E. AIR QUALITY

INTRODUCTION

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographic features that influence pollutant movement and dispersal. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants, and consequently affect air quality. This setting section provides region-specific information related to climate and topography; followed by an overview of the regulatory context, including plans, policies, and regulations; and existing air quality conditions. In the Bay Area, air pollutants of concern are ozone, carbon monoxide, and particulate matter. A discussion of toxic air contaminants is covered in Section IV.I, Hazards and Hazardous Materials.

SETTING

CLIMATE AND METEOROLOGY

The project site is located in the city of Redwood City and is within the boundaries of the San Francisco Bay Area Air Basin (Bay Area). The Bay Area Air Basin encompasses the nine-county region including all of Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin and Napa Counties, and the southern portions of Solano and Sonoma Counties. The climate of the Bay Area is determined largely by a high-pressure system that predominates over the eastern Pacific Ocean off the West Coast of North America. High-pressure systems are characterized by an upper layer of dry air that warms as it descends, restricting the mobility of cooler marine-influenced air near the ground surface, and resulting in the formation of subsidence inversions. In winter, the Pacific high pressure system shifts southward, allowing storms to pass through the region. During summer and fall, emissions generated within the Bay Area can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are conducive to the formation of photochemical pollutants, such as ozone and secondary particulates, such as sulfates and nitrates.

The project site is located within the Peninsula climatological subregion of the Bay Area Air Basin. This subregion extends from northwest of San Jose to the Golden Gate with the Santa Cruz Mountains through the center of the peninsula. Coastal towns experience a high incidence of cool, foggy weather in summer. Cities in the southeastern peninsula, such as Redwood City, experience warmer temperatures and fewer foggy days because the marine layer is blocked by the ridgeline to the west.

The blocking effect of the Santa Cruz Mountains results in variations in summertime maximum temperatures in different parts of the peninsula. On the eastern side of the peninsula, maximum summer temperatures are in the low-80s while mean minimum temperatures during the winter months are in the high 30s to low 40s. Annual average wind speeds range from 5 to 10 mph throughout the peninsula, with higher wind speeds usually found along the coast. However,

winds on the eastern side of the peninsula are often high in certain areas, such as near the San Bruno gap between Fort Funston on the ocean to the San Francisco Airport and the Crystal Springs Gap between half Moon Bay and San Mateo. The prevailing winds on the east side of the mountains are generally from the west, although wind patterns in this area are often influenced by local topographic features. Northwest winds are most common in Redwood City, reflecting the orientation of the Crystal Springs gap. Winds are persistent and strong, providing excellent ventilation and carrying pollutants downwind. Winds are lightest in fall and winter.

Though persistent winds provide ventilation and reduce pollution levels in the area, during times of fog, air pollution potential is high along the southeastern portion of the peninsula as air pollutant emissions are also relatively high due to motor vehicle traffic as well as stationary sources.

REGULATORY CONTEXT

Criteria Air Pollutants

Regulation of air pollution is achieved through both national and state ambient air quality standards and emissions limits for individual sources of air pollutants. As required by the federal Clean Air Act, the U.S. Environmental Protection Agency (U.S. EPA) has identified criteria pollutants and established National Ambient Air Quality Standards (national standards) to protect public health and welfare. National standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria. California has adopted more stringent ambient air quality standards for most of the criteria air pollutants (referred to as State Ambient Air Quality Standards or State standards). Because of the unique meteorological conditions in California, there is considerable diversity between state and federal air quality standards currently in effect in California. Table IV.E-1 presents both sets of ambient air quality standards (i.e., national and state) and provides a brief discussion of the related health effects and principal sources for each pollutant.

Under amendments to the federal Clean Air Act, U.S. EPA has classified air basins or portions thereof, as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the national standards have been achieved. In 1988, the State Legislature passed the California Clean Air Act, which is patterned after the federal Clean Air Act to the extent that areas are required to be designated as "attainment" or "nonattainment" for the state standards. Thus, areas in California have two sets of attainment / nonattainment designations: one set with respect to the national standards and one set with respect to the state standards.

The federal Clean Air Act also requires nonattainment areas to prepare air quality plans that include strategies for achieving attainment. Air quality plans developed to meet federal requirements are referred to as State Implementation Plans (SIPs). The California Clean Air Act also requires plans for nonattainment areas with respect to the state standards. Thus, just as areas in California have two sets of designations, many also have two sets of air quality plans: one to meet federal requirements relative to the national standards and one to meet state requirements relative to the state standards.

TABLE IV.E-1
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour 8 hours	0.09 ppm ---	0.12 ppm 0.08 ppm	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NO_X) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
Carbon Monoxide	1 hour 8 hours	20 ppm 9 ppm	35 ppm 9 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
Nitrogen Dioxide	1 hour Annual Avg.	0.25 ppm ---	--- 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
Sulfur Dioxide	1 hour 3 hours 24 hours Annual Avg.	0.25 ppm --- 0.04 ppm ---	--- 0.5 ppm 0.14 ppm 0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Respirable Particulate Matter (PM-10)	24 hours Annual Avg.	50 ug/m^3 30 ug/m^3	150 ug/m^3 50 ug/m^3	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays).
Fine Particulate Matter (PM-2.5)	24 hours Annual Avg.	--- ---	65 ug/m^3 15 ug/m^3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
Lead	Monthly Quarterly	1.5 ug/m^3 ---	--- 1.5 ug/m^3	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurologic dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.

NOTE: ppm = parts per million; ug/m^3 = micrograms per cubic meter.

SOURCES: South Coast Air Quality Management District, *1997 Air Quality Management Plan*, November 1996; http://www.arb.ca.gov/health/health.htm.

Regulatory Agencies

U.S. EPA is responsible for implementing the myriad of programs established under the federal Clean Air Act, such as establishing and reviewing the national ambient air quality standards and judging the adequacy of State Implementation Plans, but has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented. The California Air Resources Board (CARB), The state's air quality management agency, is responsible for establishing and reviewing the state ambient air quality standards, compiling the California State Implementation Plan and securing approval of that plan from U.S. EPA, and identifying toxic air contaminants. The state ARB also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. The county or regional air quality management districts are primarily responsible for regulating stationary emissions sources at industrial and commercial facilities within their geographic area and for preparing the air quality plans that are required under the federal Clean Air Act and California Clean Air Act.

AIR QUALITY PLANS, POLICIES AND REGULATIONS

Plans and Policies

The project site is located in an area currently designated "nonattainment" for state and national ozone standards and for the state PM-10 standard (ARB, 2002) and is also designated as a "maintenance" area for the national carbon monoxide standard. The "maintenance" designation denotes that the area, now "attainment," had once been designated as "nonattainment." The Bay Area is "attainment" or "unclassified" with respect to the other ambient air quality standards.

As noted earlier, the federal Clean Air Act and the state California Clean Air Act require plans to be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the state PM-10 standard). Plans are also required under federal law for areas designated as "maintenance" for national standards. Such plans are to include strategies for attaining the standards. Currently, there are three plans for the Bay Area including the *Bay Area 2001 Ozone Attainment Plan for the 1-Hour National Ozone Standard* (Association of Bay Area Governments [ABAG], 2001) developed to meet federal ozone air quality planning requirements; the *Bay Area 2000 Clean Air Plan* (Bay Area Air Quality Management District [BAAQMD], 2000) developed to meet planning requirements related to the state ozone standard and the *Carbon Monoxide Maintenance Plan* (ABAG, 1994) developed to ensure continued attainment of the national carbon monoxide standard.

The Bay Area 2001 Ozone Attainment Plan is a proposed revision to the Bay Area portion of California's plan to achieve the national ozone standard. The plan was prepared in response to the Bay Area's failure to attain the national ozone standard and U.S. EPA's consequent disapproval of elements of the Bay Area's 1999 Ozone Attainment Plan and finding of failure to attain the national ambient air quality standard for ozone. The Revised Plan was adopted by the Boards of the co-lead agencies at a public meeting in October 2001 and approved by the ARB at a

hearing in November 2001. The Plan is now pending approval from the U.S. EPA as a revision to the California State Implementation Plan. This Plan amends and supplements the 1999 Plan and predicts attainment of the national ozone standard by 2006.

Rules and Regulations

The regional agency primarily responsible for developing air quality plans for the Bay Area is the Bay Area Air Quality Management District (BAAQMD), the agency with permit authority over most types of stationary emission sources in the Bay Area. BAAQMD exercises permit authority through its *Rules and Regulations*. Both federal and state ozone plans rely heavily upon stationary source control measures set forth in BAAQMD's *Rules and Regulations*. In contrast to the ozone plans, the *Carbon Monoxide Maintenance Plan* relies heavily on mobile source control measures.

City of Redwood City General Plan

The Land Use Element of the *Redwood City Strategic General Plan* contains the following policy related to air quality applicable to the proposed project.

- The City should take into consideration the cumulative air quality impacts from proposed developments and should establish and enforce appropriate land use as well as other regulations to reduce air pollution (Policy L-13, p. 6-5).

Redwood City Zoning Ordinance

The *Redwood City Zoning Ordinance* contains no provisions specific to air quality.

EXISTING AIR QUALITY

The BAAQMD and the CARB operate a regional monitoring network that measures the ambient concentrations of the six criteria pollutants. Existing and probable future levels of air quality in the project area can generally be inferred from ambient air quality measurements at these stations. The major pollutants of concern in the San Francisco Bay Area include ozone, carbon monoxide, and particulate matter, and are monitored at a number of locations. The Redwood City monitoring station located on Barron Avenue is the monitoring station closest to the project site. The monitoring station is located about two miles southeast of the site and monitors ozone, carbon monoxide and PM-10. Table IV.E-2 shows a five-year summary of monitoring data from the Redwood City station. Table IV.E-2 also compares measured pollutant concentrations with state and national ambient air quality standards.

Emission Trends and Forecasts

Emission levels of ozone precursors NOx and Reactive Organic Gasses (ROG) have decreased in the Bay Area since 1975 and are projected to continue declining through 2010. The Bay Area has a significant motor vehicle population, and the implementation of stricter motor vehicle controls has resulted in significant emissions reductions for NOx and ROG. Stationary source emissions of ROG have declined over the last 20 years due to new controls for oil refinery fugitive

TABLE IV.E-2
AIR QUALITY DATA SUMMARY (1997-2001) FOR THE PROJECT AREA

Pollutant	Standard[b]	Monitoring Data by Year[a] 1997	1998	1999	2000	2001
Ozone						
Highest 1 Hour Average (ppm) [c]		0.09	0.07	0.08	0.08	**0.11**
Days over State Standard	0.09	0	0	0	0	1
Days over National Standard	0.12	0	0	0	0	0
Highest 8 Hour Average (ppm) [c]	0.08	0.07	0.05	0.06	0.06	0.07
Days over National Standard		0	0	0	0	0
Carbon Monoxide						
Highest 8 Hour Average (ppm) [c]	9.0	4.2	4.1	3.8	4.4	3.9
Days over State Standard		0	0	0	0	0
Particulate Matter (PM-10)						
Highest 24 Hour Average ($\mu g/m^3$) [c]	50	**69.8**	48.6	**84.8**	**53.3**	**64.5**
Calculated days over State Standard		8	0	15	6	24
Number of samples [d]		60	61	60	60	60
Annual Average ($\mu g/m^3$) [c]	30	22	20	22	19	19

a Data are from the Redwood City station.
b Generally, state standards are not to be exceeded and national standards are not to be exceeded more than once per year.
c ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.
d PM-10 is not measured every day of the year. "Number of samples" refers to the number of days in a given year during which PM-10 was measured at the Redwood City station.

NOTE: Values in **bold** are in excess of applicable standard.

SOURCE: California Air Resources Board, *Summaries of Air Quality Data*, 1997, 1998, 1999, 2000, 2001; http://www.arb.ca.gov/adam.

emissions and new rules for control of ROG from various industrial coatings and solvent operations. Direct emissions of PM-10 are increasing slightly in the Bay Area since 1975 and the trend is projected to continue. This increase is due to growth in emissions from area-wide sources, primarily fugitive dust sources. Emissions of directly emitted PM-10 from diesel motor vehicles have been decreasing since 1990 even though population and vehicle miles traveled (VMT) are growing, due to adoption of more stringent emission standards on vehicle manufacturers. Emissions of CO have been declining in the Bay Area over the last 25 years. Motor vehicles and other mobile sources are the largest sources of CO emissions in the air basin. Emissions from motor vehicles have been declining, with the introduction of new automotive emission controls, despite increases in VMT. Oil refineries, manufacturing, and electric generation contribute a significant portion of the stationary source CO emissions. Area-wide CO emissions are primarily from residential fuel combustion, waste burning, and fires.

SENSITIVE RECEPTORS

Some receptors are considered more sensitive than others to air pollutants. The reasons for greater than average sensitivity include pre-existing health problems, proximity to emissions source, or duration of exposure to air pollutants. Schools, hospitals and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, with associated greater exposure to ambient air quality. Recreational uses are also considered sensitive due to the greater exposure to ambient air quality conditions because vigorous exercise associated with recreation places a high demand on the human respiratory system.

The project site is located in an area designated for Light Industrial Use (Research and Development) by the Redwood City General Plan Land Use map. The nearest existing sensitive uses are open space uses located primarily to the north of the project site and existing and proposed residential uses to the southwest. For this EIR, the City of Redwood City also considers recreational and educational uses such as the Marine Sciences Institute, currently located the site's northeastern shoreline, the municipal marina and the Seaport Conference Center located east of the site as sensitive receptors. Redwood Creek, the San Francisco Bay, and open spaces including Bair Island National Wildlife Refuge lie to the north of the site. Other uses surrounding the site, such as commercial, mixed use, and light and heavy industrial uses, are considered less sensitive than residential receptors. The Villas at Bair Island and the Bair Island Marina are recently completed projects located approximately 1,300 feet to the southwest of the site across redwood Creek. They consist of a 155-unit apartment and 100-slip marina development. For the purposes of this analysis, these apartments are considered the nearest sensitive receptors. Residential uses are also proposed to be located on the Peninsula Marina property as part of the Marina Shores Village project between the Pete's Harbor property and the Villas at Bair Island development. These proposed developments are anticipated to be constructed in phases over approximately the same timeframe as the proposed project and are expected to be complete by 2013. The proposed project is expected to be completely operational by 2010. The Pete's Harbor property currently includes several occupied recreational vehicles and a mobile home, and approximately 90 live-aboard boats along the marina that would also be considered sensitive uses.

The project proposes to possibly include a child care center during the third and final phase of construction. However, since the child care center would be operational upon completion of all three construction phases, it would not be impacted by emissions from project construction.

Other land uses in the vicinity of the project site include open space, commercial, mixed use, and light and heavy industrial uses. Inoperative salt evaporation ponds are located at the northern terminus of Seaport Boulevard and are the site of the recently approved West Point Marina mixed use development, which includes retail and commercial space. Redwood Creek, salt evaporator ponds, the Port of Redwood City Complex and Pacific Shores, an office development, lie to the east of the site. The Port of Redwood City complex contains a variety of maritime and industrial uses. The Seaport Center office park is located to the west of the project site. The Seaport Center

office park contains primarily light industrial uses. The Port of Redwood City parking lot, the existing Stanford Rowing and Sailing Team's facilities, the Seaport Center office park and other predominately heavy industrial uses lie to the south of the site.

IMPACTS AND MITIGATION MEASURES

APPROACH TO ANALYSIS

Project-related air quality impacts fall into two categories: short-term impacts due to construction, and long-term impacts due to project operation. First, during project construction, the project would affect local particulate concentrations, primarily due to fugitive dust sources. Over the long term, the project would result in an increase in emissions primarily due to related motor vehicle trips. Onsite stationary sources and area sources would result in lesser quantities of pollutant emissions.

SIGNIFICANCE CRITERIA

Generally, a project would be considered to have a significant effect on the environment with respect to air quality if it would:

- conflict with or obstruct implementation of the applicable air quality plan;
- violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- result in a cumulatively considerable net increase of any nonattainment pollutant;
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

The following air quality analysis addresses the first four of these general criteria; the fifth is not discussed since the project would not include development of the types of land uses generally associated with potential odor impacts.

For project-level impact analysis, the BAAQMD provides various thresholds and tests of significance. For ROG, NO_x and PM-10, 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 a possible local violation of the carbon monoxide standards (i.e., if it creates a "hot spot"). Generally, if a project results in an increase in ROG, NOx, or PM-10, of more than 80 pounds per day, then it would also be considered to contribute substantially to the significant cumulative effect. For projects that would not lead to a significant increase of ROG, NOx, or PM-10 emissions, the cumulative effect is evaluated based on a determination of the consistency of the project with the regional Clean Air Plan. A project that is consistent with the applicable General Plan, such as the proposed project, would not contribute in a significant manner to the cumulative regional effect if the applicable General Plan itself is consistent with the Clean Air

Plan. To be consistent with the Clean Air Plan, a General Plan must be based on population projections that are consistent with those used in developing the Clean Air Plan and must provide for a rate of increase in vehicle miles traveled (VMT) that does exceed the rate of increase in population.

For construction phase impacts, BAAQMD does not require quantification of construction emissions, but recommends that significance be based on a consideration of the control measures to be implemented (BAAQMD, 1999). Construction impacts are discussed qualitatively and the applicable BAAQMD recommended dust abatement measures are identified.

Operational-phase emissions were estimated using the ARB emissions inventory model URBEMIS 2001 and compared to BAAQMD significance thresholds. Carbon monoxide impacts were evaluated using the BAAQMD's methodology for the calculation of carbon monoxide concentrations and traffic data developed for this EIR. This methodology is a simplified version of CALINE4 and is designed to provide a reasonable estimate of carbon monoxide concentrations near roads under worst-case conditions. BAAQMD requires that the full CALINE4 model be used for projects and plans that generate 10,000 or more trips per day and for smaller projects if the simplified screening method indicates that an air quality standard may be exceeded. Lastly, cumulative impacts of the project were evaluated based on the *BAAQMD CEQA Guidelines* as discussed under the significance criteria.

CONSTRUCTION IMPACTS

Impact E.1: Construction activities associated with demolition, renovation and new construction would generate short-term emissions of criteria pollutants, including suspended and inhalable particulate matter and equipment exhaust emissions. (Potentially Significant)

Construction-related emissions would occur during the short term, but may still cause adverse effects on the local air quality. The project would involve the development of an approximately 18-acre site along Redwood City's waterfront that is currently undeveloped. Each phase of project construction would generate substantial amounts of dust (including PM-10 and PM-2.5), primarily from "fugitive" sources (i.e., emissions released through means other than through a stack or tailpipe) and lesser amounts of other criteria air pollutants primarily from operation of heavy equipment construction machinery (primarily diesel operated) and construction worker automobile trips (primarily gasoline operated).

Construction-related dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. In the absence of control measures, construction activities may result in significant quantities of dust, and as a result, local visibility and PM-10 concentrations may be adversely affected on a temporary and intermittent basis during the construction period. In addition, the fugitive dust generated by construction would include not only PM-10, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts. The BAAQMD's approach to analyses of construction impacts is to emphasize implementation of effective and

comprehensive control measures rather than detailed quantification of emissions. The District considers any project's construction related impacts to be less than significant if the required dust-control measures are implemented. Without these measures, the impact is generally considered to be significant, particularly if sensitive land uses are located in the project vicinity.

Construction activities would also result in the emission of other criteria pollutants from equipment exhaust, construction-related vehicular activity, and construction worker automobile trips. Emission levels for construction activities would vary depending on the number and type of equipment, duration of use, operation schedules, and the number of construction workers. Criteria pollutant emissions of ROG and NOx from these emission sources would incrementally add to the regional atmospheric loading of ozone precursors during project construction. BAAQMD CEQA Guidelines recognize that construction equipment emits ozone precursors, but indicate that such emissions are included in the emission inventory that is the basis for regional air quality plans. Therefore construction emissions are not expected to impede attainment or maintenance of ozone standards in the Bay Area (BAAQMD, 1999). The impact would therefore be less than significant.

A preliminary site investigation was conducted for the project site and no asbestos containing structures were identified on the site. Demolition of existing onsite facilities would therefore not cause an asbestos-related hazard.

Mitigation Measure E.1: The project sponsor shall require the construction contractor to implement the BAAQMD basic control measures for dust abatement at all construction sites, and "enhanced" control measures for dust abatement at construction sites greater than four acres in area (BAAQMD, 1999).

During construction in each of the project's three proposed phases, the project sponsor shall require the construction contractor to implement the following BAAQMD basic and enhanced dust control procedures required to maintain project construction-related impacts at acceptable levels; this mitigates the potential impact to less than significant.

Elements of the "basic" dust control program include:

- Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used, if feasible.

- Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).

- 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 streets (with water sweepers using reclaimed water if possible) at the end of each day if visible soil material is carried onto adjacent paved roads.

Elements of the "enhanced" dust abatement program include all of the "basic" measures in addition to the following measures to be implemented by the construction contractor:

- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for one month or more).
- Enclose, cover, water twice daily or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads and other areas to 15 miles per hour.
- Minimize the amount of the disturbed area at any one time, as feasible.
- Pave all roadways, driveways, sidewalks, etc. as soon as possible. In addition, lay building pads as soon as feasible after grading unless seeding or soil binders are used.
- Replant vegetation in disturbed areas as early as feasible.
- Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress. The name and telephone number of such persons shall be provided to the BAAQMD prior to the start of construction.

Significance after Mitigation: Less than Significant.

OPERATIONAL IMPACTS

Impact E.2: The project would result in an increase in criteria pollutant emissions due to project-related traffic and onsite area sources. (Less than Significant)

Over the long-term, the project would result in an increase in emissions primarily due to related motor vehicle trips. Onsite stationary sources and area sources would result in lesser quantities of pollutant emissions.

The project is proposed to be constructed in three phases, with buildout of the campus projected by about the year 2010. Emissions for project buildout year 2010 and cumulative analysis year 2020 were analyzed using URBEMIS 2001 and the traffic data developed for this EIR. The results are shown in Table IV.E-3. The estimates shown in Table IV.E-3 are based on 4,066 daily vehicle trips at project buildout, as estimated in the traffic analysis for this project. The estimates also include criteria pollutant emissions from area sources such as natural gas combustion for space and water heating, landscaping, and use of consumer products (e.g., solvents, etc.).

Based on the estimates shown in Table IV.E-3, the project's contribution to the regional emissions would be well below the significance thresholds specified by the BAAQMD for ROG, NOx and PM-10 for both the 2010 and 2020 scenarios. Therefore, the operational impacts of the project would be considered less than significant.

TABLE IV.E-3
OPERATIONAL EMISSIONS (POUNDS PER DAY)

Pollutant	BAAQMD Thresholds	2010 Estimated Project Emissions[a]	2020 Estimated Project Emissions[a]
ROG	80	60	36
NO_x	80	59	36
PM-10	80	46	45
CO	550	724[b]	533[b]

a Emission factors were generated by the Air Board's URBEMIS 2001 model for San Francisco Bay Area Air Basin, and assume a default vehicle mix. Input assumptions include an ambient temperature of 75 degrees and year 2010 and 2020 EMFAC 2001 composite emissions factors. To avoid underestimating possible impacts, all daily estimates are for summertime conditions except for CO, which assumes wintertime conditions.

b Projects for which mobile source CO emissions exceed 550 pounds per day do not necessarily have a significant air quality impact, but are required to estimate localized CO concentrations. Refer to Impact E.3 for a more detailed discussion of project CO emissions.

NOTE: **Bold** values are in excess of applicable standard (none).

SOURCE: Environmental Science Associates, 2003.

Mitigation: None required.

Impact E.3: Project traffic would increase localized carbon monoxide concentrations at intersections in the project vicinity. (Less than Significant)

In addition to the project's contribution to the regional pollution burden, project-related traffic may lead to localized "hot spots" or areas with high concentrations of carbon monoxide concentrations around stagnation points such as major intersections and heavily traveled and congested roadways. Project-related traffic could not only increase existing traffic volumes but also cause existing non-project traffic to travel at slower, more polluting speeds.

To evaluate "hot spot" potential, a microscale impact analysis was conducted for the three intersections in the vicinity of the project site that would be most impacted by project traffic. These intersections were found to be ones with the highest traffic volumes that the project would affect. It was assumed that if the relatively higher volumes of traffic at these intersections did not result in significant adverse impacts, impacts at other nearby intersections would experience similar or less substantial effects. For this analysis, the BAAQMD's methodology for estimating carbon monoxide intersections was used. The analyzed intersections and the concentration estimates are shown in Table E-4.

TABLE IV.E-4
ESTIMATED CARBON MONOXIDE CONCENTRATIONS AT SELECTED INTERSECTIONS IN PROJECT VICINITY

Intersection	Averaging Time (hours)	Standard (ppm)	Concentrations (ppm)[a] Existing (2002)	2010 No Project	2010 Plus Project	2020 No project	2020 Plus Project
Without Blomquist Extension[b]							
Bayfront @ Willow	1	20.0	15.3	10.5	10.6	--	--
	8	9.0	7.2	4.4	4.4	--	--
Blomquist @ Seaport	1	20.0	11.6	6.6	10.0	--	--
	8	9.0	4.6	3.7	4.0	--	--
Veterans @ Woodside	1	20.0	14.6	10.4	10.6	--	--
	8	9.0	6.7	4.3	4.5	--	--
With Blomquist Extension							
Bayfront @ Willow	1	20.0	15.3	10.5	10.6	9.4	9.4
	8	9.0	7.2	4.4	4.4	3.8	3.8
Blomquist @ Seaport	1	20.0	11.6	9.6	10.0	8.6	8.8
	8	9.0	4.6	3.8	4.1	3.2	3.5
Veterans @ Woodside	1	20.0	14.6	10.2	10.5	9.4	9.5
	8	9.0	6.7	4.2	4.4	3.8	3.9

[a] Concentrations relate to a location 25 feet from the edge of the roadways that form the intersection. The carbon monoxide analysis focuses on the afternoon (p.m.) peak-hour because the project's effects on traffic congestion and related carbon monoxide concentrations were found to be greater during that period than during the morning (a.m.) peak hour. Carbon monoxide estimates shown above include background concentrations of 8.4 ppm, one-hour average, and 2.3 ppm, eight-hour average for 2002; 7.0 ppm, one-hour average and 2.0 ppm, eight-hour average for 2010; and 6.5 ppm, one-hour average and 1.8 ppm, eight-hour average for 2020.

[b] The traffic analysis for this EIR did not analyze cumulative scenarios through 2020 without the Blomquist Road extension.

NOTE : To calculate the contribution of project and cumulative traffic to the eight-hour average of CO concentration, a persistence factor of 0.7 was applied to the project's contribution to the one-hour average of CO concentration.

SOURCE: Environmental Science Associates, 2003.

The worst-case project increment to the one-hour carbon monoxide concentration at a hypothetical location 25 feet from the intersection of the two roads was modeled and added to the background one-hour concentration. The project increment was added to the ambient eight-hour concentration in the project area, as determined using the isopleth maps included in the *BAAQMD CEQA Guidelines*. As shown in the table, the analysis showed that the project would not result in exceedances of carbon monoxide standards, and therefore, the effect of the project on local carbon monoxide standards would be less than significant.

Under 2010 plus project traffic conditions, the worst-case one-hour and eight-hour concentrations, as determined by the screening analysis would be 10.5 parts per million (ppm) and 4.4 ppm, respectively, and would occur at the intersection of Bayfront and Willow. Under 2020 plus project conditions, the worst-case one-hour and eight-hour average concentrations would be 9.5 ppm and 3.9 ppm, respectively and would occur at the intersection of Veterans Blvd. and Woodside Avenue. Carbon monoxide concentrations in 2020 are projected to be lower due to improvements in the automobile fleet, attrition of older, high-polluting vehicles, and improved fuel mixtures. Such reductions would offset any effects of increase in traffic due to the project and other cumulative development. Thus, project-related and cumulative traffic would have a less than significant impact on local carbon monoxide concentrations.

Mitigation: None required.

CUMULATIVE IMPACTS

Impact E.4: The project together with existing and probable future cumulative development in the Bay Area would contribute to regional air pollution. (Less than Significant)

The state CEQA Guidelines state that lead agencies shall consider whether cumulative impact of a project is significant and whether the proposed project's incremental effects are cumulatively considerable. According to the BAAQMD CEQA Guidelines, any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. Table E-3 shows the operational emissions of ROG, NOx and PM-10 due to project-related traffic estimated based on the ARB model URBEMIS 2001. Because the project would not exceed the significance criteria of 80 pounds per day for ROG, NOx and PM-10, the BAAQMD recommends that the project's cumulative impact on air quality of the region be determined based on an evaluation of the project's consistency with the local general plan and in turn the general plan's consistency with the regional air quality plan. In this case, the applicable general plan would be Redwood City's Strategic General Plan and the applicable regional air quality plan would be the 2000 Bay Area Clean Air Plan. The proposed project would consist of infill development in an area designated for such uses and would not require a general plan amendment. Hence, the project would be consistent with the development projections in the Redwood City General Plan.

For the General Plan to be consistent with the *2000 Clean Air Plan (CAP)*, projections for Vehicle Miles Traveled (VMT) and population used in the General Plan should be consistent with the projections used for regional air quality planning in the *Bay Area 2000 CAP*. In forecasting future stationary and mobile source emissions and preparing the regional air quality plan, the BAAQMD uses growth projections prepared by the Association of Bay Area Governments (ABAG). The resultant emissions forecasts are then used to develop strategies and control measures necessary to achieve regional ozone attainment within a designated timeframe. In

developing its projections, ABAG uses information from local government general plans, current zoning and other local development policies, in conjunction with economic and demographic factors. Consistent with this process, the 1998 ABAG estimates used in the *2000 CAP* for Redwood City use the development anticipated under the Redwood City Strategic General Plan adopted much earlier in 1990. Therefore, it can be inferred that the Redwood City Strategic General Plan is consistent with the 2000 CAP and hence, the project would have a less than significant cumulative impact. It should be noted that Table IV.E-3 also shows that project emissions of ROG, NOx and PM-10 in the cumulative analysis year 2020. Project emissions in 2020 are expected to be lower than in 2010 primarily because of the reduction in emission factors expected to occur by 2020 due to more stringent regulations and improved engine technology and fuel mixtures.

Locally, emissions from project sources would be combined with emissions from other sources, primarily including area traffic (local streets and freeways) from existing and future development in the greater project area. Although cumulative traffic volumes would increase by 2020, this increase would be partly offset by the reduction in emissions on a grams-per-mile per vehicle basis. This is due to attrition of older, high polluting vehicles, improvements in the overall automobile fleet, and improved fuel mixtures (as a result of on-going State and federal emissions standards and programs for on-road motor vehicles). As discussed under Impact E.3, cumulative impacts on carbon monoxide concentrations at local intersections in 2020 would be less than significant, as the worst-case carbon monoxide concentrations at all the analyzed intersections would be below the corresponding ambient standards.

Mitigation: None required.

REFERENCES – Air Quality

(*The references cited below are available at the Redwood City Planning Services Department, 1017 Middlefield Road, Redwood City, California, unless specified otherwise below.*)

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