protected, while including a reasonable margin of safety to protect the more sensitive individuals in the population.

Foster City is located in the San Francisco Bay Area Air Basin, which includes the counties of San Francisco, Santa Clara, San Mateo, Marin, Napa, Contra Costa, and Alameda, along with the southeast portion of Sonoma County and the southwest portion of Solano County. The local air quality regulatory agency responsible for this basin is the BAAQMD.

**(1) Local Climate and Topography.** The climate of Foster City is characterized by warm, dry summers and cool, moist winters. The proximity of the San Francisco Bay and Pacific Ocean has

a moderating influence on the climate. Foster City lies in the peninsula climatological subregion of the Bay Area Air Basin. The peninsula region extends from northwest of San Jose to the Golden Gate. Cities in the southeastern peninsula experience warmer temperatures and fewer foggy days than coastal towns to the north and west because the marine layer is blocked by the Santa Cruz Mountains running up the center of the peninsula. However, the Crystal Springs Gap, between Half Moon Bay and San Carlos, permits maritime air to pass across the mountains and provides a cooling effect from San Mateo to Foster City.

The major large-scale weather feature controlling the area's climate is a large high pressure system located in the eastern Pacific Ocean, known as the Pacific High. The strength and position of the Pacific High varies seasonally. It is strongest during summer and located off the west coast of the United States. Large-scale atmospheric subsidence associated with the Pacific High produces an elevated temperature inversion along the West Coast. The base of this inversion is usually located from 1,000 to 3,000 feet above mean sea level, depending on the intensity of subsidence and the prevailing weather condition. Vertical mixing is often limited to the base of the inversion, trapping air pollutants in the lower atmosphere. Marine air trapped below the base of the inversion is often condensed into fog or stratus clouds by the cool Pacific Ocean. This condition is typical of the warmer months of the year from roughly May through October. Stratus clouds usually form offshore and move into the Bay Area during the evening hours. As the land warms the following morning, the clouds often dissipate, except along the immediate coast. The stratus then redevelops and moves inland late in the day along with an increase in winds. Otherwise, clear skies and dry conditions prevail during summer.

As winter approaches, the Pacific High becomes weaker and shifts south, allowing weather systems associated with the polar jet stream to affect the region. Low-pressure systems produce periods of cloudiness, strong shifting winds, and precipitation. The number of days with precipitation can vary greatly from year to year, resulting in a wide range of annual precipitation totals. Precipitation is generally lowest along the Bay with much higher amounts occurring along south and west facing slopes. About 90 percent of rainfall occurs from November through April. High-pressure systems are also common in winter and can produce cool stagnant conditions. Radiation fog and haze are common during extended winter periods where high-pressure systems influence the weather

The proximity of the eastern Pacific High and relatively lower pressure inland produces a prevailing westerly sea breeze along the central and northern California coast for most of the year. As this wind is channeled through the Golden Gate and other topographical gaps such as the Crystal Springs Gap, it branches off to the northeast and southeast, following the general orientation of the San Francisco Bay system. The prevailing wind is primarily from the northwest, especially during spring and summer. In fall and winter, winds become variable with more of a southeasterly orientation. Nocturnal winds and land breezes during the colder months of the year prevail with variable drainage out of the mountainous areas. Wind speeds are highest during the spring and early summer and lightest in fall. Winter storms bring relatively short episodes of strong southerly winds.

Temperatures in Foster City tend to be less extreme compared to inland locations due to the moderating effect of the Pacific Ocean and the Bay. In summer, high temperatures are generally in the high 70's and low temperatures during the winter months are in the low 40's.

(2) **Air Monitoring Data.** Air quality in the region is controlled by the rate of pollutant emissions and meteorological conditions. Meteorological conditions such as wind speed, atmospheric stability, and mixing height may all affect the atmosphere's ability to mix and disperse pollutants. Long-term variations in air quality typically result from changes in air pollutant emissions, while frequent, short-term variations result from changes in atmospheric conditions. The San Francisco Bay Area is considered to be one of the cleanest metropolitan areas in the country with respect to air quality. BAAQMD monitors air quality conditions at more than 30 locations throughout the Bay Area. The closest monitoring station to the project site is in Redwood City. Summarized air pollutant data for this station are shown in Table V.I-2. This table shows the highest air pollutant concentrations measured at the stations. Table V.I-3 identifies the annual number of days that ambient air quality standards were exceeded at the Redwood City monitoring station for each criteria pollutant.

c. **Criteria Air Pollutants.** Air quality studies generally focus on five pollutants that are most commonly measured and regulated: carbon monoxide (CO), ground level ozone, nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), and suspended particulate matter ( i.e., PM<sub>10</sub> and PM<sub>2.5</sub>). These pollutants are described in more detail below. In San Mateo County, ozone and particulate matter are the pollutants of greatest concern since measured air pollutant levels exceed these concentrations at times.

**Carbon Monoxide.** CO, a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue, and can impair central nervous system functions. CO is emitted almost exclusively from the incomplete combustion of fossil fuels.

The highest CO concentrations measured in Redwood City (the closest air monitoring station to the project site) have been well below the national and State ambient standards. Since the primary source of CO is automobiles, the highest concentrations would be found near congested roadways that carry large volumes of traffic. Carbon monoxide emitted from a vehicle is highest near the origin of a trip and considerably lower when a vehicle is operating in a hot-stabilized mode (usually 5 to 10 minutes into a trip). However, this pattern is different for vehicles of different ages, where older cars require a longer time to reach a hot-stabilized running mode. A vehicle sitting idle for over 1 hour is normally considered to return to a cold start mode. Vehicle operation on freeways is usually in a hot-stabilized mode so the individual emission rates are much lower than those encountered on arterial roadways leading to the freeway. Measured concentrations in the area are below both State and federal ambient air quality standards; however, CO is a localized air pollutant that can be found in high concentrations near the source (e.g., congest roadways).

**Ozone.** While ozone serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing ultraviolet radiation potentially harmful to humans, when it reaches elevated concentrations in the lower atmosphere it can be harmful to the human respiratory system and to sensitive species of plants. Ozone concentrations build to peak levels during periods of light winds, bright sunshine, and high temperatures. Short-term ozone exposure can reduce lung function in children, make persons susceptible to respiratory infection, and produce symptoms that cause people to seek medical treatment for respiratory distress. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. Sensitivity to ozone varies among individuals, but about 20 percent of the population is sensitive to ozone, with exercising children being particularly vulnerable.

**Table V.I-2: Highest Measured Air Pollutant Concentrations**

Pollutant	Average Time	Measured Air Pollutant Levels				
		2003	2004	2005	2006	2007
<b>Redwood City</b>						
Ozone (O <sub>3</sub> )	1-Hour	<b>0.11 ppm</b>	<b>0.10 ppm</b>	0.08 ppm	0.09 ppm	0.08 ppm
	8-Hour	0.08 ppm	0.07 ppm	0.06 ppm	0.06 ppm	0.07 ppm
Carbon Monoxide (CO)	8-Hour	2.6 ppm	2.1 ppm	2.3 ppm	2.4 ppm	2.3 ppm
Nitrogen Dioxide (NO <sub>2</sub> )	1-Hour	0.08 ppm	0.06 ppm	0.06 ppm	0.07 ppm	0.06 ppm
	Annual	0.015 ppm	0.015 ppm	0.015 ppm	0.014 ppm	0.013 ppm
Respirable Particulate Matter (PM <sub>10</sub> )	24-Hour	38 µg/m <sup>3</sup>	<b>65 µg/m<sup>3</sup></b>	<b>81 µg/m<sup>3</sup></b>	<b>70 µg/m<sup>3</sup></b>	<b>56 µg/m<sup>3</sup></b>
	Annual	20 µg/m <sup>3</sup>	<b>21 µg/m<sup>3</sup></b>	<b>21 µg/m<sup>3</sup></b>	20 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>
Fine Particulate Matter (PM <sub>2.5</sub> )	24-Hour	34 µg/m <sup>3</sup>	36 µg/m <sup>3</sup>	31 µg/m <sup>3</sup>	<b>75 µg/m<sup>3</sup></b>	45 µg/m <sup>3</sup>
	Annual	9 µg/m <sup>3</sup>	9 µg/m <sup>3</sup>	9 µg/m <sup>3</sup>	10 µg/m <sup>3</sup>	8 µg/m <sup>3</sup>
<b>Bay Area (Basin Summary)</b>						
Ozone (O <sub>3</sub> )	1-Hour	<b>0.12 ppm</b>	<b>0.11 ppm</b>	<b>0.12 ppm</b>	<b>0.12 ppm</b>	<b>0.12 ppm</b>
	8-Hour	<b>0.10 ppm</b>	<b>0.08 ppm</b>	<b>0.09 ppm</b>	<b>0.11 ppm</b>	<b>0.09 ppm</b>
Carbon Monoxide (CO)	8-Hour	4.0 ppm	3.4 ppm	3.1 ppm	2.9 ppm	2.7 ppm
Nitrogen Dioxide (NO <sub>2</sub> )	1-Hour	0.09 ppm	0.07 ppm	0.07 ppm	0.11 ppm	0.07 ppm
	Annual	0.021 ppm	0.019 ppm	0.019 ppm	0.018 ppm	0.017 ppm
Respirable Particulate Matter (PM <sub>10</sub> )	1-Hour	<b>60 µg/m<sup>3</sup></b>	<b>65 µg/m<sup>3</sup></b>	<b>81 µg/m<sup>3</sup></b>	<b>73 µg/m<sup>3</sup></b>	<b>78 µg/m<sup>3</sup></b>
	Annual	<b>25 µg/m<sup>3</sup></b>	<b>26 µg/m<sup>3</sup></b>	<b>24 µg/m<sup>3</sup></b>	<b>23 µg/m<sup>3</sup></b>	<b>26 µg/m<sup>3</sup></b>
Fine Particulate Matter (PM <sub>2.5</sub> )	24-Hour	56 µg/m <sup>3</sup>	52 µg/m <sup>3</sup>	55 µg/m <sup>3</sup>	<b>75 µg/m<sup>3</sup></b>	<b>58 µg/m<sup>3</sup></b>
	Annual	12 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	11 µg/m <sup>3</sup>	11 µg/m <sup>3</sup>

Note: ppm = parts per million and µg/m<sup>3</sup> = micrograms per cubic meter

Values reported in **bold** exceed ambient air quality standard

NA = data not available

Source: BAAQMD Air Quality Summaries for 2003, 2004, 2005, 2006, and 2007.

**Table V.I-3: Annual Number of Days Exceeding Ambient Air Quality Standards**

Pollutant	Standard	Monitoring Station	Days Exceeding Standard				
			2003	2004	2005	2006	2007
Ozone (O <sub>3</sub> )	NAAQS 1-hr	Redwood City	0	0	X	X	X
		Bay Area	1	0	X	X	X
	NAAQS 8-hr	Redwood City	0	0	0	0	0
		Bay Area	7	0	1	12	1
	CAAQS 1-hr	Redwood City	1	1	0	0	0
		Bay Area	19	7	9	18	4
	CAAQS 8-hr	Redwood City	--	--	0	0	0
		Bay Area	--	--	9	22	9
Fine Particulate Matter (PM <sub>10</sub> )	NAAQS 24-hr	Redwood City	0	0	0	0	0
		Bay Area	0	0	0	0	0
	CAAQS 24-hr	Redwood City	0	1	2	2	1
		Bay Area	6	7	6	15	4
Fine Particulate Matter (PM <sub>2.5</sub> )	NAAQS 24-hr <sup>a</sup>	Redwood City	0	0	0	1	1
		Bay Area	0	1	0	10	14
All Other (CO, NO <sub>2</sub> , Lead, SO <sub>2</sub> )	All Other	Redwood City	0	0	0	0	0
		Bay Area	0	0	0	0	0

<sup>a</sup> Based on standard of 65 µg/m<sup>3</sup> that was in place until September 21, 2006, then 35 µg/m<sup>3</sup> standard adopted in 2006.

X = Standard revoked in 2004.

NA = Data Not Available.

Source: BAAQMD, 2008.

Ozone is formed in the atmosphere by a complex series of photochemical reactions that involve “ozone precursors” that are two families of pollutants: oxides of nitrogen ( $\text{NO}_x$ ) and reactive organic gases (ROG).  $\text{NO}_x$  and ROG are emitted from a variety of stationary and mobile sources.  $\text{NO}_x$ , a combustion pollutant, includes nitrogen oxide (NO), nitrogen dioxide ( $\text{NO}_2$ ) and nitrous oxide ( $\text{NO}_2$ ). Most  $\text{NO}_x$  is emitted in the form of NO, but all  $\text{NO}_x$  can react with ROG to form ozone. While  $\text{NO}_2$ , an oxide of nitrogen, is another criteria pollutant itself, ROG are not in that category, but are included in this discussion as ozone precursors. ROG is a class of organic compounds that react most rapidly in the atmosphere with  $\text{NO}_x$  to form ozone. Most ROG is emitted through combustion or evaporation. U.S. EPA recently established a new more stringent standard of 0.075 ppm for 8-hour exposures, based on a review of the latest new scientific evidence.

Over the last 5 years in Redwood City, the NAAQS for 8-hour ozone levels was exceeded once in 2003. The Bay Area, as a whole, exceeded the 8-hour ozone NAAQS on 0 to 12 days annually and the 8-hour CAAQS on 9 to 22 days (statistics have been collected since 2005). In Redwood City, the 1-hour State standard for ozone was exceeded on 0 to 4 days annually while that same standard was exceeded on 4 to 19 days annually in the Bay Area as a whole. Most exceedances of the ozone standard in the Bay Area occur in downwind portions of the basin, such as Livermore, Concord, and Gilroy.

**Nitrogen Dioxide.**  $\text{NO}_2$ , a reddish-brown gas, irritates the lungs, and can cause breathing difficulties at high concentrations. Like ozone,  $\text{NO}_2$  is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and  $\text{NO}_2$  are collectively referred to as nitrogen oxides ( $\text{NO}_x$ ) and are major contributors to ozone formation.  $\text{NO}_2$  also contributes to the formation of  $\text{PM}_{10}$  (see discussion of  $\text{PM}_{10}$  below). Monitored levels of the pollutant in the Bay Area are well below ambient air quality standards.

**Sulfur Oxides.** Sulfur oxides, primarily  $\text{SO}_2$ , are a product of high-sulfur fuel combustion. The main sources of  $\text{SO}_2$  are coal and oil used in power stations, in industries, and for domestic heating.  $\text{SO}_2$  is a gas that irritates the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children.  $\text{SO}_2$  concentrations have been reduced to levels well below the State and national standards, but further reductions in emissions are needed to attain compliance with standards for  $\text{PM}_{10}$ , to which  $\text{SO}_2$  contributes.

**$\text{PM}_{10}$  and  $\text{PM}_{2.5}$ .** Particulate matter pollution consists of very small particles suspended in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gaseous pollutants undergo chemical reactions in the atmosphere. Respirable particulate matter ( $\text{PM}_{10}$ ) and fine particulate matter ( $\text{PM}_{2.5}$ ) represent particulate matter of different sizes.  $\text{PM}_{10}$  refers to particulate matter less than 10 microns in diameter and  $\text{PM}_{2.5}$  refers to particulate matter that is 2.5 microns or less in diameter.  $\text{PM}_{2.5}$  is generated primarily by diesel fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves.  $\text{PM}_{10}$  includes all  $\text{PM}_{2.5}$  sources as well as emissions from dust generated by construction, landfills and agriculture, wildfires and brush/waste burning, industrial sources, windblown dust from open lands, and atmospheric chemical and photochemical reactions.  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  pose a greater health risk than larger-size particles because these tiny particles can penetrate the human respiratory system’s natural defenses and damage the respiratory tract, increasing the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body’s ability to fight

infections. Whereas larger particles tend to collect in the upper portion of the respiratory system, PM<sub>2.5</sub> is miniscule and can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility. The U.S. EPA recently adopted a new more stringent standard of 35  $\mu\text{g}/\text{m}^3$  for 24-hour exposures based on a review of the latest new scientific evidence. At the same time, U.S. EPA revoked the annual PM<sub>10</sub> standard due to a lack of scientific evidence correlating long-term exposures of ambient PM<sub>10</sub> with adverse health effects.

Measured exceedances of the PM<sub>10</sub> standards occurred on four separate sampling days over the last 5 years. Statistics on the new NAAQS for PM<sub>2.5</sub> have only been kept since 2006. Two exceedances have occurred each year since in Redwood City. Monitoring data indicate that the new standard would have been exceeded also in 2004. PM<sub>10</sub> and PM<sub>2.5</sub> are only measured once every sixth day at Redwood City (most monitoring stations measure particulates every sixth day according to a national schedule). It is estimated that there were 24 days over the past 5 years on which the State PM<sub>10</sub> standard was exceeded. Most stations in the Bay Area reported exceedances of the State standard on the same fall/winter days as reported in Redwood City, indicating a regional air quality problem. The primary sources of these pollutants are wood smoke and local traffic. Meteorological conditions that are common during this time of the year result in calm winds and strong surface-based inversions that trap pollutants near the surface. The buildup of these pollutants is greatest during the evenings and early morning periods. The high levels of PM<sub>10</sub> result in not only health effects, but also reduced visibility.

**d. Toxic Air Contaminants.** Besides the “criteria” air pollutants, there is another group of substances found in air that are referred to as Hazardous Air Pollutants (HAPs) under the CAA and Toxic Air Contaminants (TACs) under the California Clean Air Act. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. They are regulated at the local, State, and federal level.

HAPs are the air contaminants identified by U.S. EPA as known or suspected to cause cancer, serious illness, birth defects, or death. Many of these contaminants originate from human activities, such as fuel combustion and solvent use. Mobile source air toxics (MSATs) are a subset of the 188 identified HAPs. Of the 21 HAPs identified by EPA as MSATs, priority lists of six HAPs were identified that include: diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene. While vehicle miles traveled in the United States are expected to increase by 64 percent over the period 2000 to 2020, emissions of MSATs are anticipated to decrease substantially as a result of efforts to control mobile source emissions (by 57 percent to 67 percent depending on the contaminant)<sup>2</sup>.

California developed a program under the Tanner Toxics Act (AB 1807) to identify, characterize and control TACs. Subsequently, AB 2728 incorporated all 188 HAPs into the AB 1807 process. TACs include all HAPs plus other containments identified by CARB. These are a broad class of compounds known to cause morbidity or mortality (cancer risk). 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., diesel particulate matter near a freeway).

<sup>2</sup> Federal Highway Administration, 2006. Interim Guidance on Air Toxic Analysis in NEPA Documents.

Particulate matter from diesel exhaust is the predominant TAC in urban air. According to 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 chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by ARB, and are listed as carcinogens either under State Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB reports that recent air pollution studies have shown that diesel exhaust and other cancer-causing toxic air contaminants emitted from vehicles are responsible for much of the overall cancer risk from TACs in California. Particulate matter emitted from diesel-fueled engines (diesel particulate matter (DPM)) was found to comprise much of that risk. In August 1998, CARB formally identified DPM as a TAC. Diesel particulate matter is of particular concern since it can be distributed over large regions, thus leading to widespread public exposure. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by EPA as HAPs, and by CARB as TACs. Diesel engines emit particulate matter at a rate about 20 times greater than comparable gasoline engines. The vast majority of diesel exhaust particles (over 90 percent) consist of  $PM_{2.5}$ , which are particles that can be inhaled deep into the lungs. Like other particles of this size, a portion will eventually become trapped within the lungs, possibly leading to adverse health effects. While the gaseous portion of diesel exhaust also contains TACs, CARB's 1998 action was specific to DPM, which accounts for much of the cancer-causing potential from diesel exhaust. California has adopted a comprehensive diesel risk reduction program to reduce DPM emissions 85 percent by 2020. The U.S. EPA and CARB adopted low sulfur diesel fuel standards in 2006 that would reduce diesel particulate matter substantially.

Smoke from residential wood combustion can also be a source of TACs. Wood smoke is typically emitted during wintertime, when dispersion conditions are poor. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind, the pollution can persist for many hours, especially in sheltered valleys during winter. Wood smoke also contains a significant amount of  $PM_{10}$  and  $PM_{2.5}$ . Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

## 2. Impacts And Mitigation Measures

This section identifies the air quality impacts associated with implementation of the proposed project. The subsection begins with the criteria of significance, which establish the thresholds for determining whether a project impact is significant. The latter part of this subsection presents the potential air quality impacts associated with the proposed project. Mitigation measures are recommended, as appropriate, to reduce significant impacts to less-than-significant levels. This section also identifies impacts that are considered to be less than significant.

**a. Criteria of Significance.** The *BAAQMD CEQA Guidelines*<sup>3</sup> include significance thresholds that are specific to the Bay Area. The BAAQMD does not consider construction impacts to be significant if the BAAQMD's control measures for  $PM_{10}$  construction emissions are implemented. The proposed project would result in a significant air quality impact if it would:

<sup>3</sup> Bay Area Quality Management District, 1999. op cit.

- Violate the District's air quality standards or contribute substantially to an existing or projected air quality violation by:
  - Contributing to CO concentrations exceeding the State ambient air quality standards of 9 ppm averaged over 8 hours and 20 ppm for 1 hour; or
  - Generating criteria air pollutant emissions of ROG, NO<sub>x</sub>, or PM<sub>10</sub> in excess of 15 tons per year, or 80 pounds per day;
- Frequently expose members of the public to objectionable odors;
- Expose sensitive receptors (including residential areas) or the general public to substantial toxic air contaminants; or
- Result in a cumulative air quality impact. Projects that would individually have a significant air quality impact due to project operations would also result in a cumulative air quality impact. For projects that do not individually have significant operational air quality impacts, a cumulative impact would result if the project would cause the City's General Plan to conflict with the Clean Air Plan or, if the City's General Plan is already inconsistent with the Clean Air Plan, the project would combine with other reasonably foreseeable future projects to either: 1) exceed the BAAQMD individual operational thresholds of significance or 2) exceed the CAP population and VMT assumptions for growth in the City or County.

The BAAQMD provides various quantitative thresholds that can be used to better define the above criteria. For ROG<sup>4</sup>, NO<sub>x</sub> and PM<sub>10</sub>, a net increase of 80 pounds per day is considered significant, while for CO, an increase of 550 pounds per day would be considered significant if it leads to or contributes to CO concentrations exceeding the State Ambient Air Quality Standard of 9 ppm averaged over 8 hours and 20 ppm for 1 hour (i.e., if it creates a "hot spot"). Generally, if a project results in an increase in ROG, NO<sub>x</sub>, or PM<sub>10</sub> of more than 80 pounds per day, then it would also be considered to contribute considerably to a significant cumulative effect. For projects that would not lead to a significant increase of ROG, NO<sub>x</sub>, or PM<sub>10</sub> emissions, the cumulative effect is evaluated based on a determination of the consistency of the proposed project with the regional Clean Air Plan. Impacts from PM<sub>2.5</sub> emissions were analyzed quantitatively, but there are no recommended significance thresholds from the BAAQMD (although federal and State standards for the pollutant exist).

It should be noted that the emission thresholds were established based on the attainment status of the air basin in regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety, these emission thresholds are regarded as cautious in their application and would tend to overstate an individual project's contribution to health risks.

**b. Less-than-Significant Air Quality Impacts.** Implementation of the project would result in the following less-than-significant air quality impacts.

**(1) Odors.** During construction, the various diesel powered vehicles and equipment in use onsite would create localized odors. These odors would be temporary and are not likely to be

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<sup>4</sup> Reactive Organic Gases (ROG) are classes of organic compounds that transform with heat and sunlight to form smog or ozone. SO<sub>2</sub> is a reactive organic gas.

noticeable for extended periods of time beyond the Master Plan area. The potential for diesel odor impacts is therefore considered less than significant. Odors from existing uses are not generally noticeable beyond the campus. A public records request to the BAAQMD revealed no odor complaints at Gilead Sciences. The proposed uses that would be developed within the project site would be similar to existing uses and are not expected to produce any offensive odors that would result in frequent odor complaints.

**(2) Criteria Pollutant Analysis.** The Bay Area is considered a non-attainment area for ground-level ozone under both the CAA and the California Clean Air Act. The area is also considered non-attainment for  $PM_{10}$  and  $PM_{2.5}$  under the California CAA, but not the Federal CAA. The area has attained both State and federal ambient air quality standards for CO. As part of an effort to attain and maintain ambient air quality standards for ozone and  $PM_{10}$ , BAAQMD has established thresholds of significance for air pollutants. These thresholds are for ozone precursor pollutants (reactive organic gases and nitrogen oxides) and  $PM_{10}$ .

The Master Plan would generate new vehicle trips, which would increase emissions of air pollutants. Emissions of air pollutants associated with the project were predicted using the URBEMIS2007 model (Version 9.2.4) recommended for use by BAAQMD. This model predicts daily emissions associated with land use developments. The model combines predicted daily traffic activity, associated with the different land use types, with emission factors from the State's mobile emission factor model (i.e., EMFAC2007). Fehr & Peers Transportation Consultants provided trip generation rates in the transportation analysis for the project (see Section V.G, Transportation and Circulation).

The model also predicts area source emissions associated with the proposed project, which are minor compared to emissions associated with traffic. Area source emissions include natural gas combustion for space and water heating, use of landscape equipment, and consumer products.

The ROG emissions from mobile sources include different automobile operating modes such as running emissions and evaporation from engine running and resting. These emissions also include those resulting from increased emission rates (due to incomplete combustion) that occur when a cold car is started.  $NO_x$  emissions comprise running exhaust and are increased during the initial engine running periods.

$PM_{10}$  emissions result from running exhaust, tire and brake wear, and the entrainment of dust into the atmosphere from vehicles traveling on paved roadways. Entrainment of  $PM_{10}$  occurs when vehicle tires pulverize small rocks and pavement and the vehicle wakes generate airborne dust. The contribution of tire and brake wear is small compared to the other PM emission processes. Gasoline powered engines have small rates of particulate matter emissions compared with diesel-powered vehicles. Since much of the project traffic fleet would be made up of light-duty gasoline-powered vehicles, a majority of the  $PM_{10}$  emissions would result from entrainment of roadway dust from vehicle travel. The URBEMIS2007 default silt loading values were changed to reflect values that CARB uses for calculating paved roadway dust emissions for average vehicles traveling on arterial and collector roadways<sup>5</sup>.

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<sup>5</sup> A factor of 0.035 grams silt per square meter was used based on data developed in 2006 for calculating area source emissions in the San Joaquin Valley Air Basin (<http://www.arb.ca.gov/ei/areasrc/PMSJVPavedRoadMethod2003.pdf>).

Criteria pollutants were evaluated by predicting future emissions associated with existing conditions at the project site, and comparing these emissions to emissions that would result from buildout of the Master Plan. The difference in emissions between the two scenarios was compared to identify the net increase of ozone precursor pollutants and PM<sub>10</sub>, and the net increases were compared to the pollutant thresholds set by BAAQMD. Buildout of the campus would take about 10 years, so project emissions were predicted for 2020.

The change in daily emissions predicted with full buildout of the proposed Master Plan is summarized in Table V.I-4. As shown in Table V.I-4, the emissions associated with buildout of the proposed Master Plan would not result in increased emissions that exceed significance thresholds. URBEMIS2007 Model output files are included as Appendix C.

**Table V.I-4: Daily Project Emissions**

Scenario	Modeled Daily Emissions in Pounds Per Day (lbs/day)			
	Reactive Organic Gases (ROG)	Nitrogen Oxides (NOx)	Respirable Particulates (PM <sub>10</sub> )	Fine Particulates (PM <sub>2.5</sub> )
<b>Current Development Scenario - 2020</b>				
Current Area Sources	4	4	<1	<1
Current Operational Sources	25	23	45	16
Total Current Development	29	27	45	16
<b>Proposed Master Plan Development Scenario - 2020</b>				
Proposed Area Sources	8	6	<1	<1
Proposed Operational Sources	47	46	87	32
Total Proposed Sources	55	52	87	32
<i>Net New Emissions at Master Plan Buildout (Project Increment)</i>	26	25	42	16
<i>BAAQMD Significance Thresholds</i>	80	80	80	--
<i>Significant Contribution?</i>	No	No	No	--

Source: Illingworth and Rodkin, 2008.

Stationary equipment that could emit substantial volumes of air pollution has not been identified for the future buildout of the Master Plan. The existing corporate campus includes laboratories and small stationary equipment, such as back-up generators. These sources result in minor air pollutant emissions. The proposed Master Plan would increase on-site lab uses and possibly include additional stationary equipment, such as generators. Specifics regarding lab uses or installation of any new stationary equipment are not available as part of the Master Plan. If stationary sources are included in individual development projects, they may require permits from BAAQMD. Such sources could include boilers used for heating and cooling or standby emergency generators (rated 50 horsepower or greater). Large laboratory uses may be subject to BAAQMD permitting if they could generate emissions that require controls. These sources would normally result in minor emissions, compared to those associated with trip generation. Sources of air pollutant emissions that comply with all applicable BAAQMD regulations generally would not be considered to have a significant air quality impact. Stationary sources that are exempt from BAAQMD permit requirements due to low emission thresholds would not be considered to have a significant air quality impact.

The increase in emissions from buildout of the proposed Master Plan is anticipated to be below significance thresholds, and therefore would be less than significant.

**(3) Violate Air Quality Standards.** Carbon monoxide emissions from traffic generated by the project would be the greatest pollutant concern at the local level. Congested intersections with a large volume of traffic have the greatest potential to cause high localized concentrations of carbon CO. Measured CO levels have been at healthy levels (i.e., below State and federal standards) in the Bay Area since the early 1990s. As a result, the region has been designated as attainment for the standard. The highest measured 8-hour CO level over the last 3 years is 2.4 ppm in Redwood City.

The contribution of project-generated traffic to CO levels was calculated following the screening guidance recommended by the BAAQMD. The screening procedure was used to predict 8-hour concentrations of CO. There is also a 1-hour standard for CO, but this would never be exceeded by traffic impacts from office-generated traffic unless the 8-hour standard is also exceeded. Therefore, only the 8-hour standard is addressed unless it is exceeded. The BAAQMD also has an emission standard of 550 pounds per day of CO that only applies to stationary sources.

A review of intersection traffic volumes and level of service was conducted to identify intersections with the potential for the highest CO levels that would be affected by the project. Three intersections: Foster City Boulevard and Metro Center Boulevard/Triton Drive; SR 92 Eastbound Ramps and Metro Center Boulevard; and Foster City Boulevard and Chess Drive were considered the worst intersections (in terms of elevated CO levels from traffic) that may be affected by project-generated traffic. Other intersections would be expected to experience less substantial pollutant concentrations. Future CO levels were calculated near these intersections for existing conditions and future conditions with the project in place using traffic projections provided by Fehr & Peers Transportation Consultants. Emission factors used were calculated using the EMFAC2007 model, developed by the CARB, with default assumptions for San Mateo County during the winter, including a temperature of 40 degrees F. As part of the screening analysis, a slow speed of 5 miles per hour was assumed, resulting in higher emission rates. The screening analysis included the number of through lanes in the intersection configuration with a receptor located at the edge of the roadway. The contribution of roadway CO levels was added to the current background concentration to predict future levels. Screening calculations are provided in Appendix C. Predicted CO concentrations along the busiest roadways affected by the Master Plan are reported in Table V.I-5.

**Table V.I-5: Predicted Roadside 8-Hour Carbon Monoxide Concentrations in PPM**

Description	Existing (2008)	Baseline (2011)	Project (2011)	Cumulative (2020)
Foster City Blvd. & Metro Center Blvd./Triton	4.1	3.7	4.0	3.2
Metro Blvd. & SR 92 EB Ramps	4.6	4.1	4.1	3.3
Foster City Blvd. & Chess Dr.	4.4	4.0	4.0	3.2
<i>BAAQMD Threshold: 9.0 ppm</i>				

Note: CO emission rates are expected to decrease by 50 percent between 2011 and 2020 due to implementation of more stringent automobile emissions standards.

Source: Illingworth and Rodkin, 2008.

The highest 8-hour concentration with the project in place (in about 2015 at the earliest) is predicted to be 4.1 ppm over an 8-hour averaging period. This concentration would occur along Metro Center Boulevard and the SR92 Eastbound Ramps. Lower concentrations would occur at other intersections affected by project traffic. The data in Table V.I-5 represent the roadside concentration with future PM peak hour conditions, as reported by Fehr & Peers Transportation Consultants. The results of this

screening analysis indicate that project levels would be below the California ambient air quality standard 9.0 ppm; therefore, the impact on CO concentrations would be less than significant. Had levels been identified that were above the ambient air quality standards, a more refined analysis would have been conducted using the CALINE4 dispersion model and actual lane-receiver geometry.

**(4) Sensitive Receptors.** Certain groups of people are more susceptible to health effects associated with air pollution than others. CARB has identified the following groups that are most likely to be affected by air pollution: children under 14 years, the elderly over 65 years, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and open space. The closest sensitive receptors to the project site are located in residences along Mariners Island Drive that are 200 feet to the west of the project site. There are also residences about 350 feet to the south of the site on Chess Boulevard. A hotel is located approximately 150 feet south of the project site. A hotel may be considered a sensitive receptor for short-term exposure to air pollutants (but not for long-term exposure).

The project is a source of minor air pollutant emissions from laboratory uses and some building equipment. These sources do not expose the public to substantial pollutant concentrations. The project is not expected to include stationary sources or specific laboratory sources that could emit TACs. Project construction would result in temporary emissions of dust and diesel exhaust (see Impact AIR-1, below). As shown in Tables V.I-4 and V.I-5, the project traffic would not generate substantial pollutant concentrations around sensitive receptors.

**(5) Long-Term Operational Emissions.** The project would be a source of minor emissions from stationary equipment and laboratories. Existing stationary equipment in the project site includes an emergency generator that uses diesel fuel. This generator is tested infrequently and only operates continuously when there is a power outage. Emissions from this source would not affect existing sensitive receptors. Laboratory emissions from this laboratory space on the campus are minor and would not be expected to affect nearby sensitive receptors.

Buildout of the proposed Master Plan could also result in the construction or modification of stationary air pollutant sources that are not accurately accounted for in the URBEMIS2007 modeling. Such sources could include boilers used for heating and cooling, standby emergency generators, and laboratory facilities. Specific information regarding these sources is not currently available. Depending on the size of these sources, they may be subject to BAAQMD permit requirements. Those sources that emit toxic or hazardous air pollutants would be required to undergo permitting by the BAAQMD. Sources that pose a significant impact to other land uses would not be permitted. Sources of air pollutant emissions that comply with all applicable BAAQMD regulations generally would not be considered to have a significant air quality impact. Stationary sources (including laboratories) that are exempt from BAAQMD permit requirements, because they fall below emission thresholds for permitting, would not be considered to have a significant air quality impact.

**(6) Clean Air Plan Consistency.** A key element in air quality planning is to make reasonably accurate projections of future human activities, particularly vehicle activities that are related to air pollutant emissions. BAAQMD uses population projections made by the Association of Bay Area Governments (ABAG) and vehicle use trends made by the Metropolitan Transportation

Commission (MTC) to formulate future air pollutant emission inventories. These projections are based on estimates from cities and counties. In order to provide the best plan to reduce air pollution in the Bay Area, accurate projections from local governments are necessary. When General Plans are not consistent with these projections, they cumulatively reduce the effectiveness of air quality planning in the region. Regional clean air planning efforts address both the federal and State ozone standards using the most recent population and vehicle travel projections.

The most current Clean Air Plan, the *2005 Bay Area Ozone Strategy*, was adopted by BAAQMD in 2006. This plan is based on population projections through 2020 compiled by ABAG. The project would not require a General Plan amendment. However, the project applicant has applied for rezoning (RZ-07-004) in order to amend the General Development Plan for Vintage Park. The project applicant proposes to rezone the site in order to increase the maximum square footage allowed on the campus. One purpose of the proposed Master Plan is to accommodate the employee growth that is anticipated for the campus. Gilead's 10-year strategic plan projects that the employee count at the Foster City campus will grow to approximately 3,100 by the year 2018. This represents an increase of 1,900 employees over current staffing levels. The proposed Master Plan would intensify office and light industrial uses at a site that is already used in that manner. The site is served by regional freeways, has local and regional transit opportunities for workers, and implements a Transportation Demand Management program (discussed below). While increasing local trip generation, maintaining a central office campus (as opposed to developing numerous satellite campuses to accommodate future staff) would reduce regional vehicle trips and thus would support implementation of the Clean Air Plan. Therefore, development of the Gilead Campus under the proposed Master Plan is not anticipated to conflict with regional projections of population growth or the rate of growth in vehicle miles traveled in the region that were used to develop the latest Clean Air Plan.

Determining consistency with the Clean Air Plan also involves assessing whether Transportation Control Measures (TCMs)<sup>6</sup> contained in the *2005 Bay Area Ozone Strategy* are implemented. The 2005 Ozone Strategy (i.e., BAAQMD's most recent Clean Air Plan) includes 20 transportation control measures, of which seven require participation at the local level. The latest set of adopted TCMs, which identify local governments as implementing agencies, are listed in the BAAQMD *CEQA Guidelines*. TCMs that would apply to projects are designed to reduce motor vehicle travel by encouraging use of other transportation modes. For projects, these would include amenities that would encourage transit, bicycle, and pedestrian modes of transportation.

The project cannot individually implement the listed TCMs that require local action; however, the City's General Plan policies should include all those measures that are consistent with the City's responsibility. There are measures that the project could implement to make TCMs more effective. The Master Plan includes enhanced pedestrian connectivity and continuance of a comprehensive TDM program to reduce dependence on private motor vehicles. The following measures are included in the TDM program (refer to Section V.G, Transportation and Circulation for a quantification of trip reduction associated with implementation of the TDM Program):

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<sup>6</sup> Note that transportation control measures (TCMs) differ from transportation demand management (TDM) measures in that they are regional measures designed to reduce vehicle trips, vehicle miles traveled, and congestion. TDM programs are designed to reduce project traffic demands. Both programs share similar goals, since reducing traffic generation solves traffic demand problems.

- Try Transit Free Program provides free transit tickets to anyone interested in trying one of the following to get to work: BART; CalTrain; SamTrans; Dumbarton Express; AC Transit M Line; or VTA;
- Guarantee Ride Home provides employees who regularly vanpool, carpool, bike, walk, or take transit with a free taxi ride or 24-hour car rental in the case of an emergency;
- Establishment and management of shuttles to CalTrain and BART;
- Carpool Incentive Program (one time gas card incentive);
- Bike and Pedestrian Safety Program;
- Commute Benefits Program;
- Bike to Work Program;
- Four vanpools, one from the San Francisco area, one from the Hayward/Fremont area, one from the Contra Costa/Dublin area, and from the Tracy/Stockton area;
- Rebates for new vanpool participants; and
- Monthly Commuter Checks distributed to approximately 110 Gilead employees a month that subsidize transit use and are intended to encourage Gilead employees to use alternative modes of transportation.

The project site is also served by the Foster City Connections Shuttles, which operate Monday through Friday (except holidays) between 9:30 a.m. and 3:30 p.m. These free shuttles provide transportation to shopping centers, recreation areas and employment centers. These measures, along with project features and General Plan policies, are generally consistent with Clean Air Plan TCMs. Therefore, the proposed Master Plan would not conflict with the *2005 Bay Area Ozone Strategy*.

**c. Significant Air Quality Impacts.** Implementation of the Master Plan would result in the following significant air quality impact.

**Impact AIR-1: Construction period activities could generate significant dust, exhaust, and organic emissions. (S)**

Construction would occur over an approximate 10-year buildout period. During this period, select buildings would be demolished and there may be minor site grading. Demolition materials would be hauled off-site by trucks. New buildings and necessary infrastructure would be constructed. The BAAQMD-recommended approach to analysis of construction impacts focuses on application of appropriate mitigation measures. BAAQMD does not recommend quantification of emissions. In addition, attempting to quantify emissions from construction activities that would occur on and off over a 10-year period would be speculative. In addition, no quantified thresholds to which these emissions could be compared to evaluate significance have been established by either the BAAQMD or the City of Foster City.

Dust would be generated during demolition, grading, and construction activities. Most of the dust would result during demolition and grading activities. Extensive grading is not envisioned, since the site is already developed. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed, amount of activity, soil conditions and meteorological conditions.

Typical winds during late spring through summer are from the north-northwest. Nearby sensitive land uses include a mixture of residential, recreational, hotel, and office uses that are separated from the site by roadways. These nearby active land uses could be adversely affected by dust generated during construction activities. In addition, construction dust emissions can contribute to regional  $PM_{10}$  emissions.

Although these construction activities would be temporary, they would have the potential to cause both nuisance-related and health-related air quality impacts.  $PM_{10}$  is the pollutant of greatest concern associated with dust. If uncontrolled,  $PM_{10}$  levels downwind of actively disturbed areas could possibly exceed State standards. In addition, dust fall on adjacent properties could be a nuisance. If uncontrolled, dust generated by grading and construction activities represents a significant impact.

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. BAAQMD has not developed any procedures or guidelines for identifying TAC impacts from temporary construction activities where emissions are transient. TAC impacts are typically evaluated for stationary sources (e.g., large compression ignition engines such as generators) in health risk assessments over the course of lifetime exposures (i.e., 24 hours per day over 70 years). Diesel exhaust poses both a health and nuisance impact to nearby receptors. Use of dirty construction equipment or staging of construction equipment near residences could result in high concentrations of dust that could result in nuisance and health impacts (in terms of  $PM_{2.5}$  concentration). As a result, these emissions are considered significant unless measures to reduce the potential for high exposures to residential receptors are included in the project. Implementation of the following two-part mitigation measure would reduce construction period air pollutant emissions to a less-than-significant level:

Mitigation Measure AIR-1a: The construction contractor(s) shall implement the following measures to control construction dust emissions. Implementation of the measures recommended by the Bay Area Air Quality Management District (BAAQMD) and listed below would reduce the air quality impacts associated with grading and new construction to a less-than-significant level. Analysis by the BAAQMD indicates that implementation of these measures would reduce particulate matter construction impacts by 90 percent. Measures to reduce diesel particulate matter and  $PM_{10}$  from construction (measures that would reduce  $PM_{10}$  would also reduce  $PM_{2.5}$  since  $PM_{10}$ , by definition, includes  $PM_{2.5}$ ) are also required to ensure that short-term health impacts to nearby sensitive receptors are avoided.

- Water all active construction areas at least twice daily and more often during windy periods. Active areas adjacent to residences shall be kept damp at all times.
- Cover all hauling trucks or maintain at least 2 feet of freeboard.
- Pave, apply water at least twice daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads.
- Hydroseed or apply non-toxic soil stabilizers to inactive construction areas (i.e., previously-graded areas that are inactive for 10 days or more).
- Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stockpiles.

- Limit traffic speeds on any unpaved roads to 15 mph.
- Replant vegetation in disturbed areas as quickly as possible.
- Suspend construction activities that cause visible dust plumes to extend beyond the construction site.

Mitigation Measure AIR-1b: The construction contractor(s) shall implement the following measures to control construction diesel exhaust emissions:

- Diesel equipment standing idle for more than 5 minutes shall be turned off. This would include trucks waiting to deliver or receive soil, aggregate, or other bulk materials. Rotating drum concrete trucks may keep their engines running continuously as long as they are onsite.
- Properly tune and maintain equipment to reduce emissions.
- Avoid staging equipment within 200 feet of residences. (LTS)

