7.0 AIR QUALITY

This chapter describes air quality in the San Francisco Bay area in general and in the project area specifically. It includes regulatory, regional, and project settings to provide a context for analyzing the effects of the project. The information presented in this section was compiled largely from information provided by the Bay Area Air Quality Management District (BAAQMD) and the CALFED Bay-Delta Program Final Programmatic EIS/EIR and Record of Decision issued August 28, 2000 (including CEQA certification). References to other documents are provided as appropriate.

7.1 AFFECTED ENVIRONMENT

7.1.1 Topography and Meteorology

The project area is located in the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB is composed of the counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara, along with the southeast portion of Sonoma County and the southwest portion of Solano County. The SFBAAB covers an area of approximately 5,540 square miles.

Atmospheric conditions such as wind speed and direction, air temperature gradients, and local and regional topography influence air quality. The SFBAAB is affected by a Mediterranean climate of warm, dry summers and cool, damp winters. Temperatures on the coast and bay of Marin County are typically in the high 50s or low 60s (^{o}F) year-round. Daily and seasonal oscillations of temperature are small because of the moderating effects of the nearby Pacific Ocean. Winds in Marin County are typically out of the northwest, and annual average wind speeds are approximately 8–10 miles per hour (BAAQMD 1999).

Topographical features, the location of the Pacific high-pressure system, and varying circulation patterns resulting from temperature gradients affect the speed and direction of local winds. The winds play a major role in the dispersion of pollutants. Strong winds can carry pollutants far from their source; a lack of wind will allow pollutants to concentrate in an area.

Air dispersion also affects pollutant concentrations. As altitude increases, air temperature normally decreases. Inversions occur when colder air becomes trapped below warmer air, restricting the air masses' ability to mix. Pollutants also become trapped, which promotes the production of secondary pollutants. Subsidence inversions, which can occur during the summer in the SFBAAB, result from high-pressure cells that cause the local air mass to sink, compress, and become warmer than the air closer to the earth. Pollutants accumulate as this stagnating air mass remains in place for one or more days.

7.1.2 Regulatory Setting

The project area is subject to major air quality planning programs required by both the federal Clean Air Act (CAA), which was last amended in 1990, and the California Clean Air Act of 1988. Both the federal and state statutes provide for ambient air quality standards (AAQS) to protect public health, timetables for progressing toward achieving

and maintaining ambient standards, and the development of plans to guide the air quality improvement efforts of state and local agencies.

AAQS specify the concentration of pollutants to which the public can be exposed without adverse health effects. Individuals vary widely in their sensitivity to air pollutants, so standards are set to protect more sensitive populations (e.g., children and the elderly). The national ambient air quality standards (NAAQS) and California ambient air quality standards (CAAQS) are reviewed and updated periodically based on new health studies. CAAQS tend to be at least as protective as NAAQS and are often more stringent. The NAAQS and CAAQS for criteria pollutants that are a potential concern for the proposed project (ozone [O_3], carbon monoxide [CO], nitrogen oxides [NO_x], sulfur oxides [SO_x], and particulate matter less than 10 micrometers in diameter [PM_{10}]) are listed in Table 7-1.

The CAA requires states to submit a State Implementation Plan (SIP) for review and approval by USEPA. The SIP must contain control strategies that demonstrate attainment with NAAQS by deadlines established in the CAA. States that fail to submit a plan or to secure approval may be denied federal funding and/or be required to increase emission offsets for industrial expansion. In California, the state plan is called the Clean Air Plan (CAP) (BAAQMD 1997a). The CAP must show satisfactory progress in attaining CAAQS.

The U.S. Environmental Protection Agency (USEPA) oversees state and local implementation of CAA requirements. It sets NAAQS for criteria air pollutants. USEPA also sets emission standards for mobile sources, which include on-road motor vehicles, off-road vehicles, and marine engines.

Under California law, the responsibility to carry out air pollution control programs is split between the California Air Resources Board (CARB), USEPA, and BAAQMD.

- CARB shares the regulation of mobile sources with USEPA and sets the CAAQS (see Table 7-1). CARB has the authority to set emission standards for on-road motor vehicles and for some classes of off-road mobile sources that are sold in California. CARB also regulates vehicle fuels. It has set emission reduction performance requirements for gasoline (referred to as *California reformulated gasoline*) and has limited the sulfur and aromatic content of diesel fuel to make it burn cleaner (this is referred to as *California diesel* or *California red-dyed diesel*).
- BAAQMD can require stationary sources to obtain permits, and can impose emission standards, set fuel or material specifications, and establish operational limits to reduce air emissions.

The CAA contains conformity provisions, which are designed to ensure that federal agencies contribute to efforts to achieve the NAAQS. A conformity analysis may be required for a project if emissions of reactive organic gases (ROG) and NO_x are above the conformity thresholds of 50 tons of ROG and 100 tons of NO_x per year. The Proposed Project will not exceed these emissions thresholds; therefore, no conformity analysis is required for this project.

Table 7-1. National and California Ambient Air Quality Standards

			NAAQS	
Pollutant	**Averaging Time**	**CAAQS**	**Primary**	**Secondary**
Ozone (O_3)	1-hour	0.09 ppm	0.12 ppm	Same as primary standard
Carbon Monoxide (CO)	8-hour	9 ppm	9 ppm	—
	1-hour	20 ppm	35 ppm	—
	Annual		0.053 ppm	
Nitrogen Dioxide (NO_2)	Annual		0.25 ppm	Same as primary standard
	1-hour	0.25 ppm	—	—
Sulfur Dioxide (SO_2)	Annual	—	0.03 ppm	—
	24-hour	0.04 ppm	0.14 ppm	—
	3-hour	—	—	0.5 ppm
	1-hour	0.25 ppm	—	—
Inhalable particulate matter (PM_{10})	Annual. (geometric)	30 µg/m3	50 µg/m3	—
	Annual (arithmetic)	—	15 µg/m3	Same as Primary Standard
	24-hour		65 µg/m3	Same as Primary Standard

Notes:
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter

1. California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and visibility-reducing particles are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

2. National standards other than 1-hour O_3 and 24-hour PM_{10} and those based on annual averages are not to be exceeded more than once a year. The 1-hour O_3 standard is attained when the expected number of days per calendar year with a maximum hourly average concentration above the standard is equal to or less than one. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile 24-hour concentrations is below 150 $\mu g/m^3$.

3. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects from a pollutant.

7.1.3 SFBAAB Air Quality Attainment Status

Areas with monitored pollutant concentrations that are lower than AAQS are designated as attainment areas on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards, areas are designated as non-attainment areas. An area that recently exceeded ambient standards, but is now in attainment is designated as a maintenance area. Areas are often designated as unclassified when data are insufficient to have a basis for determining the area's attainment status. Non-attainment areas are further classified based on the severity and persistence of the air quality problem as moderate, serious, or severe. Classifications determine the minimum pollution control requirements. In general, the more serious the air quality classification, the more stringent the control requirements that must be contained in the regional air quality plans (see discussion above of the SIP and CAP).

CARB designates areas of the state as either in attainment or in non-attainment of the CAAQS. An area is in non-attainment if the CAAQS have been exceeded more than once in 3 years. At the present time, the SFBAAB is in non-attainment of the CAAQS for O_3 and PM_{10} and in attainment of the CAAQS for CO, NO_2, and SO_2 (CARB 2001a). The SFBAAB is designated as a serious state non-attainment area for O_3. The SFBAAB is currently in attainment of the NAAQS for NO_x and SO_x, in non-attainment for O_3 and CO (urbanized areas only), and unclassified for PM_{10} (CARB 2001a). The urbanized areas of the SFBAAB are moderate non-attainment areas for CO.

Table 7-2 displays the estimated annual average air emissions for the SFBAAB in the year 2000 (CARB, 2001b). Mobile sources are one of the largest contributors to air pollutants in the SFBAAB. Mobile sources account for approximately 60% of the ROG, 93% of the CO, 81% of the NO_x, 39% of the SO_2, and 12% of the PM_{10} emitted in the SFBAAB.

Table 7-2. Year 2000 Estimated Annual Average Emissions for SFBAAB (tons/day)

Source Type/Category	ROG	CO	NO_x	SO_2	PM_{10}
Stationary Sources					
Fuel Combustion	2.8	33.4	77.4	10.7	3.9
Waste Disposal	7.1	0.1	0.1	0.0	0.0
Cleaning and Surface Coating	71.0	0.0	0.0	--	0.0
Petroleum Production and Marketing	33.3	1.2	8.7	36.5	1.2
Industrial Processes	11.0	0.7	3.0	7.5	12.2
Subtotal	125.2	35.4	89.2	54.7	17.3
Area wide Sources					
Solvent Evaporation	74.6	--	--	--	--
Miscellaneous Processes	15.6	169.0	17.1	1.4	130.1
Subtotal	90.2	169.0	17.1	1.4	130.1
Mobile Sources					
On-Road Motor Vehicles	255.1	2,149.6	273.6	4.9	8.5
Other Mobile Sources	63.7	513.3	178.1	31.4	12.4
Subtotal	318.8	2,662.9	451.7	36.3	20.9
Total for the Air Basin	534.2	2,867.3	558.0	92.4	168.3

Source: The California Almanac of Emissions and Air Quality - 2005 Edition: Chapter 2: Current Emissions and Air Quality--Criteria Pollutants (http://www.arb.ca.gov/aqd/almanac/almanac05/chap205.htm)

7.1.4 Ambient Air Quality in the Project Area

The nearest air quality monitoring stations to the project site are located in Fort Cronkhite and San Rafael. The Fort Cronkhite site monitors only air toxics (Tox [see http://www.epa.gov /ttn/atw/188polls.html for a list of air toxics]) and dioxin (dibenzo-p-dioxins). Fort Cronkhite is 24 miles southwest of the project site in southern Marin County and is on the Pacific Ocean coast. The San Rafael station reports O_3, CO, No_x, Tox, and PM_{10}. The San Rafael station is 11 miles south of the project site and is on San Pablo Bay.

Table 7-3 shows ambient air quality data from the years 1997 to 2004 for the criteria pollutants, O_3, CO, and PM_{10} for the San Rafael station only. The Fort Cronkhite station monitors its assigned toxins once every 12 days. Since the project will contribute none of these toxins to the environment, the Fort Cronkhite data are not presented here.

Table 7-3. Summary of Ambient Air Quality in the Vicinity of San Rafael, 1997 – 2004

		Days above standard*							
Pollutant	**Time Standard**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
O_3	Federal 1-hour	0	0	0	0	0	0	0	0
	State 1-hour	9	7	8	7	9	8	9	9
	Federal 8-hour	0	0	0	0	0	0	0	0
CO	Federal 8-hour	3	3	3	2	2	2	2	0
PM_{10}	State 24-hour	2	1	2	0	0	0	0	1
	Federal 24-hour	0	0	0	0	0	0	0	0

Source: BAAQMD 1997,1998, 1999, 2000, 2001, 2002, 2003, and 2004 Internet Air Quality Data Summaries
* The number of days the standard was exceeded one or more times

7.2 CRITERIA FOR DETERMINING SIGNIFICANCE OF EFFECTS

Criteria based on the *CEQA Guidelines* and federal, state, and local air pollution standards and regulations, as well as professional judgment, were used to determine the significance of air quality impacts. The project would have a significant impact on air quality if it would:

- Conflict with or obstruct implementation of applicable air quality plans;
- Increase ambient pollutant levels from below to above the NAAQS or CAAQS;
- Substantially contribute to an existing or projected air quality standard violation;
- Exceed the following thresholds that BAAQMD defines as significant under CEQA for project operation activities: total emissions greater than 80 pounds per day or 15 tons per year of ROG, NO_x, PM_{10}, or PM_{10} precursors, such as SO_x (BAAQMD 1996);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

BAAQMD has not identified thresholds of significance for emissions from construction activities. Construction-related emissions are generally short-term in duration, but still may cause adverse air quality impacts. PM_{10} is generally the pollutant of greatest concern with respect to construction activities that disturb the ground surface. Construction equipment emits CO and O_3 air pollutants; however, these emissions are included in the emission inventory that is the basis for regional air quality plans and are allowable. CO and O_3 pollutants produced by the project are therefore not expected to exceed the O_3 and CO standards in the Bay Area (BAAQMD 1996).

In 1997, legislation was enacted directing USEPA to develop new standards to address particulate matter smaller than 2.5 microns in diameter ($PM_{2.5}$). These standards went

into effect in 2005; however, a satisfactory way of monitoring compliance with the new standards has not been developed.

7.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The following discussion describes the potential air quality impacts of the proposed project and project alternatives. Construction phase and post-construction phase impacts are discussed separately. During project construction, minor impacts are anticipated from construction-related dust (PM_{10}) and vehicular emissions. Emissions produced by trucks hauling fill materials through the Bahia residential community would constitute a minor impact. Dust will be generated during excavation of fill material from East Bahia and emissions will be generated by the operation of construction equipment and by trucks transporting fill material from one portion of the site to the other. Under certain wind conditions (high winds out of the east), fugitive dust generated by construction activities in East Bahia could potentially impact nearby residents to the west. However, the prevailing winds are out of the northwest, which would blow the dust away from the residential community. Construction in Central and West Bahia would be too far away to impact the Bahia residents.

7.3.1 Construction Phase Air Quality Impacts

7.3.1.1 Proposed Project

Under the Proposed Project, construction equipment would extract approximately 23,000 cubic yards (cy) of fill materials from the East Bahia peninsulas. Trucks would transport this material to the Central Peninsula of East Bahia and to Central Bahia for use as fill material. These activities and resulting air emission impacts would occur over an estimated period of 4 weeks.

Under certain weather, temperature, chemical, and biological conditions, standing water at the project site can produce noxious water surface odors. Recently, deeper water at the site (from levee overtopping) has reduced this problem. Opening up the project site to full tidal influence will create better flow and exchange of water, thereby eliminating or greatly reducing this existing impact.

Air Quality Impact-1: Operation of construction equipment and vehicles (worker commute trips and truck transport of fill material) during project construction would generate air emissions.

Impacts are expected to be minor and of short duration. A qualitative analysis of construction-related air quality impacts was performed by comparing this project to the type of construction projects likely to produce emissions that could exceed federal and state ambient air quality standards.

Ozone Precursor Emissions-Internal combustion engines used in construction emit ozone precursors. The BAAQMD has established significance thresholds for emissions of ozone precursor pollutants (ROG and NO_x ;See section 7.2). According to the CEQA Guidelines established by BAAQMD (http://www.baaqmd.gov/dst/regulations/rg0100),

examples of projects that generate sufficient traffic to exceed the established thresholds for ozone precursors include subdivision developments of 320 homes, shopping centers of 44,000 square feet, or office parks of 210,000 square feet. The Proposed Project would generate significantly less traffic than these types of projects and would therefore not exceed the BAAQMD thresholds for ozone precursor pollutants.

Carbon Monoxide Emissions- Internal combustion engines used in construction are also a source of CO emissions. The BAAQMD CEQA Guidelines indicate that exceedances of the CO air quality standard are not anticipated from projects that generate less than 550 pounds per day of CO, do not cause congestion at intersections, and do not increase traffic substantially (by 10 percent or more) at congested intersections. Since the proposed project is expected to generate significantly less than 550 pounds per day of CO, and is not expected to cause significant congestion or increases in traffic, it can be concluded that the project would not lead to exceedances of the CO air quality standards.

Significance: Less than significant.

Air Quality Impact-2: Project construction would generate fugitive dust.

Dust contains PM_{10}, for which the BAAQMD has established a significance threshold (see section 7.2). Excavation of fill from East Bahia and travel on unpaved access roads and levees has the potential to generate dust and therefore PM_{10}. In addition, project construction may require some stockpiling of dirt, either from excavations or for use in construction. If stockpiles are allowed to dry out, they may become a source of blowing dust and PM_{10}.

As noted above, construction activities would take place over a period of approximately 4 weeks; therefore, impacts would be short in duration. The majority of the work would be done in moist or wet soil or mud, thereby minimizing the likelihood of dust generation, which is not expected to exceed the BAAQMD significance threshold. Stockpiled dirt from the project is unlikely to generate much dust since excavated soils will be wet and are not likely to dry out during the short construction period. Furthermore, dust generation from the project is expected to be localized and would be unlikely to affect off-site receptors. Construction operations at East Bahia could cause minor impacts to off-site receptors in the Bahia community. Construction in Central and West Bahia is too far away to impact off-site receptors. Overall, this impact would be less than significant.

Significance: Less than significant

7.3.1.2 No Project Alternative

This alternative does not involve the extraction or transport of materials; therefore, it would not produce air quality impacts from vehicular emissions or fugitive dust. However, this alternative would not eliminate or reduce the potential for odor impacts from standing water at the project site.

Air Quality Impact-3: Generation of noxious odors from existing ponds.

Under certain weather, temperature, chemical, and biological conditions, standing water at the project site can produce noxious water surface odors. Recently, deeper water at the site (from levee overtopping) has reduced this problem. Under the No Project Alternative, levees would not be maintained and additional breaches would occur over time, eventually opening up the project site to tidal influence. However, it is not known how long this process could take. In the meantime, noxious odors could continue to be a problem at the project site. Prevailing winds out of the northwest carry the odors away from nearby residences.

Significance: Potentially significant.

No mitigation is required for the No Project Alternative.

7.3.1.3 Alternative 1 (Reduced Fill Removal from East Bahia)

Under Alternative 1, approximately 11,000 cy of fill materials excavated from the East Bahia peninsulas would be transported to the Central Peninsula of East Bahia and to Central Bahia for use as fill material (a 50% reduction of material from the Proposed Project). The reduced quantity of transported materials would generate reduced air emission impacts from construction equipment, but impacts from fugitive dust may be greater in the proximity of East Bahia. Similar to the Proposed Project, Alternative 1 would greatly reduce or eliminate pond odors.

Air Quality Impact-1: Operation of construction equipment and vehicles (worker commute trips and truck transport of fill material) during project construction would generate air emissions.

The 50% reduction in material to be trucked through the Bahia community would significantly reduce the number of truck trips through the community and would therefore lower the degree to which vehicular emissions would impact sensitive residential receptors. (Note that the impacts from the Proposed Project are already anticipated to be less than significant).

Significance: Less than significant.

Air Quality Impact-2: Project construction would generate fugitive dust.

This alternative would probably cause somewhat greater impacts from fugitive dust since more earth-moving, stockpiling, and construction would occur in the East Bahia area, closer to Bahia residences. The length of time required to transport materials from one part of the site to another would be less than the proposed project. However, the reduction in material removed from the East Bahia peninsulas would not necessarily translate to a shorter construction period since this alternative involves more complex

balancing of fill and compaction at East Bahia. This impact is expected to be less than significant due to wetness of site soils, short period, and prevailing wind direction.

Significance: Less than significant

7.3.1.4 Alternative 2 (No Fill Removal from East Bahia)

Under Alternative 2, all material excavated from the East Bahia peninsulas (approximately 23,000 cy as in the Proposed Project) would remain in East Bahia and would be used to restore tidal marsh, creating seasonal wetlands, and raise the elevation of the uplands by compacting the fill on site. The reduced quantity of transported materials would generate reduced air emission impacts from construction equipment, but impacts from fugitive dust may be greater in the proximity of East Bahia. Similar to the Proposed Project, Alternative 1 would greatly reduce or eliminate pond odors.

Air Quality Impact-1: Operation of construction equipment and vehicles (worker commute trips and truck transport of fill material) during project construction would generate air emissions.

Elimination of trucking through the Bahia community would significantly lower the degree to which vehicular emissions would impact sensitive residential receptors. (Note that the impacts from the Proposed Project are already anticipated to be less than significant).

Significance: Less than significant.

Air Quality Impact-2: Project construction would generate fugitive dust.
This alternative would probably cause somewhat greater impacts from fugitive dust since more earth-moving, stockpiling, and construction would occur in the East Bahia area, closer to Bahia residences. The length of time required to transport materials from one part of the site to another would be less than the proposed project. However, the reduction in material removed from the East Bahia peninsulas would not necessarily translate to a shorter construction period since this alternative involves more complex balancing of fill and compaction at East Bahia. This impact would be greater under Alternative 2 than under the Proposed Project or Alternative 1, but are anticipated to be less than significant, cue to the wetness of site soils, short construction period, and prevailing wind direction.

Significance: Less than significant

7.3.2 Post-Construction Phase Air Quality Impacts

Air emissions associated with the project would cease at the end of the construction phase. There may be limited vehicular activity in the project area associated with maintenance and monitoring of the project. Traffic generated by the post-construction

phase of the project is expected to be similar to or less than traffic generated by existing maintenance operations. Likewise, on-going air quality impacts are expected to be the same or less than the impacts historically generated by public usage. Therefore, these impacts were not further evaluated.