
1 4.4 AIR QUALITY

2 Redevelopment would result in less than significant, potentially significant, and significant
3 impacts to air quality. With implementation of measures recommended in this section, some of
4 the potentially significant impacts would be mitigated to a level that is less than significant. Other
5 potentially significant impacts would be reduced, but not to a level that is less than significant.
6 These impacts are considered adverse and unavoidable.

7 4.4.1 Study Area

8 The study area for air quality is the San Francisco Bay Area Air Basin. The air basin
9 encompasses all or part of nine counties surrounding San Francisco Bay: all of Alameda,
10 Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties; and portions
11 of Solano and Sonoma counties.

12 4.4.2 Regulatory Setting

13 Federal

14 The study area is subject to major air quality planning programs required by the federal Clean
15 Air Act (CAA), last amended in 1990 (42 United States Code [USC] 7401 *et seq.*). The CAA
16 provides for ambient air quality standards to protect public health (see discussion regarding
17 national and state standards, below), timetables for progressing toward achieving and
18 maintaining ambient standards, and the development of an implementation plan to guide air
19 quality improvement efforts of state and local agencies. The plan, which is referred to as the
20 State Implementation Plan (SIP), must contain control strategies that demonstrate attainment
21 with national ambient air quality standards by deadlines established in the federal CAA.

22 The U.S. Environmental Protection Agency oversees state and local implementation of federal
23 CAA requirements. In addition, the EPA sets emission standards for many mobile sources, such
24 as new on-road motor vehicles, including transport trucks, that are sold outside California. The
25 EPA also sets emission standards for various classes of new off-road mobile sources, including
26 locomotives, that are sold throughout the country. The EPA is also working with the International
27 Maritime Organization to initiate the process of setting international standards to lower
28 emissions from new marine vessels that operate under that organization's protocol. Finally, the
29 EPA is working with the California Air Resources Board (CARB) to set standards for new marine
30 engines used in vessels operating solely in California coastal waters.

31 State and Regional

32 Similar to the CAA, the California Clean Air Act (CCAA) of 1988 (California Health and Safety
33 Code § 39600 *et seq.*) promulgates health-protective ambient air quality standards, and
34 establishes a plan-based program intended to achieve and maintain those standards. The state
35 plan is called the Clean Air Plan (CAP). The CAP must show satisfactory progress in attaining
36 state ambient air quality standards. Deadlines are not fixed for attaining state standards.

1 Both the federal SIP and the state CAP rely on the combined emission control programs of the
2 EPA, CARB, and the Bay Area Air Quality Management District (BAAQMD).

3 Under California law, the responsibility to carry out air pollution control programs is split
4 between the CARB and local or regional air pollution control agencies. In the study area, the
5 BAAQMD regulates stationary sources, and can require stationary sources to obtain permits,
6 and can impose emission limits, set fuel or material specifications, or establish operational limits
7 to reduce air emissions.

8 The CARB shares the regulation of mobile sources with the EPA, and has authority to set
9 emission standards for on-road motor vehicles and for some classes of off-road mobile sources
10 that are sold in California. The emission standards most relevant to redevelopment as proposed
11 are those related to automobiles, light- and medium-duty trucks, and California heavy-duty truck
12 engines. The CARB also regulates vehicle fuels, with the intent to reduce emissions, and has
13 set emission reduction performance requirements for gasoline (California reformulated
14 gasoline), and limited the sulfur and aromatic content of diesel fuel to make it burn cleaner. The
15 CARB also sets the standards used to pass or fail vehicles in smog check and heavy-duty truck
16 inspection programs.

17 Federal, state, and regional control programs above are directed primarily toward criteria
18 pollutants—the pollutants for which ambient air quality standards exist. Programs are also in
19 place to reduce public exposure to other pollutants, such as those that present a potential
20 hazard to public health. These are termed “hazardous air pollutants” (HAPs) in federal law and
21 “toxic air contaminants” (TACs) in California law. TACs are pollutants “. . . which may cause or
22 contribute to an increase in mortality or in serious illness, or which may pose a present or
23 potential hazard to human health” (BAAQMD 1997). Federal and state programs are currently
24 directed toward reducing TAC emissions from stationary sources. Unlike criteria pollutants,
25 TACs do not have ambient standards; however, BAAQMD regulates new or expanding
26 stationary sources of TACs.

27 **National and State Ambient Air Quality Standards.** The CAA and CCAA promulgate,
28 respectively, national and state ambient air quality standards for carbon monoxide (CO), ozone
29 (O₃), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter 10 microns or less in
30 diameter (PM₁₀), and (federal standard only) particulate matter 2.5 microns or less in diameter
31 (PM_{2.5}).¹ Ambient standards specify the concentration of pollutants to which the public may be
32 exposed without adverse health effects. Individuals vary widely in their sensitivity to air
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¹ Other pollutants (e.g., lead) also have ambient standards, but they are not discussed in this document because emissions of these pollutants from redevelopment are expected to be minimal.

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**Table 4.4-1
State and Federal Ambient Air Quality Standards**

Pollutant	Averaging Time	California Standards ^a	National Standards ^b		Bay Area State Status/ Classification	Bay Area National Status/ Classification ^f
		Concentrations ^c	Primary ^{c, d}	Secondary ^{c, e}		
Photochemical Oxidants ^g	8-hour	--	0.08 ppm	Same as	Nonattainment	Not Designated/ None
	1-hour ^h	0.09 ppm	0.12 ppm	Primary		
Carbon Monoxide (CO)	8-hour	9.0 ppm	9 ppm	Same as	Attainment/None	Attainment/ Maintenance
	1-hour	20.0 ppm	35 ppm	Primary		
Nitrogen Dioxide (NO ₂)	Annual Mean	--	0.053 ppm	Same as	Attainment/None	Attainment/None
	1-hour	0.25 ppm	--	Primary		
Sulfur Dioxide (SO ₂)	Annual Mean	--	0.03 ppm	--	Attainment/None	Attainment/None
	24-hour	0.04 ppm	0.14 ppm	--		
	3-hour	--	--	0.5 ppm		
	1-hour	0.25 ppm	--	--		
Particulate Matter (PM ₁₀)	Annual Mean	--	50 µg/m ³	Same as	Nonattainment/ None	Attainment/None
	Annual Geometric Mean	30 µg/m ³	--	--		
	24-hour	50 µg/m ³	150 µg/m ³	Same as Primary		
Fine Particulate Matter (PM _{2.5})	Annual Mean	--	15 µg/m ³	Same as	Not Designated/ None	Not Designated/ None
	24-hour	--	65 µg/m ³	Primary		

Source: BAAQMD CEQA Guidelines 1996, with updated information on pollutant attainment status from the Internet site www.BAAQMD.Gov/planning/resmod/baas.htm.

Notes: ppm = parts per million, µg/m³ = micrograms per cubic meter; ---- = Not applicable

^a California standards, other than CO, SO₂ (1-hour), and PM_{2.5}, are values that are not to be equaled or violated. The CO, SO₂ (1-hour), and PM_{2.5} standards are not to be violated.

^b National standards, other than O₃, the 24-hour PM_{2.5}, the PM₁₀, and those standards based on annual averages, are not to be exceeded more than once a year. The 1-hour O₃ 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. The 8-hour O₃ standard is attained when the 3-year average of the annual fourth highest daily maximum concentration is less than 0.08 ppm. The 24-hour PM₁₀ standard is attained when the 99th percentile of 24-hour PM₁₀ concentrations in a year, averaged over 3 years, at the population-oriented monitoring site with the highest measured values in the area, is below 150 µg/m³. The 24-hour PM_{2.5} standard is attained when the 98th percentile of 24-hour PM_{2.5} concentrations in a year, averaged over 3 years, at the population-oriented monitoring site with the highest measured values in the area, is below 65 µg/m³. The annual average PM_{2.5} standard is attained when the 3-year average of the annual arithmetic mean PM_{2.5} concentrations, from single- or multiple-community-oriented monitors is less than or equal to 15 µg/m³.

^c All measurements of air quality are to be corrected to a reference temperature of 25° C and a reference pressure of 760 mm of mercury (Hg) (1013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

^d National Primary Standards: The levels of air quality deemed necessary by the federal government, with an adequate margin of safety, to protect the public health.

^e National Secondary Standards: The levels of air quality deemed necessary by the federal government, to protect the public welfare from any known or anticipated adverse effects to a pollutant.

^f The Bay Area attained the national O₃ standard 5 consecutive years in the early 1990s and was re-designated to Attainment/Maintenance status. However, in 1995 and 1996 the O₃ standard was exceeded, and the EPA began to reconsider its decision. Although the standard was once again attained in 1997, in June 1998, the EPA announced its decision to re-designate the Bay Area back to nonattainment. Due to "special circumstances," the EPA decided to apply no classification. The national standard was exceeded again in 1998.

^g Measured as O₃.

^h The 1-hour O₃ standard will be replaced by the 8-hour standard on an area-by-area basis when the area has achieved 3 consecutive years of air quality data meeting the 1-hour standard.

2

1 pollutants, and standards are set to protect more pollution-sensitive populations (e.g., children
2 and the elderly). National and state standards are reviewed and updated periodically based on
3 new health studies. California ambient standards tend to be at least as protective as national
4 ambient standards and are often more stringent. National and state ambient air quality
5 standards are presented in Table 4.4-1. The so-called criteria pollutants and associated adverse
6 health effects are described below.

7 For planning purposes, regions like the San Francisco Bay Area are given an air quality status
8 designation by the federal and state regulatory agencies. Areas with monitored pollutant
9 concentrations that are lower than ambient air quality standards are designated “attainment” on
10 a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards within
11 an air basin, it is designated “nonattainment” for that pollutant. An area that recently exceeded
12 ambient standards, but is now in attainment, is designated “maintenance.” Nonattainment areas
13 are further classified, based on the severity and persistence of the air quality problem, as
14 “moderate,” “severe,” or “serious.” Attainment classifications determine the applicability and
15 minimum stringency of pollution control requirements. In general, the more serious the air
16 quality classification, the more stringent the control requirements that must be contained in the
17 regional air quality plans (the SIP and CAP, described above). A description of criteria pollutants
18 follows.

19 **Carbon Monoxide.** Exposure to high concentrations of CO reduces the oxygen-carrying
20 capacity of the blood and can cause dizziness and fatigue, impair central nervous system
21 function, and induce angina in persons with serious heart disease. Primary sources of CO in
22 ambient air are passenger cars, light-duty trucks, and residential wood burning.

23 **Ozone.** While O₃ serves a beneficial purpose in the upper atmosphere (stratosphere) by
24 reducing ultraviolet radiation potentially harmful to humans, when it reaches elevated
25 concentrations in the lower atmosphere it can be harmful to the human respiratory system and
26 to sensitive species of plants. O₃ concentrations build to peak levels during periods of light
27 winds, bright sunshine, and high temperatures. Short-term O₃ exposure can reduce lung
28 function in children, make persons susceptible to respiratory infection, and produce symptoms
29 that cause people to seek medical treatment for respiratory distress. Long-term exposure can
30 impair lung defense mechanisms and lead to emphysema and chronic bronchitis. Sensitivity to
31 O₃ varies among individuals, but about 20 percent of the population is sensitive to O₃, with
32 exercising children being particularly vulnerable. O₃ is formed in the atmosphere by a complex
33 series of photochemical reactions that involve “ozone precursors” that are two large families of
34 pollutants: oxides of nitrogen (NO_x) and reactive organic gases (ROG). NO_x and ROG are
35 emitted from a variety of stationary and mobile sources. While NO_x is another criteria pollutant
36 itself, ROGs are not in that category, but are included in this discussion as O₃ precursors.

37 **Nitrogen Dioxide.** The major health effect from exposure to high levels of NO₂ is the risk of
38 acute and chronic respiratory disease. NO₂ is a combustion by-product, but it can also form in

1 the atmosphere by chemical reaction. NO₂ is a reddish-brown colored gas often observed
2 during the same conditions that produce high levels of O₃. NO₂ is a precursor to O₃.

3 **Sulfur Dioxide.** The major health effect from exposure to SO₂ is acute and chronic respiratory
4 disease. Asthmatics are particularly sensitive. SO₂ can also react with water in the atmosphere
5 to form acids (or so-called “acid rain”), which can cause damage to vegetation and man-made
6 materials. The main source of SO₂ is the combustion of fuels containing sulfur — chiefly coal
7 and fuel oil. California has very low levels of SO₂ because most large combustion sources burn
8 natural gas, which contains only trace quantities of sulfur. California regulations also limit the
9 sulfur content of gasoline and diesel fuel.

10 **Particulate Matter.** Particulate matter is regulated as PM₁₀. More recently, it has been
11 subdivided into coarse and fine fractions, with particulate matter less than 2.5 microns in
12 diameter (PM_{2.5}) constituting the fine fraction. The health effects from long-term exposure to
13 high concentrations of particulate matter are increased risk of chronic respiratory disease like
14 asthma, and altered lung function in children. Short-term exposure to high levels of particulate
15 matter has been shown to increase the number of people seeking medical treatment for
16 respiratory distress, and to increase mortality among those with severe respiratory problems.
17 Particulate matter also results in reduced visibility. Ambient particulate matter has many
18 sources. It is emitted directly by combustion sources like motor vehicles, industrial facilities, and
19 residential wood burning, and in the form of dust from ground-disturbing activities such as
20 construction and farming. It also forms in the atmosphere from the chemical reaction of
21 precursor gases.

22 **Toxic Air Contaminants.** TACs do not have ambient air quality standards. Many pollutants are
23 identified as TACs because of their potential to increase the risk of developing cancer. For TACs
24 that are known or suspected carcinogens, the CARB has consistently found there are no levels
25 or thresholds below which exposure is risk free. Individual TACs vary greatly in the risk they
26 present; at a given level of exposure, one TAC may pose a hazard that is many times greater
27 than another. Where data are sufficient to do so, a “unit risk factor” can be developed for cancer
28 risk. The unit risk factor expresses assumed risk to a hypothetical population in terms of the
29 estimated number of individuals in a million who may develop cancer as the result of
30 continuous, lifetime (70-year) exposure to 1 microgram per cubic meter (µg/m³) (equal to one
31 part per million) of the TAC. Unit risk factors provide a standard that can be used to establish
32 regulatory thresholds for permitting purposes. However, they are not a measure of actual health
33 risk because actual populations do not experience the extent and duration of exposure that the
34 hypothetical population is assumed to experience. For non-cancer health effects, a similar factor
35 called a Hazard Index is used.

36 In 1998, the CARB formally identified particulate matter emitted by diesel-fueled engines as a
37 TAC. Diesel engines emit TACs in both gaseous and particulate forms. The particles emitted by
38 diesel engines are coated with chemicals, many of which have been identified by the EPA as
39 HAPs, and by the CARB as TACs. The vast majority of diesel exhaust particles are very small

1 (94 percent of their combined mass consists of particles less than 2.5 microns in diameter), both
2 the particles and their coating of TACs can be inhaled into the lungs. While the gaseous portion
3 of diesel exhaust also contains TACs, the CARB's action was specific to diesel particulate
4 emissions which, according to supporting CARB studies, represent 50 to 90 percent of the
5 mutagenicity of diesel exhaust (CARB 1998).

6 The CARB action was taken at the end of a lengthy process that considered dozens of health
7 studies, extensive analysis of health effects and exposure data, and public input collected over
8 the last nine years. CARB's Scientific Advisory Committee has recommended a unit risk factor
9 of 300 in a million for diesel particulate.² The CARB action will lead to additional control of diesel
10 engine emissions in coming years by CARB. The EPA has also begun an evaluation of both the
11 cancer and non-cancer health effects of diesel exhaust.

12 The 1998 ruling prompted the CARB to begin searching for means to reduce diesel PM
13 emissions. In September 2000, the CARB approved the *Risk Reduction Plan to Reduce*
14 *Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (Diesel Risk Reduction
15 Plan). The Diesel Risk Reduction Plan outlines a comprehensive and ambitious program that
16 includes the development of numerous new control measures over the next several years aimed
17 at substantially reducing emissions from new and existing on-road vehicles (e.g., heavy duty
18 trucks and buses), off-road equipment (e.g., graders, tractors, forklifts, sweepers, and boats),
19 portable equipment (e.g., pumps), and stationary engines (e.g., stand-by power generators).

20 **Odors.** BAAQMD Regulation 7, and Regulation 9, Rules 1 and 2, place limitations on odorous
21 substances and specific limitations on certain odorous compounds including dimethylsulfide,
22 ammonia, methylmercaptan, phenol, trimethylamine, sulfur dioxide, and hydrogen sulfide.
23 Regulation 9, Rule 1, places emission limits for sulfur dioxide from all sources and Regulation 9,
24 Rule 2, limits the ground level concentrations of hydrogen sulfide to 0.06 ppm for a three-minute
25 average or 0.03 ppm for a six-minute average.

26 **4.4.3 Regional Setting**

27 The region under consideration is the San Francisco Bay Area Air Basin. Several large-scale
28 transportation projects are planned that could affect long-term regional air quality, including the
29 San Francisco International Airport Expansion Project and the metropolitan Oakland
30 International Airport Development Program. In addition to the construction and operation of
31 these airport projects, several major construction projects located near the redevelopment
32 project area with long-term schedules could also have an effect on ambient air quality, including
33 the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project³, and the Oakland
34 Harbor Navigation Improvement Project (the "-50-Foot Project").

² The Scientific Review Committee findings are Attachment A to CARB Resolution 98-35, August 27, 1998.

³ The environmental review document for this project concludes there would be no significant long-term impacts to air quality from project operation..

1 **Meteorology and Climatology**

2 The climate of the San Francisco Bay Area is classified as Mediterranean, and has mild, wet
3 winters and warm, dry summers. The regional climate is controlled primarily by the Pacific high-
4 pressure system over the eastern Pacific Ocean and by local topography. Local climate is
5 strongly influenced by topography and proximity to the Pacific Ocean and San Francisco Bay.
6 Cool, onshore winds blowing from the Pacific have a moderating effect, especially west of the
7 Diablo Mountain Range where the study area is located. These mountains act as a barrier to
8 onshore winds, resulting in the channeling of airflow along canyons, valleys, and through straits
9 in the Bay, as well as strong west-to-east temperature differences. The resulting overall air flow
10 patterns are complex, exhibiting much local variation. Large-scale winds, which are the wind
11 patterns influenced by general geographical and topographical features of the San Francisco
12 Bay Area on a roughly 50-mile scale, are predominantly from the west from the Golden Gate
13 toward the Delta.

14 Atmospheric dispersion of pollutants is influenced by several parameters, including temperature
15 inversion. An inversion is a layer of cooler air near the ground surface trapped below a layer of
16 warm air aloft. This condition restricts vertical movement or mixing of pollutants, and therefore
17 allows pollutant concentrations to increase. Inversions can be caused by several different
18 combinations of meteorological conditions, and can occur in both the summer and winter in the
19 study area.

20 In the immediate study area, the flow of marine air traveling through the Golden Gate, across
21 San Francisco and through the San Bruno Gap is the dominant weather factor. Prevailing winds
22 are from the west (CARB 1984). Air pollution potential in Northern Alameda County is lowest
23 close to the Bay where the study area is located, due largely to two factors: good ventilation
24 from winds that are frequently brisk, and a relatively low flux of pollutants from upwind areas.
25 The occurrence of light winds in the early morning and late evening occasionally cause elevated
26 levels of pollutants (BAAQMD 1996).

27 **Emission Inventory**

28 Table 4.4-2 presents the BAAQMD inventory of emissions of CO, ROGs, NO_x, SO₂, and PM₁₀,
29 for the Bay Area and for Alameda County. Projections of expected future emission levels are
30 based on expected growth rates in population, employment, industrial/commercial activity,
31 travel, and energy use, and consider the effects of control measures already adopted by the
32 EPA, CARB, and BAAQMD, and some proposed measures as well (BAAQMD 1997 Clean Air
33 Plan). PM_{2.5} is not included in this inventory because the federal PM_{2.5} standard was only
34 recently upheld, and Bay Area-wide PM_{2.5} emissions and monitoring data are not yet available.

35 Inventory information presented in Table 4.4-2 indicates that within the region, the BAAQMD
36 expects total annual tons of CO, ROGs, and NO_x to decrease over time, and total annual tons of
37 SO₂ and PM₁₀ to increase.

**Table 4.4-2
Bay Area Emission Inventory Summary and Projections (1994 to 2010)^a**

Pollutant	1994		2000		2010	
	Bay Area (tons/day)	Alameda County's Share ^b	Bay Area (tons/day)	Alameda County's Share ^b	Bay Area (tons/day)	Alameda County's Share ^b
CO	2,425	22%	1,963	21%	1,600	21%
ROGs	572	22%	446	22%	359	22%
NO _x ^c	692	20%	555	20%	451	20%
SO ₂	102	12%	107	12%	115	12%
PM ₁₀ ^d	187	19%	209	19%	230	19%

Source: BAAQMD 1996.

Notes:

^a Data are estimates for 1995 and were taken from BAAQMD (1996) CEQA Guidelines.

^b Percent of Bay Area emissions attributable to Alameda County sources.

^c Average summer day emissions.

^d Average winter day emissions.

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Pollutant Monitoring

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The BAAQMD operates a regional air quality monitoring network for O₃, CO, NO₂, SO₂, and PM₁₀. Monitoring data from the BAAQMD network are used by the EPA and CARB to designate the attainment status of the region and to classify the severity of nonattainment conditions (see discussion of planning requirements, above). Table 4.4-1 describes the attainment status of the Bay Area region relevant to federal and state ambient air quality standards. The large number of “attainment” designations shown in Table 4.4-1 indicates that the Bay Area experiences low concentrations of most pollutants, the exceptions being O₃ and particulate matter, for which standards are exceeded periodically.

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In addition to criteria pollutants, both the BAAQMD and the CARB operate TAC monitoring networks in the San Francisco Bay Area. These stations measure 10 to 15 TACs, depending on the specific station. The TACs selected for monitoring are those that have traditionally been found in the highest concentrations in ambient air, and therefore tend to produce the most significant risk. The BAAQMD operates an ambient TAC monitoring station at Davie Stadium at 198 Oak Road in Oakland, about 2.5 miles to the east of the study area. The estimated average lifetime cancer risk resulting from exposure to TAC concentrations monitored at this station in 1999 (the latest year for which data are available) is 170 in one million (BAAQMD 2000). This risk level is close to the Bay Area average for estimated average lifetime cancer risk, 186 in one million for all Bay Area TAC monitoring stations (BAAQMD 2000). These levels can be compared to a background cancer incidence rate in the United States from all causes that is about 1 in 4, or 250,000 in one million⁴.

⁴ It is generally believed that a large portion of the total background cancer risk in the United States comes from smoking and other personal habits, genetic susceptibilities, diet, natural radiation including radon, and other lifestyle factors.

1 There is also growing evidence that exposure to emissions from diesel-fired engines (about 95
2 percent of which come from mobile sources) may result in cancer risks that exceed those
3 attributed to the measured TACs. In 1998, the State of California identified diesel particulate
4 matter (PM) as a TAC and issued a health risk assessment that included estimates of cancer
5 potency of diesel PM. Because diesel PM cannot be monitored directly in the ambient air,
6 cancer risk is estimated using indirect methods based on measurement of surrogate
7 compounds. The BAAQMD has estimated the average cancer risk associated with diesel
8 particulate exposure in the Bay Area, based on CARB estimates of population-weighted
9 average ambient diesel PM concentrations for the Bay Area in the year 2000, to be about 450 in
10 one million (BAAQMD 2000).

11 4.4.4 Local Setting

12 For air quality, the current environmental setting, and the alternative baseline in 1995 for the
13 OARB are described. As allowed by CEQA, where relevant, the analysis of air quality impacts of
14 a military base reuse may be based on environmental conditions that existed at the time the
15 federal government made the decision to close the base, rather than current existing conditions.
16 For the OARB, the government made this decision in 1995. The analysis of impacts to air
17 quality use an alternative baseline for only the OARB portion of the redevelopment project area.

18 **Emission Inventory.** As presented in Table 4.4-2, Alameda County's contribution to regional
19 emissions is consistent over time, between 12 to 22 percent per year, depending on pollutant.
20 The District expects the percentage of Alameda County's contribution to basin-wide emissions
21 would remain approximately the same per pollutant, except the County's relative contribution to
22 CO is expected to slightly decrease.

23 Setting

24 **Pollutant Monitoring, Attainment Status.** The BAAQMD monitoring stations nearest to the
25 redevelopment project area are as follows:

- 26 • Alice Street, Oakland (monitors O₃ and CO)
- 27 • San Leandro Hospital (monitors O₃ and PM₁₀)
- 28 • 7th Street, Richmond (monitors SO₂)

29 Table 4.4-3 summarizes three years of ambient air quality data measured at these stations. No
30 BAAQMD monitoring station representative of the project area monitors NO_x. Monitoring data
31 from stations closest to the project area generally reflect the regional pattern; only the state O₃
32 standard is occasionally exceeded.

**Table 4.4-3
Summary of Criteria Air Pollutant Monitoring Data**

Monitoring Station	Air Quality Indicator	1998	1999	2000
Ozone (O₃)				
Alice Street (Oakland)	Peak 1-hour concentration (ppm)	0.056	0.081	0.072
	Days above federal standard	0	0	0
	Days above state standard	1	0	1
San Leandro County Hospital	Peak 1-hour concentration (ppm)	0.111	0.113	0.098
	Days above federal standard	0	0	0
	Days above state standard	2	3	1
Carbon Monoxide (CO)				
Alice Street ^a (Oakland)	Peak 1-hour concentration (ppm)	4.58	5.23	2.69 ^a
	Days above federal standard	0	0	0
	Days above state standard	0	0	0
	Peak 8-hour concentration (ppm)	3.9	3.9	3.6
	Days above federal standard	0	0	0
	Days above state standard	0	0	0
PM₁₀				
San Leandro ^b County Hospital	Peak 24-hour concentration (µg/m ³)	32 ^a	--	--
	Days above federal standard	0	--	--
	Days above state standard	0	--	--
	Annual geometric mean (µg/m ³)	13.2	--	--
	Exceedance of state standard	no	--	--
	Annual arithmetic mean (µg/m ³)	14.0	--	--
	Exceedance of federal standard	no	--	--
Sulfur Dioxide (SO₂)				
7 th Street (Richmond)	Peak 24-hour	0.010	0.008	0.008
	Days above state or federal standards	0	0	0

Source: CARB 1998, 1999, and 2000, Internet Air Quality Data Summaries.

Notes:

-- Data not available

^a The carbon monoxide values for 2000 are based on 46 percent of the annual data for that year.

^b The PM₁₀ values for 1998 are based on 41 percent of the annual data for that year. No PM₁₀ data are available for 1999 and 2000. For monitored PM₁₀ data closest to the study area, see Table 4.4-4.

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2 To increase knowledge of particulate exposure at and near the Port of Oakland, in April 1997,
 3 the Port of Oakland initiated a monitoring program to measure PM₁₀ and PM_{2.5} at two locations.
 4 One PM monitoring station is located on Port property near the intersection of 7th Street and
 5 Middle Harbor Road. The second monitoring station is located near the intersection of Filbert
 6 and 24th streets in a residential area of West Oakland. The monitoring program is being
 7 coordinated with the BAAQMD.

Data have been reported for the years 1997 through August 2001 and are summarized in Table 4.4-4 (GAIA 2001). During this sampling period, the highest annual average PM₁₀ concentration in the project area was 30.7 µg/m³, slightly above the annual average state standard of 30 µg/m³. The peak 24-hour concentration was 83 µg/m³, above the 24-hour state standard of 50 µg/m³. The maximum 24-hour PM_{2.5} concentration was 59 µg/m³, below the 24-hour federal standard of 65 µg/m³. The maximum annual average PM_{2.5} concentration was 12.6 µg/m³; there is not an annual average PM_{2.5} standard.

Pollution-sensitive receptors (e.g., residences, schools, hospitals, etc.) are located within and near the study area. The Oakland Military Institute College Preparatory Academy and Head Start classrooms are interim uses at the OARB. Residences are located adjacent to and near the 16th/Wood sub-district, and the Phoenix Lofts are located within the Maritime sub-district. The intervening UP West Oakland and Desert railyards and elevated I880 freeway separate most West Oakland residential receptors from the majority of the OARB and Maritime sub-districts. Near Martin Luther King, Jr. Way, receptors are separated from the project area by

Table 4.4-4
PM_{2.5} and PM₁₀ Concentrations^a, 1997 to 2000

Monitoring Site	24-Hour Maximum Concentration ^b		Annual Average Concentration		Days Above National/State Standard	
	PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
	National Standard: 65	150	15	50		
	State Standard: --	50	--	30		
Port of Oakland Site (7th/Middle Harbor Road)						
1997 ^c	53	83	10.6	25.5	0/--	0/2
1998	58	76	10.8	26.5	0/--	0/6
1999	53	72	12.6	34.6	0/--	0/14
2000	32	60	11.0	30.6	0/--	0/2
2001 ^d	44.6	68.1	11.6	33.4	0/--	0/7
West Oakland (Filbert/24th Street)						
1997 ^c	51	77	9.6	23.6	0/--	0/1
1998	59	65	9.9	22.2	0/--	0/1
1999	49	81	11.8	25.5	0/--	0/4
2000	35	59	11.2	25.0	0/--	0/2
2001 ^d	44.6	83	10.6	26.8	0/--	0/3

Source: GAIA 2001.

Notes:

^a All concentrations in µg/m³ (micrograms per cubic meter).

^b Highest 24-hour concentration in a 12-month period.

^c April 1997 – December 1997.

^d January 2001 – August 2001.

-- = Not applicable (no standard).

1 intervening land uses that include commercial and industrial facilities, although some live/work
 2 units are located intermittently throughout this area. The closest public schools to the project
 3 area are McLymonds High on Myrtle Street and Prescott Elementary on Campbell Street.

4 The East Bay Municipal Utility District (EBMUD) Main Wastewater Treatment Plant (WWTP) is
 5 located immediately north of the Baldwin Yard and Subaru site, at the I-80/I-880 interchange.
 6 This existing facility does not present a new odor source to the surrounding community. The
 7 former Knight railyard and the Desert railyard are located immediately west of I-880, with
 8 potential odor-sensitive West Oakland residential areas located on the east side of that freeway.

9 **Alternative Baseline 1995**

10 This alternative baseline provides information on the level of activity and air pollutant emissions
 11 at the OARB in 1995, at the time of the OARB closure. The purpose of the information is to
 12 compare the projected levels of activity and air pollutant emissions associated with
 13 redevelopment to those of the Base when it was still operating in 1995.

14 **OARB Pollutant Emissions.** In 1995, the OARB operated a number of air pollutant-emitting
 15 sources. These included natural gas-fired boilers, emergency diesel-fired engine generators,
 16 underground and three above-ground petroleum storage tanks, a diesel-powered crane, two
 17 woodworking shops, a photographic lab, solvent washing units, multiple metal welding
 18 operations, and multiple touch-up coating operations. 1994 emission estimates for these
 19 stationary sources are presented below. As noted by the Army in their environmental analysis of
 20 Base closure and reuse, estimates for
 21 1994 were used due to lack of data for
 22 the year 1995 (Corps 2001).

1994 OARB Stationary Source Emissions					
Pollutant	CO	ROG	NO _x	SO _x	PM ₁₀
Pounds/day	10.7	3.87	33.1	0.557	6.53
			6		
Tons/year	1.4	0.5	4.3	0.07	0.8

Source: Corps 2001.

23 The majority of emissions associated
 24 with operations at OARB resulted from
 25 employee commute trips and other
 26 vehicular traffic associated with the installation (Corps 2001). Mobile source emissions were
 27 calculated following methodology from the BAAQMD CEQA Guidelines (1996, revised 1999).
 28 This methodology uses average trip generation rates for specific land uses, average trip
 29 lengths, and composite emission factors for estimating mobile source emissions. Emission
 30 factors from the BAAQMD CEQA Guidelines are as follows:

1995 BAAQMD Mobile Source Emission Factors					
CO (lbs/mile)	Hot Soak ROG (lbs/trip)	ROG (lbs/mile)	NO _x (lbs/mile)	SO _x (lbs/mile)	PM ₁₀ (lbs/mile)
0.0233	0.0019	0.0018	0.0026	0.00013	0.0019

Source: BAAQMD CEQA Guidelines as revised through 1999.

1

2 Following are estimates of mobile source emissions at the OARB in 1995.

1995 Mobile Source Emissions at the OARB					
Pollutant	CO	ROG	NO _x	SO _x	PM ₁₀
Pounds/day	4247	377	473	24	349
Tons/year	552	49	61	3	45

Source: Corps 2001.

Notes: Average trip length assumed to be 7.9 miles.
Average daily trips = 23,027 for the year 1995.

3 4.4.5 Impact Assessment Methodology

4 Potential air quality impacts from redevelopment are discussed qualitatively, in terms of the
5 likely emissions that would occur with each activity involved. Specific information about sources
6 of air emissions, and their locations is required to perform a meaningful dispersion modeling
7 analysis. Such information is not currently defined for the redevelopment program at this time.
8 Rather, this analysis takes a conservative approach (of estimated gross emissions) to impact
9 significance, and a solution-oriented approach to potential impacts.

10 Emissions from vehicular sources (transport trucks and passenger cars) were quantified based
11 on the traffic analysis conducted for this EIR. This analysis examined the potential traffic
12 associated with year 2020 buildout. Emissions were calculated using emission factors from the
13 EMFAC2000 model, which is the latest CARB emissions model for on-road vehicles.

14 Emissions from cargo-handling equipment at Port of Oakland terminals, railyard equipment, and
15 switch engines at the New Intermodal Facility were estimated using existing information about
16 emissions from these sources located on the Berths 55-58 Project EIR (Port of Oakland 1998)
17 and the JIT Project EIR (Port of Oakland 1999) as well as cargo throughput for the year 2020.
18 Emissions from line haul trains using the New Intermodal Facility were estimated using
19 information provided in the transportation analysis (Dowling Associates 2002). Finally, ship and
20 tugboat emissions were estimated using ship call information provided by the Port of Oakland.

21 Emission factors for diesel combustion were available for particulate matter of 10 microns or
22 less in aerodynamic diameter (PM₁₀), which is the mass fraction of all particulate matter
23 emissions comprising particles of 10 microns or less in diameter. These estimated PM₁₀
24 emissions were used to characterize all diesel particulate matter (PM) emissions. It is well
25 documented that the great majority of diesel PM emissions comprise particles less than 10
26 microns in aerodynamic diameter. According to one recent critical review paper on diesel engine
27 emissions (Lloyd and Cackette 2001), more than 90 percent of diesel exhaust-derived PM is
28 smaller than one micron in diameter. This is supported by the Staff Report prepared by CARB in
29 1998 in support of CARB's listing of diesel PM as a TAC (CARB 1998), which states:

1 *Approximately 98 percent of the mass of these particles are 10 microns or less in*
2 *diameter, 94 percent less than 2.5 microns in diameter, and 92 percent less than*
3 *one micron in diameter.*

4 Therefore, the use of PM₁₀ emission factors for diesel PM is representative of total diesel PM in
5 terms of characterizing potential health effect. In addition, most of the mass of these diesel PM₁₀
6 emissions is in the size range of 2.5 microns or less in aerodynamic diameter (PM_{2.5}). Assuming
7 the estimates in the 1998 CARB Staff Report, about 96 percent of the mass of PM₁₀ in diesel
8 exhaust comprises particles with diameters of 2.5 microns or less. Therefore, PM₁₀ emission
9 estimates for diesel combustion essentially represent PM_{2.5} emission estimates, and on
10 balance, provide a slightly conservative estimate of PM_{2.5} emissions.

11 Emissions calculations for this analysis incorporate anticipated future truck and passenger
12 vehicle emissions reductions due to improved fuel and vehicle engine technology. This
13 reduction in emissions is reflected in the EMFAC2000 model for future years. In addition, diesel
14 emissions calculations incorporate currently legislated emission reduction requirements by EPA.

15 Project emissions calculated for impacts in this analysis do not include projected mitigated
16 emissions for major projects located within the redevelopment area previously disclosed in
17 publicly reviewed and certified environmental review documents (the Berths 55-58 EIR and the
18 JIT Project EIR, Port of Oakland 1998 and 1999, respectively) as further discussed under
19 Section 4.4.6 below. Neither do they include emissions associated with operation of the OARB
20 in 1995, the alternative baseline year.

21 **Significance Criteria**

22 Redevelopment would have a significant impact on the environment if it would:

- 23 • Conflict with or obstruct implementation of the applicable air quality plan;
- 24 • Violate any air quality standard or contribute substantially to an existing or projected air
25 quality violation;
- 26 • Expose pollution-sensitive receptors to substantial pollutant concentrations;
- 27 • Contribute to CO concentrations exceeding the state ambient air quality standards of 9 ppm
28 averaged over 8 hours and 20 ppm for 1 hour;
- 29 • Result in total emissions of ROG, NO_x, or PM₁₀ of 15 tons per year or greater, or 80 pounds
30 (36 kilograms) per day or greater (there is currently no quantitative significance threshold for
31 PM_{2.5});
- 32 • Result in a substantial increase in diesel emissions; or
- 33 • Create objectionable odors affecting a substantial number of people.

34 Discussion of impacts with respect to consistency with the Clean Air Plan is located in Chapter
35 5: Cumulative Impacts.

1 4.4.6 Impacts

2 In general, redevelopment would involve activities that produce pollutant emissions. These
3 activities include construction/remediation, vessel movement, cargo handling and transport,
4 passenger car travel, and operation and maintenance of commercial development. Both criteria
5 and toxic pollutants would be emitted in all sub-districts. TACs would be emitted in the form of
6 particulate matter from diesel fuel exhaust. Construction/remediation emissions consist of
7 fugitive dust from earth-disturbing activities and equipment exhaust from combustion of gasoline
8 and diesel fuel. Cargo ships, tugboats, on-dock equipment, and trains in the Maritime sub-
9 district and Port development area would emit pollutants in the exhaust, as would trucks and
10 vehicles traveling to all three sub-districts. Finally, buildings, warehouses, offices, and
11 residences would also be sources of emissions from combustion of natural gas for space and
12 water heating, exhaust emissions from landscaping equipment, and volatile organic compound
13 emissions from miscellaneous consumer products, solvents, and cleaners as would emissions
14 from trucks and vehicles from all sub-districts within the project area. The specific activities that
15 would generate air pollutants are discussed below.

16 Emissions of criteria pollutants (ROG, NO_x, CO, and PM) are associated with each activity. In
17 addition, activities such as construction/remediation involving diesel-fueled engines would emit
18 toxic air contaminants from the diesel exhaust in the form of PM_{2.5}.

19 Construction/remediation activities would generate fugitive dust PM₁₀ emissions and exhaust
20 emissions of NO_x, ROG, and CO that could violate the ambient air quality standards and expose
21 pollution-sensitive receptors to substantial pollutant concentrations for the duration of
22 construction/remediation. This would result in a potentially significant impact. In addition,
23 particulate matter from diesel-fueled equipment exhaust could be emitted in a significant
24 amount. This would also result in a potentially significant impact. Construction/remediation
25 emissions were not quantified for this analysis because the specific size, location, and timing of
26 construction activities are not defined at this time.

27 The BAAQMD CEQA Guidelines include numerous measures for controlling fugitive dust as PM
28 from construction activities. The BAAQMD normally allows a presumption of impact
29 insignificance with implementation of these control measures, and does not require
30 quantification of construction emissions.

31 Estimated emissions resulting from year 1995 operations at the OARB (the alternative baseline
32 year are as follows:

OARB Area Redevelopment EIR

OARB Alternative Baseline (1995) Estimated Emissions					
1994 Stationary Source Emissions					
Pollutant	CO	ROG	NO_x	SO_x	PM₁₀
Pounds/day	10.7	3.87	33.16	0.557	6.53
Tons/year	1.4	0.5	4.3	0.07	0.8
1995 Mobile Source Emissions					
Pollutant	CO	ROG	NO_x	SO_x	PM₁₀
Pounds/day	4247	377	473	24	349
Tons/year	552	49	61	3	45

Source: Corps 2001.

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Estimated mitigated emissions of the Berths 55-58 and JIT Projects , as reported in the Berths 55-58 Project EIR are:

Berths 55-58 and JIT Projects		
Mitigated Emissions in 2010 (tons/year)		
ROG	NO_x	PM
66	454	40

Source: Port of Oakland 1998.

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Estimated emissions from the increment of cargo operations (ships, tugs, cargo handling equipment, locomotives), transport trucks, and passenger vehicles (including delivery trucks) associated with proposed redevelopment are shown in Table 4.4-5. This table shows the resulting emissions after those already disclosed in other approved EIRs (Berths 55-58, JIT) and the 1995 OARB baseline were subtracted out. All emissions except for passenger cars/delivery trucks are associated with either the Port development area or Maritime sub-district.

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Area source emissions (business and residential) from natural gas combustion for space and water heating, consumer product use, and landscaping could expose pollution-sensitive receptors to elevated levels of NO_x, ROG, CO, and PM₁₀. These emissions were qualitatively assessed. Passenger cars/delivery trucks traveling to all sub-districts within the area could lead to violations of the CO standard at congested intersections.

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Finally, the development of the OARB sub-district near the EBMUD wastewater treatment plant would place individuals near an existing source of odorous emissions. Relocation of JIT functions to the New Intermodal Facility could expose receptors to odors associated with diesel fuel combustion. However, the likelihood of an odor impact is extremely low due to meteorological conditions and distance from the community.

**Table 4.4-5
Redevelopment Program Year 2020 Estimated Emissions from Operations (tons/year)**

	NO _x	ROG	CO	SO ₂	PM ₁₀ ^a
Port Development Area/Maritime Sub-District					
Marine Cargo Equipment	37	5	14	2	2
Ships	1,065	65	101	580	79
Tugs	33	1	5	6	1
Trains	29	2	7	5	1
Rail Cargo Equipment	8	1	2	Negligible	Negligible
Transport Trucks	402	67	625	Negligible	19
Cars/Delivery Trucks	9	16	94	Negligible	1
Total Gross Emissions, Port Activities:	1,583	157	848	593	103
Gateway Development Area					
Cars/Delivery Trucks	50	91	519	Negligible	8
Transport Trucks	54	9	85	Negligible	3
Total Gross Emissions, Gateway:	104	100	604	Negligible	11
16th/Wood Sub-District					
Cars/Delivery Trucks	37	67	382	Negligible	6
Transport Trucks	24	4	37	Negligible	1
Total Gross Emissions, 16 th /Wood:	61	71	419	Negligible	7
Redevelopment Program Gross Emissions:	1,748	328	1,871	593	121
Less Berths 55-58 and JIT Mitigated Emissions	454	68	0	0	40
Less 1995 Alternative Baseline Emissions	65	50	553	3	46
Redevelopment Program Net Total	1,229	210	1,318	590	35

Sources: Marine cargo equipment emissions and mitigated Port emissions from Berths 55-58 Project EIR (Port of Oakland 1998); Railyard cargo equipment and train emissions from JIT Project EIR (Port of Oakland 1999); transport trucks and passenger and delivery vehicle emissions from traffic analysis by Dowling Associates for this EIR (2002); alternative baseline emissions from Army EIS for disposal and reuse of the OARB (Corps 2001).

Note:

^a Considered a TAC from diesel fuel combustion.

- 1 **Impact 4.4-1:** PM as fugitive dust would be emitted during construction and
2 remediation activities.
- 3 **Significance:** Potentially significant
- 4 **Mitigation 4.4-1:** Contractors shall implement all BAAQMD “Basic” and “Optional” PM₁₀
5 (fugitive dust) control measures at all sites, and all “Enhanced” control
6 measures at sites greater than four acres.
- 7 **Residual Significance:** Less than significant
- 8 Construction/remediation activities would produce PM as fugitive dust. Such activities would
9 include, and are not limited to, demolition/de-construction of buildings and structures; removal

1 and recycling of paving and concrete; excavation and fill, and hauling of excavated and fill
2 materials; removal of surface and subsurface contaminants; grade correction, and other site
3 preparation. Other dust-producing construction activities would include construction of
4 infrastructure, including realignment of Maritime Street and installation of utilities.

5 These emissions would be short-term, for the duration of specific construction/remediation
6 activities. Because the level of emissions depend on details of construction not yet completely
7 defined, the impact is considered potentially significant. With implementation of Mitigation
8 Measure 4.4-1, the BAAQMD allows a presumption of impact insignificance in the absence of
9 quantitative analysis (BAAQMD 1996, revised 1999), and the residual impact is considered less
10 than significant.

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12 **Impact 4.4-2:** Construction equipment exhaust could increase levels of NO_x, ROG,
13 CO, and PM₁₀ (the latter primarily as diesel PM) that could exceed 15
14 tons per year, or result in substantial increase in diesel emissions.

15 **Significance:** Potentially significant

16 **Mitigation 4.4-2:** Contractors shall implement exhaust control measures at all
17 construction sites.

18 **Residual Significance:** Significant and unavoidable

19 All construction/remediation equipment would emit criteria pollutants, particularly ROG, NO_x CO,
20 and PM. Most heavy equipment, and some support equipment, is likely to be diesel-fueled, and
21 would emit diesel exhaust. These emissions would be relatively short-term, and quantities would
22 depend on the amount of equipment, as well as its frequency and duration of use.

23 The BAAQMD provides that impacts to air quality from construction emissions of CO, NO_x, and
24 ROG are included in the emission inventory that is the basis of regional air quality plans and as
25 such are not expected to impact attainment or maintenance of O₃ and CO standards in the Bay
26 Area. However, the proposed redevelopment is unusual for several reasons:

- 27 • construction/remediation activity may take place throughout the entire 1,800 acre project
28 area;
- 29 • at a minimum, approximately 370 acres of the OARB will be deconstructed, regraded and
30 redeveloped;
- 31 • numerous construction activities may take place in the same general vicinity and at the
32 same time; and

- portions of the redevelopment project area are located within different jurisdictional boundaries, generally preventing a coordinated timing or phasing of construction activities.

For these reasons and in the interest of being conservative, the emission of construction/remediation equipment exhaust is considered to be a potentially significant effect of redevelopment.

PM₁₀ emissions from diesel-fueled equipment exhaust are considered by the CARB to be a TAC. The majority of diesel PM₁₀ is in the fine fraction (less than 2.5 microns in diameter, or PM_{2.5}) and can remain airborne for several days. The area of impact would depend on meteorological conditions. On most days, when at least light wind conditions prevail in the study area, construction-related diesel particulate is likely to be dispersed widely and have its impact on a regional scale. During periods of very light wind speeds, low inversion heights, and atmospheric stability, diesel particulate may remain in the study area and have more local impact. Because health risks relate to long-term, lifetime exposure, it is long-term average exposure to diesel particulate that is of most concern. Due to the prevailing meteorological conditions in the redevelopment project area and the distance of the closest residential areas from the emissions sources, levels of diesel particulate in the area of local impact are expected to be well dispersed. Increased levels of PM would be short-term, for the duration of those construction activities that generate such emissions.

It is assumed that most trucks associated with hazardous remediation (including hauling off site) and other trucks used to haul demolition and construction debris would be diesel-fueled. The amount of emitted pollutants would depend on the frequency of truck trips, the speed and idling time, and the distance traveled by the trucks. This impact would occur near the OARB, Maritime, and 16th/Wood sub-districts and also throughout the air basin, depending on where the trucks deliver the off-hauled material.

Construction and remediation-related generation of criteria pollutants and diesel exhaust would be short-term, and, given meteorological conditions, pollutants are expected to be dispersed. However, because details of construction are not yet completely defined, the impact is considered potentially significant. With implementation of Mitigation Measure 4.4-2, the impact would be reduced, but not to a level that is less than significant, and the residual impact is considered significant and unavoidable.

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Maritime and Rail Operations

Maritime and rail transportation operations utilize a variety of gasoline-, diesel-, and alternatively-fueled equipment. Air pollutants would be emitted from ships, trains, trucks, and cargo equipment working at or supporting New Berth 21, as well as the increment of other additional maritime and rail operations needed to meet year 2020 throughput projections.

1 **Marine Terminal Cargo Equipment.** Cargo handling or “yard” equipment would emit criteria
2 and toxic pollutants from combustion of diesel fuel. Yard equipment transports cargo between
3 the ship to an over-the-road truck, and intermodal truck, or to a storage area in the marine
4 terminal yard. Yard equipment generally does not leave the terminal area. Types of marine
5 terminal cargo equipment include transtainers (also known as rubber-tired gantries), top picks,
6 reach stackers, yard hustlers (“hostlers”), side picks, and forklifts. Emissions from these sources
7 were estimated taking into account emission estimates for the year 2010, and the predicted
8 cargo throughput for the year 2020.

9 **Rail Terminal Cargo Equipment and Locomotives.** Rail use is proposed for the Port
10 development area of the OARB sub-district and the Maritime sub-district. Rail development
11 involves the movement of cargo between trains, to ships and trucks. Train engines would emit
12 air pollutants from combustion of diesel fuel. Switch locomotives, or “yard engines” are used in
13 rail terminal for connecting and disconnecting long haul trains. Switch locomotives have longer
14 idle times and vary their running speed often while performing operations. Yard equipment used
15 to handle the transfer and storage of cargo would emit air pollutants from the combustion of
16 diesel fuel.

17 Trains that transport cargo to and from other areas of the state and country (line haul) would be
18 sources of air pollutants, but the majority of their emissions would occur outside the study area.
19 Emissions from line haul trains were calculated for mileage within the Bay Area air basin only.

20 **Transport Trucks.** Both “intermodal” and “over-the-road” transport trucks would emit criteria
21 and toxic pollutants in the exhaust. Intermodal trucks transport cargo between Port terminals
22 (marine to rail or rail to marine). Over-the-road trucks transport cargo between the Port, the
23 Gateway development area, or the 16th/Wood sub-district, and locations outside the project
24 area. Over-the-road truck emissions were calculated using mileage within the Bay Area air
25 basin. Over-the-road trucks traveling south through southern Santa Clara county would travel
26 approximately 80 miles within the air basin. Trucks traveling east towards Tracy would travel
27 approximately 45 miles within the air basin. The average of these distances was used to
28 calculate emissions from over-the-road trucks.

29 **Combined Diesel Emissions.** The analysis in this document is an assessment of the
30 incremental increase in train and rail yard activity associated with the redevelopment program
31 only, and takes into account emissions disclosed in a previously certified and publicly reviewed
32 EIR (EIR for the Joint Intermodal Terminal, Port of Oakland 1999). This EIR also considers the
33 effect of additional cargo handling equipment at the marine terminals and the rail terminal, as
34 well as increased truck transport activity, and relocating the functions of the JIT to the New
35 Intermodal Facility. Taken together, these activities could increase exposure of pollutant-
36 sensitive receptors in the West Oakland community to increased diesel emissions.

37 The total increase in emissions combined with the relocation of the railyard emissions source
38 nearer the West Oakland community are considered a significant impact. With implementation

of Mitigation Measures 4.3-3 and 4.3-4 , the impact would be substantially reduced, but it is not likely it would be reduced to a level that is less than significant, and the residual impact would be significant and unavoidable.

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Impact 4.4-4: Passenger vehicles and delivery trucks associated with redevelopment would emit NO_x, ROG, CO, and PM in excess of 15 tons per year or 80 pounds per day.

Significance: Significant

Mitigation 4.4-5: Major developers⁵ shall fund on a fair share basis BAAQMD-recommended feasible Transportation Control Measures (TCMs) for reducing vehicle emissions from commercial, institutional, and industrial operations, as well as all CAP TCMs the BAAQMD has identified as appropriate for local implementation.

Residual Significance: Significant and unavoidable

Passenger car and delivery truck traffic would be generated by redevelopment in all sub-districts, and exhaust from this traffic would emit criteria pollutants as follows:

2020 Emissions of Criteria Pollutants from Passenger and Delivery Vehicles (tons/year)			
Pollutant	Port Development Area, Maritime Sub-District	Gateway Development Area	16th/Wood Sub-District
NO _x	9	50	37
ROG	16	91	67
CO	94	519	382
SO ₂	Negligible	Negligible	Negligible
PM ₁₀	1	8	6

Source: Table 4.4-5.

Emissions of all criteria pollutants would exceed significance criteria, and the impact is considered significant. With implementation of Mitigation Measure 4.4-5, the impact would be substantially reduced, but may not be reduced to a level that is less than significant, and the residual impact is considered significant and unavoidable. In addition, Mitigation Measure 4.3-4, comprising traffic demand management (TDM) measures intended primarily to address traffic impacts, would also reduce air emissions, but not to a level that is less than significant.

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⁵ Defined as City, Port, and private developers whose subsequent redevelopment activity would generate more than 20,000 square feet of employment-generating land uses, or that would generate 100 or greater local jobs.

1 **Impact 4.4-5:** Space and water heating as well as routine maintenance of office
2 buildings, warehouses, retail stores, and live-work space, could emit
3 NO_x, ROG, CO, and PM₁₀ in quantities that could exceed thresholds.

4 **Significance:** Potentially significant

5 **Mitigation 4.4-6:** Title 24 of the Uniform Building Code (UBC) requires that new
6 construction include energy-conserving fixtures and designs.
7 Additionally, the City and Port shall implement sustainable
8 development policies and strategies related to new development
9 design and construction.

10 **Residual Significance:** Less than significant

11 Land uses proposed for the OARB and 16th/Wood sub-districts include light industrial, office,
12 research and development, retail, warehouse/distribution, and live/work. Air pollutants emitted
13 from stationary sources at these types of land uses include combustion emissions from space
14 and water heating and industrial sources. These area emission sources would also be present
15 in the Maritime sub-district in the administration building and miscellaneous one-story buildings
16 (e.g., repair shop, storage, etc.) at the Port terminal and at the rail terminal. Emissions of these
17 types could result in quantities of emissions that exceed significance criteria. Because
18 occurrence of this impact depends on site-specific design not currently defined, the impact is
19 considered potentially significant. With implementation of Mitigation Measure 4.4-6, the impact
20 would be minimized, and the residual impact would be less than significant. Mitigation Measures
21 4.11-4 and 4.11-5, intended primarily to mitigate impacts to aesthetic resources, would partially
22 mitigate impacts to air quality resources as well.

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24 **Impact 4.4-6:** Proximity of the New Intermodal Facility to West Oakland, and of the
25 EBMUD Main WWTP to the OARB sub-district, could expose
26 individuals to odorous emissions.

27 **Significance:** Less than significant

28 **Mitigation:** Mitigation is not warranted.

29 Examination of the annual wind directions shown in Figure D-1 of the BAAQMD CEQA
30 Guidelines (1996, revised 1999) illustrates that the prevailing wind direction in the area is from
31 the west and west-northwest most of the year. Winds sometimes blow from the southwest to
32 southeast, in part due to passing frontal systems. Winds seldom blow from the northeast
33 quadrant. The wind directions shown for the area were developed from data collected at the
34 EBMUD Main WWTP.

1 The EBMUD Main WWTP is located northeast of the OARB sub-district. Odor thresholds of
2 airborne compounds from WWTPs are very low (primarily hydrogen sulfide, with a characteristic
3 “rotten egg” odor). Because of this, there is a possibility that new employee population at the
4 OARB sub-district could experience odor events. Because the wind is seldom from the
5 northeast, the likelihood odor events at the OARB is low, although such events would be
6 possible under stable, calm air conditions. Because the expected frequency of odor events at
7 the OARB sub-district is low, the impact is considered less than significant.

8 The New Intermodal Facility would be generally located at the former Knight railyard. This would
9 place the railyard in the prevailing upwind direction from the West Oakland community,
10 however, odor thresholds for compounds in diesel exhaust are relatively high compared to many
11 other types of odorous compounds, and these odors would be expected to dissipate quickly.
12 Therefore, the expected likelihood of an odor impact is extremely low, given the distance of the
13 New Intermodal Facility to the West Oakland community and the intervening freeway and rail
14 land uses. The impact is considered less than significant. Should odor complaints regarding that
15 facility be registered with the BAAQMD, that agency would investigate these complaints.

16 Discussion of odors and land use compatibility can be found in Section 4.2: Land Use.

17 ~ ~ ~

18 **4.4.7 Mitigation**

19 Implementation of the following mitigation measures will avoid, minimize, reduce, rectify, or
20 compensate for significant impacts of redevelopment.⁶

21 **Mitigation 4.4-1:** Contractors shall implement all BAAQMD “Basic” and “Optional” PM₁₀ (fugitive
22 dust) control measures at all sites, and all “Enhanced” control measures at sites greater than
23 four acres.

24 This measure applies to Impact 4.4-1 and Cumulative Impact 5.4-1.

25 The following BAAQMD fugitive dust control measures shall be implemented as indicated at
26 construction sites, and shall be enforced through contract specifications.

⁶ An extensive evaluation of potential air quality mitigation measures was conducted as part of the Berths 55-58 EIR (Port of Oakland 1998). Mitigation measures found feasible in that study, and for which some cost-benefit remains are included in the following recommendations for mitigating maritime-related impacts.

BAAQMD Fugitive Dust Control Measures			
Control Measure	BAAQMD Category	Emission Source Controlled	Measure
1	Basic	Land	Water all active construction areas at least twice daily
2	Basic	Trucks	Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.
3	Basic	Land	Pave, apply water 3 times daily, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas and staging areas, at construction sites.
4	Basic	Land	Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.
5	Basic	Streets	Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
6	Enhanced	Land	Hydroseed or apply (nontoxic) soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
7	Enhanced	Stockpiles	Enclose, cover, water twice daily or apply (nontoxic) soil binders to exposed stockpiles (dirt, sand, etc.)
8	Enhanced	Streets	Limit traffic speeds on unpaved roads to 15 mph.
9	Enhanced	Land	Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
10	Enhanced	Land	Replant vegetation in disturbed areas as quickly as possible.
11	Optional	Land	Limit the area subject to excavation, grading, and other construction activity at any one time.
12	Optional	Land	Suspend excavation and grading activity when sustained ^a wind speeds exceed 25 mph.
13	Optional	Trucks	Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.

Source: BAAQMD, 1996 as revised through 1999. Table 2.
Note: ^aModified as per the Berths 55-58 EIR.

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- 1 **Mitigation 4.4-2:** Contractors shall implement exhaust control measures at all construction
- 2 sites.
- 3 This measure applies to Impact 4.4-2 and Cumulative Impact 5.4-1.

1 Exhaust control measures shall be implemented where feasible at each construction site, and
 2 may include, but not be limited to the following:

Exhaust Control Measures	
Control Measure	Measure
1	Prohibit truck idling in excess of 2 minutes
2	Use electricity from power poles rather than generators
3	Limit the size of construction equipment engines to the minimum practical size
4	Configure construction equipment with two to four degree engine timing retard or pre-combustion chamber engines
5	Install high pressure injectors on diesel construction equipment
6	Install soot traps
7	Install catalytic oxidizers
8	Minimize concurrent operation of vehicles
9	If they are available in the air basin, purchase emission offsets if ROG or NO _x emissions from construction where emissions exceed 6 tons/quarter

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3 **Mitigation 4.4-3:** The Port shall develop and implement a criteria pollutant reduction program
 4 aimed at reducing or off-setting Port-related emissions in West Oakland from its maritime and
 5 rail operations. The program shall be sufficiently funded to reduce and/or off-set redevelopment
 6 related contributions to local West Oakland air quality to the maximum extent feasible.

7 This measure applies to Impact 4.4-3 and Cumulative Impact 5.4-1.

8 This program shall be periodically reviewed and updated every one to three years,
 9 corresponding to regular updates of the Clean Air Plan. The review and update shall include a
 10 reassessment of funding requirements, technical feasibility, cost benefit assumptions and other
 11 factors. The periodic updates shall be submitted to the City/Port Liaison Committee or its
 12 equivalent.

13 The pollutant reduction program shall give priority to emission reduction strategies that address
 14 PM₁₀ emissions, but shall also provide for reductions in NO_x and ROG emissions. The emission
 15 reduction program shall include a list of potential emission reduction strategies. Strategies that
 16 shall be included in the program and implemented over the buildout period include:

- 17 • The Port shall expand its existing cargo handling equipment re-powering and retrofitting
 18 program (part of the Berths 55-58 Project air quality mitigation program) to include marine
 19 and rail terminal yard equipment added or relocated as part of redevelopment build-out.

- 1 1. On-site Port improvements.
- 2 • Configure truck parking in the Port to minimize traffic interference and reduce idling
- 3 times.
- 4 • Allow easy access to a truck parking facility at the Port 24-hours a day.
- 5 • Synchronize traffic lights in the Port area to reduce congestion (requires coordination
- 6 with the City).
- 7 2. City/Port loan or grant/incentive programs for local businesses or entities.
- 8 • Provide incentives for re-powering, retrofitting, electrifying, or switching to alternative
- 9 fuels to local businesses, franchises or truck fleets operating in West Oakland. Such
- 10 businesses may include, for example, locally owned and operated trucking
- 11 operations, refuse and recycling collection vehicles, school buses, Port and/or City
- 12 fleet vehicles, and US Mail trucks.

13 Other strategies to be included in the diesel emissions reduction program to be examined and

14 incorporate when technically and economically feasible, include the following:

- 15 1. On-site Port improvements.
- 16 • Allow trucks using alternative fuels to the head of queues or have separate gate
- 17 entrances.
- 18 2. On-going studies.
- 19 • Explore methods to minimize truck idling times at the Port.
- 20 • Explore and encourage the use of alternative fuels for Port marine, rail and truck
- 21 operations.
- 22 • Propose and fund a random roadside heavy duty diesel vehicle (HDDV) emissions
- 23 testing program and an HDDV repair subsidy program.
- 24 3. City/Port loan or grant/incentive programs for local businesses or entities.
- 25 • Provide subsidies, training programs and/or voucher programs for local West
- 26 Oakland businesses to conduct timing retard, compressions changes and other
- 27 adjustments to diesel engines to reduce emissions.
- 28 • Install oxidative catalyst and particulate traps on diesel engines with low NOx,
- 29 alternatively fueled or electrified engines.

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1 **Mitigation 4.4-5:** Major developers shall fund on a fair share basis BAAQMD-recommended
 2 feasible Transportation Control Measures (TCMs) for reducing vehicle emissions from
 3 commercial, institutional, and industrial operations, as well as all CAP TCMs the BAAQMD has
 4 identified as appropriate for local implementation.

5 This measure applies to Impact 4.4-4 and Cumulative Impact 5.4-1.

6 Each major developer of a subsequent redevelopment activity shall fund its fair share toward
 7 some or all of the following TCMs:

BAAQMD-Recommended Transportation Control Measure, Modified for this Action

Control Measure	Measure
1	Construct transit facilities such as bus turnouts/bus bulbs, benches, shelters, etc. Improve transit bus service to the area.
2	Design and locate buildings to facilitate transit access, e.g., locate building entrances near transit stops, eliminate building setbacks, etc.
3	Provide and make public transit convenient for 16 th and Wood sub-district residents and tenants
4	Encourage OARB sub-district tenants to use car pools, vanpools, and public transit by providing incentives.
5	Provide a shuttle to and from the West Oakland BART station
6	Provide on-site shops and services for employees, such as cafeteria, bank, dry cleaners, convenience market, etc.
7	Provide on-site child care, or contribute to off-site child care within walking distance.
8	Establish mid-day shuttle service from worksite to food service establishments/commercial areas.
9	Provide preferential parking for carpool and vanpool vehicles
10	Implement parking fees for single occupancy vehicle commuters.
11	Provide secure, weather-protected bicycle parking for employees.
12	Provide safe, direct access for bicyclists to adjacent bicycle routes.
13	Provide showers and lockers for employees bicycling or walking to work.
14	Provide direct, safe, attractive pedestrian access from project to transit stops and adjacent development.
15	Provide neighborhood-serving shops and services within or adjacent to the 16 th and Wood sub-district.

Source: BAAQMD 1996, as amended through 1999. Based on Table 15: "Mitigation Measures for Reducing Motor Vehicle Emissions from Commercial, Institutional, and Industrial Projects."

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9 Each major developer of a subsequent redevelopment activity shall also fund its fair share of the
 10 following CAP TCMs, which the BAAQMD has identified as appropriate for local implementation,
 11 with redevelopment-specific modifications:

OARB Area Redevelopment EIR

CAP TCMs	Description
1. Support Voluntary Employer-Based Trip Reduction Programs	The City and Port will explore ways to promote transit use and support employer-based trip reduction programs through development incentives such as density bonuses, reduced parking requirements, incentives for permanent bicycle facilities, etc. The City will encourage development of transit transfer stations near employment concentrations in the Gateway development area and 16 th /Wood sub-district.
9. Improve Bicycle Access and Facilities	Redevelopment includes extensive multi-use trails serving as both “spine” thoroughfares and “spurs” connecting main trails to the Oakland waterfront. The City and Port will encourage employers and developers to provide permanent bicycle facilities.
12. Improve Arterial Traffic Management	Maritime Street and other roadways in the project area will include facilities to encourage bicycling and walking. Roadways and intersections will be designed to operate at City-standard LOS, to facilitate traffic flow and avoid unnecessary queuing.
15. Local Clean Air plans, Policies and Programs	Redevelopment as presented in Chapter 3: Description, and including mitigation measures described in Chapter 4: Setting and Baseline, Impacts, and Mitigation, incorporates land uses such as live/work, and measures intended to reduce the number and length of single-occupant automobile trips.
17. Conduct Demonstration Projects	The City will encourage through development incentives demonstration projects for fleet electrification or alternative fueling. In addition, the Port will not preclude alternative fueling in its design of rail facilities.
19. Pedestrian Travel	OARB and Maritime sub-districts will include multi-use trails to encourage safe pedestrian travel.
20. Promote Traffic Calming Measures	Redevelopment will include traffic calming measures to the extent appropriate, consistent with the General Plan and sound traffic management of the project area area.

Source: BAAQMD CEQA Guidelines, revised 1999 Table 5.

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These TCMs shall be coordinated with transportation demand management (TDM) measures implemented under Mitigation Measure 4.3-4.

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Mitigation 4.4-6: Title 24 of the Uniform Building Code (UBC) requires that new construction include energy-conserving fixtures and designs. Additionally, the City and Port shall implement sustainable development policies and strategies related to new development design and construction.

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This measure applies to Impact 4.4-5.

1 Implementation of UBC requirements would reduce the need for space and water heating that
2 would emit pollutants.

3 City and Port policies and strategies shall be conditioned for all new development within the
4 redevelopment project area. Specific examples may include, and are not limited to the following:

- 5 • Wood fire heating shall be prohibited in new live/work development.
- 6 • Where siting allows and where feasible, buildings shall be oriented to take advantage of
7 passive and active climate control designs.
- 8 • To the maximum extent feasible, central water heating systems shall be installed.

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