measure titled *Reduce speed on unpaved roads to less than 15 mph* without altering the default percent reduction. URBEMIS assumes that fugitive PM dust emissions from soil disturbance activities and travel on unpaved roads account for approximately 79 percent and 21 percent of total the fugitive PM dust emissions, respectively. URBEMIS will apply an approximate 53 percent reduction to total fugitive PM dust emissions as a result of implementation of the *Basic Construction Mitigation Measures* 1 through 5 in Table 8-2.

BAAQMD considers this as a surrogate for the implementation of the *Basic Construction Mitigation Measures* listed in Section 8.2. RoadMod assumes an inherent 50 percent reduction in fugitive PM dust emissions when water trucks are selected. BAAQMD recommends selecting water trucks to account for the implementation of the *Basic Construction Mitigation Measures*.

Exhaust Emissions

For quantification of the exhaust-related *Basic Construction Mitigation Measures* in URBEMIS, select the *Mitigation* option in the *Enter Construction Data* module for the *Site Grading*, *Building Construction,* and *Asphalt Paving* phases, as applicable to the proposed project. BAAQMD then recommends that for the *Off-Road Equipment Mitigation*, select (turn on) the measure titled *Use aqueous diesel fuel* and alter the default percent reduction for each to match those recommended by BAAQMD in Section 8.2. BAAQMD considers this as a surrogate for the implementation of the *Basic Construction Mitigation Measures* listed in Section 8.2.

RoadMod

RoadMod does not calculate emission reductions associated with the implementation of the exhaust-related *Basic Construction Mitigation Measures*. To quantify the exhaust-related emission reductions associated with the implementation of the *Basic Construction Mitigation Measures*, rely on the information and data contained in the *Data Entry* and *Emission Estimates* tabs in RoadMod. Reductions in exhaust emissions should be quantified separately for each phase (i.e., Grubbing/Land Clearing, Grading/Excavation, Drainage/Utilities/ Sub-Grade, and Paving). First isolate the exhaust emissions from off-road (e.g., heavy-duty) equipment for each phase. Table 8-4 below provides a cell reference for the *Data Entry* tab of RoadMod to assist with the identification and isolation of such emissions.

Once isolated, apply the specified percent reductions listed in Section 8.2 to each compound emission to determine the resultant amount of mitigated emissions from construction of the proposed project for each phase. A 5 percent reduction could be applied for NO_X, PM_{10}, and $PM_{2.5}$ to account for implementation of the appropriate *Basic Construction Mitigation Measures*.

Emission reductions should be estimated by multiplying the total emissions for each compound by the anticipated emission reduction applicable for that compound to estimate the mitigated amount of emissions reductions.

Linear Projects

For proposed projects that are linear in nature (e.g., road or levee construction, pipeline installation, transmission lines), BAAQMD recommends using the most current version of Sacramento Metropolitan Air Quality Management District's (SMAQMD) Road Construction Emissions Model (RoadMod) to quantify construction-related criteria air pollutants and precursors. Similar to URBEMIS, RoadMod quantifies fugitive PM dust, exhaust, and off-gas emissions from the following construction-related activity phases: grubbing/land clearing, grading/excavation, drainage/utilities/sub-grade, and paving. BAAQMD recommends using RoadMod in accordance with the user instructions and default assumptions unless project-specific information is available. The default assumptions are applicable to projects located within the SFBAAB. Also, URBEMIS inherently accounts for the on-site construction of roadways and the installation of project infrastructure. If the proposed project involves off-site improvements that

are linear in nature (e.g., roadway widening), use RoadMod in addition to URBEMIS to determine total emissions.

Table B-1
Roadway Construction Emissions Model
Cell Reference for Unmitigated Off-Road Equipment Emissions

Linear Construction Phase	NO_X	PM_{10}	$PM_{2.5}$
Grubbing/Land Clearing	G155	H155	I155
Grading/Excavation	G195	H195	I195
Drainage/Utilities/Sub-Grade	G235	H235	I235
Paving	G275	H275	I275

Notes: NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less.
Cell references refer to the *Data Entry* tab from the SMAQMD Road Construction Emissions Model.
Source: SMAQMD 2009.

NO_X Emission Reduction
Emissions of NO_X (lb/day) × (1 – [NO_X percent reduction])

PM_{10} Emission Reduction
Emissions of PM_{10} (lb/day) × (1 – [PM_{10} percent reduction])

$PM_{2.5}$ Emission Reduction
Emissions of $PM_{2.5}$ (lb/day) × ([1 – [$PM_{2.5}$ percent reduction])

Users should use the *Emission Estimates* tab to calculate the total mitigated amount of emissions for each phase of construction. The total NO_X, PM_{10}, and $PM_{2.5}$ exhaust emissions for each phase are contained in cells E6 to E9, H6 to H9, and K6 to K9, respectively. To calculate the total amount of mitigated emissions, first subtract the unmitigated off-road equipment exhaust emissions (Please refer to Table 8-2) from the total exhaust emissions to calculate total emissions without inclusion of off-road equipment exhaust emissions. Then, add the mitigated off-road exhaust emissions (calculated with the method described above) to the remaining emissions to calculate the total emissions with mitigated off-road construction equipment exhaust emissions. For PM_{10} and $PM_{2.5}$, add the mitigated exhaust emissions with the mitigated fugitive PM dust emissions (calculated by RoadMod) to calculate the total amount of mitigated PM_{10} and $PM_{2.5}$ emissions.

Fugitive Particulate Matter Dust
BAAQMD recommends that for *Site Grading Soil Disturbance Mitigation* select (turn on) the soil stabilizing measure titled *Equipment loading/unloading*. To account for the implementation of the *Additional Construction Mitigation Measures* 1 through 8, alter the default percent reduction to 63 percent, which would result in a total reduction of 75 percent in fugitive PM dust emissions.

To quantify emission reductions associated with the implementation of the fugitive PM dust-related *Additional Construction Mitigation Measures* in RoadMod, rely on the *Emission Estimates* tab. RoadMod assumes a 50 percent reduction in fugitive PM dust emissions. Apply an additional 50 percent reduction to the fugitive PM dust emissions contained in the *Emission Estimates* tab of RoadMod to account for the implementation of the *Additional Construction Mitigation Measures* 1

through 8. The resulting total percent reduction from fugitive PM dust emissions would be 75 percent (i.e., 1 – (0.5 × 0.5)). The resultant amount of fugitive PM dust emissions should be added to the average daily mitigated exhaust PM emissions (methodology described below) to calculate the total amount of mitigated PM_{10} and $PM_{2.5}$ emissions.

Exhaust Emissions

BAAQMD recommends that for the *Off-Road Equipment Mitigation* select (turn on) the measure titled *Diesel particulate filter* and alter the default percent reduction for each to match those recommended by BAAQMD in Section 8.2. BAAQMD considers this as a surrogate for the implementation of the *Additional Construction Mitigation Measures*. BAAQMD recommends that, if implementing Measure 9, turn on the measure titled *Use aqueous diesel fuel* and alter the default percent reduction values to 20 percent for NO_X and 45 percent for PM_{10}, and $PM_{2.5}$.

For RoadMod, apply a 20 percent reduction for NO_X and a 45 percent reduction for PM_{10} and $PM_{2.5}$ to account for implementation of Measure 9 in the *Additional Construction Mitigation Measure* .To quantify the other exhaust-related emission reductions associated with the implementation of the *Additional Construction Mitigation Measures*, follow the same methodology described above for applying the reductions associated with the implementation of the *Basic Construction Mitigation Measures*.

Off-Gas Emissions

For quantification of off-gas-related *Additional Construction Mitigation Measures*, first select the *Mitigation* option in the *Enter Construction Data* module for the *Architectural Coating* phase. Then select (turn on) the measures applicable to the proposed project and alter the default percent reduction for each to match those recommended by BAAQMD in Section 8.2. BAAQMD considers this as a surrogate for the implementation of the *Additional Construction Mitigation Measures* listed in Section 8.2.

EXAMPLE PROJECT CONSTRUCTION-RELATED EMISSIONS CALCULATION

Description

This Example Project proposes development of 100 single-family residential units over a 2-year period. The project site would be approximately 33 acres (URBEMIS default assumption) and require an undetermined volume of fill materials to be imported to the site. In addition, the project would involve construction of a new access road to serve the development.

Screening Analysis

The project size is less than the construction screening level for single-family residential uses listed in Table 3-4. However, because the project includes the import of fill to the site, the construction screening levels cannot be used to address construction emissions. Therefore, a detailed quantitative analysis of construction-generated NO_X emissions should be performed using URBEMIS to estimate NO_X generated by construction of the residential units and using the RoadMod to estimate NO_X emissions from construction of the new access road.

Emissions Quantification

The size and type of land use proposed (i.e., single family housing) should be entered into the Land Use Module in URBEMIS. In this case, the project's total acres are equal to the default URBEMIS assumption; therefore, no override is necessary in the Acres data field. Modeling the construction emissions associated with single-family residential units in URBEMIS requires detailed information about the construction schedule (e.g., commencement date, types of construction activities required, and length of construction activities).

The fugitive PM dust emissions associated with fill activities should be estimated using the Fugitive Dust tab of the Mass Site Grading phase. For use of the Low Level of Detail quantification method, the volume of fill activities should be divided by the number of days that fill activities would occur. For example, if the project would require up to 20,000 yd^3 of fill materials to be imported over a minimum of 40 work days, the user should enter 500 (i.e., 20,000 yd^3 ÷ 40 days) into the Amount of Offsite Cut/Fill (cubic yards/day) data field. In addition, users should also input the total volume of fill materials to be imported into the Total Amount of Soil to Import (cubic yards) data field in the Soil Hauling tab. Off-road construction equipment for grading activities is estimated by URBEMIS based on the Maximum Daily Acreage Disturbed data field.

URBEMIS estimates the types and quantities of construction equipment in the Building Construction phase to develop the proposed project. For the Asphalt Paving phase, URBEMIS assumes the project requires asphalt paving for 25% of the total site. If more specific information can be provided, then user should turn off the Reset acreage with land use changes button in the Off Gas Emissions tab and override the Total Acreage to be Paved with Asphalt data field.

Due to the linear nature of the new access road to the project, daily mass emissions associated with its construction should be quantified using RoadMod. Users should obtain basic project information for the new access road and enter the information into the Data Entry tab of RoadMod. If project-specific information is not available RoadMod estimates the construction schedule for the road and the equipment used in each construction phase.

For analysis of the project's total average daily emissions, users should add emissions of each respective pollutant associated with development of the single-family residential units with the respective emissions associated with construction of the access road where construction activities are anticipated to overlap in the construction schedule. The average daily emissions of each pollutant that would occur throughout the entire construction period should be identified and compared with the District's threshold of significance. If the emissions would exceed the threshold of significance, construction emissions would be considered significant and all feasible mitigation measures to reduce emissions shall be implemented.

The user should keep in mind that the District's numeric thresholds for construction emissions apply to exhaust emissions only. The District recommends implementation of Basic Control Measures to reduce fugitive dust emissions for all projects, and Additional Control Measures to reduce fugitive dust emissions for significant projects.

C. SAMPLE AIR QUALITY SETTING

The Bay Area Air Quality Management District (BAAQMD) is the regional air quality agency for the San Francisco Bay Area Air Basin (SFBAAB), which comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties, the southern portion of Sonoma, and the southwestern portion of Solano County. Air quality in this area is determined by such natural factors as topography, meteorology, and climate, in addition to the presence of existing air pollution sources and ambient conditions. These factors along with applicable regulations are discussed below.

C.1.1. Climate, Topography, Air Pollution Potential

The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Coast Range splits resulting in a western coast gap, Golden Gate, and an eastern coast gap, Carquinez Strait, which allow air to flow in and out of the SFBAAB and the Central Valley.

The climate is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell. During the summer, the Pacific high pressure cell is centered over the northeastern Pacific Ocean resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below to the surface because of the northwesterly flow produces a band of cold water off the California coast. The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold water band resulting in condensation and the presence of fog and stratus clouds along the Northern California coast.

In the winter, the Pacific high-pressure cell weakens and shifts southward resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in a low air pollution potential.

High Pressure Cell

During the summer, the large-scale meteorological condition that dominates the West Coast is a semi-permanent high pressure cell centered over the northeastern Pacific Ocean. This high pressure cell keeps storms from affecting the California coast. Hence, the SFBAAB experiences little precipitation in the summer months. Winds tend to blow on shore out of the north/northwest.

The steady northwesterly flow induces upwelling of cold water from below. This upwelling produces a band of cold water off the California coast. When air approaches the California coast, already cool and moisture-laden from its long journey over the Pacific, it is further cooled as it crosses this bank of cold water. This cooling often produces condensation resulting in a high incidence of fog and stratus clouds along the Northern California coast in the summer.

Generally in the winter, the Pacific high weakens and shifts southward, winds tend to flow offshore, upwelling ceases and storms occur. During the winter rainy periods, inversions (layers of warmer air over colder air; see below) are weak or nonexistent, winds are usually moderate and air pollution potential is low. The Pacific high does periodically become dominant, bringing strong inversions, light winds and high pollution potential.

Topography

The topography of the SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys and bays. This complex terrain, especially the higher elevations, distorts the normal wind flow patterns in the SFBAAB. The greatest distortion occur when low-level inversions are present and the air beneath the inversion flows independently of air above the inversion, a condition that is common in the summer time.

The only major break in California's Coast Range occurs in the SFBAAB. Here the Coast Range splits into western and eastern ranges. Between the two ranges lies San Francisco Bay. The gap in the western coast range is known as the Golden Gate, and the gap in the eastern coast range is the Carquinez Strait. These gaps allow air to pass into and out of the SFBAAB and the Central Valley.

Wind Patterns

During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more directly from the west as they stream through the Golden Gate. This channeling of wind through the Golden Gate produces a jet that sweeps eastward and splits off to the northwest toward Richmond and to the southwest toward San Jose when it meets the East Bay hills.

Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, the Golden Gate or the San Bruno gap. For example, the average wind speed at San Francisco International Airport in July is about 17 knots (from 3 p.m. to 4 p.m.), compared with only 7 knots at San Jose and less than 6 knots at the Farallon Islands.

The air flowing in from the coast to the Central Valley, called the sea breeze, begins developing at or near ground level along the coast in late morning or early afternoon. As the day progresses, the sea breeze layer deepens and increases in velocity while spreading inland. The depth of the sea breeze depends in large part upon the height and strength of the inversion. If the inversion is low and strong, and hence stable, the flow of the sea breeze will be inhibited and stagnant conditions are likely to result.

In the winter, the SFBAAB frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds. Winter stagnation episodes are characterized by nighttime drainage flows in coastal valleys. Drainage is a reversal of the usual daytime air-flow patterns; air moves from the Central Valley toward the coast and back down toward the Bay from the smaller valleys within the SFBAAB.

Temperature

Summertime temperatures in the SFBAAB are determined in large part by the effect of differential heating between land and water surfaces. Because land tends to heat up and cool off more quickly than water, a large-scale gradient (differential) in temperature is often created between the coast and the Central Valley, and small-scale local gradients are often produced along the shorelines of the ocean and bays. The temperature gradient near the ocean is also exaggerated, especially in summer, because of the upwelling of cold ocean bottom water along the coast. On summer afternoons the temperatures at the coast can be 35°F cooler than temperatures 15 to 20 miles inland. At night this contrast usually decreases to less than 10°.

In the winter, the relationship of minimum and maximum temperatures is reversed. During the daytime the temperature contrast between the coast and inland areas is small, whereas at night the variation in temperature is large.

Precipitation

The SFBAAB is characterized by moderately wet winters and dry summers. Winter rains account for about 75 percent of the average annual rainfall. The amount of annual precipitation can vary greatly from one part of the SFBAAB to another even within short distances. In general, total annual rainfall can reach 40 inches in the mountains, but it is often less than 16 inches in sheltered valleys.

During rainy periods, ventilation (rapid horizontal movement of air and injection of cleaner air) and vertical mixing are usually high, and thus pollution levels tend to be low. However, frequent dry periods do occur during the winter where mixing and ventilation are low and pollutant levels build up.

Air Pollution Potential

The potential for high pollutant concentrations developing at a given location depends upon the quantity of pollutants emitted into the atmosphere in the surrounding area or upwind, and the ability of the atmosphere to disperse the contaminated air. The topographic and climatological factors discussed above influence the atmospheric pollution potential of an area. Atmospheric pollution potential, as the term is used here, is independent of the location of emission sources and is instead a function of factors described below.

Wind Circulation

Low wind speed contributes to the buildup of air pollution because it allows more pollutants to be emitted into the air mass per unit of time. Light winds occur most frequently during periods of low sun (fall and winter, and early morning) and at night. These are also periods when air pollutant emissions from some sources are at their peak, namely, commute traffic (early morning) and wood burning appliances (nighttime). The problem can be compounded in valleys, when weak flows carry the pollutants upvalley during the day, and cold air drainage flows move the air mass downvalley at night. Such restricted movement of trapped air provides little opportunity for ventilation and leads to buildup of pollutants to potentially unhealthful levels.

Wind-roses provide useful information for communities that contain industry, landfills or other potentially odorous or noxious land uses. Each wind-rose diagram provides a general indication of the proportion of time that winds blow from each compass direction. The longer the vector length, the greater the frequency of wind occurring from that direction. Such information may be particularly useful in planning buffer zones. For example, sensitive receptors such as residential developments, schools or hospitals are inappropriate uses immediately downwind from facilities that emit toxic or odorous pollutants, unless adequate separation is provided by a buffer zone. Caution should be taken in using wind-roses in planning and environmental review processes. A site on the opposite side of a hill or tall building, even a short distance from a meteorological monitoring station, may experience a significant difference in wind pattern. Consult BAAQMD meteorologists if more detailed wind circulation information is needed.

Inversions

An inversion is a layer of warmer air over a layer of cooler air. Inversions affect air quality conditions significantly because they influence the mixing depth, i.e., the vertical depth in the atmosphere available for diluting air contaminants near the ground. The highest air pollutant concentrations in the SFBAAB generally occur during inversions.

There are two types of inversions that occur regularly in the SFBAAB. One is more common in the summer and fall, while the other is most common during the winter. The frequent occurrence of elevated temperature inversions in summer and fall months acts to cap the mixing depth, limiting the depth of air available for dilution. Elevated inversions are caused by subsiding air from the subtropical high pressure zone, and from the cool marine air layer that is drawn into the SFBAAB by the heated low pressure region in the Central Valley.

The inversions typical of winter, called radiation inversions, are formed as heat quickly radiates from the earth's surface after sunset, causing the air in contact with it to rapidly cool. Radiation inversions are strongest on clear, low-wind, cold winter nights, allowing the build-up of such pollutants as carbon monoxide and particulate matter. When wind speeds are low, there is little mechanical turbulence to mix the air, resulting in a layer of warm air over a layer of cooler air next

to the ground. Mixing depths under these conditions can be as shallow as 50 to 100 meters, particularly in rural areas. Urban areas usually have deeper minimum mixing layers because of heat island effects and increased surface roughness. During radiation inversions downwind transport is slow, the mixing depths are shallow, and turbulence is minimal. All of these factors contribute

Although each type of inversion is most common during a specific season, either inversion mechanism can occur at any time of the year. Sometimes both occur simultaneously. Moreover, the characteristics of an inversion often change throughout the course of a day. The terrain of the SFBAAB also induces significant variations among subregions.

Solar Radiation

The frequency of hot, sunny days during the summer months in the SFBAAB is another important factor that affects air pollution potential. It is at the higher temperatures that ozone is formed. In the presence of ultraviolet sunlight and warm temperatures, reactive organic gases and oxides of nitrogen react to form secondary photochemical pollutants, including ozone.

Because temperatures in many of the SFBAAB inland valleys are so much higher than near the coast, the inland areas are especially prone to photochemical air pollution.

In late fall and winter, solar angles are low, resulting in insufficient ultraviolet light and warming of the atmosphere to drive the photochemical reactions. Ozone concentrations do not reach significant levels in the SFBAAB during these seasons.

Sheltered Terrain

The hills and mountains in the SFBAAB contribute to the high pollution potential of some areas. During the day, or at night during windy conditions, areas in the lee sides of mountains are sheltered from the prevailing winds, thereby reducing turbulence and downwind transport. At night, when wind speeds are low, the upper atmospheric layers are often decoupled from the surface layers during radiation conditions. If elevated terrain is present, it will tend to block pollutant transport in that direction. Elevated terrain also can create a recirculation pattern by inducing upvalley air flows during the day and reverse downvalley flows during the night, allowing little inflow of fresh air.

The areas having the highest air pollution potential tend to be those that experience the highest temperatures in the summer and the lowest temperatures in the winter. The coastal areas are exposed to the prevailing marine air , creating cooler temperatures in the summer, warmer temperatures in winter, and stratus clouds all year. The inland valleys are sheltered from the marine air and experience hotter summers and colder winters. Thus, the topography of the inland valleys creates conditions conducive to high air pollution potential.

Pollution Potential Related to Emissions

Although air pollution potential is strongly influenced by climate and topography, the air pollution that occurs in a location also depends upon the amount of air pollutant emissions in the surrounding area or transported from more distant places. Air pollutant emissions generally are highest in areas that have high population densities, high motor vehicle use and/or industrialization. These contaminants created by photochemical processes in the atmosphere, such as ozone, may result in high concentrations many miles downwind from the sources of their precursor chemicals.

Climatological Subregions

This section discusses the varying climatological and topographic conditions, and the resulting variations in air pollution potential, within inhabited subregions of the SFBAAB. All urbanized areas of the SFBAAB are included in one of 11 climatological subregions. Sparsely inhabited

areas are excluded from the subregional designations. Some of the climatological subregions discussed in this appendix overlap county boundaries. The Lead Agencies analyzing projects located close to the boundary between subregions may need to examine the characteristics of the neighboring subregions to adequately evaluate potential air quality impacts.

The information about each subregion includes location, topography and climatological factors relevant to air quality. Where relevant to air quality concerns, more localized subareas within a subregion are discussed. Each subregional section concludes with a discussion of pollution potential resulting from climatological and topographic variables and the major types of air pollutant sources in the subregion.

Carquinez Strait Region

The Carquinez Strait runs from Rodeo to Martinez. It is the only sea-level gap between the Bay and the Central Valley. The subregion includes the lowlands bordering the strait to the north and south, and includes the area adjoining Suisun Bay and the western part of the Sacramento-San Joaquin Delta as far east as Bethel Island. The subregion extends from Rodeo in the southwest and Vallejo in the northwest to Fairfield on the northeast and Brentwood on the southeast.

Prevailing winds are from the west in the Carquinez Strait. During the summer and fall months, high pressure offshore coupled with low pressure in the Central Valley causes marine air to flow eastward through the Carquinez Strait. The wind is strongest in the afternoon. Afternoon wind speeds of 15 to 20 mph are common throughout the strait region. Annual average wind speeds are 8 mph in Martinez, and 9 to 10 mph further east. Sometimes atmospheric conditions cause air to flow from the east. East winds usually contain more pollutants than the cleaner marine air from the west. In the summer and fall months, this can cause elevated pollutant levels to move into the central SFBAAB through the strait. These high pressure periods are usually accompanied by low wind speeds, shallow mixing depths, higher temperatures and little or no rainfall.

Summer mean maximum temperatures reach about 90° F. in the subregion. Mean minimum temperatures in the winter are in the high 30's. Temperature extremes are especially pronounced in sheltered areas farther from the moderating effects of the strait itself, e.g. at Fairfield.

Many industrial facilities with significant air pollutant emissions — e.g., chemical plants and refineries — are located within the Carquinez Strait Region. The pollution potential of this area is often moderated by high wind speeds. However, upsets at industrial facilities can lead to short-term pollution episodes, and emissions of unpleasant odors may occur at anytime. Receptors downwind of these facilities could suffer more long-term exposure to air contaminants than individuals elsewhere., It is important that local governments and other Lead Agencies maintain buffers zones around sources of air pollution sufficient to avoid adverse health and nuisance impacts on nearby receptors. Areas of the subregion that are traversed by major roadways, e.g. Interstate 80, may also be subject to higher local concentrations of carbon monoxide and particulate matter, as well as certain toxic air contaminants such as benzene.

Cotati and Petaluma Valleys

The subregion that stretches from Santa Rosa to the San Pablo Bay is often considered as two different valleys: the Cotati Valley in the north and the Petaluma Valley in the south. To the east, the valley is bordered by the Sonoma Mountains, while to the west is a series of low hills, followed by the Estero Lowlands, which open to the Pacific Ocean. The region from the Estero Lowlands to the San Pablo Bay is known as the Petaluma Gap. This low-terrain area allows marine air to travel into the SFBAAB.

Wind patterns in the Petaluma and Cotati Valleys are strongly influenced by the Petaluma Gap, with winds flowing predominantly from the west. As marine air travels through the Petaluma Gap, it splits into northward and southward paths moving into the Cotati and Petaluma valleys. The

southward path crosses San Pablo Bay and moves eastward through the Carquinez Strait. The northward path contributes to Santa Rosa's prevailing winds from the south and southeast. Petaluma's prevailing winds are from the northwest.

When the ocean breeze is weak, strong winds from the east can predominate, carrying pollutants from the Central Valley and the Carquinez Strait. During these periods, upvalley flows can carry the polluted air as far north as Santa Rosa.

Winds are usually stronger in the Petaluma Valley than the Cotati Valley because the former is directly in line with the Petaluma Gap. Petaluma's climate is similar to areas closer to the coast even though Petaluma is 28 miles from the ocean. Average annual wind speed at the Petaluma Airport is seven mph. The Cotati Valley, being slightly north of the Petaluma Gap, experiences lower wind speeds. The annual average wind speed in Santa Rosa is five mph.

Air temperatures are very similar in the two valleys. Summer maximum temperatures for this subregion are in the low-to-mid-80's, while winter maximum temperatures are in the high-50's to low-60's. Summer minimum temperatures are around 50 degrees, and winter minimum temperatures are in the high 30's.

Generally, air pollution potential is low in the Petaluma Valley because of its link to the Petaluma Gap and because of its low population density. There are two scenarios that could produce elevated pollutant levels: 1) stagnant conditions in the morning hours created when a weak ocean breeze meets a weak bay breeze, and 2) an eastern or southeastern wind pattern in the afternoon brings in pollution from the Carquinez Strait Region and the Central Valley.

The Cotati Valley has a higher pollution potential than does the Petaluma Valley. The Cotati Valley lacks a gap to the sea, contains a larger population and has natural barriers at its northern and eastern ends. There are also industrial facilities in and around Santa Rosa. Both valleys of this subregion are also threatened by increased motor vehicle traffic and the associated air contaminants. Population and motor vehicle use are increasing significantly, and housing costs and the suburbanization of employment are leading to more and longer commutes traversing the subregion.

Diablo and San Ramon Valleys

East of the Coast Range lay the Diablo and San Ramon Valleys. The valleys have a northwest to southeast orientation, with the northern portion known as Diablo Valley and the southern portion as San Ramon Valley. The Diablo Valley is bordered in the north by the Carquinez Strait and in the south by the San Ramon Valley. The San Ramon Valley is long and narrow and extends south from Walnut Creek to Dublin. At its southern end it opens onto the Amador Valley.

The mountains on the west side of these valleys block much of the marine air from reaching the valleys. During the daytime, there are two predominant flow patterns: an upvalley flow from the north and a westerly flow (wind from the west) across the lower elevations of the Coast Range. On clear nights, surface inversions separate the flow of air into two layers: the surface flow and the upper layer flow. When this happens, there are often drainage surface winds which flow downvalley toward the Carquinez Strait.

Wind speeds in these valleys generally are low. Monitoring stations in Concord and Danville report annual average wind speeds of 5 mph. Winds can increase in the afternoon near San Ramon because it is located at the eastern edge of the Crow Canyon gap. Through this gap, polluted air from cities near the Bay travels to the valley in the summer months.

Air temperatures in these valleys are cooler in the winter and warmer in the summer than are temperatures further west, as these valleys are far from the moderating effect of the Bay and

ocean. Mean summer maximum temperatures are in the low- to mid-80's. Mean winter minimum temperatures are in the high-30's to low-40's.

Pollution potential is relatively high in these valleys. On winter evenings, light winds combined with surface-based inversions and terrain that restricts air flow can cause pollutant levels to build up. San Ramon Valley can experience high pollution concentrations due to motor vehicle emissions and emissions from fireplaces and wood stoves. In the summer months, ozone and ozone precursors are often transported into the valleys from both the central SFBAAB and the Central Valley.

Livermore Valley

The Livermore Valley is a sheltered inland valley near the eastern border of SFBAAB. The western side of the valley is bordered by 1,000 to 1,500 foot hills with two gaps connecting the valley to the central SFBAAB, the Hayward Pass and Niles Canyon. The eastern side of the valley also is bordered by 1,000 to 1,500 foot hills with one major passage to the San Joaquin Valley called the Altamont Pass and several secondary passages. To the north lie the Black Hills and Mount Diablo. A northwest to southeast channel connects the Diablo Valley to the Livermore Valley. The south side of the Livermore Valley is bordered by mountains approximately 3,000 to 3,500 feet high.

During the summer months, when there is a strong inversion with a low ceiling, air movement is weak and pollutants become trapped and concentrated. Maximum summer temperatures in the Livermore Valley range from the high-80's to the low-90's, with extremes in the 100's. At other times in the summer, a strong Pacific high pressure cell from the west, coupled with hot inland temperatures causes a strong onshore pressure gradient which produces a strong, afternoon wind. With a weak temperature inversion, air moves over the hills with ease, dispersing pollutants.

In the winter, with the exception of an occasional storm moving through the area, air movement is often dictated by local conditions. At night and early morning, especially under clear, calm and cold conditions, gravity drives cold air downward. The cold air drains off the hills and moves into the gaps and passes. On the eastern side of the valley the prevailing winds blow from north, northeast and east out of the Altamont Pass. Winds are light during the late night and early morning hours. Winter daytime winds sometimes flow from the south through the Altamont Pass to the San Joaquin Valley. Average winter maximum temperatures range from the high-50's to the low-60's, while minimum temperatures are from the mid-to-high-30's, with extremes in the high teens and low-20's.

Air pollution potential is high in the Livermore Valley, especially for photochemical pollutants in the summer and fall. High temperatures increase the potential for ozone to build up. The valley not only traps locally generated pollutants but can be the receptor of ozone and ozone precursors from San Francisco, Alameda, Contra Costa and Santa Clara counties. On northeasterly wind flow days, most common in the early fall, ozone may be carried west from the San Joaquin Valley to the Livermore Valley.

During the winter, the sheltering effect of the valley, its distance from moderating water bodies, and the presence of a strong high pressure system contribute to the development of strong, surface-based temperature inversions. Pollutants such as carbon monoxide and particulate matter, generated by motor vehicles, fireplaces and agricultural burning, can become concentrated. Air pollution problems could intensify because of population growth and increased commuting to and through the subregion.

Marin County Basins

Marin County is bounded on the west by the Pacific Ocean, on the east by San Pablo Bay, on the south by the Golden Gate and on the north by the Petaluma Gap. Most of Marin's population lives in the eastern part of the county, in small, sheltered valleys. These valleys act like a series of miniature air basins.

Although there are a few mountains above 1500 feet, most of the terrain is only 800 to 1000 feet high, which usually is not high enough to block the marine layer. Because of the wedge shape of the county, northeast Marin County is further from the ocean than is the southeastern section. This extra distance from the ocean allows the marine air to be moderated by bayside conditions as it travels to northeastern Marin County. In southern Marin the distance from the ocean is short and elevations are lower, resulting in higher incidence of maritime air in that area.

Wind speeds are highest along the west coast of Marin, averaging about 8 to 10 miles per hour. The complex terrain in central Marin creates sufficient friction to slow the air flow. At Hamilton Air Force Base, in Novato, the annual average wind speeds are only 5 mph. The prevailing wind directions throughout Marin County are generally from the northwest.

In the summer months, areas along the coast are usually subject to onshore movement of cool marine air. In the winter, proximity to the ocean keeps the coastal regions relatively warm, with temperatures varying little throughout the year. Coastal temperatures are usually in the high-50's in the winter and the low-60's in the summer. The warmest months are September and October.

The eastern side of Marin County has warmer weather than the western side because of its distance from the ocean and because the hills that separate eastern Marin from western Marin occasionally block the flow of the marine air. The temperatures of cities next to the Bay are moderated by the cooling effect of the Bay in the summer and the warming effect of the Bay in the winter. For example, San Rafael experiences average maximum summer temperatures in the low-80's and average minimum winter temperatures in the low-40’s. Inland towns such as Kentfield experience average maximum temperatures that are two degrees cooler in the winter and two degrees warmer in the summer.

Air pollution potential is highest in eastern Marin County, where most of population is located in semi-sheltered valleys. In the southeast, the influence of marine air keeps pollution levels low. As development moves further north, there is greater potential for air pollution to build up because the valleys are more sheltered from the sea breeze. While Marin County does not have many polluting industries, the air quality on its eastern side — especially along the U.S. 101 corridor — may be affected by emissions from increasing motor vehicle use within and through the county.

Napa Valley

The Napa Valley is bordered by relatively high mountains. With an average ridge line height of about 2000 feet, with some peaks approaching 3000 to 4000 feet, these mountains are effective barriers to the prevailing northwesterly winds. The Napa Valley is widest at its southern end and narrows in the north.

During the day, the prevailing winds flow upvalley from the south about half of the time. A strong upvalley wind frequently develops during warm summer afternoons, drawing air in from the San Pablo Bay. Daytime winds sometimes flow downvalley from the north. During the evening, especially in the winter, downvalley drainage often occurs. Wind speeds are generally low, with almost 50 percent of the winds less than 4 mph. Only 5 percent of the winds are between 16 and 18 mph, representing strong summertime upvalley winds and winter storms.

Summer average maximum temperatures are in the low 80's at the southern end of the valley and in the low 90's at the northern end. Winter average maximum temperatures are in the high-

50's and low-60's, and minimum temperatures are in the high to mid 30's with the slightly cooler temperatures in the northern end.

The air pollution potential in the Napa Valley could be high if there were sufficient sources of air contaminants nearby. Summer and fall prevailing winds can transport ozone precursors northward from the Carquinez Strait Region to the Napa Valley, effectively trapping and concentrating the pollutants when stable conditions are present. The local upslope and downslope flows created by the surrounding mountains may also recirculate pollutants already present, contributing to buildup of air pollution. High ozone concentrations are a potential problem to sensitive crops such as wine grapes, as well as to human health. The high frequency of light winds and stable conditions during the late fall and winter contribute to the buildup of particulate matter from motor vehicles, agriculture and woodburning in fireplaces and stoves.

Northern Alameda and Western Contra Costa Counties

This climatological subregion stretches from Richmond to San Leandro. Its western boundary is defined by the Bay and its eastern boundary by the Oakland-Berkeley Hills. The Oakland-Berkeley Hills have a ridge line height of approximately 1500 feet, a significant barrier to air flow. The most densely populated area of the subregion lies in a strip of land between the Bay and the lower hills.

In this area, marine air traveling through the Golden Gate, as well as across San Francisco and through the San Bruno Gap, is a dominant weather factor. The Oakland-Berkeley Hills cause the westerly flow of air to split off to the north and south of Oakland, which causes diminished wind speeds. The prevailing winds for most of this subregion are from the west. At the northern end, near Richmond, prevailing winds are from the south-southwest.

Temperatures in this subregion have a narrow range due to the proximity of the moderating marine air. Maximum temperatures during summer average in the mid-70's, with minimums in the mid-50's. Winter highs are in the mid- to high-50's, with lows in the low- to mid-40's.

The air pollution potential is lowest for the parts of the subregion that are closest to the bay, due largely to good ventilation and less influx of pollutants from upwind sources. The occurrence of light winds in the evenings and early mornings occasionally causes elevated pollutant levels.

The air pollution potential at the northern (Richmond) and southern (Oakland, San Leandro) parts of this subregion is marginally higher than communities directly east of the Golden Gate, because of the lower frequency of strong winds.

This subregion contains a variety of industrial air pollution sources. Some industries are quite close to residential areas. The subregion is also traversed by frequently congested major freeways. Traffic and congestion, and the motor vehicle emissions they generate, are increasing.

Peninsula

The peninsula region extends from northwest of San Jose to the Golden Gate. The Santa Cruz Mountains run up the center of the peninsula, with elevations exceeding 2000 feet at the southern end, decreasing to 500 feet in South San Francisco. Coastal towns experience a high incidence of cool, foggy weather in the summer. Cities in the southeastern peninsula experience warmer temperatures and fewer foggy days because the marine layer is blocked by the ridgeline to the west. San Francisco lies at the northern end of the peninsula. Because most of San Francisco's topography is below 200 feet, marine air is able to flow easily across most of the city, making its climate cool and windy.

The blocking effect of the Santa Cruz Mountains results in variations in summertime maximum temperatures in different parts of the peninsula. For example, in coastal areas and San Francisco

the mean maximum summer temperatures are in the mid-60's, while in Redwood City the mean maximum summer temperatures are in the low-80's. Mean minimum temperatures during the winter months are in the high-30's to low-40's on the eastern side of the Peninsula and in the low 40's on the coast.

Two important gaps in the Santa Cruz Mountains occur on the peninsula. The larger of the two is the San Bruno Gap, extending from Fort Funston on the ocean to the San Francisco Airport. Because the gap is oriented in the same northwest to southeast direction as the prevailing winds, and because the elevations along the gap are less than 200 feet, marine air is easily able to penetrate into the bay. The other gap is the Crystal Springs Gap, between Half Moon Bay and San Carlos. As the sea breeze strengthens on summer afternoons, the gap permits maritime air to pass across the mountains, and its cooling effect is commonly seen from San Mateo to Redwood City.

Annual average wind speeds range from 5 to 10 mph throughout the peninsula, with higher wind speeds usually found along the coast. Winds on the eastern side of the peninsula are often high in certain areas, such as near the San Bruno Gap and the Crystal Springs Gap.

The prevailing winds along the peninsula's coast are from the west, although individual sites can show significant differences. For example, Fort Funston in western San Francisco shows a southwest wind pattern while Pillar Point in San Mateo County shows a northwest wind pattern. On the east side of the mountains winds are generally from the west, although wind patterns in this area are often influenced greatly by local topographic features.

Air pollution potential is highest along the southeastern portion of the peninsula. This is the area most protected from the high winds and fog of the marine layer. Pollutant transport from upwind sites is common. In the southeastern portion of the peninsula, air pollutant emissions are relatively high due to motor vehicle traffic as well as stationary sources. At the northern end of the peninsula in San Francisco, pollutant emissions are high, especially from motor vehicle congestion. Localized pollutants, such as carbon monoxide, can build up in "urban canyons". Winds are generally fast enough to carry the pollutants away before they can accumulate.

Santa Clara Valley

The Santa Clara Valley is bounded by the Bay to the north and by mountains to the east, south and west. Temperatures are warm on summer days and cool on summer nights, and winter temperatures are fairly mild. At the northern end of the valley, mean maximum temperatures are in the low-80's during the summer and the high-50's during the winter, and mean minimum temperatures range from the high-50's in the summer to the low-40's in the winter. Further inland, where the moderating effect of the Bay is not as strong, temperature extremes are greater. For example, in San Martin, located 27 miles south of the San Jose Airport, temperatures can be more than 10 degrees warmer on summer afternoons and more than 10 degrees cooler on winter nights.

Winds in the valley are greatly influenced by the terrain, resulting in a prevailing flow that roughly parallels the valley's northwest-southeast axis. A north-northwesterly sea breeze flows through the valley during the afternoon and early evening, and a light south-southeasterly drainage flow occurs during the late evening and early morning. In the summer the southern end of the valley sometimes becomes a "convergence zone," when air flowing from the Monterey Bay gets channeled northward into the southern end of the valley and meets with the prevailing north-northwesterly winds.

Wind speeds are greatest in the spring and summer and weakest in the fall and winter. Nighttime and early morning hours frequently have calm winds in all seasons, while summer afternoons and

evenings are quite breezy. Strong winds are rare, associated mostly with the occasional winter storm.

The air pollution potential of the Santa Clara Valley is high. High summer temperatures, stable air and mountains surrounding the valley combine to promote ozone formation. In addition to the many local sources of pollution, ozone precursors from San Francisco, San Mateo and Alameda Counties are carried by prevailing winds to the Santa Clara Valley. The valley tends to channel pollutants to the southeast. In addition, on summer days with low level inversions, ozone can be recirculated by southerly drainage flows in the late evening and early morning and by the prevailing northwesterlies in the afternoon. A similar recirculation pattern occurs in the winter, affecting levels of carbon monoxide and particulate matter. This movement of the air up and down the valley increases the impact of the pollutants significantly.

Pollution sources are plentiful and complex in this subregion. The Santa Clara Valley has a high concentration of industry at the northern end, in the Silicon Valley. Some of these industries are sources of air toxics as well as criteria air pollutants. In addition, Santa Clara Valley's large population and many work-site destinations generate the highest mobile source emissions of any subregion in the SFBAAB.

Sonoma Valley

The Sonoma Valley is west of the Napa Valley. It is separated from the Napa Valley and from the Cotati and Petaluma Valleys by mountains. The Sonoma Valley is long and narrow, approximately 5 miles wide at its southern end and less than a mile wide at the northern end.

The climate is similar to that of the Napa Valley, with the same basic wind characteristics. The strongest upvalley winds occur in the afternoon during the summer and the strongest downvalley winds occur during clear, calm winter nights. Prevailing winds follow the axis of the valley, northwest/southeast, while some upslope flow during the day and downslope flow during the night occurs near the base of the mountains. Summer average maximum temperatures are usually in the high-80's, and summer minimums are around 50 degrees. Winter maximums are in the high-50's to the mid-60's, with minimums ranging from the mid-30's to low-40's.

As in the Napa Valley, the air pollution potential of the Sonoma Valley could be high if there were significant sources of pollution nearby. Prevailing winds can transport local and nonlocally generated pollutants northward into the narrow valley, which often traps and concentrates the pollutants under stable conditions. The local upslope and downslope flows set up by the surrounding mountains may also recirculate pollutants.

However, local sources of air pollution are minor. With the exception of some processing of agricultural goods, such as wine and cheese manufacturing, there is little industry in this valley. Increases in motor vehicle emissions and woodsmoke emissions from stoves and fireplaces may increase pollution as the valley grows in population and as a tourist attraction.

Southwestern Alameda County

This subregion encompasses the southeast side of San Francisco Bay, from Dublin Canyon to north of Milpitas. The subregion is bordered on the east by the East Bay hills and on the west by the bay. Most of the area is flat.

This subregion is indirectly affected by marine air flow. Marine air entering through the Golden Gate is blocked by the East Bay hills, forcing the air to diverge into northerly and southerly paths. The southern flow is directed down the bay, parallel to the hills, where it eventually passes over southwestern Alameda County. These sea breezes are strongest in the afternoon. The further from the ocean the marine air travels, the more the ocean’s effect is diminished. Although the

climate in this region is affected by sea breezes, it is affected less so than the regions closer to the Golden Gate.

The climate of southwestern Alameda County is also affected by its close proximity to San Francisco Bay. The Bay cools the air with which it comes in contact during warm weather, while during cold weather the Bay warms the air. The normal northwest wind pattern carries this air onshore. Bay breezes push cool air onshore during the daytime and draw air from the land offshore at night.

Winds are predominantly out of the northwest during the summer months. In the winter, winds are equally likely to be from the east. Easterly-southeasterly surface flow into southern Alameda County passes through three major gaps: Hayward/Dublin Canyon, Niles Canyon and Mission Pass. Areas north of the gaps experience winds from the southeast, while areas south of the gaps experience winds from the northeast. Wind speeds are moderate in this subregion, with annual average wind speeds close to the Bay at about 7 mph, while further inland they average 6 mph.

Air temperatures are moderated by the subregion's proximity to the Bay and to the sea breeze. Temperatures are slightly cooler in the winter and slightly warmer in the summer than East Bay cities to the north. During the summer months, average maximum temperatures are in the mid-70's. Average maximum winter temperatures are in the high-50's to low-60's. Average minimum temperatures are in the low 40's in winter and mid-50's in the summer.

Pollution potential is relatively high in this subregion during the summer and fall. When high pressure dominates, low mixing depths and Bay and ocean wind patterns can concentrate and carry pollutants from other cities to this area, adding to the locally emitted pollutant mix. The polluted air is then pushed up against the East Bay hills. In the wintertime, the air pollution potential in southwestern Alameda County is moderate. Air pollution sources include light and heavy industry, and motor vehicles. Increasing motor vehicle traffic and congestion in the subregion may increase Southwest Alameda County pollution as well as that of its neighboring subregions.

C.1.2. Existing Ambient Air Quality: Criteria Air Pollutants

The California Air Resources Board (ARB) and the U.S. Environmental Protection Agency (EPA) currently focus on the following air pollutants as indicators of ambient air quality: ozone, particulate matter (PM), nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), and lead. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as "criteria air pollutants." Sources and health effects of the criteria air pollutants are summarized in Table C.2. Current state and federal air quality standards are available at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf and designations are available at http://www.arb.ca.gov/desig/desig.htm. See Table C.1 for current attainment status.

Table C.1
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards[a]		
		Standards[b, c]	Attainment Status[d]	Primary[c,e]	Secondary[c,f]	Attainment Status[g]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	N (Serious)	–[h]	Same as Primary Standard	–[h]
	8-hour	0.070 ppm (137 µg/m^3)	–	0.075 ppm (147 µg/m^3)		N
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	–	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	–	0.053 ppm (100 µg/m^3)	Same as Primary Standard	U/A
	1-hour	0.18 ppm (339 µg/m^3)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 µg/m^3)	–	A
	24-hour	0.04 ppm (105 µg/m^3)	A	0.14 ppm (365 µg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 µg/m^3)	
	1-hour	0.25 ppm (655 µg/m^3)	A	–	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N	–[h]	Same as Primary Standard	U
	24-hour	50 µg/m^3		150 µg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	N	15 µg/m^3	Same as Primary Standard	N[j]
	24-hour	–	–	35 µg/m^3		
Lead[i]	30-day Average	1.5 µg/m^3	A	–	–	–
	Calendar Quarter	–	–	1.5 µg/m^3	Same as Primary Standard	–

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Table C.1
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards[a]		
		Standards[b, c]	Attainment Status[d]	Primary[c,e]	Secondary[c,f]	Attainment Status[g]
Sulfates	24-hour	25 µg/m^3	A	**No National Standards**		
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	U			
Vinyl Chloride[i]	24-hour	0.01 ppm (26 µg/m^3)	–			
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer —visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

[a] National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the EPA for further clarification and current federal policies.

[b] California standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[c] Concentration expressed first in units in which it was promulgated [i.e., parts per million (ppm) or micrograms per cubic meter (µg/m^3)]. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] Unclassified (U): a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
Attainment (A): a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment (N): a pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area.
Nonattainment/Transitional (NT): is a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Nonattainment (N): any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.
Attainment (A): any area that meets the national primary or secondary ambient air quality standard for the pollutant.
Unclassifiable (U): any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[h] The 1-hour ozone NAAQS was revoked on June 15, 2005 and the annual PM_{10} NAAQS was revoked in 2006.

[i] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for this pollutant.

[j] U.S EPA lowered the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3 in 2006. EPA issued attainment status designations for the 35 µg/m^{3}standard on December 22, 2008. EPA has designated the Bay Area as nonattainment for the 35 µg/m^3 $PM_{2.5}$ standard. The EPA designation will be effective 90 days after publication of the regulation in the Federal Register.

Table C.2
Common Sources of Health Effects for Criteria Air Pollutants

Pollutants	Sources	Health Effects
Ozone	Atmospheric reaction of organic gases with nitrogen oxides in sunlight	Aggravation of respiratory and cardiovascular diseases; reduced lung function; increased cough and chest discomfort
Fine Particulate Matter (PM_{10} and $PM_{2.5}$)	Stationary combustion of solid fuels; construction activities; industrial processes; atmospheric chemical reactions	Reduced lung function; aggravation of respiratory and cardiovascular diseases; increases in mortality rate; reduced lung function growth in children
Nitrogen Dioxide (NO_2)	Motor vehicle exhaust; high temperature stationary combustion; atmospheric reactions	Aggravation of respiratory illness
Carbon Monoxide (CO)	Incomplete combustion of fuels and other carbon-containing substances, such as motor vehicle exhaust; natural events, such as decomposition of organic matter	Aggravation of some heart diseases; reduced tolerance for exercise; impairment of mental function; birth defects; death at high levels of exposure
Sulfur Dioxide (SO_2)	Combination of sulfur-containing fossil fuels; smelting of sulfur-bearing metal ore; industrial processes	Aggravation of respiratory diseases; reduced lung function
Lead	Contaminated soil	Behavioral and hearing disabilities in children; nervous system impairment

Source: South Coast Air Quality Management District 2005; EPA 2009; EDAW 2009

Ozone, or smog, is not emitted directly into the environment, but is formed in the atmosphere by complex chemical reactions between ROG and NO_X in the presence of sunlight. Ozone formation is greatest on warm, windless, sunny days. The main sources of NO_X and ROG, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) the evaporation of solvents, paints, and fuels, and biogenic sources. Automobiles are the single largest source of ozone precursors in the SFBAAB. Tailpipe emissions of ROG are highest during cold starts, hard acceleration, stop-and-go conditions, and slow speeds. They decline as speeds increase up to about 50 mph, then increase again at high speeds and high engine loads. ROG emissions associated with evaporation of unburned fuel depend on vehicle and ambient temperature cycles. Nitrogen oxide emissions exhibit a different curve; emissions decrease as the vehicle approaches 30 mph and then begin to increase with increasing speeds.

Ozone levels usually build up during the day and peak in the afternoon hours. Short-term exposure can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, it can aggravate existing respiratory diseases such as asthma, bronchitis and emphysema. Chronic exposure to high ozone levels can permanently damage lung tissue. Ozone can also damage plants and trees, and materials such as rubber and fabrics.

Particulate Matter refers to a wide range of solid or liquid particles in the atmosphere, including smoke, dust, aerosols, and metallic oxides. Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. $PM_{2.5}$ includes a subgroup of finer particles that have an aerodynamic diameter of 2.5 micrometers or less. Some particulate matter,

such as pollen, is naturally occurring. In the SFBAAB most particulate matter is caused by combustion, factories, construction, grading, demolition, agricultural activities, and motor vehicles. Extended exposure to particulate matter can increase the risk of chronic respiratory disease. PM_{10} is of concern because it bypasses the body's natural filtration system more easily than larger particles, and can lodge deep in the lungs. The EPA and the state of California revised their PM standards several years ago to apply only to these fine particles. $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health. Motor vehicles are currently responsible for about half of particulates in the SFBAAB. Wood burning in fireplaces and stoves is another large source of fine particulates.

Nitrogen Dioxide (NO_2) is a reddish-brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, nitrogen dioxide can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels.

Carbon Monoxide (CO) is an odorless, colorless gas. It is formed by the incomplete combustion of fuels. The single largest source of CO in the SFBAAB is motor vehicles. Emissions are highest during cold starts, hard acceleration, stop-and-go driving, and when a vehicle is moving at low speeds. New findings indicate that CO emissions per mile are lowest at about 45 mph for the average light-duty motor vehicle and begin to increase again at higher speeds. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia, as well as fetuses. Even healthy people exposed to high CO concentrations can experience headaches, dizziness, fatigue, unconsciousness, and even death.

Sulfur Dioxide (SO_2) is a colorless acid gas with a pungent odor. It has potential to damage materials and it can have health effects at high concentrations. It is produced by the combustion of sulfur-containing fuels, such as oil, coal and diesel. SO_2 can irritate lung tissue and increase the risk of acute and chronic respiratory disease.

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The EPA banned the use of leaded gasoline in highway vehicles in December 1995. As a result of the EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector and levels of lead in the air decreased dramatically.

Monitoring Data

The BAAQMD operates a regional air quality monitoring network that regularly measures the concentrations of the five major criteria air pollutants. Air pollutant monitoring data is available at http://www.arb.ca.gov/adam/welcome.html. Air quality conditions in the SFBAAB have improved significantly since the BAAQMD was created in 1955. Ambient concentrations and the number of days on which the region exceeds standards have declined dramatically. Neither State nor

national ambient air quality standards of these chemicals have been violated in recent decades for nitrogen dioxide, sulfur dioxide, sulfates, lead, hydrogen sulfide, and vinyl chloride.

Emissions Inventory

The BAAQMD estimates emissions of criteria air pollutants from approximately nine hundred source categories. The estimates are based on BAAQMD permit information for stationary sources (e.g., manufacturing industries, refineries, dry-cleaning operations), plus more generalized estimates for area sources (e.g., space heating, landscaping activities, use of consumer products) and mobile sources (e.g., trains, ships and planes, as well as on-road and off-road motor vehicles). BAAQMD emissions inventory data is available at http://www.arb.ca.gov/ei/maps/statemap/dismap.htm.

C.1.2. Existing Ambient Air Quality: Toxic Air Contaminants

In addition to the criteria air pollutants listed above, another group of pollutants, commonly referred to as toxic air contaminants (TACs) or hazardous air pollutants can result in health effects that can be quite severe. Many TACs are confirmed or suspected carcinogens, or are known or suspected to cause birth defects or neurological damage. Secondly, many TACs can be toxic at very low concentrations. For some chemicals, such as carcinogens, there are no thresholds below which exposure can be considered risk-free.

Industrial facilities and mobile sources are significant sources of TACs. The electronics industry, including semiconductor manufacturing, has the potential to contaminate both air and water due to the highly toxic chlorinated solvents commonly used in semiconductor production processes. Sources of TACs go beyond industry. Various common urban facilities also produce TAC emissions, such as gasoline stations (benzene), hospitals (ethylene oxide), and dry cleaners (perchloroethylene). Automobile exhaust also contains TACs such as benzene and 1,3-butadiene. Most recently, diesel particulate matter was identified as a TAC by the ARB. Diesel PM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. BAAQMD research indicates that mobile-source emissions of diesel PM, benzene, and 1,3-butadiene represent a substantial portion of the ambient background risk from TACs in the SFBAAB.

C.1.3. Greenhouse Gases and Global Climate Change

Unlike emissions of criteria and toxic air pollutants, which have local or regional impacts, emissions of greenhouse gases (GHGs) that contribute to global warming or global climate change have a broader, global impact. Global warming is a process whereby GHGs accumulating in the atmosphere contribute to an increase in the temperature of the earth's atmosphere. The principal GHGs contributing to global warming are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated compounds. The primary GHGs of concern are summarized in Table C.3. These gases allow visible and ultraviolet light from the sun to pass through the atmosphere, but they prevent heat from escaping back out into space. Among the potential implications of global warming are rising sea levels, and adverse impacts to water supply, water quality, agriculture, forestry, and habitats. In addition, global warming may increase electricity demand for cooling, decrease the availability of hydroelectric power, and affect regional air quality and public health. Like most criteria and toxic air pollutants, much of the GHG production comes from motor vehicles. GHG emissions can be reduced to some degree by improved coordination of land use and transportation planning on the city, county, and subregional level, and other measures to reduce automobile use. Energy conservation measures also can contribute to reductions in GHG emissions.

Table C.3 Examples of Greenhouse Gases	
Gas	**Sources**
Carbon dioxide (CO_2)	Fossil fuel combustion in stationary and point sources; emission sources includes burning of oil, coal, gas.
Methane (CH_4)	Incomplete combustion in forest fires, landfills, and leaks in natural gas and petroleum systems, agricultural activities, coal mining, wastewater treatment, and certain industrial processes.
Nitrous oxide (N_2O)	Fossil fuel combustion in stationary and point sources; other emission sources include agricultural soil management, animal manure management, sewage treatment, adipic acid production, and nitric acid production.
Chlorofluorocarbon (CFC), and Hydro-chlorofluorocarbon (HCFC)	Agents used in production of foam insulation; other sources include air conditioners, refrigerators, and solvents in cleaners.
Sulfur hexafluoride (SF_6)	Electric insulation in high voltage equipment that transmits and distributes electricity, including circuit breakers, gas-insulated substations, and other switchgear used in the transmission system to manage the high voltages carried between generating stations and customer load centers.
Perfluorocarbons (PFC's)	Primary aluminum production and semiconductor manufacturing.
Source: EPA 2009	

California Greenhouse Gas Emissions Inventory

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial and agricultural sectors. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation. Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) is largely associated with agricultural practices and landfills. N_2O is also largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution, respectively, two of the most common processes of CO_2 sequestration.

California produced 474 million gross metric tons (MMT) of CO_2 equivalent (CO_2e) averaged over the period from 2002-2004. CO_2e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, one ton of CH_4 has the same contribution to the greenhouse effect as approximately 23 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2. Expressing emissions in CO_2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2002-2004, accounting for 38 percent of total GHG emissions in the state. This sector was followed by the electric power sector (including both in-state and out-of-state sources) (18 percent) and the industrial sector (21 percent).

California Greenhouse Gas Emissions Projections

The 1990 GHG emissions limit is approximately 430 MMT CO_2e, which must be met in California by 2020 per the requirements of AB 32 (discussed below in the Regulatory Setting). ARB's GHG inventory for all emissions sectors would require an approximate 28 percent reduction in GHG emissions from projected 2020 forecasts to meet the target emissions limit (equivalent to levels in 1990) established in AB 32. The AB 32 Scoping Plan, discussed further below, is ARB's plan for meeting this mandate.

C.1.4. Existing Ambient Air Quality: Odors and Dust

Other air quality issues of concern in the SFBAAB include nuisance impacts of odors and dust. Objectionable odors may be associated with a variety of pollutants. Common sources of odors include wastewater treatment plants, landfills, composting facilities, refineries and chemical plants. Similarly, nuisance dust may be generated by a variety of sources including quarries, agriculture, grading and construction. Odors rarely have direct health impacts, but they can be very unpleasant and can lead to anger and concern over possible health effects among the public. Each year the BAAQMD receives thousands of citizen complaints about objectionable odors. Dust emissions can contribute to increased ambient concentrations of PM_{10}, and can also contribute to reduced visibility and soiling of exposed surfaces.

REGULATORY SETTING

Air quality with respect to criteria air pollutants and TACs within the SFBAAB is regulated by such agencies as the BAAQMD, ARB, and EPA. Each of these agencies develops rules, regulations, policies, and/or goals to attain the goals or directives imposed through legislation. Although the EPA regulations may not be superseded, both state and local regulations may be more stringent.

C.1.5. Criteria Air Pollutants

Federal Air Quality Regulations

U.S. Environmental Protection Agency

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (FCAA), which was enacted in 1963. The FCAA was amended in 1970, 1977, and 1990.

The FCAA required EPA to establish primary and secondary NAAQS, which are available at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The Federal Clean Air Act Amendments of 1990 (FCAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA has responsibility to review all state SIPs to determine conformation to the mandates of the FCAAA and determine if implementation will achieve air quality goals. If the EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures. Failure to submit an approvable SIP or to implement the plan within the mandated timeframe may result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

State Air Quality Regulations

In 1992 and 1993, the California Air Resources Board (CARB) requested delegation of authority for the implementation and enforcement of specified New Source Performance Standards

(NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the following local agencies: Bay Area and South Coast Air Quality Management Districts (AQMDs). EPA's review of the State of California's laws, rules, and regulations showed them to be adequate for the implementation and enforcement of these federal standards, and EPA granted the delegations as requested.

California Air Resources Board

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA), which was adopted in 1988. The CCAA requires that all air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources, and provides districts with the authority to regulate indirect sources.

ARB is primarily responsible for developing and implementing air pollution control plans to achieve and maintain the NAAQS. The ARB is primarily responsibility for statewide pollution sources and produces a major part of the SIP. Local air districts are still relied upon to provide additional strategies for sources under their jurisdiction. The ARB combines this data and submits the completed SIP to EPA.

Other ARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control and air quality management districts), establishing CAAQS (which in many cases are more stringent than the NAAQS), determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, and off-road vehicles.

Transport of Pollutants

The California Clean Air Act, Section 39610 (a), directs the ARB to “identify each district in which transported air pollutants from upwind areas outside the district cause or contribute to a violation of the ozone standard and to identify the district of origin of transported pollutants.” The information regarding the transport of air pollutants from one basin to another was to be quantified to assist interrelated basins in the preparation of plans for the attainment of State ambient air quality standards. Numerous studies conducted by the ARB have identified air basins that are impacted by pollutants transported from other air basins (as of 1993). Among the air basins affected by air pollution transport from the SFBAAB are the North Central Coast Air Basin, the Mountain Counties Air Basin, the San Joaquin Valley Air Basin, and the Sacramento Valley Air Basin. The SFBAAB was also identified as an area impacted by the transport of air pollutants from the Sacramento region.

Local Air Quality Regulations

Bay Area Air Quality Management District

The BAAQMD attains and maintains air quality conditions in the SFBAAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. The BAAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the FCAA, FCAAA, and the CCAA.

In 2009, the BAAQMD released the update to its CEQA Guidelines. This is an advisory document that provides the Lead Agency, consultants, and project applicants with uniform procedures for

addressing air quality in environmental documents. The handbook contains the following applicable components:

1. Criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
2. Specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
3. Methods available to mitigate air quality impacts;
4. Information for use in air quality assessments and environmental documents that will be updated more frequently such as air quality data, regulatory setting, climate, topography.

Air Quality Plans

As stated above, the BAAQMD prepares plans to attain ambient air quality standards in the SFBAAB. The BAAQMD prepares ozone attainment plans (OAP) for the national ozone standard and clean air plans (CAP) for the California standard both in coordination with the Metropolitan Transportation Commission and the Association of Bay Area Governments (ABAG).

With respect to applicable air quality plans, the BAAQMD prepared the *2009 Clean Air Plan* to address nonattainment of the national 1-hour ozone standard in the SFBAAB. The purpose of the 2009 Clean Air Plan is to:

1. Update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone;
2. Consider the impacts of ozone control measures on particulate matter (PM), air toxics, and greenhouse gases in a single, integrated plan;
3. Review progress in improving air quality in recent years;
4. Establish emission control measures to be adopted or implemented in the 2009-2012 timeframe.

Similarly, the BAAQMD prepared the 2009 Clean Air Plan to address nonattainment of the CAAQS.

C.1.6. Toxic Air Contaminants

TACs, or in federal parlance under the FCAA, HAPs, are pollutants that result in an increase in mortality, a serious illness, or pose a present or potential hazard to human health. Health effects of TACs may include cancer, birth defects, and immune system and neurological damage.

TACs can be separated into carcinogens and noncarcinogens based on the nature of the physiological degradation associated with exposure to the pollutant. For regulatory purposes, carcinogens are assumed to have no safe threshold below which heath impacts will not occur. Noncarcinogenic TACs differ in that there is a safe level in which it is generally assumed that no negative health impacts would occur. These levels are determined on a pollutant-by-pollutant basis.

It is important to understand that TACs are not considered criteria air pollutants and thus are not specifically addressed through the setting of ambient air quality standards. Instead, the EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology (MACT and BACT) to limit emissions. These in conjunction with additional rules set forth by the BAAQMD establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Program

Title III of the FCAAA requires the EPA to promulgate national emissions standards for hazardous air pollutants (NESHAPs). The NESHAP may differ for major sources than for area sources of HAPs. (Major sources are defined as stationary sources with potential to emit more than 10 tons per year [TPY] of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources.) The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), the EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. These federal rules are also commonly referred to as MACT standards, because they reflect the Maximum Achievable Control Technology. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), the EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards. The FCAAA required the EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum to benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, §219 required the use of reformulated gasoline in selected U.S. cities (those with the most severe ozone nonattainment conditions) to further reduce mobile-source emissions.

State Toxic Air Contaminant Programs

California regulates TACs primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. To date, ARB has identified over 21 TACs, and adopted the EPA's list of HAPs as TACs. Most recently, diesel exhaust particulate was added to the ARB list of TACs. Once a TAC is identified, ARB's then adopts an Airborne Toxics Control Measure for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate TBACT to minimize emissions. None of the TACs identified by ARB have a safe threshold.

The Hot Spots Act requires that existing facilities that emit toxic substances above specified level:

1. Prepare a toxic emission inventory;
2. Prepare a risk assessment if emissions are significant;
3. Notify the public of significant risk levels;
4. Prepare and implement risk reduction measure.

ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new public transit bus fleet rule and emission standards for new urban buses. These new rules and standards provide for 1) more stringent emission standards for some new urban bus engines beginning with 2002 model year engines, 2) zero-emission bus demonstration and purchase requirements applicable to transit agencies, and 3) reporting requirements with which transit agencies must demonstrate compliance with the urban transit bus fleet rule. Upcoming milestones include the low sulfur diesel fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially less TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced

significantly over the last decade, and will be reduced further in California through a progression of regulatory measures [e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year 2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

Local Air Quality Regulations

Bay Area Air Quality Management District

The BAAQMD has regulated TACs since the 1980s. At the local level, air pollution control or management districts may adopt and enforce ARB's control measures. Under BAAQMD Regulation 2-1 (General Permit Requirements), Regulation 2-2 (New Source Review), and Regulation 2-5 (New Source Review), all nonexempt sources that possess the potential to emit TACs are required to obtain permits from BAAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new source review standards and air toxics control measures. The BAAQMD limits emissions and public exposure to TACs through a number of programs. The BAAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors. In addition, the BAAQMD has adopted Regulation 11 Rules 2 and 14, which address asbestos demolition renovation, manufacturing, and standards for asbestos containing serpentine.

C.1.7. Greenhouse Gases and Global Climate Change

Federal Greenhouse Gas Regulations

Supreme Court Ruling

The U.S. Environmental Protection Agency (EPA) is the Federal agency responsible for implementing the Clean Air Act (CAA). The U.S. Supreme Court ruled in its decision in *Massachusetts et al. v. Environmental Protection Agency* et al. ([2007] 549 U.S. 05-1120), issued on April 2, 2007, that carbon dioxide (CO_2) is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs.

EPA Actions

In response to the mounting issue of climate change, EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO2 per year. This publically available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act

On April 23, 2009, EPA published their Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CCA (Endangerment Finding) in the Federal Register. The Endangerment Finding is based on Section 202(a) of the CAA, which states that the Administrator (of EPA) should regulate and develop standards for "emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." The proposed rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., carbon dioxide [CO_2], methane [CH_4], nitrous oxide [N_2O], hydrofluorocarbons [HFCs], perflurorocarbons [PFCs], and sulfur hexafluoride [SF_6]) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and therefore the threat of climate change.

The Administrator proposed the finding that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CCA. The evidence supporting this finding consists of human activity resulting in "high atmospheric levels" of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wild fires, droughts, sea level rise, higher intensity storms) are a threat to the public health and welfare. Therefore, GHGs were found to endanger the public health and welfare of current and future generations.

The Administrator also proposed the finding that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. The proposed finding cites that in 2006, motor vehicles were the second largest contributor to domestic GHG emissions (24 percent of total) behind electricity generation. Furthermore, in 2005, the U.S. was responsible for 18 percent of global GHG emissions. Therefore, GHG emissions from motor vehicles and motor vehicle engines were found to contribute to air pollution that endangers public health and welfare.

State Greenhouse Gas Regulations

Assembly Bill 1493 (2002)

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 requires that ARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

To meet the requirements of AB 1493, in 2004 ARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California's existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1) require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons), beginning with the 2009 model year. For passenger cars and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 pounds or less, the GHG emission limits for the 2016 model year are approximately 37percent lower than the limits for the first year of the regulations, the 2009 model year. For light-duty trucks with LVW of 3,751 pounds to gross vehicle

weight (GVW) of 8,500 pounds, as well as medium-duty passenger vehicles, GHG emissions would be reduced approximately 24 percent between 2009 and 2016.

In December 2004, a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against ARB to prevent enforcement of 13 CCR Sections 1900 and 1961 as amended by AB 1493 and 13 CCR 1961.1 (*Central Valley Chrysler-Jeep et al. v. Catherine E. Witherspoon, in Her Official Capacity as Executive Director of the California Air Resources Board, et al.*). The auto-makers' suit in the U.S. District Court for the Eastern District of California, contended California's implementation of regulations that, in effect, regulate vehicle fuel economy violates various federal laws, regulations, and policies.

On December 12, 2007, the Court found that if California receives appropriate authorization from EPA (the last remaining factor in enforcing the standard), these regulations would be consistent with and have the force of federal law, thus, rejecting the automakers' claim. This authorization to implement more stringent standards in California was requested in the form of a CAA Section 209, subsection (b) waiver in 2005. Since that time, EPA failed to act on granting California authorization to implement the standards. Governor Schwarzenegger and Attorney General Edmund G. Brown filed suit against EPA for the delay. In December 2007, EPA Administrator Stephen Johnson denied California's request for the waiver to implement AB 1493. Johnson cited the need for a national approach to reducing GHG emissions, the lack of a "need to meet compelling and extraordinary conditions", and the emissions reductions that would be achieved through the Energy Independence and Security Act of 2007 as the reasoning for the denial.

The state of California filed suit against EPA for its decision to deny the CAA waiver. The recent change in presidential administration directed EPA to reexamine its position for denial of California's CAA waiver and for its past opposition to GHG emissions regulation. California received the waiver, notwithstanding the previous denial by EPA, on June 30, 2009.

Assembly Bill 32 (2006), California Global Warming Solutions Act

In September 2006, the governor of California signed AB 32 (Chapter 488, Statutes of 2006), the California Global Warming Solutions Act of 2006, which enacted Sections 38500–38599 of the California Health and Safety Code. AB 32 requires the reduction of statewide GHG emissions to 1990 levels by 2020. This equates to an approximate 15 percent reduction compared to existing statewide GHG emission levels or a 30 percent reduction from projected 2020 "business as usual" emission levels. The required reduction will be accomplished through an enforceable statewide cap on GHG emissions beginning in 2012.

To effectively implement the statewide cap on GHG emissions, AB 32 directs ARB to develop and implement regulations that reduce statewide GHG emissions generated by stationary sources. Specific actions required of ARB under AB 32 include adoption of a quantified cap on GHG emissions that represent 1990 emissions levels along with disclosing how the cap was quantified, institution of a schedule to meet the emissions cap, and development of tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions needed to meet the cap.

In addition, AB 32 states that if any regulations established under AB 1493 (2002) cannot be implemented then ARB is required to develop additional, new regulations to control GHG emissions from vehicles as part of AB 32.

AB 32 Climate Change Scoping Plan

In December 2008, ARB adopted its *Climate Change Scoping Plan*, which contains the main strategies California will implement to achieve reduction of approximately 169 million metric tons (MMT) of CO_2e, or approximately 30% from the state's projected 2020 emission level of 596 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 42 MMT CO_2e, or almost 10%,

from 2002-2004 average emissions). The *Scoping Plan* also includes ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO_2e),
- the Low-Carbon Fuel Standard (15.0 MMT CO_2e),
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e), and
- a renewable portfolio standard for electricity production (21.3 MMT CO_2e).

ARB has not yet determined what amount of GHG reductions it recommends from local government operations; however, the *Scoping Plan* does state that land use planning and urban growth decisions will play an important role in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. (Meanwhile, ARB is also developing an additional protocol for community emissions.) ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The *Scoping Plan* states that the ultimate GHG reduction assignment to local government operations is to be determined (ARB 2008). With regard to land use planning, the *Scoping Plan* expects approximately 5.0 MMT CO_2e will be achieved associated with implementation of SB 375, which is discussed further below.

Senate Bills 1078 and 107 and Executive Order S-14-08

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008 Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Energy Standard to 33 percent renewable power by 2020. Governor Schwarzenegger plans to propose legislative language that will codify the new higher standard.

Senate Bill 1368 (2006)

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (PUC) to establish a greenhouse gas emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The California Energy Commission (CEC) must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

Senate Bill 97 (2007)

SB 97, signed by governor of California in August 2007 (Chapter 185, Statutes of 2007; Public Resources Code, Sections 21083.05 and 21097), acknowledges climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Resources Agency by July 1, 2009 guidelines for mitigating GHG emissions or the effects of GHG emissions,

as required by CEQA. The California Resources Agency is required to certify and adopt these guidelines by January 1, 2010.

This bill also removes, both retroactively and prospectively, as legitimate causes of action in litigation any claim of inadequate CEQA analysis of effects of GHG emissions associated with environmental review for projects funded by the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006 (Proposition 1B) or the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E). This provision will be repealed by provision of law on January 1, 2010 at that time such projects, if any remain unapproved, will no longer enjoy protection against litigation claims based on failure to adequately address issues related to GHG emissions.

Senate Bill 375 (2008)

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. As part of the alignment, SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) which prescribes land use allocation in that MPO's Regional Transportation Plan (RTP). The ARB, in consultation with MPOs, is required to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. The ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned GHG emission reduction targets. If MPOs do not meet the GHG reduction targets, transportation projects located in the MPO boundaries would not be eligible for funding programmed after January 1, 2012.

This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle from 5 years to 8 years for local governments located in an MPO that meets certain requirements. City or County land use policies (e.g., General Plans) are not required to be consistent with the RTP including associated SCSs or APSs. Qualified projects consistent with an approved SCS or APS and categorized as "transit priority projects" would receive incentives under new provisions of CEQA.

Executive Order S-3-05 (2005)

Governor Schwarzenegger signed Executive Order S-3-05 on June 1, 2005 which proclaimed California is vulnerable to the impacts of climate change. The executive order declared increased temperatures could reduce snowpack in the Sierra Nevada Mountains, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established targets for total GHG emissions which include reducing GHG emissions to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The executive order also directed the secretary of the California Environmental Protection Agency to coordinate a multiagency effort to reduce GHG emissions to the target levels. The secretary will submit biannual reports to the governor and legislature describing progress made toward reaching the emission targets; impacts of global warming on California's resources; and mitigation and adaptation plans to combat impacts of global warming.

To comply with the executive order, the Secretary of the California Environmental Protection Agency created the California Climate Action Team which is made up of members from various state agencies and commissions. The California Climate Action Team released its first report in March 2006 of which proposed achieving the GHG emissions targets by building on voluntary

actions of California businesses and actions by local governments and communities along with continued implementation of state incentive and regulatory programs.

Executive Order S-13-08

Governor Schwarzenegger signed Executive Order S-13-08 on November 14, 2008 which directs California to develop methods for adapting to climate change through preparation of a statewide plan. The executive order directs OPR, in cooperation with the California Resources Agency (CRA), to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009. The order also directs the CRA to develop a state Climate Adaptation Strategy by June 30, 2009 and to convene an independent panel to complete the first California Sea Level Rise Assessment Report. The assessment report is required to be completed by December 1, 2010 and required to include the following four items:

1. Project the relative sea level rise specific to California by taking into account issues such as coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates;
2. Identify the range of uncertainty in selected sea level rise projections;
3. Synthesize existing information on projected sea level rise impacts to state infrastructure (e.g., roads, public facilities, beaches), natural areas, and coastal and marine ecosystems; and
4. Discuss future research needs relating to sea level rise in California.

Executive Order S-1-07

Governor Schwarzenegger signed Executive Order S-1-07 in 2007 which proclaimed the transportation sector as the main source of GHG emissions in California. The executive order proclaims the transportation sector accounts for over 40 percent of statewide GHG emissions. The executive order also establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

In particular, the executive order established a Low-Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the CEC, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (*State Alternative Fuels Plan* adopted by CEC on December 24, 2007) and was submitted to ARB for consideration as an "early action" item under AB 32. The ARB adopted the LCFS on April 23, 2009.

Local Greenhouse Gas Regulations

Bay Area Air Quality Management District Climate Protection Program

The BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

D. THRESHOLD OF SIGNIFICANCE JUSTIFICATION

[TO BE ADDED AFTER BAAQMD BOARD OF DIRECTORS TAKE ACTION]

E. GLOSSARY

Aerosol -- Particle of solid or liquid matter that can remain suspended in the air because of its small size (generally under one micrometer in diameter).

Air Quality Management District (AQMD) -- Local agency charged with controlling air pollution and attaining air quality standards. The Bay Area Air Quality Management District is the regional AQMD that includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara Counties and the southern halves of Solano and Sonoma Counties.

Air Resources Board (ARB) -- The State of California agency responsible for air pollution control. Responsibilities include: establishing State ambient air quality standards, setting allowable emission levels for motor vehicles in California and oversight of local air quality management districts.

Area Sources -- Sources of air pollutants that individually emit relatively small quantities of air pollutants, but that may emit considerable quantities of emissions when aggregated over a large area. Examples include water heaters, lawn maintenance equipment, and consumer products.

Best Available Control Technology (BACT) -- The most stringent emissions control that has been achieved in practice, identified in a state implementation plan, or found by the District to be technologically feasible and cost-effective for a given class of sources.

California Clean Air Act (CCAA) -- Legislation enacted in 1988 mandating a planning process to attain state ambient air quality standards.

CALINE -- A model developed by the Air Resources Board that calculates carbon monoxide concentrations resulting from motor vehicle use.

Carbon Monoxide (CO) -- A colorless, odorless, toxic gas produced by the incomplete combustion of carbon-containing substances. It is emitted in large quantities by exhaust of gasoline-powered vehicles.

Carbon Dioxide (CO_2) -- A colorless, odorless gas that is an important contributor to Earth's greenhouse effect.

Carbon Dioxide Equivalent (CO_2E) -- A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential.

Chlorofluorocarbons (CFCs) -- A family of inert, nontoxic, and easily liquefied chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. CFCs drift into the upper atmosphere where their chlorine components destroy stratospheric ozone.

Clean Air Act (CAA) -- Long-standing federal legislation, last amended in 1990, that is the legal basis for the national clean air programs.

Conformity -- A requirement in federal law and administrative practice that requires that projects will not be approved if they do not conform with the State Implementation Plan by: causing or contributing to an increase in air pollutant emissions, violating an air pollutant standard, or increasing the frequency of violations of an air pollutant standard.

Criteria Air Pollutants -- Air pollutants for which the federal or State government has established ambient air quality standards, or criteria, for outdoor concentration in order to protect public health. Criteria pollutants include: ozone, carbon monoxide, sulfur dioxide PM10 (previously total suspended particulate), nitrogen oxide, and lead.

EMFAC -- The computer model developed by the California Air Resources Board to estimate composite on-road motor vehicle emission factors by vehicle class.

Emission Factor -- The amount of a specific pollutant emitted from a specified polluting source per unit quantity of material handled, processed, or burned.

Emission Inventory -- A list of air pollutants emitted over a determined area by type of source. Typically expressed in mass per unit time.

Environmental Protection Agency (EPA) -- The federal agency responsible for control of air and water pollution, toxic substances, solid waste, and cleanup of contaminated sites.

Exceedance -- A monitored level of concentration of any air contaminant higher than national or state ambient air quality standards.

Global Warming Potential (GWP) -- The index used to translate the level of emissions of various gases into a common measure in order to compare the relative radiative forcing of different gases without directly calculating the changes in atmospheric concentrations. GWPs are calculated as the ratio of the radiative forcing that would result from the emissions of one kilogram of a greenhouse gas to that from emission of one kilogram of carbon dioxide over a period of time (usually 100 years).

Greenhouse Gas (GHG) -- Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), halogenated fluorocarbons (HCFCs), ozone (O_3), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6) and hydrofluorocarbons (HFCs).

Hazardous Air Pollutants – Federal terminology for air pollutants which are not covered by ambient air quality standards but may reasonably be expected to cause or contribute to serious illness or death (see NESHAPs).

Health Risk Assessment -- An analysis where human exposure to toxic substances is estimated, and considered together with information regarding the toxic potency of the substances, to provide quantitative estimates of health risk.

Hot Spot -- A location where emissions from specific sources may expose individuals and population groups to elevated risks of adverse health effects and contribute to the cumulative health risks of emissions from other sources in the area.

Hydrogen Sulfide (H_2S) -- A gas characterized by "rotten egg" smell, found in the vicinity of oil refineries, chemical plants and sewage treatment plants.

Impacted Communities – Also known as priority communities, the Air District defines impacted communities within the Bay Area as having higher emitting sources, highest air concentrations, and nearby low income and sensitive populations. The Air District identified the following impacted communities: the urban core areas of Concord, eastern San Francisco, western Alameda County, Redwood City/East Palo Alto, Richmond/San Pablo, and San Jose.

Indirect Sources – Land uses and facilities that attract or generate motor vehicle trips and thus result in air pollutant emissions, e.g., shopping centers, office buildings, and airports.

Inversion -- The phenomenon of a layer of warm air over cooler air below. This atmospheric condition resists the natural dispersion and dilution of air pollutants.

Level of Service (LOS) -- A transportation planning term for a method of measurement of traffic congestion. The LOS compares actual or projected traffic volume to the maximum capacity of the road under study. LOS ranges from A through F. LOS A describes free flow conditions, while LOS F describes the most congested conditions, up to or over the maximum capacity for which the road was designed.

Mobile Source -- Any motor vehicle that produces air pollution, e.g., cars, trucks, motorcycles (on-road mobile sources) or airplanes, trains and construction equipment (off-road mobile sources).

National Ambient Air Quality Standards (NAAQS) -- Health-based pollutant concentration limits established by EPA that apply to outdoor air (see Criteria Air Pollutants).

National Emissions Standards for Hazardous Air Pollutants (NESHAPs) – Emissions standards set by EPA for air pollutants not covered by NAAQS that may cause an increase in deaths or in serious, irreversible, or incapacitating illness.

Nitrogen Oxides (NO_X) -- Gases formed in great part from atmospheric nitrogen and oxygen when combustion takes place under conditions of high temperature and high pressure; NOX is a precursor to the criteria air pollutant ozone.

Nonattainment Area -- Defined geographic area that does not meet one or more of the

Ambient Air Quality Standards for the criteria pollutants designated in the federal Clean Air Act and/or California Clean Air Act.

Ozone (O_3) -- A pungent, colorless, toxic gas. A product of complex photochemical processes, usually in the presence of sunlight. Tropospheric (lower atmosphere) ozone is a criteria air pollutant.

Particulate -- A particle of solid or liquid matter; soot, dust, aerosols, fumes and mists.

Photochemical Process -- The chemical changes brought about by the radiant energy of the sun acting upon various polluting substances. The products are known as photochemical smog.

$PM_{2.5}$ -- Fine particulate matter (solid or liquid) with an aerodynamic diameter equal to or less than 2.5 micrometers. Individual particles of this size are small enough to be inhaled deeply into the lungs..

PM_{10} -- Fine particulate matter (solid or liquid) with an aerodynamic diameter equal to or less than 10 micrometers. Individual particles of this size are small enough to be inhaled into human lungs; they are not visible to the human eye.

Precursor -- Compounds that change chemically or physically after being emitted into the air and eventually produce air pollutants. For example, organic compounds are precursors to ozone.

Prevention of Significant Deterioration (PSD) -- EPA program in which State and/or federal permits are required that are intended to restrict emissions for new or modified sources in places where air quality is already better than required to meet primary and secondary ambient air quality standards.

Reactive Organic Gases (ROG) -- Classes of organic compounds, especially olefins, substituted aromatics and aldehydes, that react rapidly in the atmosphere to form photochemical smog or ozone.

Sensitive Receptors -- Facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals and residential areas.

State Implementation Plan (SIP) -- EPA-approved state plans for attaining and maintaining federal air quality standards.

Stationary Source -- A fixed, non-mobile source of air pollution, usually found at industrial or commercial facilities.

Sulfur Oxides (SO_X) -- Pungent, colorless gases formed primarily by the combustion of sulfur-containing fossil fuels, especially coal and oil. Considered a criteria air pollutant, sulfur oxides may damage the respiratory tract as well as vegetation.

Toxic Air Contaminants -- Air pollutants which cause illness or death in relatively small quantities. Non-criteria air contaminants that, upon exposure, ingestion, inhalation, or assimilation into organisms either directly from the environment or indirectly by ingestion through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, or physical deformations in such organisms or their offspring.

Transportation Control Measures (TCMs) -- Measures to reduce traffic congestion and decrease emissions from motor vehicles by reducing vehicle use.

URBEMIS -- A computer model developed by the California Air Resources Board to estimate air pollutant emissions from motor vehicle trips associated with land use development.

EXHIBIT 4

Revised Draft Options and Justification Report

California Environmental Quality Act Thresholds of Significance

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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AB	State of California Assembly Bill
ABAG	Association of Bay Area Governments
APS	Alternative Planning Strategy
AQP	air quality plan
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BMP	Best Management Practices
BAU	Business as Usual
CAA	federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAP	climate action plan
CAPCOA	California Air Pollution Control Officers Association
CARE	Community Air Risk Evaluation
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DOF	California Department of Finance
EDD	California Economic Development Department
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guidelines
GBC	California Green Building Code
GHG	greenhouse gas
GPA	general plan amendment
HAP	hazardous air pollutants
IS/MND	Initial Study/Mitigated Negative Declaration
lb/day	pounds per day
LCFS	Low Carbon Fuel Standard
LOS	level of service
MDAQMD	Mojave Desert Air Quality Management District

MEI	Maximally Exposed Individual
MMT	million metric tons
MMT/yr	million metric tons per year
MPO	Metropolitan Planning Organization
MT	metric tons
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NOE	Notice of Exemption
NO_X	oxides of nitrogen
NSR	New Source Review
OPR	Governor's Office of Planning and Research
PM_{10}	respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less
$PM_{2.5}$	fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less
PM	particulate matter
ppm	parts per million
PSD	Prevention of Significant Deterioration
RMPP	Risk Management Prevention Program
ROG	reactive organic gases
RTP	Regional Transportation Plan
SB	Senate Bill
SCH	California State Clearinghouse
SCS	Sustainable Communities Strategy
sf	square feet
SFBAAB	San Francisco Bay Area Air Basin
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
TACs	toxic air contaminants
T-BACT	Toxic Best Available Control Technology
TBPs	Toxic Best Practices
TCMs	transportation control measures
tons/day	tons per day
tpy	tons per year
UNFCCC	United Nations Framework Convention on Climate Change
URBEMIS	Urban Emissions Model
VCAPCD	Ventura County Air Pollution Control District
VMT	vehicle miles traveled

1 EXECUTIVE SUMMARY

Bay Area Air Quality Management District (BAAQMD or Air District) California Environmental Quality Act (CEQA) Guidelines for assessing air quality impacts, first published in 1985, were last revised in 1999. The CEQA process and the associated Guidelines are one of many mechanisms BAAQMD employs to further the primary goal of attaining and maintaining state and national ambient air quality standards. CEQA alone will not achieve the air quality goals. Thus, this paper recommends thresholds of significance that BAAQMD staff believes will provide a fair share of emission reductions from land use development.

BAAQMD publishes these Guidelines to assist local jurisdictions and agencies to comply with the requirements of CEQA regarding potentially adverse impacts to air quality. The primary purpose of the Guidelines are to provide a means to identify proposed local plans and development projects that may have a significant adverse effect on air quality, public health, attainment of state and national ambient air quality standards, and to provide recommendations to mitigate those impacts. Many of the assumptions underlying the analytical methodologies have been updated or revised since the last update of the Guidelines. In addition, some air quality impact issues, such as toxic air contaminant (TAC) risk and global climate change, have received significantly increased focus and prominence.

For these reasons, BAAQMD has decided to update the Guidelines, review existing significance criteria, establish new significance criteria where needed, and develop substantial evidence to support the threshold options available for use.

These thresholds are intended for application to land use development projects, which includes both project level residential and commercial development and Plans, e.g., general plans, specific plans, transportation plans, etc. These thresholds only apply in part to industrial sources. Mobile sources and area sources from industrial land use can be evaluated using the thresholds below as these emission sources have much in common with mobile sources and area sources from residential and commercial uses. Stationary sources are regulated through Air District rules and regulations, the federal Clean Air Act, and the California Clean Air Act and CEQA evaluation of stationary sources should apply these relevant regulations to make significance determinations.

Many of the thresholds are proposed as cumulatively significant impact levels that identify a level of impact that is considered either a cumulatively considerable contribution to an existing adverse condition or a level of impact where, in combination with the project being evaluated, together with other projects causing related impacts, is considered cumulatively significant. In the case of emissions of regional (e.g. ozone precursors) or global pollutants (greenhouse gases) no single project would be sufficient in size, by itself, to result in emissions that are considered significant.

BAAQMD staff-recommended CEQA thresholds of significance for construction, operational-related, and plan-level emissions of criteria air pollutants and ozone precursors, greenhouse gases (GHGs), TACs, and odors include the following, as summarized in Table 1 at the end of this section. The justifications for the recommended thresholds are presented in the main body of this report.

1.1 CONSTRUCTION-RELATED IMPACTS

1.1.1 CRITERIA AIR POLLUTANTS AND OZONE PRECURSORS (REGIONAL)

Staff recommends the following thresholds for addressing attainment-related pollutants, which includes the following average daily thresholds of significance:

- 54 pounds per day (lb/day) for reactive organic gases (ROG),

- 54 lb/day for oxides of nitrogen (NO_x),
- 82 lb/day for respirable particulate matter from exhaust emissions with an aerodynamic resistance diameter of 10 micrometers or less (PM_{10}), and
- 54 lb/day for fine particulate matter from exhaust emissions with an aerodynamic resistance diameter of 2.5 micrometers or less ($PM_{2.5}$).

These levels are based on the trigger levels for the federal New Source Review (NSR) Program and BAAQMD's Regulation 2, Rule 2 for new or modified sources. These levels represent a cumulatively considerable contribution.

For fugitive dust, staff recommends a continuation of the current Best Management Practice approach for the control of construction fugitive dust production.

No thresholds are proposed for regional Carbon Monoxide or Sulfur Dioxide construction emissions as control of these sources is currently not required to achieve regional attainment for these pollutants.

1.1.2 LOCALIZED CARBON MONOXIDE

Staff recommends a case-by-case consideration of localized carbon monoxide emissions from construction because carbon monoxide emissions from construction activities are rarely a public health concern except for the occasionally very large construction efforts.

1.1.3 GREENHOUSE GASES

Staff does not recommend a construction GHG threshold at this time because there is not sufficient evidence to determine a level at which construction emissions are significant. Staff recommends a case-by-case consideration of construction GHG emissions and encourages project applicants to implement construction GHG reduction strategies where feasible. The Air District will develop a list of best management practices, such as alternative fuels, use of local materials, and recycling of construction and demolition waste, to provide lead agencies with strategies that reduce greenhouse gas emissions from construction.

1.1.4 LOCAL COMMUNITY RISKS AND HAZARDS

Staff recommends the following thresholds for evaluation of a project's construction related toxic air contaminant emissions:

- Increase of greater than 10 in a million cancer risk;
- Increase of non-cancer risk greater than a chronic or acute Hazard Index of 1.0; or
- Increase in ambient air quality emissions of $PM_{2.5}$ greater than > 0.3 $\mu g/m^3$.

Staff recommends a case-by-case consideration of a project's cumulative construction impact. A cumulative analysis of a project's construction risk impacts should be considered if there is a substantial overlap of projects or there is a major source of risk nearby. Where a cumulative analysis is warranted, staff recommends that the operational-related cumulative risks and hazards thresholds described below are used.

1.1.5 ODORS

Staff recommends individual lead agencies address this issue on a case-by-case basis, taking into consideration the specific construction-related characteristics of each project and proximity of off-site receptors. Proximity examples are given in the text below. Examples of odorous compounds are found in District Regulation 7.

1.2 OPERATIONAL-RELATED IMPACTS

1.2.1 CRITERIA AIR POLLUTANTS AND OZONE PRECURSORS (REGIONAL)

Staff recommends the following average daily and maximum annual thresholds of significance for evaluation of attainment-related criteria pollutants and ozone precursors:

- 54 lb/day and 10 tons per year (tpy) for ROG,
- 54 lb/day and 10 tpy for NO_x,
- 82 lb/day and 15 tpy for PM_{10}, and
- 54 lb/day and 10 tpy for $PM_{2.5}$.

These levels are based on the trigger levels for the federal NSR Program and BAAQMD's Regulation 2, Rule 2 for new or modified sources. These levels represent a cumulatively considerable contribution.

1.2.2 LOCALIZED CARBON MONOXIDE

Staff recommends the following ambient CO thresholds of significance for operational emissions:

- 20 ppm for 1-hour exposure
- 8 ppm for 8-hour exposure

These thresholds are based on the California ambient air quality standards for carbon monoxide.

1.2.3 GREENHOUSE GASES

1.2.3.1 LAND USE SECTOR PROJECTS

Staff recommends a tiered approach to consideration of operational GHG emissions.

Projects consistent with a qualified Climate Action Plan adopted by the local jurisdiction (or similar adopted policies, ordinances and programs) that include enforceable measures to reduce GHG emissions consistent with AB 32 goals or Executive Order S-03-05 targets, would be considered less than significant.

Projects not consistent with an adopted qualified Climate Action Plan (or similar adopted policies, ordinances and programs) would be considered to have a significant impact.

Projects proposed in areas where a qualified Climate Action Plan has not been adopted should be reviewed against a "bright-line" threshold of 1,100 MT carbon dioxide equivalent per year (CO_2e/yr). A bright line numeric threshold of 1,100 MT CO_2e/yr would result in approximately 59 percent of all future projects and 92 percent of all future land use emissions being subject to mitigation requirements under CEQA, and achieve aggregate emissions reduction of 1.6 MMT CO_2e by 2020 to achieve the SFBAAB's fair share GHG emission reductions

needed from new land use projects. This threshold corresponds to a project size of approximately 60 single family dwelling units.

Residential projects that are over the bright line threshold would not be considered significant if their overall GHG efficiency is less than 6.7 MT CO_2e/yr/capita. Mixed use projects that are over the bright line threshold would not be considered significant if their overall efficiency is less than 4.6 MT CO_2e/yr/service population (= project jobs + project residents).

The above levels represent a cumulatively considerable contribution.

For tiering, projects consistent with a SB 375 Sustainable Communities Strategy or Alternative Planning Strategy would be considered less than significant for transportation-related GHG emissions, but not necessarily for other GHG emissions. Review against the bright-line threshold for non-transportation related emissions would still be required. Given that transportation emissions are often the largest source of GHG emissions for land use sector projects, it is expected that projects consistent with a SB 375 plan would more readily demonstrate compliance with the bright line significance threshold.

Staff will revisit these thresholds over time as implementation of AB 32 and SB 375 proceed.

1.2.3.2 STATIONARY SOURCES

Staff recommends that stationary source permit applications be reviewed against a bright-line threshold of 10,000 MT CO_2e/yr. This threshold corresponds to a level that would capture approximately 95 percent of stationary source GHG emissions based on all combustion emissions.

1.2.4 LOCAL COMMUNITY RISK AND HAZARD IMPACTS

1.2.4.1 SITING OF A NEW SOURCE OR NEW RECEPTOR

Staff recommends a tiered approach to consideration of community risk and hazard impacts.

Projects consistent with a qualified Community Risk Reduction Plan (CRRP) adopted by the local jurisdiction that includes enforceable measures to reduce the community risk to acceptable levels would be considered less than significant.

Proposed development projects that are not consistent with a qualified CRRP that has been adopted for the area where the project is proposed to be located would be considered to have a significant impact.

Projects proposed in areas where a qualified CRRP has not been adopted and the potential to expose sensitive receptors or the general public to emissions-related risk in excess of the following thresholds from any source would be considered to have a significant air quality impact:

- *Increased Cancer Risk to Maximally Exposed Individual (MEI)* - Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of carcinogenic TACs from any source result in an increased cancer risk greater than 10.0 in one million.

- *Increased Non-Cancer Risk to MEI* – Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of non-carcinogenic TACs result in an increased chronic or acute Hazard Index from any source greater than 1.0.

- *Increased Ambient Concentration of $PM_{2.5}$* – Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of $PM_{2.5}$ from any source would result in an average annual increase greater than 0.3 $\mu g/m^3$.

These thresholds would apply to stationary, area, and mobile sources of TAC emissions.

Accidental Release of Acutely Hazardous Air Pollutants

Staff recommends continuing with the current threshold for the accidental release of hazardous air pollutants. Staff recommends that agencies consult with the California Emergency Management Agency for the most recent guidelines and regulations for the storage of hazardous materials. Staff recommends that projects using or storing acutely hazardous materials locating near existing receptors, and projects resulting in receptors locating near facilities using or storing acutely hazardous materials be considered significant.

1.2.4.2 CUMULATIVE RISK AND HAZARD EMISSIONS

Staff recommends the following as the thresholds of significance for cumulative impacts of siting a new source of risks or hazards or siting a new receptor.

Projects consistent with a qualified Community Risk Reduction Plan (CRRP) adopted by the local jurisdiction that includes enforceable measures to reduce the community risk to acceptable levels would be considered a less than cumulative significant.

Proposed development projects that are not consistent with a qualified CRRP that has been adopted for the area where the project is proposed to be located would be considered to have a significant cumulative impact.

Projects proposed in areas where a qualified CRRP has not been adopted and the potential to expose sensitive receptors or the general public to emissions-related risk in excess of the following thresholds from any source would be considered to have a significant cumulative air quality impact:

- *Cancer Risk to MEI* - Cumulative sources (including the proposed project, existing sources and reasonably foreseeable future sources) would be subject to a significance threshold of 100 in one million within 1,000 feet from the location of the new source being evaluated. Siting of new receptors would be subject to the 100 in one million threshold relative to all cumulative sources within 1,000 feet of the new receptor location.

- *Non-Cancer Risk to MEI* - Cumulative sources of risks or hazards would be subject to a significance threshold of a chronic or acute Hazard Index of greater than 1.0 within 1,000 feet from the location of the new source being evaluated. Siting of new receptors would be subject to the chronic or acute Hazard Index threshold of greater than 1.0 relative to all cumulative sources within 1,000 feet of the new receptor location.

- *Increased Ambient Concentration of $PM_{2.5}$* – Cumulative emissions within the 1,000 foot evaluation zone would be considered significant where the increased average annual ground-level concentrations of $PM_{2.5}$ would be greater than 0.8 $\mu g/m^3$.

These thresholds would apply to stationary, area, and mobile sources of TAC emissions.

1.2.5 ODOR IMPACTS

Staff recommends agencies use BAAQMD's current approach, which is based on screening level distances, complaint history, and other factors. The BAAQMD considers a project locating near an existing source of odors as having a significant odor impact if it is proposed for a site that is closer to an existing odor source than any location where there has been:

- More than one confirmed complaint per year averaged over a three year period; or
- More than three unconfirmed complaints per year averaged over a three year period.

If a proposed project involves the siting of sensitive receptors within the screening-level distances or the siting of an odor-producing land use within the impacts distances in Table 19 below, and the average complaints are greater than identified above, the BAAQMD recommends that mitigation measures be identified to reduce a potentially significant impact.

1.3 PLAN-LEVEL IMPACTS

1.3.1 CRITERIA AIR POLLUTANTS AND PRECURSORS

Staff s' recommendation is to continue the current approach for plan-level impacts with one addition. The current approach recommends that general plans of cities and counties must show consistency with regional plans and policies affecting air quality to claim a less than significant impact on air quality. General plan amendments, transportation plans, congestion management plans, redevelopment plans, specific area plans, annexations of lands and services, and similar planning activities should receive the same scrutiny as general plans with respect to consistency with regional air quality plans. Staff recommends the addition of a threshold requiring that the forecasted rate of vehicle-miles travelled (VMT) or vehicle trip increase from a new plan should be less than the forecasted rate of population increase.

1.3.2 GREENHOUSE GAS EMISSIONS

Staff recommends that plans, such as general plans, be considered less than significant if they either meet specified GHG efficiency metrics or if the jurisdiction has adopted a qualified Climate Action Plan (or similar adopted policies, ordinances and programs) that includes feasible measures to reduce GHG emissions consistent with AB 32 goals and Executive Order S-03-05 targets.

GHG-efficiency metrics (6.7 MT CO_2e/capita, 4.6 CO_2e/service population) can be used to enable comparison of a proposed general plan to determine if the proposed general plan meets AB 32 emission reduction goals on an efficiency basis. Staff will revisit the efficiency thresholds over time as implementation of AB 32 and SB 375 proceed.

Local jurisdictions that may not initiate a general plan update for a number of years may decide instead to address GHG emissions for general plans through a stand-alone Climate Action Plan. In order for a Climate Action Plan to be considered less than significant under CEQA, the Climate Action Plan for the jurisdiction must contain a GHG inventory and forecast, an adopted local reduction goal consistent with AB 32 (or S-03-05), enforceable reduction measures that are measureable in terms of their reduction effectiveness and are verifiable, a viable implementation plan and schedule and monitoring. In addition, CEQA compliance must be completed for adoption of the plan.

1.3.3 LOCAL COMMUNITY RISK AND HAZARDS

Staff recommends that for local plans to have a less-than-significant impact with respect to potential risks or hazards, special overlay zones should be established around existing and proposed land uses that would emit these air pollutants. Overlay zones should also be established for areas that have an adopted Community Risk Reduction Plan. Overlay zones should be established based on a quantitative threshold of exposure using the quantitative operational project level thresholds. Risk and hazard overlay zones should be reflected in local plan policies, land use map(s), and implementing ordinances (e.g., zoning ordinance).

1.3.4 ODORS

Staff recommends that for local plans to have a less-than-significant impact with respect to potential odors, special overlay zones based on current screening guidance would have to be established around existing and proposed land uses that would emit nuisance odors. Overlay zones to avoid odor impacts should be reflected in local plan policies, land use map(s), and implementing ordinances (e.g., zoning ordinance).

Table 1 - Staff-Recommended CEQA Thresholds of Significance

Pollutant	Construction-Related	Operational-Related	
Project-Level			
Criteria Air Pollutants and Precursors (Regional)	**Average Daily Emissions (lb/day)**	**Average Daily Emissions (lb/day)**	**Maximum Annual Emissions (tpy)**
ROG	54	54	10
NO_X	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10
$PM_{10}/PM_{2.5}$ (fugitive dust)	Best Management Practices		
Criteria Air Pollutants and Precursors (Local CO)	Case-by–Case Basis	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	
GHGs – Projects other than Stationary Sources	No Threshold Recommendation	Compliance with Qualified Climate Action Plan (or similar adopted policies, ordinances and programs) that includes enforceable measures to reduce GHG emissions consistent with AB 32 goals or Executive Order S-03-05 targets. OR Threshold of 1,100 MT of CO_2e/yr OR 6.7 MT CO2e/capita/yr; (residential) / 4.6 MT CO_2e/SP/yr (mixed use)	
GHGs –Stationary Sources	No Threshold Recommendation	10,000 MT/yr	
Risks and Hazards (Siting a New Source or Receptor)	Cancer Risk Increase > 10 in a million Non-Cancer Risk Increase Hazard Index >1.0 (Chronic or Acute) Ambient Increase $PM_{2.5}$: > 0.3 µg/m^3 annual average	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) $PM_{2.5}$: > 0.3 µg/m^3 annual average	
Risks and Hazards (Cumulative – Source or Receptor)	Same as Operational Thresholds	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 1.0 Hazard Index (from all local sources) (Chronic or Acute) $PM_{2.5}$: > 0.8 µg/m^3 annual average (from all local sources)	

Table 1 - Staff-Recommended CEQA Thresholds of Significance		
Pollutant	**Construction-Related**	**Operational-Related**
Accidental Release of Acutely Hazardous Air Pollutants	No Threshold Recommendation	Storage or use of acutely hazardous materials locating near receptors or receptors locating near stored or used acutely hazardous materials considered significant
Odors	Case-by-Case Basis	Screening Level Distances and Complaint History
Plan-Level		
Criteria Air Pollutants and Precursors (Regional and Local)	Consistency with Current Air Quality Plan control measures Rate of VMT increase or vehicle trips is less than rate of increase in population	
GHGs	No Threshold Recommendation	Qualified Climate Action Plan Meets or Exceeds AB 32 or EO S-03-05 targets OR 6.7 MT CO2e/capita/yr; 4.6 MT CO_2e/SP/yr;
Risks and Hazards/Odors	Overlay zones around existing and planned sources of TACs (including adopted Community Risk Reduction Plan areas) and odors Overlay zones of at least 500 feet from all freeways and high volume roadways	
Accidental Release of Acutely Hazardous Air Pollutants	No Threshold Recommended	No Threshold Recommended

Notes: CEQA = California Environmental Quality Act; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; GHGs = greenhouse gases; lb/day = pounds per day; MT = metric tons; NO_X = oxides of nitrogen; $PM_{2.5}$= fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; ROG = reactive organic gases; SO_2 = sulfur dioxide; SP = service population; TACs = toxic air contaminants; TBP = toxic best practices; tons/day = tons per day; tpy = tons per year; yr= year; TBD: to be determined.

2 INTRODUCTION

The purpose of this report is to evaluate options for California Environmental Quality Act (CEQA) thresholds of significance for use within Bay Area Air Quality Management District's (BAAQMD or Air District) jurisdiction. In this section the regulatory authority of BAAQMD, the justification for why the thresholds are being updated, the current air quality designation of the region, emission reduction nomenclature used in this report, and a review of other air districts efforts to revise air quality thresholds to evaluate new thresholds are introduced.

2.1 BAAQMD/CEQA REGULATORY AUTHORITY

The BAAQMD has direct and indirect regulatory authority over sources of air pollution in the San Francisco Bay Area Air Basin (SFBAAB). CEQA requires that public agencies consider the potential adverse environmental impacts of any project that a public agency proposes to carry out, fund or approve. CEQA requires that a lead agency prepare an Environmental Impact Report (EIR) whenever it can be fairly argued (the "fair argument" standard), based on substantial evidence,[1] that a project may have a significant effect[2] on the environment, even if there is substantial evidence to the contrary (CEQA Guidelines § 15064). CEQA requires that the lead agency review not only a project's direct effects on the environment, but also the cumulative impacts of a project and other projects causing related impacts. When the incremental effect of a project is cumulatively considerable, the lead agency must discuss the cumulative impacts in an EIR. (CEQA Guidelines § 15064).

The "fair argument" standard refers to whether a fair argument can be made that a project may have a significant effect on the environment (*No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 84). The fair argument standard is generally considered a low threshold requirement for preparation of an EIR. The legal standards reflect a preference for requiring preparation of an EIR and for "resolving doubts in favor of environmental review." *Meija v. City of Los Angeles* (2005) 130 Cal. App. 4th 322, 332. "The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data." CEQA Guidelines § 15064(b).

In determining whether a project may have a significant effect on the environment, CEQA Guidelines Section 15064.7 provides that lead agencies may adopt and/or apply "thresholds of significance." A threshold of significance is "an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant" (CEQA Guidelines § 15064.7).

While thresholds of significance give rise to a presumption of insignificance, thresholds are not conclusive, and do not excuse a public agency of the duty to consider evidence that a significant effect may occur under the fair argument standard. *Meija*, 130 Cal. App. 4th at 342. "A public agency cannot apply a threshold of significance or regulatory standard 'in a way that forecloses the consideration of any other substantial evidence showing there may be a significant effect.'" *Id.* This means that if a public agency is presented with factual information or other substantial evidence establishing a fair argument that a project may have a significant effect on the environment,

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1 "Substantial evidence" includes facts, reasonable assumptions predicated upon facts, or expert opinions supported by facts, but does not include argument, speculation, unsubstantiated opinion or narrative, evidence that is clearly inaccurate or erroneous, or evidence of social or economic impacts that do not contribute to, or are not caused by, physical impacts on the environment. Cal. Pub. Res. C. § 21080(c); *see also* CEQA Guidelines § 15384.

2 A "significant effect" on the environment is defined as a "substantial, or potentially substantial, adverse change in the environment." Cal. Pub. Res. C. § 21068; *see also* CEQA Guidelines § 15382.

the agency must prepare an EIR to study those impacts even if the project's impacts fall below the applicable threshold of significance.

Thresholds of significance must be supported by substantial evidence. This Report provides the substantial evidence in support of the thresholds of significance developed by the BAAQMD. The BAAQMD recommends that lead agencies within the nine counties of the BAAQMD's jurisdiction use the thresholds of significance in this report when considering the air quality impacts of projects under their consideration.

2.2 JUSTIFICATION FOR UPDATING CEQA THRESHOLDS

Any analysis of environmental impacts under CEQA includes an assessment of the nature and extent of each impact expected to result from the project to determine whether the impact will be treated as significant or less than significant. CEQA gives lead agencies discretion whether to classify a particular environmental impact as significant. Ultimately, formulation of a standard of significance requires the lead agency to make a policy judgment about where the line should be drawn distinguishing adverse impacts it considers significant from those that are not deemed significant. This judgment must, however, be based on scientific information and other factual data to the extent possible (State CEQA Guidelines §15064(b)).

In the sense that advances in science provide new or refined factual data, combined with advances in technology and the gradual improvement or degradation of an environmental resource, the point where an environmental effect is considered significant is fluid over time. Other factors influencing this fluidity include new or revised regulations and standards, and emerging, new areas of concern.

In the ten years since BAAQMD last reviewed its recommended CEQA thresholds of significance for air quality, there have been tremendous changes that affect the quality and management of the air resource in the Bay Area. Traditional criteria air pollutant ambient air quality standards, at both the state and federal levels, have become increasingly more stringent. A new criteria air pollutant standard for $PM_{2.5}$ has been added to federal and state ambient air quality standards. We have found, through technical advances in impact assessment, that toxic air contaminants are not only worse than previously thought from a health perspective, but also their concentrations have been steadily increasing, giving rise to new regulations and programs to reduce the significantly elevated levels of ambient toxic air contaminant concentrations in the Bay Area. Another significant issue that affects the quality of life for Bay Area residents is the growing concern with global climate change

For the reasons stated above, and to further the goals of other District programs such as transit-oriented and infill development, BAAQMD has undertaken an effort to review all of its currently-recommended CEQA thresholds, revise them as appropriate, and develop new thresholds where appropriate. The overall goal of this effort is to develop CEQA significance criteria that ensure new development contributes its feasible fair share of emissions reductions to mitigate significant air quality impacts and meet the objectives stated above. The Air District's recommended CEQA significance criteria will be vetted through a public review process and presented to the BAAQMD Board of Directors for adoption.

2.3 SFBAAB AIR QUALITY DESIGNATIONS

SFBAAB is currently designated as an ozone non-attainment area for the California and national ambient air quality standards (CAAQS and NAAQS, respectively) as shown in Table 2. The U.S. Environmental Protection Agency (EPA) has also recently designated the SFBAAB as non-attainment for the new 24-hour fine particulate with an aerodynamic resistance diameter of 2.5 micrometers or less ($PM_{2.5}$) standard of 35 microgram per cubic meter ($\mu g/m^3$). However, since the new presidential administration has ordered a freeze on all pending federal rules, the designation will not be effective until after publication of the regulation in the Federal Register. With regards to the CAAQS, the SFBAAB is also designated as a non-attainment area for respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less (PM_{10}) and $PM_{2.5}$.

Table 2 - Ambient Air Quality Standards and Designations, San Francisco Bay Area Air Basin						
Pollutant	Averaging Time	California		National [1]		
		Standards [2,3]	Attainment Status [4]	Primary [3, 5]	Secondary [3, 6]	Attainment Status [7]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	N (Serious)	–	–	–
	8-hour	0.07 ppm (137 µg/m^3)	–	0.075 ppm (147 µg/m^3)	Same as Primary Standard	N
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	–	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (56 µg/m^3)	–	0.053 ppm (100 µg/m^3)	Same as Primary Standard	U/A
	1-hour	0.18 ppm (338 µg/m^3)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 µg/m^3)	–	A
	24-hour	0.04 ppm (105 µg/m^3)	A	0.14 ppm (365 µg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 µg/m^3)	
	1-hour	0.25 ppm (655 µg/m^3)	A	–	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N	-	Same as Primary Standard	U
	24-hour	50 µg/m^3		150 µg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	N	15 µg/m^3	Same as Primary Standard	N[9]
	24-hour	–	–	35 µg/m^3		
Lead[8]	30-day Average	1.5 µg/m^3	A	–	–	–
	Calendar Quarter	–	–	1.5 µg/m^3	Same as Primary Standard	
Sulfates	24-hour	25 µg/m^3	A	**No National Standards**		
Hydrogen Sulfide	1-hour	0.03 ppm	U			

Table 2 - Ambient Air Quality Standards and Designations, San Francisco Bay Area Air Basin						
Pollutant	Averaging Time	California		National [1]		
		Standards [2,3]	Attainment Status [4]	Primary [3, 5]	Secondary [3, 6]	Attainment Status [7]
		(42 µg/m^3)		**No National Standards**		
Vinyl Chloride[8]	24-hour	0.01 ppm (26 µg/m^3)	U			
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

Notes: µg/m^3 = micrograms per cubic meter; mg/m^3 = milligram per cubic meter; ppm = parts per million.

[1] National standards (other than ozone, respirable and fine particulate matter (PM_{10} and $PM_{2.5}$, respectively)), and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For respirable particulate matter, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 micrograms per cubic meter is equal to or less than one. For fine particulate matter, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[2] California standards for ozone, carbon dioxide (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; parts per million (ppm) refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Unclassified (U): A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or non-attainment. Attainment (A): A pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period. Non-attainment (N): A pollutant is designated non-attainment if there was a least one violation of a state standard for that pollutant in the area. Non-attainment/Transitional (NT): A subcategory of the non-attainment designation. An area is designated non-attainment/transitional to signify that the area is close to attaining the standard for that pollutant.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Non-attainment (N): Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant. Attainment (A): Any area that meets the national primary or secondary ambient air quality standard for the pollutant. Unclassifiable (U): Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[8] The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[9] The U.S Environmental Protection Agency (EPA) lowered the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3 in 2006. EPA issued attainment status designations for the 35 µg/m^3 standard on December 22, 2008. EPA has designated the San Francisco Bay Area Air Basin as non-attainment for the 35 µg/m^3 $PM_{2.5}$ standard. The EPA designation will be effective 90 days after publication of the regulation in the Federal Register. The Office of the President has ordered a freeze on all pending federal rules; therefore, the effective date of the designation is unknown at this time.

Source: ARB 2009c.

The fact that SFBAAB is designated as non-attainment for both national and California ambient air quality standards highlights the need to evaluate new CEQA thresholds to improve Bay Area air quality.

2.4 EMISSIONS NOMENCLATURE

Terminology such as capture and mitigation can change definition based on context. To ensure the unambiguous description of emission related terminology, the following definitions are used in this the report. All references to mitigation used below refer to air pollution emission reduction measures. Unless specifically qualified, the use of the word *total* in the definitions below refers to total emissions subject to CEQA not to total regional emissions.

The following terms relate to the total number of projects subject to CEQA:

- **CEQA Projects** – the total number of projects that require CEQA analysis.
- **Captured Projects** – the number of projects that require mitigation.
- **Project Capture Ratio** – the ratio of *Captured Projects* to *CEQA Projects.*

The following terms below can apply to any single project, program, plan, or the Bay Area as a whole.

- **Raw Emissions** – the amount of emissions (by mass) emitted as a result of a project, program or plan without considering mitigation measures.
- **Captured Emissions** – the amount of *Raw Emissions* (by mass) that require mitigation measures in any particular threshold option.
- **Mitigated Emissions** – the amount of emissions (by mass) emitted as a result of a project when mitigation measures are in place.
- **Mitigation Effectiveness** – the percent reduction in Raw Emissions as a result of mitigation measures.

2.5 A REVIEW OF CALIFORNIA AIR DISTRICT'S APPROACHES TO AIR QUALITY THRESHOLDS

In this section, a review of how various California air districts address CEQA thresholds is presented. This review should add context to the methodologies and approaches used by BAAQMD to update their air quality thresholds. A summary of air district thresholds, and supporting documentation, where available, is presented in Appendix A.

With respect to criteria air pollutant and ozone precursor emissions, numerous air districts (e.g., Monterey Bay Unified Air Pollution Control District, Santa Barbara County Air Pollution Control District, Mojave Desert Air Quality Management District [MDAQMD], and South Coast Air Quality Management District) have based thresholds of significance for reactive organic gases (ROG) and oxides of nitrogen (NO_X) on limits established by the federal New Source Review (NSR) Program. In certain cases, these NSR limits, which are identified in regulation on an annual basis (tons per year [tpy]), are converted to pounds per day (lb/day) for precursor emissions. While some air districts have no quantitative threshold levels, many use the CAAQS as thresholds of significance, particularly for carbon monoxide (CO) where impacts are more localized in nature. Dispersion modeling is often required to evaluate whether a concentration-based threshold would be exceeded as a result of project implementation. Within jurisdictions where thresholds of significance have not been adopted, air districts advise the lead agencies on a case-by-case basis and rely on guidance of nearby air districts.

Supporting documentation for non-NSR-derived thresholds of significance from the Sacramento Metropolitan Air Quality Management District (SMAQMD) and the Ventura County Air Pollution Control District (VCAPCD) are included in Appendix A. SMAQMD prepared draft justification documentation for both construction- and operational-related thresholds of significance in 2001. The bases for these thresholds were derived from the reductions (tons per day [tons/day] of ozone precursors) committed to by control measures contained in the State Implementation Plan (SIP) and in a manner that was intended to optimize project emission elimination of proposed projects, while requiring a level of mitigation that would be realistic and achievable.

VCAPCD developed thresholds of significance for ozone precursors by determining the emissions capture rate associated with applying five different increments of ROG and NO_X emission levels to projected development. This approach was intended to achieve a balance between the number of projects affected and the amount of emissions subject to mitigation.

With respect to toxic air contaminants (TACs), an excess cancer risk level of 10 in one million or a hazard index of one are widely used based on a thorough review of district-adopted CEQA guidance and discussions with air district staff. In most cases, these are applied to stationary sources and not to construction or mobile sources of TACs. The current rationale for not applying these indices to construction-related emissions is that such activities are short-term and intermittent in nature and the primary health concern with diesel particulate matter (PM) is long-term exposure. Because these indices were originally developed based on the behavior of stationary sources (e.g., constant emissions rate over time), they are also typically not applied to mobile sources. Some air districts (e.g., MDAQMD) also use adopted rules and regulations based on limits established by the federal Toxic NSR Program (e.g., new or modified source that emit more than 10 tpy of a single hazardous air pollutant [HAP] or more than 25 tpy of multiple HAPs would be required to implement maximum achievable control technology) for thresholds of significance (e.g., projects that would violate a rule or regulation would be considered significant with respect to TACs). Others refer to the *Air Quality and Land Use Handbook: A Community Health Perspective* released by the California Air Resources Board (ARB) in 2005 for guidance on land use compatibility issues; however, this document was intended to be advisory, not regulatory.

For assessing odor impacts, no quantitative thresholds of significance have been adopted, but instead many air districts use screening-level buffer distances for common odor-generating sources in combination with complaint history. Typically, a significant odor impact would occur under the complaint-based threshold if the project has: 1) more than one confirmed complaint per year averaged over a three-year period, or 2) more than three unconfirmed complaints per year averaged over a three-year period. Projects that would involve the siting of sensitive receptors within the screening-level distances or the siting of an odor-producing land use within these distances from existing sensitive receptors would be considered to have a significant odor impact and further analysis and/or mitigation would be required. Prevailing wind direction relative to the source and receptors are also taken into consideration.

Many air districts state that if implementation of a proposed project would not result in the generation of emissions that exceed applicable project-level mass emission thresholds, then the cumulative impact of the project on air quality would also be considered less than significant. In other words, if project-generated emissions would exceed the operational-related thresholds of significance in a designated non-attainment area, then the project's incremental contribution would be considered cumulatively considerable, and therefore, significant.

To date, no air district in California has adopted a threshold of significance for greenhouse gas (GHG) emissions for nonindustrial land use development projects. The South Coast Air Quality Management District (SCAQMD) has developed an approach to tiered threshold of significances for GHG emissions that considers CEQA exemptions, consistency with a GHG reduction plan, a quantitative threshold based on source analysis and a 90 percent capture rate, and several performance standard approaches for mitigation. SCAQMD has adopted a tiered threshold for industrial projects with a quantitative threshold of 10,000 metric tons/year using this general approach. SCAQMD is also developing a tiered threshold approach for residential and commercial projects using a similar methodology, but have not made a proposal for adoption yet. The San Joaquin Air Pollution Control

District is exploring a tiered GHG emissions threshold for land use development projects that considers CEQA exemptions, compliance with a GHG reduction plan, and compliance with best performance standards or a 29 percent reduction requirement compared to business as usual conditions.

3 ANALYSIS TO SUPPORT NEW THRESHOLD DEVELOPMENT

Relevant findings from a series of qualitative and quantitative studies conducted by BAAQMD to support the development and selection of new CEQA thresholds are presented below.

3.1 CAA/CCAA & NEW SOURCE REVIEW

The federal and California Clean Air Acts (CAA and CCAA, respectively) impose emission limitations on stationary sources (e.g., federal New Source Review [NSR], and BAAQMD Best Available Control Technology [BACT] and Offset Requirements) that serve to reduce emissions from those sources to the extent feasible.

The NSR Program[3] was created by the CAA to ensure that stationary sources of air pollution are constructed or modified in a manner that is consistent with attainment of health-based federal ambient air quality standards. Existing regulations require the NSR Program to address any pollutant for which there is an established federal ambient air quality standard. The NSR Program is composed of two primary components: Prevention of Significant Deterioration (PSD), which applies to pollutants where the standard has been attained, and NSR, which applies to pollutants where the standard has not been attained. The CAA regulations also require the installation of BACT, air quality monitoring and modeling analyses to ensure that a project's emissions will not cause or contribute to a violation of any air quality standard, limiting the incremental increase of a pollutant and offsetting new emissions with creditable emission reductions.

The determination of whether a source is subject to NSR is based, in part, on comparison to the Significant Emission Rates identified in the regulations. These are derived from modeling analyses to determine the level of emissions below which a source alone is not expected to have an impact on air quality (see Table 3). Although the limits are adopted in regulation to control stationary source emissions, they are considered to have the same effect of controlling emissions from land use development.

Table 3 – New Source Review Criteria Pollutant/Precursor Significant Emission Rates

Emissions Type	Significant Emissions Rate (tpy)
ROG	40
NO_X	40
CO	100
SO_2	40
PM_{10}	15
$PM_{2.5}$	10

Notes: CO = carbon monoxide; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; SO_2 = sulfur dioxide; tpy = tons per year.
Sources: BAAQMD 2005, EPA 2008.

BAAQMD Regulation 2, Rule 2 provides for the review of new and modified sources, including the use of BACT and offsets before a source is allowed to operate. Specifically, an applicant for a permit to operate shall apply BACT to any new or modified source that could result in the potential to emit more than the levels shown in Table 4.

[3] Code of Federal Regulation (CFR) [i.e., PSD (40 CFR 52.21, 40 CFR 51.166, 40 CFR 51.165 (b)), Non-attainment NSR (40 CFR 52.24, 40 CFR 51.165, 40 CFR part 51, Appendix S)

Table 4 – Criteria Air Pollutant/Precursor BACT and Offset Emissions Levels		
Emissions Type	BACT Emissions Level (lb/day)[1]	Offset Emissions Level (tpy)[2]
ROG	10	10
NO_X	10	10
CO	10	-
SO_2	10	100
PM_{10}	10	100

Notes: BACT = Best Available Control Technology; CO = carbon monoxide; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; SO_2 = sulfur dioxide; tpy = tons per year.

[1]The project size equivalent would be approximately 40 single-family dwelling units.

[2] The project size equivalent would be approximately 200 single-family dwelling units.

Source: BAAQMD 2005.

With respect to BAAQMD's Offset Requirements, before a permit to operate is issued for a new or modified source that could emit more than the levels specified in Table 4, federally enforceable emission offsets must be provided for the source's emissions and any preexisting cumulative increases. Emission offsets are verified reductions from an emission source that has shut down or has reduced its historical emissions through better control devices or modified operations. Verified offsets then can be used at a new or modified source and retired.

3.2 ANALYSIS OF BAY AREA GROWTH AND EMISSION FORECASTS

Operational-related criteria air pollutant and precursor emissions were estimated based on projected land use development in the SFBAAB. Growth projections were calculated for new land use development in the SFBAAB from 2010 to 2020 based on the following two data sets: (1) the California Department of Finance (DOF) projections for population, household size, and residential unit distribution (DOF 2009); and (2) the California Economic Development Department (EDD) for employment projections by North American Industry Classification System (NAICS) code (EDD 2009). These data sources were selected primarily because DOF and EDD have a long history and good track record of projecting growth estimates, and because they do so on a statewide level, thereby considering allocations between regions. This data was also reported at a level of specificity that allows for simple translation into land use type categories consistent with those in the Urban Emissions Model (URBEMIS). URBEMIS includes general land use categories (e.g., residential, educational, recreational, commercial, retail, and industrial). Within each general category there are several specific land use types resulting in a total of 52 possible land use types. Please refer to Exhibit 1 for a graphical representation of the derivation process for this concept for the single family residential land use type.

Data from the Association of Bay Area Governments (ABAG) were available, but not at the land use category resolution required for conversion into URBEMIS. Notwithstanding, the DOF/EDD data were not at a fine enough resolution to develop projections for every URBEMIS land use category. In instances of asymmetry between the DOF/EDD data and the URBEMIS land use categories, development projections were aggregated into the most similar URBEMIS category based on density and behavioral trip capture (i.e., trip generation rates) assumptions. The NAICS data projected less development over the next ten years in comparison to ABAG, thus, making the NAICS dataset more conservative for the purposes of a threshold evaluation, because fewer projects (and fewer associated emissions) would be available for capture by the threshold. In other words, the emissions reduction potential of the CEQA threshold would be lower using more conservative development projections. If more development occurs than was expected under the growth projections, the emissions reduction potential associated with the CEQA significance threshold would be greater than assumed in this analysis. Please refer to Appendix A for detailed land use development projections and associated emissions calculations.

For residential development, the DOF population, household size, and residential unit distribution projections were used to calculate population-driven residential square footage projections. For non-residential development, EDD projections for employment by NAICS code were used to calculate employment-driven commercial, retail, and industrial development square footage projections. Using type and size distribution data from projects in the SFBAAB that passed through the CEQA process from 2001-2008, the development square footage annual projections were translated into units and project size distributions for each URBEMIS land use category. This uses the 2001 – 2008 profile of proposed development to develop a projected development inventory for new development that would occur over the next ten years (i.e., 2010-2020). Please refer to Appendix B for detailed development projections calculations.

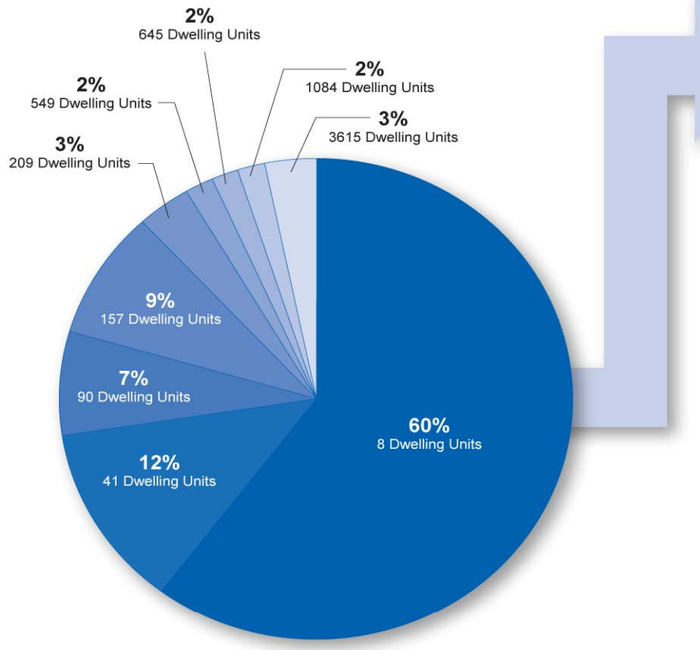
The CEQA Projects Database (Rimpo and Associates 2009), which includes information from environmental documents prepared by lead agencies within BAAQMD's jurisdiction and filed with the California State Clearinghouse (SCH) during the past eight years (2001-2008), was used to conduct a frequency analysis of projects categorized by land use type and size. Projects for which an Environmental Impact Report (EIR) or Initial Study/Mitigated Negative Declaration (IS/MND) was prepared during the last eight years were distributed over size intervals of 50,000 square feet (sf) by each corresponding URBEMIS land use category to develop frequency distributions of project type and size. These frequency distributions were applied to the total development projections to obtain development forecasts by project size and type in the SFBAAB. This development forecast dataset represents the manner in which the projected development will come under the purview of CEQA in terms of project type and size. It was assumed that past projects proposed in the SFBAAB Area are indicative of project attributes in the future.

It was necessary to forecast these attributes into the future to model the mass emissions for projects of different types and sizes in order to evaluate the sensitivity (e.g., emissions reduction and capture rates) of the threshold level for each pollutant. Projects of a certain size would trigger the CEQA threshold, and would require mitigation. The sensitivity analysis (presented in Section 4) involved adjusting the threshold in order to achieve a balance that attains different amount of emissions reduction. Project size intervals (i.e., "bins") of 50,000 sf (approximately 28 single family homes) were used to assess the sensitivity of operational criteria air pollutant and precursor threshold levels at different increments to determine a reasonable emissions capture rate which achieves a feasible (as defined by CEQA) amount of emission reductions when considering mitigation effectiveness.

It is important to note that there is an unknown amount of projected development included in the forecast totals that would not be subject to CEQA requirements, because some of the projected development included in the DOF/EDD data would be categorically (e.g., certain infill development projects in urban areas [Class 32; State of California CEQA Guidelines Section 15332]) or statutorily exempt (e.g., actions related to construction of less than 100 low-income housing units in urban areas [California Public Resources Code 21080.14]). Our presumption is that the quantity of potential development that is exempt is not considerable. Data to support this conclusion is incomplete, despite attempts to acquire it throughout the State. First, Notices of Exemption (NOE) are not required to be posted or filed for exempt projects; they are voluntary. Furthermore, NOEs are not required to be filed with the SCH unless a state agency serves as the CEQA lead agency. Otherwise, NOEs only need be filed with the County Clerk's office. NOEs filed with the SCH represent a small portion of total NOEs, and rarely do NOEs where the State is the lead agency represent development that could be categorized within URBEMIS. Typically, NOEs accompany ministerial actions that do not result in actual development, such as the subdivision of land or modification of an existing use. Further, many exempt development projects are, at some point, largely captured under CEQA, such as through an EIR prepared for a proposed subdivision. The exemption would apply to the building permits for already evaluated projects, in this instance. Projects that are not exempt are typically small, or would otherwise not meet a category that exempts the projects (plus lead agencies cannot, under CEQA, categorically exempt projects that considerably contribute to cumulative impacts or may have potentially significant impacts). Thus, it was concluded that NOEs represent a less-than-substantial portion of total projected development in the SFBAAB.

BAAQMD Single Family Residential Development Projections:

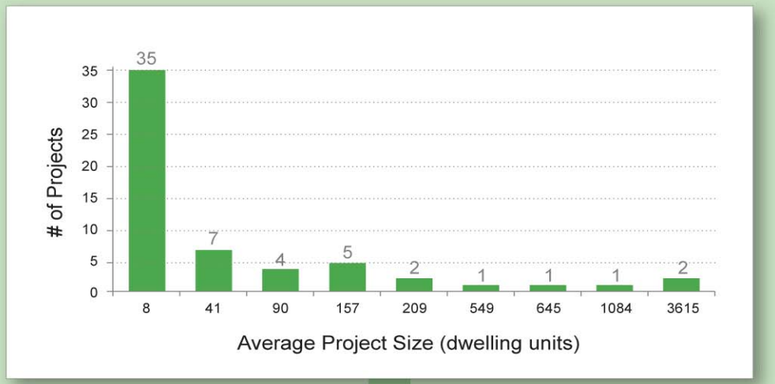
# of new dwelling units in 2020 = 11,638



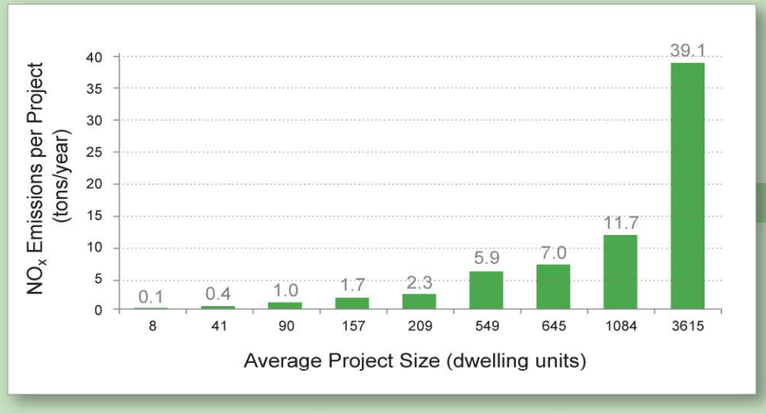
CEQA Projects Database

provides size distribution of past projects (2001-2008) in BAAQMD

Operational Year 2020 Projections



BAAQMD Projected Projects[1]



URBEMIS Operational Emissions Modeling Example[2]

Notes:

Though this exhibit only pertains to single-family development, the year 2020, and the pollutant NO_x; please note that this exercise was performed for all applicable land use types, years, and pollutants for the purposes of this threshold evaluation report.

1. Applies the past project size distribution data to the 2020 development projection for the purpose of predicting how the 11,638 dwelling units will be built out in terms of the project frequency of occurrence (#) by average size bin.
2. For each average project size bin, the amount of emissions were modeled and multiplied by the total number of corresponding projects.

BAAQMD Projected Land Use Development Emissions Inventory

(Single Family Residential Projects Subject to CEQA)

Year 2020 = 126.2 tons/year NO_x

Perform Sensitivity Analysis

(Adjust Threshold Bar and Mitigation Effectiveness to Determine Emission Reduction Potential)

G 08110224.01 003

Notes: BAAQMD = Bay Area Air Quality Management District; CEQA = California Environmental Quality Act; NO_x = oxides of nitrogen; tons/year = tons per year; URBEMIS = Urban Emissions Model.
Source: Data adapted by EDAW 2009.

Exhibit 1: Example Derivation from BAAQMD Single-Family Residential Development Projections

An emissions inventory (see Table 5) for unmitigated emissions for new development that would fall under the purview of CEQA was calculated.

Table 5 - Unmitigated Criteria Pollutant/Precursor Emissions Subject to CEQA in the Basin

Year	Number of Projects/Yr	Unmitigated[1] Emissions (tpy)				Aggregate Unmitigated[1] Emissions Between 2010-2020 (Tons)			
		ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$
2010	366	911	856	1,121	259	-	-	-	-
2015	404	777	618	1,240	287	-	-	-	-
2020	436	725	463	1,336	308	8,045	6,453	12,322	2,848

Notes: CEQA = California Environmental Quality Act; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; tpy = tons per year; yr = year.

[1] Unmitigated emissions are the results of an URBEMIS model run using default model settings, including default (i.e., worst-case) trip generation rates and average trip length assumptions. The modeling does not account for project attributes that may reduce emissions relative to the default settings (i.e., full trip generation) scenario, such as proximity to transit or mix of land use types.

Please refer to Appendix B for detailed unmitigated emissions calculations.

Sources: Data calculated by EDAW 2009, Rimpo and Associates 2009, DOF 2009, EDD 2009.

4 THRESHOLD OPTIONS EVALUATION

The following section evaluates options for CEQA thresholds of significance for use within BAAQMD's jurisdiction including current approaches for impact determinations. Threshold options evaluated are summarized in Tables 6 and 7.

Table 6 - CEQA Threshold Options for Project Construction Emissions

Criteria Air Pollutants and Precursors (Regional)	**Option 1: Qualitative Approach** (Current) BMPs for PM_{10}	**Option 2: CAA Approach** Average daily emissions (lb/day) ROG/NOx – 54 PM_{10} – 82 $PM_{2.5}$ - 54	
Criteria Air Pollutants and Precursors (Local CO)	**Option 1: Current Approach** Case by Case Basis	**Option 2: Ambient Standards (CAAQS)** 9.0 ppm (8-hour average) 20.0 ppm (1-hour average)	
GHGs	**Option 1: Qualitative Approach** BMPs for GHGs	**Option 2: Operational Threshold Approach** 33,000 MT of CO_2e Total	**Option 3: Regional Allocation Approach** 10 MT of CO_2e per day
Risks and Hazards	**Option 1: Qualitative Approach/Project Screening Level** Case-by-Case Basis Project Size Screening Level	**Option 2: Tiered Approach** <u>Impacted Communities</u> >5 in a million cancer risk >0.5 Chronic Hazard Index >1.0 Acute Hazard Index <u>Other Locations</u> >10 in a million cancer risk >1.0 Hazard Index (Chronic or Acute)	**Option 3: Operational Threshold Approach** <u>All Locations</u> >10 in a million cancer risk > 1.0 Hazard Index (Chronic or Acute) $PM_{2.5}$: > 0.3 µg/m^3
Odors	**Qualitative Approach** Case-by-Case Basis		

Notes: CEQA = California Environmental Quality Act; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; GHGs = greenhouse gases; lb/day = pounds per day; MT = metric tons; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; ROG = reactive organic gases; SO_2 = sulfur dioxide; SP = service population; TACs = toxic air contaminants; tons/day = tons per day; tpy = tons per year; yr= year; TBD: to be determined

.

Table 7 - CEQA Threshold Options for Operational Emissions				
Criteria Air Pollutants and Precursors (Regional - Project Level)	**Option 1 - Current Approach** Daily ROG / NOX / PM_{10} –80 lb/day Annual ROG / NOX / PM_{10} – 15 tpy Cumulative Consistency with AQMP	**Option 2 - CAA Approach** Daily (lb/day) ROG / NOx – 54 PM_{10} – 82 $PM_{2.5}$ – 54 Annual (tpy) ROG / NOx / $PM_{2.5}$ – 10 PM_{10} – 15 Cumulative Same as Option 1	**Option 3 - CCAA Approach** Various daily and annual thresholds (see text) Minor contribution toward 5% target from land use sector Cumulative – same as Option 1	**Option 4 - Gap Analysis Approach** Determine criteria pollutant gap for non-attainment pollutants. Close gap with threshold
Localized Carbon Monoxide (Project Level)	**Option 1 - Current Approach** Proxy Thresholds (requiring quantification) 550 lb/day of CO Contribute traffic to roadway at LOS D, E, or F Contribute 10% increase to roadway (if > 100 vehicles/hour) Ambient Threshold (if above the proxy thresholds) 20.0 ppm CO for 1 hour 9 ppm CO for 8 hour		**Option 2 – Ambient Standards (CAAQS)** Ambient Threshold 20.0 ppm CO for 1 hour 9 ppm CO for 8 hour	
Criteria Air Pollutants and Precursors (Plan Level)	**Option 1 – Current Approach** Consistency with Current Air Quality Plan 1. Population growth in plan will not exceed values used in current AQP 2. Plan's projected rate of VMT increase is less than the rate of increase in population used in AQP 3. Plan implements AQP TCMs		**Option 2 – Modified Current Approach** Consistency with Current Air Quality Plan 1. Plan's projected rate of increase in VMT or vehicle trips (may use either) is less than the rate of increase in population used for plan. 2. Plan implements AQP TCMs	
GHGs (Project Level, other than Stationary Sources)	**Option 1A - Quantitative Threshold** Projects > 1,100 MT CO_2e/yr Reduction to threshold or minimum 26% reduction compared to base case **Option 1B - Performance Standard** All Projects Minimum 26% reduction	**Option 1C - Quantitative Threshold and Performance Standard** All Projects 5% reduction Projects >1,900 MT CO_2e/yr Reduction to threshold or minimum 30% reduction compared to base case **Option 1D – Efficiency Thresholds** 6.7 MT CO_2e/capita/yr 4.6 MT CO_2e/SP/yr	**Option 2 - CARB Tiered Approach** Tier 1 Exemptions Tier 2 Consistent with an SB 375 SCS or equivalent Tier 3 (industrial) Performance standards < 7,000 MT for non-transport GHGs Tier 3 (residential/commercial) Performance standards for construction, mobile sources, energy, water, and waste	**Option 3 - BACT Approach** All Projects Implement GHG BACT for all projects BAAQMD to define and update BACT periodically **Option 4 - Tiered Threshold Approach** Tier 1 Consistent with a Climate Action Plan (or SB 375 SCS/APS for transportation emissions) Tier 2 Threshold Projects > 1,100 MT CO_2e/yr Reduction to threshold
GHGs (Stationary Sources)	**Option 1 – Natural Gas Approach** 18,000 MT CO_2e/yr		**Option 2 – All Combustion Approach** 10,000 MT CO_2e/yr	

Table 7 - CEQA Threshold Options for Operational Emissions				
GHGs (Plan Level)	**Option 1A - Per Capita Threshold** 6.7 MT CO_2e/capita/yr	**Option 1B - Service Population Threshold** 4.6 MT CO_2e/SP/yr	**Option 2 - Local Climate Action Plan** 26% GHG Reduction Goal Compared to 2020 BAU for Land Use Sector	
TACs (Siting New Sources – Project Level)	**Option 1 - Current Approach** All Bay Area Cancer risk > 10 in a million Non-Cancer HI of > 1.0 (Chronic or Acute)	**Option 2 - Stationary Source Permit Approach** TBP Trigger TBPs where increased cancer risk levels exceed one in one million Thresholds Same as Option 1	**Option 3 - Tiered Approach** All Bay Area Implement TBPs where increased Cancer risk > 1 in a million Impacted Communities Cancer risk >5 in a million, Non-cancer risk of >Chronic HI of 0.5 >Acute HI of 1.0 Mandatory T-BACT and/or TBPs; PM 2.5 of >0.2 µg/m^3 annual average All of Bay Area Cancer risk >10 in a million, Non-cancer risk of >HI of 1.0 (Chronic or Acute) PM 2.5 of >0.3 µg/m^3 annual average	**Option 4 - No Net Increase Approach** Impacted communities No net increase in cancer or non-cancer risk Rest of Bay Area Threshold for excess cancer risk level of 10 in one million and non-cancer HI of 1.0 (Chronic or Acute)
TACs (Siting New Receptor – Project Level)	**Option 1 - Health-Based Impact Approach** TBP Trigger TBPs for all projects with risk > 100 in a million Threshold Cancer risk for new receptors above 100 in a million Update very three years	**Option 2 - Source-Based Approach** Zone of Influence 1,000 feet from source/receptor Impacted Communities Mandatory T-BACT and/or TBPs All Bay Area Cancer risk >10 in a million, Non-cancer risk of >HI of 1.0 PM 2.5 of >0.3 µg/m3 annual average	**Option 3 – San Francisco DPM Approach** All Projects 0.2 µg/m3 for roadway exposures	**Option 4 – Community Risk Reduction Plan Approach** All Bay Area Consistent with Community Risk Reduction Plan that addresses community-wide risk

Table 7 - CEQA Threshold Options for Operational Emissions		
TACs (Cumulative Level)	**Option 1 – Incremental Risk Approach** Use Project Level threshold as cumulative contribution threshold	**Option 2 – Absolute Risk Approach** <u>Zone of Influence</u> 1,000 feet from source/receptor <u>All Bay Area</u> Cancer risk >100 in a million from all zone sources Non-cancer risk of >HI of 1.0 (Chronic or Acute) from all zone sources $PM_{2.5}$ of 0.8 µg/m3 annual average from all zone sources
TACs (Plan Level)	**Option 1 – TAC Buffer Zones** Establish Buffer Zones in General Plan around existing and planned sources Special overlay zones of at least 500 feet on each side of all freeways and high volume roadways	**Option 2 – Quantitative Thresholds** Adopt quantitative approaches used for projects as General Plan Policy
Odors – Project and Plan Level	**Current Approach** Establish Buffer Zones around existing and planned sources	
Notes: CEQA = California Environmental Quality Act; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; GHGs = greenhouse gases; lb/day = pounds per day; MT = metric tons; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; ROG = reactive organic gases; SO_2 = sulfur dioxide; SP = service population; TACs = toxic air contaminants; tons/day = tons per day; tpy = tons per year; yr= year; TBD: to be determined		

4.1 CONSTRUCTION EMISSIONS

4.1.1 CRITERIA AIR POLLUTANTS AND PRECURSORS (REGIONAL)

4.1.1.1 OPTION 1: QUALITATIVE APPROACH/BMPS FOR PM10 (CURRENT APPROACH)

BAAQMD's current threshold of significance for construction activities is qualitative in nature (i.e., emissions quantification is not required). Construction emissions of criteria pollutants (other than fugitive PM_{10}) and ozone precursors are considered less than significant on the rationale that they are already included in regional inventories used as the basis of the AQP. The current approach to fugitive PM_{10} dust emissions is a Best-Management Practices (BMP) approach. If BAAQMD-recommended BMPs, which are tiered based on the size of the construction site (less than or greater than four acres), are incorporated into the proposed project, then air quality impacts from project construction can be considered less than significant. The construction threshold of significance requires all projects, regardless of size, to implement at least a minimum level of mitigation for construction-related fugitive PM_{10} dust emissions.

4.1.1.2 OPTION 2: CLEAN AIR ACT EMISSIONS LIMIT APPROACH

This option evaluates the use of the CAA/CCAA stationary source emission limitation levels as CEQA thresholds of significance for construction-related criteria air pollutant and precursor emissions. This approach is considered appropriate because the source of the emissions is irrelevant to their effect on cumulative air quality impacts.

For those pollutants for which the SFBAAB is designated as a non-attainment area, this option uses BAAQMD's Offset Requirement limits, except for PM_{10} and $PM_{2.5}$. Though the SFBAAB is currently designated as a non-

attainment area for both PM_{10} and $PM_{2.5}$[4], the federal NSR Significant Emission Rate limits of 15 and 10 tons per year, respectively, are recommended for this option as BAAQMD has not established an Offset Requirement limit for $PM_{2.5}$ and the existing limit of 100 tons per year under the federal PSD program is much less stringent and would not be appropriate in light of our pending nonattainment designation for the federal 24-hour $PM_{2.5}$ standard. The BACT Requirement limits as shown in Table 8 represent the levels at which, if exceeded, stationary sources must install common control devices. However, stationary sources are still allowed to result in emissions up to the offset requirement and above if federally enforceable offsets are provided. With respect to construction sources, analogous common control devices include increasingly stringent tailpipe standards for off-road equipment, after-market controls such as diesel particulate matter traps and oxidation catalysts.

CARB's new off-road regulations will require the use of newer equipment with lower emission rates and retrofitting of older equipment with after-market controls. These statewide regulations will essentially require the equivalent of installing BACT on all off-road construction equipment over the next several years. Therefore, it would be appropriate to set a threshold level of significance at the NSR offset level to be consistent with this approach. Thus, utilization of the BACT Requirements as thresholds of significance for CEQA would result in achieving considerably more emission reductions from land use development than is needed to achieve air quality goals. The federal NSR Significant Emission Rate and BAAQMD's Offset Requirement limits are identified in regulation on an annual basis (in units of tons per year). For this option, the applicable limits were converted to average daily emissions (pounds per day) for each threshold of significance, as shown in Table 8. This is appropriate because of the short-term intermittent nature of construction activities and, if emissions would not exceed these average daily threshold emission levels, the project would also not exceed the annual levels.

Table 8 - Criteria Air Pollutant/Precursor Construction Threshold Option 2 (CAA Approach)

Emissions Type	BACT (lb/day)	Average Daily Emissions Level (lb/day)
ROG	10	54
NO_X	10	54
CO	10	547
SO_2	10	219
PM_{10}	10	82
$PM_{2.5}$	10	54

Notes: CO = carbon monoxide; lb/day = pounds per day; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; SO_2 = sulfur dioxide.
Sources: Data compiled by EDAW 2009, BAAQMD 2005, EPA 2008.

All of these levels are used within current regulations and thus are consistent with thresholds for federal NSR, and associated definitions of significant emissions limits for criteria air pollutants and precursors.

4.1.1.3 STAFF RECOMMENDATION AND JUSTIFICATION

Staff recommends a hybrid approach of the two approaches described above regarding exhaust emissions and fugitive dust. While our current Guidelines considered construction exhaust emissions controlled by the overall air quality plan, the implementation of new and more stringent state and federal standards over the past ten years now warrants additional control of this source of emissions. The CAA approach for criteria pollutant construction thresholds and thus the average daily criteria air pollutant and precursor emission levels shown in Table 8 for

[4] The SFBAAB is designated nonattainment for the state annual and 24-hour PM_{10} and $PM_{2.5}$ standards and anticipates being designated nonattainment for the federal 24-hour $PM_{2.5}$ standard.

ROG, NOx, and PM are recommended as the thresholds of significance for construction activity for exhaust emissions. These thresholds represent the levels above which a project's individual emissions would result in a considerable contribution (i.e., significant) to the SFBAAB's existing non-attainment air quality conditions and thus establish a nexus to regional air quality impacts that satisfies CEQA requirements for evidence-based determinations of significant impacts.

For fugitive dust emissions, staff recommends following the current best management practices approach which has been a pragmatic and effective approach to the control of fugitive dust emissions. Studies have demonstrated (Western Regional Air Partnership, U.S.EPA) that the application of best management practices at construction sites have significantly controlled fugitive dust emissions. Individual measures have been shown to reduce fugitive dust by anywhere from 30 percent to more than 90 percent. In the aggregate best management practices will substantially reduce fugitive dust emissions from construction sites. These studies support staff's recommendation that projects implementing construction best management practices will reduce fugitive dust emissions to a less than significant level.

Regional concentration levels of CO in the SFBAAB have not exceeded the CAAQS in the past 11 years and sulfur dioxide (SO_2) concentrations have never exceeded the standards (EPA 2009). Construction-related SO_2 emissions represent a negligible portion of total basin-wide emissions and construction-related CO emissions represent less than five percent of the SFBAAB total basin-wide CO emissions. BAAQMD has demonstrated that attainment pollutants are sufficiently controlled by air quality plans and regulations and thus no quantitative thresholds for construction are recommended for CO or SO_2 for evaluation of impacts to regional air quality.

4.1.2 Local Carbon Monoxide

4.1.2.1 Option 1 - Current Approach

BAAQMD has no formal guidance for the evaluation of construction localized carbon monoxide impact given that the volumes necessary to result in a health-based CO impact are rarely reached due to construction traffic. Thus, the current approach is left to the case by case considerations of CEQA lead agencies.

4.1.2.2 Option 2 - Ambient Standards

As a localized pollutant, this approach for evaluation of carbon monoxide impacts would be based on ambient concentration limits set by the California Clean Air Act for Carbon Monoxide and Appendix G of the State of California CEQA Guidelines. The CAAQS of 20.0 ppm and 9 ppm for 1-hour and 8-hour CO, respectively, would be used as the thresholds of significance for localized concentrations of CO. This approach is described further below in the discussion of operational thresholds.

4.1.2.3 Staff Recommendation and Justification

BAAQMD staff recommends Option 1 – Current Approach for consideration of construction CO emissions. As noted above, health-based CO impacts rarely arise due to construction traffic and thus there is little potential for significant impacts to occur for the vast majority of projects. Instead, it is recommended that CEQA lead agencies consider the potential for CO impacts on a case by case that would focus only on the largest of construction projects.

4.1.3 Greenhouse Gases

According to the greenhouse gas inventory developed by BAAQMD, GHG emissions from construction activities represent a relatively small portion (less than two percent) of the overall GHG emissions inventory in the Bay Area. Staff has identified three potential approaches to set a significance threshold for construction GHG emissions. Because constructions GHG emissions were not included in the land use-driven sectors analyzed for

the operational GHG threshold, they were analyzed as a separate GHG emissions sector. While there are other approaches to defining GHG thresholds, such as a percent reduction approach, these are the three approaches that staff finds to be the most promising to achieve AB32 goals. All options analyzed here identify cumulatively significant threshold options.

4.1.3.1 OPTION 1: QUALITATIVE APPROACH/BMPS FOR GHGS

This approach is similar to the current approach to construction fugitive dust emissions. Quantitative evaluation of construction emissions would not be required for GHGs. Instead, all projects would be required to implement a suite of construction BMPs to reduce GHGs. A list of BMPs would need to be developed by BAAQMD and would need to be updated periodically to reflect changes in technology, feasibility, and cost-effectiveness. Initial BMPs could include, but need not be limited to the following: use of alternatives fuels (biodiesel, electricity, etc.) for at least 15 percent of the construction fleet; reduction of equipment idling beyond existing ARB regulations; worker carpooling and use of worker shuttles; a minimum use of 10 percent local building materials (to reduce material lifecycle GHGs), and recycling/diversion of a minimum of 50 percent of construction and demolition waste.

4.1.3.2 OPTION 2: OPERATIONAL THRESHOLD APPROACH

This approach includes the same CEQA threshold of significance for construction-related GHG emissions as that for project operations, which is discussed in detail herein. Assuming that a project has an operational lifetime of approximately 30 years, the aggregate operational GHG emissions associated with a project that would generate 1,100 metric tons (MT) of carbon dioxide equivalent (CO_2e) emissions per year (See Operational Option 1A discussion below) would result in approximately 33,000 MT of CO_2e emissions over the 30–year operational life of the project. Thus, if a project would result in GHG emissions greater than 33,000 MT of CO_2e over the duration of construction, the impact would be considered significant.

4.1.3.3 OPTION 3: REGIONAL ALLOCATION APPROACH

The goal of this approach is to reduce the projected 2020 emissions associated with construction activities to the 1990 level, the overall goal of AB 32, by setting a per project threshold, that when aggregated, the total annual construction emissions would not exceed the total 1990 inventory levels in 2020. BAAQMD's current CO_2e emissions inventory estimated that in 1990 CO_2e emissions from construction activities were 1.3 million metric tons (MMT) CO_2e for off-road construction equipment. In addition, about five percent of the on-road medium/heavy duty truck CO_2e emissions inventory is attributed to construction debris and material haul trips, which equals 0.2 MMT CO_2e per year. Therefore, the total 1990 inventory for construction-related CO_2 emissions is 1.5 MMT, whereas the total projected 2020 construction-related emissions inventory is 2.9 MMT CO_2e. It is also estimated that approximately 4,000 development projects would be constructed in the SFBAAB between 2010 and 2020, or an average of 400 projects per year. The threshold of significance can be established by spreading the goal of 1.5 MMT over the 400 projects (1,500,000/400 equals 3,750 tons/year, or 10.3 metric tons/day). Therefore, projects with construction CO_2e emissions above 10 metric tons per day (tons/day) would be considered to have a significant impact.

4.1.3.4 STAFF RECOMMENDATION AND JUSTIFICATION

Staff does not recommend a construction GHG threshold at this time because there is not sufficient evidence to determine a level at which construction emissions are significant. Staff recommends a case-by-case consideration of construction GHG emissions and encourages project applicants to implement construction GHG reduction strategies where feasible. The Air District will develop a list of best management practices, such as alternative fuels, use of local materials, and recycling of construction and demolition waste, to provide lead agencies with strategies that reduce greenhouse gas emissions from construction.

A BMP approach (Option1), can be effective to promote on-site emissions reductions yet allow flexibility for a wide range of construction applications. If lead agencies require all projects to implement the BMPs identified by the Air District, GHG emission reductions will be achieved during construction activity. However, a BMP approach requires that a finding can be made that the recommended measures will indeed reduce the impact to a less than significant level. Since Staff cannot substantiate such a finding at this time, this approach is not recommended.

As shown by Option 2 and Option 3, quantitative threshold approaches to construction emissions do not at present represent reasonable approaches to determining significance. Options 2 and 3 would result in an emissions threshold for construction that is so large that only truly large projects would be required to conduct any mitigation, whereas a BMP approach requires feasible measures for all projects which would result in lower emission levels overall. Thus, neither of the quantitative thresholds provides sufficient nexus and proportionality to demonstrate a significant impact tied to the impact level and severity.

4.1.4 LOCAL COMMUNITY RISKS AND HAZARDS

4.1.4.1 OPTION 1: CASE-BY-CASE APPROACH/PROJECT SIZE SCREENING LEVEL

This approach entails using the "Expose sensitive receptors to substantial pollutant concentrations" question as contained in the State of California CEQA Guidelines' Appendix G checklist to determine the significance of construction-related TAC emissions on a case-by-case basis.

This option does not include a recommendation for a numeric threshold of significance for construction-related TAC emissions, which is consistent with BAAQMD's current approach. Construction work could result in the generation of diesel PM, which ARB has designated as a TAC, from the use of off-road heavy-duty equipment during site grading, excavation, material transport, paving, and other construction activities. However, due to the variable nature of such activities, the generation of TAC emissions in most cases would be temporary, especially considering the short amount of time such heavy-duty equipment are typically within an influential distance (e.g., 70 percent reduction at approximately 500 feet from mobile sources [ARB 2005]) to nearby sensitive receptors (i.e., people or facilities that generally house people [e.g., schools, hospitals, residences]) that may experience adverse effects from unhealthful concentrations of air pollutants. In addition, current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 40, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities resulting in difficulties with producing accurate modeling results.

Staff is currently assessing the size of a construction project where an assessment of the health risk to nearby receptors would be warranted. A recommended screening level for assessing a construction project's health risks will be provided in the methodologies section of the BAAQMD CEQA Guidelines update.

4.1.4.2 OPTION 2: TIERED QUANTITATIVE THRESHOLD

This approach entails using the same risk thresholds in specific geographic areas developed below as potential operational quantitative thresholds (see discussion below). Construction emissions would need to be quantified where they occur in proximity to sensitive receptors. The threshold for incremental increase in risks would be a 10 in a million risk of cancer and a chronic or acute Hazard Index of 1.0 for all locations other than CARE communities. Within CARE communities, the threshold would be an incremental increase of 5 in a million risk of cancer, a chronic Hazard Index of 0.5 and an acute Hazard Index of 1.0.

4.1.4.3 OPTION 3: QUANTITATIVE THRESHOLDS

This approach entails using the same thresholds throughout the Bay Area for operations (see discussion below). Construction emissions would need to be quantified where they occur in proximity to sensitive receptors.

Thresholds would be an increased excess cancer risk of 10.0 in a million and a chronic or acute Hazard Index of 1.0 throughout the Bay Area.

In addition, this approach would also include a quantitative $PM_{2.5}$ average annual concentration increase threshold of 0.3 $\mu g/m^3$. This concentration is the U.S. EPA staff-proposed Significant Impact level (SIL) for $PM_{2.5}$. The SIL is a threshold applied to individual facilities that apply for a permit to emit a regulated pollutant in an area that meets the NAAQS. The state and EPA must determine if emissions from that facility will cause the air quality to worsen. If an individual facility projects an increase in emissions that result in an increase greater than the established SIL, the permit applicant would be required to perform additional analyses to determine if those impacts will be more than the amount of the PSD increment.

4.1.4.4 STAFF RECOMMENDATION AND JUSTIFICATION

BAAQMD staff recommends Option 3 – Quantitative Thresholds as the approach for construction risks and hazards emissions. Risks due to toxic emissions from construction, though temporary, can still result in substantial public health impacts due to increased cancer and non-cancer risk. Applying a quantitative threshold allows a rigorous standardized method of determining when a construction project will cause a significant increase in cancer and non-cancer risks. Regarding the use of the proposed USEPA SIL for $PM_{2.5}$, under the Clean Air Act, the SIL is a measure of whether a source may cause or contribute to a violation of PSD increment or the NAAQS, which by definition would represent a significant deterioration of air quality and thus in an appropriate significance threshold under CEQA.

Staff recommends a case-by-case consideration of a project's cumulative construction risk impact. A cumulative analysis of a project's construction TAC impacts should be considered if there is a substantial overlap of projects or there is a major source of TAC nearby.

4.1.5 ODORS

Conventional construction-related activities typically do not result in the generation of odor emissions. As shown in Table 9, odor complaints are rarely due to construction.

Table 9 - Historical Bay Area Construction Site-Related Odor Complaints

Year	Total Complaints	Construction Site Complaints	Construction Percent of Total
2005	2,110	24	1.1%
2006	2,563	29	1.1%
2007	1,760	29	1.6%
2008	1,719	23	1.3%
Average	2,038	26	1.3%

Therefore, it is recommended that BAAQMD not adopt a numeric significance threshold for construction-related odor impacts, which is consistent with BAAQMD's current approach. A further consideration for not adopting a specific threshold is that the other construction thresholds recommended above will also cause concomitant reduction of odors at construction sites. It is recommended instead to allow individual lead agencies to address this issue on a case-by-case basis, taking into consideration the specific construction-related characteristics of each project and proximity of off-site receptors.

4.2 OPERATIONAL-RELATED IMPACTS

4.2.1 CRITERIA AIR POLLUTANTS AND PRECURSORS (REGIONAL)

4.2.1.1 OPTION 1: CURRENT APPROACH

Project Impact Thresholds

At the project level, BAAQMD currently recommends that a proposed project that is estimated to generate operational criteria air pollutant or ozone precursor emissions in excess of the annual or daily thresholds shown in Table 10 should be considered to have a significant air quality impact. These thresholds of significance would be exceeded by an unmitigated project size approximately equivalent to a 430-unit single family subdivision.

Table 10 - Criteria Air Pollutant/Precursor Operational Threshold Option 1 (Current Practice)

Pollutant	Threshold Emissions (tpy)	Threshold Emissions (lb/day)	Threshold Emissions (kg/day)
ROG	15	80	36
NO_X	15	80	36
PM_{10}	15	80	36

Notes: kg/day = kilograms per day; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; tpy = tons per year.
Source: BAAQMD 1999.

Cumulative Impact Analysis

With respect to cumulative impacts of criteria pollutants and ozone precursors, BAAQMD's current approach is that any proposed project (excluding plans) that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. For any project that does not individually result in significant operational-related air quality impacts, the determination of a significant cumulative impact should be based on an evaluation of the consistency of the project with the local general plan and of the general plan with the regional air quality plan. The appropriate regional air quality plan for the SFBAAB is the most recently adopted air quality plan [AQP] that has been developed in response to the CCAA.

If a project is proposed in a city or county with a general plan that is consistent with the AQP and the project is consistent with that general plan (i.e., does not require a general plan amendment [GPA]), then the project would not have a significant cumulative impact (provided, of course, the project does not individually have any significant impacts). No further analysis regarding cumulative impacts is necessary.

In a jurisdiction with a general plan consistent with the AQP, a project may be proposed that is not consistent with that general plan because it requires a General Plan Amendment (GPA). In such instances, the cumulative impact analysis should consider the difference(s) between the project and the original (pre-GPA) land use designation for the site with respect to motor vehicle use and potential land use conflicts. In this case, a project would not have a significant cumulative impact if the vehicle miles traveled (VMT) from the project would not be greater than the VMT that would be anticipated under the original land use designation.

For a project in a city or county with a general plan that is not consistent with the AQP, the cumulative impact analysis is based on the combined impacts of the proposed project and past, present and reasonably anticipated future projects. A project would have a significant cumulative impact if these combined impacts would exceed any of the thresholds established above for project operations.

The cumulative impact threshold of significance could affect all projects, regardless of size, and require mitigation for cumulative impacts.

4.2.1.2 OPTION 2: CLEAN AIR ACT EMISSIONS LIMIT APPROACH

Project Thresholds

This option is identical to the Construction-Related Criteria Air Pollutants and Precursors Option 2 (CAA Approach) discussed above except this approach would use the maximum annual in addition to the average daily levels as shown in Table 11.

Table 11 - Criteria Air Pollutant/Precursor Operational Threshold Option 2 (CAA Approach)

Emissions Type	Maximum Annual Emissions Level (tpy)	Average Daily Emissions Level (lb/day)
ROG	10	54
NO_X	10	54
PM_{10}	15	82
$PM_{2.5}$	10	54

Notes: CO = carbon monoxide; lb/day = pounds per day; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; SO_2 = sulfur dioxide; tpy = tons per year.
Sources: Data compiled by EDAW 2009, BAAQMD 2005, EPA 2008.

Threshold Level Sensitivity Analysis

A sensitivity analysis of the threshold level was conducted for each pollutant in order to determine reasonable emissions capture rates based on NSR/PSD thresholds. Emissions capture rates are hereafter defined as the proportion of project-generated emissions that would exceed the BAAQMD CEQA threshold of significance and would thereby be subject to mitigation. The sensitivity analysis involved adjusting the mass emissions threshold level in order to develop a matrix of emission reduction scenarios.

Based on the project-level data from the development projections that were used to calculate the unmitigated amount of criteria air pollutants and precursors shown in Table 5, a sensitivity analysis was conducted of operational-related mass emission threshold levels for ROG, NO_X, PM_{10}, and $PM_{2.5}$. This was done to determine the number of occurrences wherein such levels would be exceeded by projected development subject to CEQA requirements. In situations where development would exceed these threshold levels, CEQA requires implementation of feasible mitigation, to the extent that this impact is reduced to below significance. Feasible means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (California Administrative Code, Title. 14, § 15364; California Public Resources Code, § 21061.1.). BAAQMD would achieve emission reductions from new development associated with implementation of feasible mitigation.

Reductions of 15 percent in operational emissions typically are achievable when considering standard (i.e., not "smart growth") projects. A reasonable and demonstrable amount of feasible mitigation can be required of projects, at least to the extent they are not already planned with emissions-reducing characteristics. If mitigation is deemed infeasible, CEQA allows lead agencies to override any remaining significant impacts provided certain findings are made. Thus, since a 15 percent reduction in operational emissions from an unmitigated (i.e., full trip generation URBEMIS default model run) baseline is a practicable amount of mitigation, as demonstrated in nearby jurisdictions, 15 percent mitigation effectiveness was assumed for the purposes of this analysis. It was

assumed that all of the projects that would trigger the CEQA thresholds would attempt to mitigate their emissions by at least 15 percent or down to the level of the threshold as required by CEQA.[5] It is the policy of the State that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures which will avoid or substantially lessen the significant environmental effects of such projects.

Results of the threshold sensitivity analysis are presented in Table 12.

For state and federal criteria air pollutants for which the SFBAAB is currently in attainment (e.g., CO, SO_2), the operational thresholds were not evaluated in the sensitivity analysis because it is not foreseeable that there would be any impacts from these constituents. Concentration levels of CO in the SFBAAB have not exceeded the CAAQS in the past 11 years and sulfur dioxide (SO_2) concentrations have never exceeded the standards (EPA 2009). BAAQMD has demonstrated that attainment pollutants are sufficiently controlled by air quality plans and regulations, thus, significant air quality impacts for CO and SO_2 emissions would not be expected to occur as a result of a project's operational-related emissions and quantitative thresholds are not included in this option for these pollutants.

Cumulative Thresholds

The non-attainment status of regional pollutants is a result of past and present development within the SFBAAB. Without the large scale of development that has occurred throughout the SFBAAB, non-attainment would not have occurred. Thus, this regional impact is a cumulative impact, and projects would adversely affect this impact only on a cumulative basis. No single project would be sufficient in size, by itself, to result in non-attainment of the regional air quality standards. Consequently, the thresholds of significance discussed above are the amount of pollution that is deemed cumulatively considerable and, therefore, a significant adverse air quality impact.

4.2.1.3 OPTION 3: CALIFORNIA CLEAN AIR ACT APPROACH

This approach is similar to Option 2, but uses a measurement of percent emissions reduction relative to the total emissions inventory as the supporting basis for each threshold level.

The CCAA requires a five percent per year reduction from the total emissions inventory. If a non-attainment area cannot achieve the five percent per year goal, the CCAA requires the area to implement all feasible measures to attain the state standards as soon as possible. If compounded annually between 2010 and 2020, a total of 38.75 percent reduction from the emissions inventory would be required. Table 13 summarizes the quantity of BAAQMD's emissions inventory reduction required by the CCAA during the period from 2010 through 2020 in tons/day.

The CEQA threshold developed with Option 3 is intended to contribute a portion of that five percent per year requirement. Table 14 summarizes the amount of emissions reduction achieved through various CEQA significance threshold levels evaluated. The values were calculated in the same manner as in Option 2, except in units of tons/day. The column labeled "% Reductions of 2020 Inventory" lists by how much each threshold would reduce the business as usual 2020 inventory. As shown these thresholds would reduce the 2020 inventory between 1.4 and 2.7 percent for ROG, between 0.2 and 1.5 percent for NOx, between 0.1 and 7.2 percent for PM_{10} and 1.7 to 2.6 percent of $PM_{2.5}$. These reductions would, for the most part contribute incrementally toward meeting the CCAA requirement of 5 percent per year (or 38.75 percent by 2020) for NOx, ROG, and $PM_{2.5}$. These reductions would contribute substantially towards meeting the CCAA requirement for PM_{10}, whereas the NSR, Rule 2 Offset, and Rule 2 BACT thresholds would result in 4 to 7 percent reductions in PM_{10} emissions which correspond to 13 to 24 percent of the overall CCAA reductions needed by 2020. The remaining emission reductions would need to be achieved through other control measures and regulations in BAAQMD's jurisdiction.

[5] California Public Resources Code Section 21002; *See Laurel Heights I*, 47 Cal.3d at 400-401

For cumulative impact analysis, this option would use the same approach as Option 2.

4.2.1.4 OPTION 4: QUANTITATIVE THRESHOLD, GAP ANALYSIS

This approach would involves using the same "gap" analysis described below under Operational GHG threshold Option 1 to determine a quantitative threshold for criteria pollutants and ozone precursors. The analysis would examine all sources of criteria pollutants and ozone precursors, the effect of current regulations and programs (such as the Diesel Risk Reduction Plan), the feasibility of project-specific mitigation, and then allocate an overall "budget" of emissions reductions to the land use sector subject to CEQA. This approach was not developed further given that regulatory bases for establishment of a quantitative threshold already exist in the form of the CAA and CCAA.

Table 12 - Criteria Air Pollutant/Precursor Operational Threshold Option 2 (CAA Approach) Sensitivity Analysis																	
Basis of Threshold	Mass Emissions Threshold Level (tpy)				Mitigation Requirement for Projects with Emissions >Threshold Level	Aggregate Emissions Reduction From Mitigation Between 2010-2020 (Tons)[1]				% Project Capture[2]				% Emissions Capture[2]				Project Size Equivalent (number of single family dwelling units)[3]
	ROG	NO_X	PM_{10}	$PM_{2.5}$		ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$	
NSR (Significant Emissions Rate)	40	40	15	10	15%	1,102	229	1,867	344	1%	0%	2%	1%	31%	0%	31%	23%	523
(BAAQMD Reg. 2, Offset)	10	10	100	-	15%	1,033	1,137	32	-	2%	1%	0%		43%	25%	16%	-	396
5 tpy Level[4]	5	5	5	5	15%	1,518	1,008	2,555	533	5%	2%	9%	1%	57%	33%	52%	30%	198
BAAQMD (Reg. 2, BACT)	1.8	1.8	1.8	1.8	15%	2,028	1,496	3,457	510	14%	10%	58%	7%	73%	53%	92%	52%	62

Notes: BAAQMD = Bay Area Air Quality Management District; BACT = Best Available Control Technology; NSR = New Source Review; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; tpy = tons per year.

[1]Unmitigated Emissions from Land Use Development between 2010 and 2020)

[2] Emissions capture refers to the portion of emissions that would exceed the CEQA significance threshold and would thereby be subject to mitigation. Similarly, project capture refers to the portion of projects that would result in emissions that exceed the CEQA significance threshold and would be subject to mitigation.

[3] Project size equivalent is determined by the limiting pollutant (i.e., whichever threshold is exceeded first).

[4] The mass emission level of 5 tpy represents a moderate scenario between offset levels and BACT levels. 5 tpy is not based on regulation or defined by BAAQMD as an emissions level of importance, but presented here for informational purposes only.

Please refer to Appendix C for detailed unmitigated emissions calculations.

Sources: Data calculated by EDAW 2009, DOF 2009, EDD 2009, Rimpo and Associates 2009.

Table 13 - Criteria Pollutant/Precursor Emissions with CCAA Five Percent per Year Reduction												
BAAQMD Emissions Inventory (2010) (tons/day)				CCAA % reduction (over 2010-2020)	BAAQMD Inventory with CCAA Required Reduction (2020) (tons/day)				Difference (CCAA Reduction) (tons/day)			
ROG	NO_X	PM_{10}	$PM_{2.5}$		ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$
335.5	449.6	216.1	87.9	38.75%	205.5	275.4	132.4	53.9	130.0	174.2	83.8	34.1

Notes: BAAQMD = Bay Area Air Quality Management District; CCAA = California Clean Air Act; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 microns or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 microns or less; ROG = reactive organic gases; tons/day = tons per day.

Source: BAAQMD 2009.

Table 14 - Criteria Air Pollutant/Precursor Operational Threshold Option 3 (CCAA Approach) Sensitivity Analysis														
	Mass Emissions Threshold Level (tpy)				Mitigation Requirement for Projects with Emissions > Threshold Level	Emissions Reduction From Mitigation Between 2010-2020 (Tons/day)				% Reductions of 2020 Inventory				Project Size Equivalent (number of single family dwelling units)[1]
	ROG	NO_X	PM_{10}	$PM_{2.5}$		ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$	
NSR (Significant Emissions Rate)	40	40	15	10	15%	3.0	0.6	5.1	0.9	1.5%	0.2%	3.9%	1.7%	523
(BAAQMD Rule 2, Offset)	10	10	100	-	15%	2.8	3.1	0.1	-	1.4%	1.1%	0.1%	-	396
5 tpy Level[2]	5	5	5	5	15%	4.2	2.8	7.0	1.5	2.0%	1.0%	5.3%	2.7%	198
BAAQMD (Rule 2, BACT)	1.8	1.8	1.8	1.8	15%	5.6	4.1	9.5	1.4	2.7%	1.5%	7.2%	2.6%	62

Notes: BAAQMD = Bay Area Air Quality Management District; BACT = Best Available Control Technology; CCAA = California Clean Air Act; NSR = New Source Review; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 microns or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 microns or less; ROG = reactive organic gases; tons/day = tons per day; tpy =tons per year.

[1] Project size equivalent is determined by the limiting pollutant (i.e., whichever threshold is exceeded first).

[2] The mass emission level of 5 tpy represents a moderate scenario between offset levels and BACT levels. 5 tpy is not based on regulation or defined by BAAQMD as an emissions level of importance, but presented here for informational purposes only.

Please see Table 11 for % project and emission capture rates associated with these mass emission levels.

Please refer to Appendix C for detailed unmitigated emissions calculations.

Sources: Data calculated by EDAW 2009, DOF 2009, EDD 2009, Rimpo and Associates 2009.

4.2.1.5 STAFF RECOMMENDATION AND JUSTIFICATION

BAAQMD staff recommends Option 2 and the average daily and maximum annual criteria air pollutant and precursor levels shown in Table 11 as the thresholds of significance that are derived from the information above (i.e., federal NSR Significant Emission Rate and BAAQMD Offset Requirement limits). This option applies the federal BAAQMD Offset Requirements to ozone precursors for which the SFBAAB is designated as a non-attainment area which is an appropriate approach to prevent further deterioration of ambient air quality and thus has nexus and proportionality to prevention of a regionally cumulative significant impact (e.g. worsened status of non-attainment). Despite non-attainment area for state PM_{10} and pending nonattainment for federal $PM_{2.5}$, the federal NSR Significant Emission Rate annual limits of 15 and 10 tons per year, respectively, are recommended for this option as BAAQMD has not established an Offset Requirement limit for $PM_{2.5}$ and the existing limit of 100 tons per year is much less stringent and would not be appropriate in light of our pending nonattainment designation for the federal 24-hour $PM_{2.5}$ standard. These thresholds represent the emission levels above which a project's individual emissions would result in a considerable adverse contribution to the SFBAAB's existing air quality conditions. As discussed for Option 2, the thresholds would be an evaluation both of project significance and of the cumulative contribution of a project to a significant cumulative impact. These threshold levels are well-established in terms of existing regulations as promoting review of emissions sources to prevent cumulative deterioration of air quality. Using existing environmental standards in this way to establish CEQA thresholds of significance under Guidelines section 15067.4 is an appropriate and effective means of promoting consistency in significance determinations and integrating CEQA environmental review activities with other areas of environmental regulation. (*See Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal. App. 4th 98, 111.[6])

As noted above under discussion of construction criteria pollutants, regional concentration levels of CO in the SFBAAB have not exceeded the CAAQS in the past 11 years and sulfur dioxide (SO_2) concentrations have never exceeded the standards (EPA 2009). BAAQMD has demonstrated that attainment pollutants are sufficiently controlled by air quality plans and regulations and thus no quantitative thresholds for construction are recommended for CO or SO_2 for evaluation of impacts to regional air quality.

4.2.2 LOCAL CARBON MONOXIDE

4.2.2.1 OPTION 1 - CURRENT APPROACH

BAAQMD's current approach to localized carbon monoxide concentrations is that CO emissions should be estimated for projects in which: 1) vehicle emissions of CO would exceed 550 lb/day; 2) project traffic would impact intersections or roadway links operating at Level of Service (LOS) D, E or F or would cause LOS to decline to D, E or F; or 3) project traffic would increase traffic volumes on nearby roadways by 10 percent or more. The current guidelines also state that a project contributing to CO concentrations exceeding the California Ambient Air Quality Standard (CAAQS) of 9 parts per million (ppm) averaged over 8 hours and 20 ppm for 1 hour would be considered to have a significant impact.

Thus, in effect, the current approach has an overall threshold using the CAAQS ambient standards, but also includes several proxy thresholds in the form of a mass emissions threshold, traffic LOS threshold, and a traffic volume threshold. If below the proxy thresholds, then no quantification is done and no comparison to the ambient standards is completed.

[6] The Court of Appeal in the *Communities for a Better Environment* case held that existing regulatory standards could not be used as a definitive determination of whether a project would be significant under CEQA where there is substantial evidence to the contrary. Staff's proposed thresholds would not do that. The thresholds are levels at which a project's emissions would normally be significant, but would not be binding on a lead agency if there is contrary evidence in the record.

4.2.2.2 OPTION 2 - AMBIENT STANDARDS

As a localized pollutant, this approach for evaluation of carbon monoxide impacts is based solely on ambient concentration limits set by the California Clean Air Act for Carbon Monoxide and Appendix G of the State of California CEQA Guidelines.

The CAAQS of 20.0 ppm and 9 ppm for 1-hour and 8-hour CO, respectively, would be used as the thresholds of significance for localized concentrations of CO. Carbon monoxide is a directly emitted pollutant with primarily localized adverse effects when concentrations exceed the health based standards established by the California Air Resources Board (ARB).

In addition, Appendix G of the State of California CEQA Guidelines includes the checklist question: Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation? Answering yes to this question would indicate that the project would result in a significant impact under CEQA. The use of the ambient standard would relate directly to this checklist question.

4.2.2.3 STAFF RECOMMENDATION AND JUSTIFICATION

Since the Option 2 ambient air quality standards are health-based (i.e., protective of public health), there is substantial evidence (i.e., health studies that the standards are based on) in support of their use as CEQA significance thresholds and they are recommended by BAAQMD staff instead of the current approach. The use of the ambient standard would relate directly to the CEQA checklist question. By not using a proxy standard, there would be a definitive bright line about what is or is not a significant impact and that line would be set using a health-based level.

4.2.3 GREENHOUSE GASES

4.2.3.1 CURRENT APPROACH

BAAQMD does not currently have an adopted threshold of significance for GHG emissions. BAAQMD currently recommends that lead agencies quantify GHG emissions resulting from new development and apply all feasible mitigation measures to lessen the potentially adverse impacts. One of the primary objectives in updating the current CEQA Guidelines is to identify a GHG significance threshold, analytical methodologies, and mitigation measures to ensure new land use development meets its fair share of the emission reductions needed to address the cumulative environmental impact of GHG emissions. Similar to regulated air pollutants, GHG emissions and global climate change also represent cumulative impacts. GHG emissions contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change. As reviewed herein, climate change impacts include an increase in extreme heat days, higher concentrations of air pollutants, sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental impacts. No single project could generate enough GHG emissions to noticeably change the global average temperature. The combination of GHG emissions from past, present, and future projects contribute substantially to the phenomenon of global climate change and its associated environmental impacts.

BAAQMD's approach to developing a *Threshold of Significance* for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions. If a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact, and would be considered significant. If mitigation can be applied to lessen the emissions such that the project meets its fair share of emission reductions needed to address the cumulative impact, the project would normally be considered less than significant.

GHG CEQA significance thresholds evaluated herein are intended to serve as interim levels during the implementation of the AB 32 Scoping Plan and SB 375, which will occur over time. Until AB 32 has been fully implemented in terms of adopted regulations, incentives, and programs and until SB 375 required plans have been fully adopted, or ARB adopts a recommended threshold, the BAAQMD recommends that local agencies in the SFBAAB apply the GHG threshold developed herein.

If left unchecked, GHG emissions from new land use development in California may result in a cumulatively considerable amount of GHG emissions and a substantial conflict with the State's ability to meet the goals within AB 32. Thus, BAAQMD has elected to adopt an interim GHG threshold for CEQA analysis, which can be used by lead agencies within the SFBAAB. This would help lead agencies navigate this dynamic regulatory and technological environment where the field of analysis has remained wide open and inconsistent. BAAQMD's framework for developing a GHG threshold for land development projects that is based on policy and substantial evidence follows, and is detailed in Appendix D.

It is widely recognized that AB 32 is only a starting point for the long-term effort to reduce the potential adverse effects from climate change. There will be a need for greater reductions beyond that called for by AB 32 by 2050 in order to avoid the potentially more catastrophic consequences. At this time, BAAQMD is considering threshold development to support the incremental GHG emission reductions mandated by AB 32 given the importance of curbing the growth of GHG emissions and to begin to reduce their absolute levels. Given the magnitude of this initial challenge, BAAQMD considers it premature to propose thresholds for the period after 2020. However, there will be a need in the future to consider CEQA evaluation of post-2020 GHG emissions and reductions. As California and the nation grapple with the post-2020 challenge, BAAQMD will need to update its guidelines to consider the appropriate contributions from CEQA as part of the overall effort to reduce emissions.

While there are myriad potential ways to approach thresholds as documented in the CAPCOA white paper, staff is exploring four options, as described below, as the most promising for application in the SFBAAB.

4.2.3.2 SCIENTIFIC AND REGULATORY JUSTIFICATION

Climate Science Overview

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, chlorofluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is *extremely unlikely* that global climate change of the past 50 years can be explained without the contribution from human activities (IPCC 2007a).

According to Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC), "Avoiding Dangerous Climate Change" means: *"stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."* Dangerous climate change defined in the UNFCCC based on several key indicators including the potential for severe degradation of coral reef systems, disintegration of the West Antarctic Ice Sheet, and shut down of the large-scale, salinity- and thermally-driven circulation of the oceans. (UNFCCC 2009). The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 ppm to 379 ppm in 2005 (IPCC 2007a). "Avoiding dangerous climate change" is generally understood to be achieved by stabilizing global average temperatures between 2 and 2.4°C above pre-industrial levels. In order to limit temperature increases to this level, ambient global CO_2 concentrations must stabilize between 350 and 400 ppm (IPCC 2007b).

Executive Order S-3-05

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's

snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed Assembly Bill 32, the California Global Warming Solutions Act of 2006, which set the 2020 greenhouse gas emissions reduction goal into law. AB 32 finds and declares that "Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020, and establishes regulatory, reporting, voluntary, and market mechanisms to achieve quantifiable reductions in GHG emissions to meet the statewide goal.

In December of 2008, ARB adopted its *Climate Change Scoping Plan* (*Scoping Plan*), which is the State's plan to achieve GHG reductions in California, as required by AB 32 (ARB 2008). The Scoping Plan contains the main strategies California will implement to achieve a reduction of 169 MMT CO_2e emissions, or approximately 28 percent from the state's projected 2020 emission level of 596 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 42 MMT of CO_2e, or almost 10 percent, from 2002-2004 average emissions), so that the state can return to 1990 emission levels, as is required by AB 32.

While the Scoping Plan establishes the policy intent to control numerous GHG sources through regulatory, incentive, and market means, given the early phase of implementation and the level of control that local CEQA lead agencies have over numerous GHG sources, CEQA is an important and supporting tool in achieving GHG reductions overall in compliance with AB 32. In this spirit, BAAQMD is considering the adoption of thresholds of significance for GHG emissions for land use development projects.

Senate Bill 375

Senate Bill (SB) 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but can be updated every 4 years if advancements in emission technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for State funding programmed after January 1, 2012. New provisions of CEQA would incentivize qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

While SB 375 is considered in the development of thresholds, given that Metropolitan Transportation Commission (MTC)'s development of the SCS for the Bay Area is in its early stages and the ARB GHG reduction target for light duty and passenger vehicles in the Bay Area has not yet been proposed, it is premature to be able to fully rely on SB 375 to address transportation emissions. In the future as SB 375 implementation progresses, BAAQMD may need to revisit GHG thresholds.

4.2.3.3 Option 1: Quantitative Threshold and Performance Standard Approaches

This approach sets a GHG significance threshold based on AB 32 GHG emission reduction goals while taking into consideration emission reduction strategies outlined in ARB's Scoping Plan. Within Option 1, there are four

sub-options to consider, which are described below. BAAQMD took eight essential steps in developing this approach.

Step 1. Estimate from ARB's statewide GHG emissions inventory the growth in emissions between 1990 and 2020 attributable to "land use"-driven sectors of the emission inventory per OPR's guidance document.

Step 2. Estimate the GHG emission reductions anticipated statewide to these same "land use" -driven emissions inventory sectors associated with adopted regulations identified in the AB 32 Scoping Plan.

Step 3. Determine any short fall or "gap" between the 2020 statewide emission inventory estimates and the anticipated emission reductions from Scoping Plan adopted regulations. This "gap" represents additional GHG emission reductions needed statewide from these "land use"-driven emissions inventory sectors, which represents new land development's fair share of the emission reductions needed to meet statewide GHG emission reduction goals.

Step 4. Determine the percent reduction this "gap" represents in the "land use"-driven statewide emissions inventory sectors and apply that percent to the same GHG emissions inventory sectors from BAAQMD's GHG emissions inventory to identify the mass of emission reductions needed in the SFBAAB from "land use"-driven emissions inventory sectors.

Step 5. Forecast new land use development for the Bay Area using DOF/EDD projections for all land use types. Translate the land use development projections into land use categories consistent with those contained in the Urban Emissions Model (URBEMIS).

Step 6. Apply BAAQMD's CEQA database to projected new land use development to determine the frequency distribution of project sizes and types that would be expected to see come through the CEQA process in the SFBAAB between 2010 and 2020.

Step 7. Estimate the amount of GHG emissions that can be eliminated through mitigation measures for all land use development projects subject to CEQA ("mitigation effectiveness") compared to BAU conditions.

Step 8. Conduct a sensitivity analysis of the numeric GHG mass emissions threshold needed to achieve the desired emissions reduction (i.e., "gap") determined in Step 4. This mass emission GHG threshold is that which would be needed to achieve the emissions reduction necessary by 2020 to fill the Bay Area's fair share of the statewide "gap" in emissions reduction needed from the "land use"-driven emissions inventory sectors to meet AB 32 goals.

Basis and Analysis

Derivation of Greenhouse Gas Reduction Goal

To meet the target emissions limit established in AB 32 (equivalent to levels in 1990), total GHG emissions would need to be reduced by approximately 28 percent from projected 2020 forecasts (ARB 2009a). The AB 32 Scoping Plan is ARB's plan for meeting this mandate (ARB 2008). While the Scoping Plan does not specifically identify GHG emission reductions from the CEQA process for meeting AB 32 derived emission limits, the scoping plan acknowledges that "other strategies to mitigate climate change . . . should also be explored." The Scoping Plan also acknowledges that "Some of the measures in the plan may deliver more emission reductions than we expect; others less . . . and new ideas and strategies will emerge." In addition, climate change is considered a significant environmental issue and, therefore, warrants consideration under CEQA. SB 97 represents the State Legislature's confirmation of this fact, and it directed the Governor's Office of Planning and Research (OPR) to develop CEQA Guidelines for evaluation of GHG emissions impacts and recommend mitigation strategies. In response, OPR released the *Technical Advisory: CEQA and Climate Change* (OPR 2008), and has released proposed CEQA guidelines (April 14, 2009) for consideration of GHG emissions. It is known

that new land use development must also do its fair share toward achieving AB 32 goals (or, at a minimum, should not hinder the State's progress toward the mandated emission reductions).

Foreseeable Emission Reductions from the Scoping Plan Measures

As stated above, to meet the requirements set forth in AB 32 (i.e., achieve California's 1990-equivalent GHG emissions levels by 2020) California would need to achieve an approximate 28 percent reduction in emissions across all sectors of the GHG emissions inventory compared with 2020 projections. However, to meet the AB 32 reduction goals in the emissions sectors that are related to land use development (e.g., on-road passenger and heavy-duty motor vehicles, commercial and residential area sources [i.e., natural gas], electricity generation/consumption, wastewater treatment, and water distribution/consumption), California would need to achieve an approximate 26 percent reduction in GHG emissions from these "land use-driven" sectors (ARB 2009a) by 2020. GHG emission reductions within these land use-driven sectors that are anticipated to occur from implementation of the Scoping Plan measures statewide are summarized in Table 15. Since the GHG emission reductions anticipated with the Scoping Plan were not accounted for in ARB's or BAAQMD's 2020 GHG emissions inventory forecasts (i.e., business as usual), an adjustment was made to include (i.e., give credit for) GHG emission reductions associated with key Scoping Plans measures, such as the Renewable Portfolio Standard, improvements in energy efficiency through periodic updates to Title 24, AB 1493 (Pavley) (which recently received a federal waiver to allow it to be enacted in law), the Low Carbon Fuel Standard (LCFS), and other measures. With reductions from these State regulations (Scoping Plan measures) taken into consideration, the Bay Area would still need to achieve a 2.3 percent reduction from projected 2020 GHG emissions to meet the 1990 GHG emissions goal from these "land-use driven" sectors. Refer to Tables 15 through 17 for data used in this analysis and Appendix C for detailed calculations.

Table 15 - California 1990, 2002-2004, and 2020 GHG Emissions Inventories and Projections[1]				
Sector	1990 Emissions (MMT CO_2e/yr)	2002-2004 Average (MMT CO_2e /yr)	2020 BAU Emissions Projections (MMT CO_2e/yr)	% of 2020 Total
Transportation	**137.98**	**168.66**	**209.06**	**52%**
On-Road Passenger Vehicles	108.95	133.95	160.78	40%
On-Road Heavy Duty	29.03	34.69	48.28	12%
Electric Power	**110.63**	**110.04**	**140.24**	**35%**
Electricity	95.39	88.97	107.40	27%
Cogeneration[2]	15.24	21.07	32.84	8%
Commercial and Residential	**44.09**	**40.96**	**46.79**	**12%**
Residential Fuel Use	29.66	28.52	32.10	8%
Commercial Fuel Use	14.43	12.45	14.63	4%
Recycling and Waste[1]	**2.83**	**3.39**	**4.19**	**1%**
Domestic Waste Water Treatment	2.83	3.39	4.19	1%
TOTAL GROSS EMISSIONS	**295.53**	**323.05**	**400.22**	
% Reduction Goal from Statewide land use driven sectors (from 2020 levels to reach 1990 levels within these emission inventory sectors)			26.2%	
% Reduction from AB32 Scoping Plan measures applied to land use sectors (see Table 16)			-23.9%	
% Reduction needed statewide beyond Scoping Plan measures (Gap)			2.3%	

Notes: MMT CO_2e /yr = million metric tons of carbon dioxide equivalent emissions per year.

[1] Landfills not included. See text.

[2] Cogeneration included due to many different applications for electricity, in some cases provides substantial power for grid use, and because electricity use served by cogeneration is often amenable to efficiency requirements of local land use authorities. Please refer to Appendix D for detailed calculations. Sources: Data compiled by EDAW and ICF Jones & Stokes from ARB data.

Table 16 - GHG Emission Reductions from State Regulations and AB-32 measures (2020)				
Affected Emissions Source	California Legislation	% Reduction from 2020 GHG inventory	End Use Sector (% of Bay Area LU Inventory)	Scaled % Emissions Reduction (credit)
Mobile	AB 1493 (Pavley)	19.7%	On road passenger/light truck transportation (45%)	8.9%
	LCFS	7.2%	On road passenger/light truck transportation (45%)	3.2%
	LCFS	7.2%	On road Heavy/Medium Duty Transportation (5%)	0.4%
	Heavy/Medium Duty Efficiency	2.9%	On road Heavy/Medium Duty Transportation (5%)	0.2%
	Passenger Vehicle Efficiency	2.8%	On road passenger/light truck transportation (45%)	1.3%
Area	Energy-Efficiency Measures	9.5%	Natural gas (Residential, 10%)	1.0%
			Natural gas (Non-residential,13%)	1.2%
Indirect	Renewable Portfolio Standard	21.0%	Electricity (excluding cogen) (17%)	3.5%
	Energy-Efficiency Measures	15.7%	Electricity (26%)	4.0%
	Solar Roofs	1.5%	Electricity (excluding cogen) (17%)	0.2%
Total credits given to land use-driven emission inventory sectors from Scoping Plan measures				**23.9%**

Notes: AB = Assembly Bill; LCFS = Low Carbon Fuel Standard; SB = Senate Bill; RPS = Renewable Portfolio Standard

Please refer to Appendix D for detailed calculations. Sources: Data compiled by ICF Jones & Stokes.

Table 17 - Basin 1990, 2007, and 2020 GHG Emissions Inventories and Projections				
Sector	1990 Emissions (MMT CO_2e /yr)	2007 Emissions (MMT CO_2e /yr)	2020 Emissions Projections (MMT CO_2e /yr)	% of 2020 Total[2]
Transportation	**26.1**	**30.8**	**35.7**	**50%**
On-Road Passenger Vehicles	23.0	27.5	32.0	
On-Road Heavy Duty	3.1	3.3	3.7	
Electric Power	**25.1**	**15.2**	**18.2**	**26%**
Electricity	16.5	9.9	11.8	
Cogeneration	8.6	5.3	6.4	
Commercial and Residential	**8.9**	**15.0**	**16.8**	**24%**
Residential Fuel Use	5.8	7.0	7.5	
Commercial Fuel Use	3.1	8.0	9.3	
Recycling and Waste[1]	**0.2**	**0.4**	**0.4**	**1%**
Domestic Waste Water Treatment	0.2	0.4	0.4	
TOTAL GROSS EMISSIONS	**60.3**	**61.4**	**71.1**	
SFBAAB's "Fair Share" % Reduction (from 2020 levels to reach 1990 levels) with AB-32 Reductions (from Table 16)			23.9%	
SFBAAB's Equivalent Mass Emissions Land Use Reduction Target at 2020			1.6	

Notes: MMT CO_2e /yr = million metric tons of carbon dioxide equivalent emissions per year; SFBAAB = San Francisco Bay Area Air Basin.

[1] Landfills not included.

[2] Percentages do not sum exactly to 100% in table due to rounding.

Please refer to Appendix D for detailed calculations.

Sources: Data compiled by EDAW 2009, ICF Jones & Stokes 2009, BAAQMD 2008.

Because the transportation sector is the largest emissions sector of the state's GHG emissions inventory, it is aggressively targeted in early actions and other priority actions in the Scoping Plan including measures concerning gas mileage (Pavley), fuel carbon intensity (LCFS) and vehicle efficiency measures.

The AB 32 Scoping Plan assigns an approximate 20 percent reduction in emissions from passenger vehicles associated with the implementation of AB 1493. The AB 32 Scoping Plan also notes that "AB 32 specifically states that if the Pavley regulations do not remain in effect, ARB shall implement alternative regulations to control mobile sources to achieve equivalent or greater reductions of greenhouse gas emissions (HSC §38590)." Thus, it is reasonable to assume full implementation of AB 1493 standards, or equivalent programs that would be implemented by ARB. While the Obama administration has proposed national CAFÉ standards that may be equivalent to or even surpass AB 1493, the timing for implementation of the proposed federal standards is uncertain such that development of thresholds based on currently unadopted federal standards would be premature. BAAQMD may need to revisit this methodology as the federal standards come on line, particularly if such standard are more aggressive than that forecast under state law.

According to the adopted LCFS rule (CARB, April 2009), the LCFS is expected to result in approximately 10 percent reduction in the carbon intensity of transportation fuels. However, a portion of the emission reductions required from the LCFS would be achieved over the life cycle of transportation fuel production rather than from mobile-source emission factors. Based on CARB's estimate of nearly 16 MMT reductions in on-road emissions from implementation of the LCFS and comparison to the statewide on-road emissions sector, the LCFS is assumed to result in a 7.2 percent reduction compared to 2020 BAU conditions (CARB 2009e).

Energy efficiency and renewable energy measures from the Scoping Plan were also included in the gap analysis. The Renewable Portfolio Standard (rules) will require the renewable energy portion of the retail electricity portfolio to be 33 percent in 2020. For PG&E, the dominant electricity provider in the Basin, approximately 12

percent of their current portfolio qualifies under the RPS rules and thus the gain by 2020 would be approximately 21 percent. The Scoping Plan also estimates that energy efficiency gains with periodic improvement in building and appliance energy standards and incentives will reach 10 to 15 percent for natural gas and electricity respectively. The final state measure included in this gap analysis is the solar roof initiative, which is estimate to result in reduction of the overall electricity inventory of 1.5 percent.

Landfill emissions are excluded from this analysis. While land use development does generate waste related to both construction and operations, CIWMB has mandatory diversion requirements that will, in all probability, increase over time to promote waste reductions, reuse, and recycle. The Bay Area has relatively high levels of waste diversion and extensive recycling efforts. Further, ARB has established and proposes to increase methane capture requirements for all major landfills. Thus, at this time, landfill emissions associated with land use development waste generation is not included in the land use sector inventory used to develop this threshold approach.

Industrial stationary sources thresholds were developed separately from the land use threshold development using a market capture approach as described below. However, mobile source and area source emissions, as well as indirect electricity emissions that derive from industrial use are included in the land use inventory above as these particular activities fall within the influence of local land use authorities in terms of the influence on trip generation and energy efficiency.

It should be noted that the "gap approach" used for threshold development is a conservative approach focusing on a limited set of state mandates that appear to have greatest promise in reducing land use development GHG emissions at this time. BAAQMD will need to reconsider this gap approach over time as the effectiveness of state implementation of AB 32 (and SB 375) progresses to address the need for and extent of GHG reductions required from local land use development over and above that being addressed through both federal and state mandates.

Threshold Development

AB 32 mandates (reduction to 1990-equivalent GHG levels by 2020), with foreseeable emission reductions from State regulations and key Scoping Plan measures taken into account, were applied to the "land use-driven" emission sectors within the SFBAAB (i.e., those that are included in the quantification of emissions from a land use project pursuant to a CEQA analysis [on-road passenger vehicles, commercial and residential natural gas, commercial and residential electricity consumption, and domestic waste water treatment], as directed by OPR in the Technical Advisory: *Climate Change and CEQA* [OPR 2008]). This translates to 2.3 percent gap in necessary GHG emission reductions by 2020 from these sectors.

Applying a 2.3 percent reduction to these land use emissions sectors in the SFBAAB's GHG emissions inventory would result in an equivalent fair share of 1.6 million metric tons per year (MMT/yr) reductions in GHG emissions from new land use development. As additional regulations and legislation aimed at reducing GHG emissions from land use-related sectors become available in the future, the 1.6 MMT GHG emissions reduction goal may be revisited and recalculated by BAAQMD.

A projected development inventory for the next ten years in the SFBAAB was calculated in the same manner as described above under the *Operational-Related Criteria Air Pollutants and Precursors* section (see above and refer to Exhibit 1). CO_2e emissions were modeled for projected development in the SFBAAB and compiled to estimate the associated GHG emissions inventory. The GHG (i.e., CO_2e) CEQA threshold level was adjusted for projected land use development that would occur within BAAQMD's jurisdiction over the period from 2010 through 2020.

Option 1A: Quantitative Threshold (Bright Line)

Option 1A involves using a numeric mass emissions significance threshold. If project-generated GHG emissions would be greater than the mass emissions level, the impact would be significant and mitigation would be required.

If project-generated emissions were below the mass emissions level, no CEQA related mitigation measures would be required. This option is consistent with significance thresholds recommended by air districts throughout the State for criteria pollutants. Establishing a "bright line" to determine the significance of a project's GHG emission impact provides a level of certainty to lead agencies in determining if a project needs to reduce its GHG emissions through mitigation measures and when an EIR is required.

Projects with emissions greater than the threshold would be required to mitigate to the threshold level or reduce project emissions by a fixed percentage compared to a base year condition. The base year condition is defined by an equivalent size and character of project with annual emissions using the defaults in URBEMIS and the California Climate Action Registry's General Reporting Protocol for 2008. By this method, land use project mitigation subject to CEQA would help close the "gap" remaining after application of the key regulations and measures noted above supporting overall AB 32 goals.

The Sensitivity Analysis (Table 18) conducted for Option 1 demonstrates various mass emissions significance threshold levels (i.e., bright lines) that could be chosen based on the mitigation effectiveness and performance anticipated to be achieved per project to meet the aggregate emission reductions of 1.6 MMT needed in the SFBAAB by 2020. Choosing a 1,100 MT mass emissions (equivalent to approximately 60 single-family units), significance threshold level from Option 1 would result in about 59 percent of all projects being above the significance threshold and having to implement feasible mitigation measures to meet their CEQA obligations. These projects account for approximately 92 percent of all GHG emissions anticipated to occur between now and 2020 from new land use development.

Project applicants and lead agencies could use readily available computer models to estimate a project's GHG emissions, based on project specific attributes, to determine if they are above or below the bright line numeric threshold. With this threshold, projects that are above the threshold level would have to reduce their emissions to below the threshold.

Option 1B: Performance Standards-Only Threshold

Option 1B involves implementation of performance standards by all projects subject to CEQA that are not categorically or statutorily exempt that would achieve a minimum 26 percent emissions reduction from all projects. If the project would implement performance measures to achieve the minimum performance standard of 26 percent reduction in GHG emissions, the impact would be considered less than significant. The rationale for this approach is based on the analysis of the OPR identified land use-driven GHG emissions inventory sectors in ARB's statewide GHG emissions inventory that identified the total amount of emissions reduction needed statewide to meet AB32 goals.

The sensitivity analysis (Table 18) indicates, at least theoretically, that requiring all projects to achieve a 26 percent emissions reduction would result in the SFBAAB exceeding its fair share of the emission reductions needed to meet the statewide 2020 GHG emission reduction goal. However, it should be noted that all projects (100 percent) subject to CEQA would have to calculate their unmitigated GHG emissions, or baseline, and then identify mitigation measures to reduce 26 percent of those emissions. It could prove difficult for the smallest of projects to implement sufficient mitigation measures to reduce their GHG emissions by 26 percent, thereby requiring these smaller projects to prepare an EIR for no other impacts than GHG emissions and climate change. In addition, due to economies of scale, larger projects could more efficiently mitigate GHG emission reductions.

Table 18 - Operational GHG Threshold Option 1A/1B/1C Sensitivity Analysis								
Option	Mitigation Effectiveness Assumptions		Mass Emission Threshold Level (MT CO_2e/yr)	% of Projects Captured (>threshold)	% of Emissions Captured (> threshold)	Emissions Reduction per year (MT/yr)	Aggregate Emissions Reduction (MMT) at 2020	Threshold Project Size Equivalent (single family dwelling units)
	Performance Standards Applied to All Projects with Emissions < Threshold Level	Mitigation Effectiveness Applied to Emissions > Threshold Level						
1A	N/A	30%	975	60%	93%	201,664	2.0	53
1A	N/A	25%	110	96%	100%	200,108	2.0	66
1A	N/A	30%	1,225	21%	67%	159,276	1.6	67
1A	N/A	26%	1,100	59%	92%	159,877	1.6	60
1A	N/A	30%	2,000	14%	61%	143,418	1.4	109
1A	N/A	25%	1,200	58%	92%	136,907	1.4	66
1A	N/A	30%	3,000	10%	56%	127,427	1.3	164
1A	N/A	25%	1,500	20%	67%	127,303	1.3	82
1B	26%	N/A	N/A	100%	100%	208,594	2.1	N/A[1]
1C	5%	30%	1,900	15%	62%	160,073	1.6	104
1C	10%	25%	1,250	21%	67%	159,555	1.6	68
1C	5%	30%	3,000	10%	56%	145,261	1.5	164
1C	10%	25%	2,000	4%	61%	151,410	1.5	109
1C	10%	30%	10,000	2%	33%	125,271	1.3	547

Notes: MMT = million metric tons per year; MT CO_2e/yr = metric tons of carbon dioxide equivalent emissions per year; MT/yr = metric tons per year; N/A = not applicable.

[1] Any project subject to CEQA would trigger this threshold.

Please refer to Appendix E for detailed calculations.

Source: Data modeled by ICF Jones & Stokes.

Option 1B would require provision of guidance to project applicants and lead agencies on how to calculate a project's unmitigated baseline GHG emissions and the amount of emission reductions that could be taken credit for with each separate mitigation measure proposed for implementation.

Option 1C: Combination of Performance Standards and Numeric Threshold

Option 1C involves using a combination of a minimum performance standard for all projects and a mass emissions threshold.

All projects that would result in GHG emissions would be required to reduce emissions by a minimum of 5 percent (compared to the base year condition) to be considered less than significant. The minimum amount of 5 percent was chosen because it is relatively easy to achieve 5 percent reduction in operational GHG emissions through implementation of relatively few performance measures. This amount would be achievable for projects not located along transit or bicycle infrastructure, which have historically achieved greater emission reductions. Sources of information cited in the report by the California Air Pollution Control Officers Association (CAPCOA) entitled CEQA and Climate Change indicate that there are measures and methods for quantification of mitigation effectiveness that can achieve the minimum 5 percent reduction in GHG emissions (CAPCOA 2008).

Projects that are above the mass emissions threshold would have to either reduce their emissions to below the threshold or by a minimum of 30 percent compared to the base year condition.

The results of the sensitivity analysis presented in Table 18 for Option 1C suggest that a mass emission CEQA threshold of <1,900 MT/yr (equivalent to approximately 104 single family dwelling units) combined with a mitigation effectiveness of 30 percent for projects over the threshold and 5 percent from all projects would be needed to achieve the requisite emissions capture to reach 1.6 MMT CO_2e of GHG emissions reduction by 2020.

Option 1D: GHG Efficiency Standard Approach

As discussed in Section 4.3.2 below, GHG efficiency metrics can also be utilized as thresholds to assess the GHG efficiency of a project on a per capita basis (residential only projects) or on a "service population" basis (the sum of the number of jobs and the number of residents provided by a project) . GHG efficiency metrics were developed in Section 4.3.2 for the emissions rates at the State level for the land use sector that would accommodate projected growth (as indicated by population and employment growth) under trend forecast conditions, and the emission rates needed to accommodate growth while allowing for consistency with the goals of AB 32 (i.e., 1990 GHG emissions levels by 2020). The resultant GHG efficiency metrics for this option would be 6.7 MT CO_2e/capita or 4.6 MT CO_2e/SP. A project with GHG emissions per capita or per service population less than these metrics would be considered less than significant. This approach would only apply to mixed use or residential only projects and would not apply to commercial or industrial projects.

4.2.3.4 OPTION 2: CALIFORNIA AIR RESOURCES BOARD TIERED THRESHOLD APPROACH

This option would involve implementation of the CEQA threshold(s) that have been conceptually developed by ARB in coordination with OPR, in response to SB 97 requirements.

Pursuant to SB 97, OPR was directed to develop CEQA mitigation guidelines for GHG emissions. OPR looked to ARB for technical expertise in the development, and evidence in support, of these thresholds. ARB released its draft interim CEQA thresholds concepts for industrial, commercial, and residential projects for public comment in October 2008.

ARB proposed a tiered approach as follows:

- Tier 1 - If the project is statutorily or categorically exempt from CEQA, it would be considered to result in a less-than-significant impact for GHG emissions.
- Tier 2 - If the project is consistent with an ARB-approved SCS developed pursuant to SB 375, it would be considered to result in a less-than-significant impact for GHG emissions.
- Tier 3A - For industrial projects (i.e., projects that would apply for air district permits), if the project would implement prescriptive performance standards related to construction and mobile-source operational GHG emissions, and meet a mass emissions threshold of 7,000 MT CO_2e/yr, it would be considered to result in a less-than-significant impact for GHG emissions.
- Tier 3B - For residential and commercial projects, if the project would implement a series of prescriptive performance measures addressing GHG emissions from construction, mobile sources, energy consumption, water consumption, and solid waste, and meet a mass emissions threshold (which is still under development and was not provided in the interim threshold draft) it would be considered to result in a less-than-significant impact for GHG emissions.

As of the time of writing, ARB is still accepting public comments on these draft options, and has not suggested a timeline for revision or adoption (ARB 2009b).

4.2.3.5 OPTION 3: BACT APPROACH

Quantitative evaluation of construction emissions would not be required for GHGs. Instead, all projects would be required to implement BACT to reduce GHGs. BACT would need to be developed by BAAQMD and would need to be updated periodically to reflect changes in technology, feasibility, and cost-effectiveness. Initial BACT standards could include, but need not be limited to the following: building energy efficiency, integration of renewable energy into project, waste minimization and reuse, water efficiency, alternative modes of travel. This approach would be labor intensive for BAAQMD staff and would involve the District in issues normally addressed by local land use authorities.

4.2.3.6 OPTION 4: TIERED THRESHOLD APPROACH

This option would be similar to Option 1A, except it would include two tiers of evaluation.

The first tier of evaluation would be whether the project is consistent with a qualified climate action plan or an adopted SCS/APS under SB 375 that addresses the project.

A qualified climate action plan must have the characteristics described below under Plan-Level GHG Thresholds.

A SCS (or APS) adopted pursuant to SB 375 must have the following characteristics:

- must meet the ARB identified reduction target;
- must have been adopted by the Metropolitan Transportation Organization (MPO); and
- certification of the EIR for the associated Regional Transportation Plan (RTP) must be completed.

If the project is consistent with a qualified Climate Action Plan, then the GHG emissions of the project would be less than significant. Projects that are found to not be consistent with an adopted Climate Action Plan would be reviewed against a quantitative threshold, as in Option 1A.

A project that is consistent with a SB 375 Sustainable Communities Strategy or Alternative Planning Strategy would be considered less than significant for transportation-related GHG emissions, but not necessarily for other GHG emissions. Review against the bright-line threshold, as in Option 1A, would still be required. Given that transportation emissions are often the largest source of GHG emissions for land use sector projects, it is expected that projects consistent with a SB 375 plan would more readily demonstrate compliance with the mitigation requirements in this threshold.

4.2.3.7 STATIONARY SOURCE GHG THRESHOLD

Two GHG threshold options were developed for stationary sources as discussed below using a "market-capture" approach.

Stationary Option 1: Natural Gas Only-Based Threshold Approach

Staff compiled reported annual natural gas consumption for 1,154 permitted facilities for 2007 and rank-ordered the facilities to estimate the 90th percentile of the cumulative natural gas usage for all permitted facilities. Figure 1 shows that approximately 4 percent of facilities evaluated comprise more than 90 percent of the total natural gas consumption. The threshold which would capture this 4 percent of facilities corresponds to 18,000 metric tons per year (tpy) of CO_2 emissions. If the screening threshold of 18,000 MT CO_2e/yr were implemented, based on the permitting activities for 2007, it would have resulted in 6 projects that would mandate a MNDs or EIR to be prepared by the BAAQMD as the lead agency unless another tier option is selected to demonstrate no significant impacts for GHG emissions[7]. It should be noted that this analysis did not include other possible GHG pollutants such as methane, N_2O; a life-cycle analysis; mobile sources; or indirect electricity consumption. Therefore, under an 18,000 MT CO_2e/yr screening level, a few more projects would be required to go through an MND or EIR environmental analysis than is currently the case. Furthermore, when the BAAQMD acts as a lead agency, the stationary source equipment employed as part of the proposed project typically must comply with BACT or other BAAQMD rules, regulations, programs that require reducing criteria pollutants or air toxics.

Stationary Option 2: All Combustion Emissions Threshold Approach

This approach is based on estimating the GHG emissions from combustion sources for all permit applications submitted to the Air District in 2005, 2006 and 2007. The analysis is based only on CO_2 emissions from stationary sources, as that would cover the vast majority of the GHG emissions due to stationary combustion sources in the SFBAAB. The estimated CO_2 emissions were calculated for the maximum permitted amount, i.e. emissions that would be emitted if the sources applying for a permit application operate at maximum permitted load and for the total permitted hours. All fuel types are included in the estimates. For boilers burning natural gas, diesel fuel is excluded since it is considered a backup fuel and is used only if natural gas is not available. Emission values are estimated before any offsets (i.e., Emission Reduction Credits) are applied. GHG emissions from mobile sources, electricity use and water delivery associated with the operation of the permitted sources are not included in the estimates.

It is projected that a threshold level of 10,000 metric tons of CO_2e per year would capture approximately 95% of all GHG emissions from stationary sources in the SFBAAB. That threshold level was calculated as an average of

[7] In 2005, three projects went through the CEQA process with BAAQMD as the lead.

the combined CO_2 emissions from all stationary source permit applications submitted to the Air District during the three year analysis period.

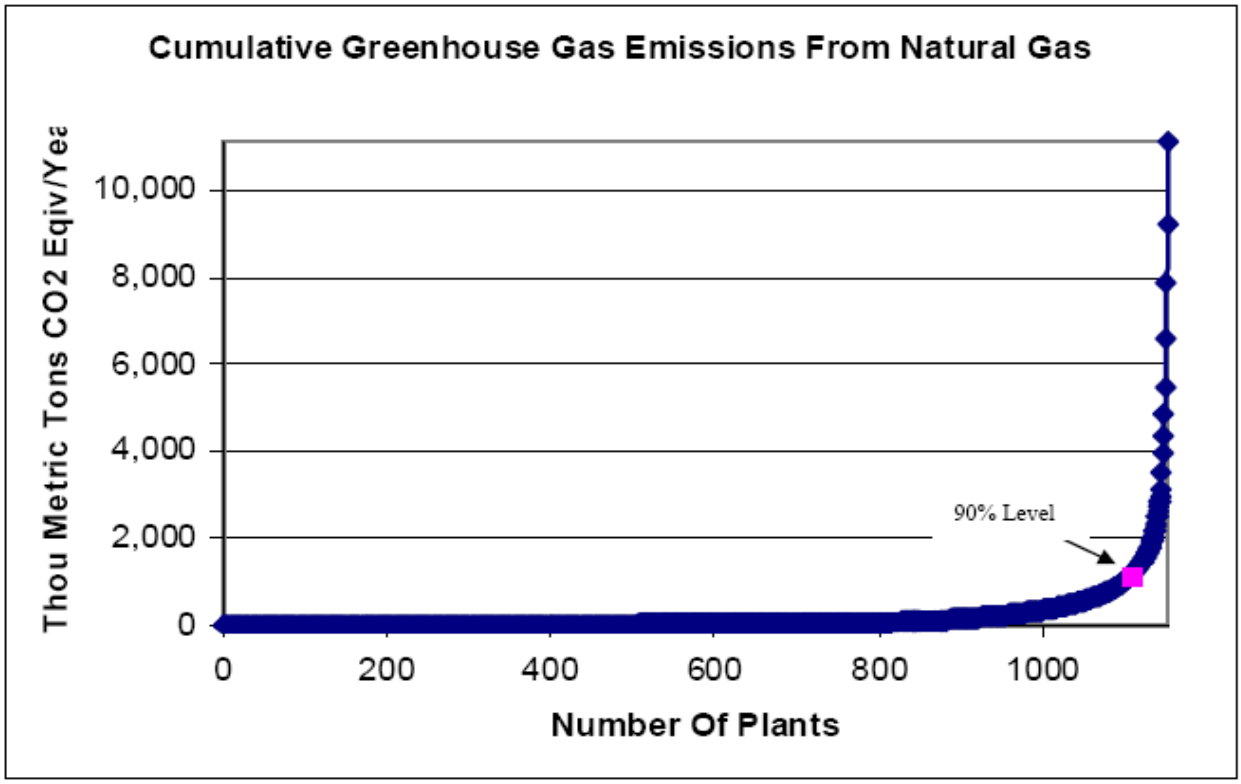


Figure 1: Natural Gas Combustion Emissions from Stationary Sources in the SFBAAB

4.2.3.8 STAFF RECOMMENDATIONS AND JUSTIFICATION

Land Use Sector Threshold Recommendation and Justification

As shown in Table 18 and described in text above, the analysis for this threshold evaluated several combinations of performance standards, mitigation effectiveness, and mass emissions levels. The percent of project and emission capture for each option is identified in Table 18 along with the aggregate emissions reduction, which ranges from 1.3 to 2.1 MMT in 2020. Although there is an inherent amount of uncertainty in these capture rates and the aggregate emission reductions, they are based on the best available data and assume a conservative approach to the amount of reductions from legislation in derivation of the goal (e.g., adopted only).

BAAQMD staff recommends a combination of Option 1A and Option 1D as an interim approach for determining the significance of a land-use project's greenhouse gas emissions until such time as Climate Action Plans and SCSs/APSs are adopted that can be used for this purpose. When the MTC RTP is completed in 2012, along with adoption of a SCS (and possibly an APS), municipalities throughout the Bay Area could analyze consistency with the SCS/APS as a significance threshold. As an interim threshold for use until a qualifying Climate Action Plan, SCS, and/or APS is adopted, staff recommends a bright-line numeric threshold of 1,100 MT CO_2e/yr as described in Option 1A as a numeric emissions level below which a project's contribution to global climate change would be less than "cumulatively considerable." This emissions rate is equivalent to a project size of approximately 60

single-family dwelling units, and approximately 59 percent of all future projects and 92 percent of all emissions from future projects would exceed this level. For projects that are above this bright-line cutoff level, emissions from these projects would still be less than cumulatively significant if the project as a whole would result in an efficiency of 6.7 MT CO_2e per capita or better for residential projects; or 4.6 MT CO_2e per service population or better for mixed-use projects. Projects with emissions above 1,100 MT CO_2e/yr would therefore still be less than significant if they achieved project efficiencies below these levels. If projects as proposed exceed these levels, they would be required to implement mitigation measures to bring them back below the 1,100 MT CO_2e/yr bright-line cutoff or within the 6.7 MT CO_2e per capita/4.6 MT CO_2e Service Population efficiency threshold. If mitigation did not bring a project back within the threshold requirements, the project would be cumulatively significant and could be approved only with a Statement of Overriding Considerations and a showing that all feasible mitigation measures have been implemented.

As explained in the preceding analyses of these options, the greenhouse gas emissions from land use projects expected between now and 2020 built in compliance with these thresholds would be approximately 26 percent below BAU 2020 conditions and thus would be consistent with achieving an AB 32 equivalent reduction. The 26 percent reduction from BAU 2020 from new projects built in conformance with these proposed thresholds would achieve an aggregate reduction of approximately 1.6 MMT CO_2e/yr, which is the "fair share" of emission reductions from Bay Area land use sources needed to meet the AB 32 goals, per ARB's Scoping Plan as discussed above.

Projects with greenhouse gas emissions in conformance with these proposed thresholds would therefore not be considered significant for purposes of CEQA. Although the emissions from such projects would add an incremental amount to the overall greenhouse gas emissions that cause global climate change impacts, emissions from projects consistent with these thresholds would not be a "cumulatively considerable" contribution under CEQA. Such projects would not be "cumulatively considerable" because they would be helping to solve the cumulative problem as a part of the AB 32 process. California's response to the problem of global climate change is to reduce greenhouse gas emissions to 1990 levels by 2020 under AB 32 as a near-term measure and ultimately to 80 percent below 1990 levels by 2050 as the long-term solution to stabilizing greenhouse gas concentrations in the atmosphere at a level that will not cause unacceptable climate change impacts. To implement this solution, the Air Resources Board has adopted a Scoping Plan and budgeted emissions reductions that will be needed from all sectors of society in order to reach the interim 2020 target. The land-use sector in the Bay Area needs to achieve aggregate emission reductions of approximately 1.6 MMT CO_2e/yr from new projects between now and 2020 to achieve this goal, as noted above, and each individual new project will need to achieve its own respective portion of this amount in order for the Bay Area land use sector as a whole to achieve its allocated emissions target. Building all of the new projects expected in the Bay Area between now and 2020 in accordance with the thresholds that District staff are proposing will achieve the overall "fair share" for the land use sector, and building each individual project in accordance with the proposed thresholds will achieve that individual project's respective portion of the emission reductions needed to implement the AB 32 solution. For these reasons, projects built in conformance with the proposed thresholds will be part of the solution to the cumulative problem, and not part of the continuing problem. They will allow the Bay Area's land use sector to achieve the emission reductions necessary from that sector for California to implement its solution to the cumulative problem of global climate change. As such, even though such projects will add an incremental amount of greenhouse gas emissions, their incremental contribution will be less than "cumulatively considerable" because they are helping to achieve the cumulative solution, not hindering it. Such projects will therefore not be "significant" for purposes of CEQA. (*See* CEQA Guidelines § 15064(h)(1).)

The conclusion that land use projects that comply with these proposed thresholds is also supported by CEQA Guidelines Section 15030(a)(3), which provides that a project's contribution to a cumulative problem can be less that cumulatively considerable "if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact." In the case of greenhouse gas emissions associated with land use projects, achieving the amount of emission reductions below BAU that will be required

to achieve the AB 32 goals is the project's "fair share" of the overall emission reductions needed under ARB's scoping plan to reach the overall statewide AB 32 emissions levels for 2020. If a project is designed to implement greenhouse gas mitigation measures that achieve a level of reductions consistent with what is required from all new land use projects to achieve the land use sector "budget" – *i.e.*, keeping overall project emissions below 1,100 MT CO_2e/yr or ensuring that project efficiency is better than 6.7 MT CO_2e per capita for residential projects or 4.6 MT CO_2e Service Population for mixed-use projects – then it will be implementing its "fair share" of the mitigation measures necessary to alleviate the cumulative impact, as shown in the analyses set forth above.

It is also worth noting that this "fair share" approach is flexible and will allow a project's significance to be determined by how well it is designed from a greenhouse-gas efficiency standpoint, and not just by the project's size. For example, a large high-density infill project located in an urban core nearby to public transit and other alternative transportation options, and built using state-of-the-art energy efficiency methods and improvements such as solar panels, as well as all other feasible mitigation measures, would not become significant for greenhouse gas purposes (and thus require a statement of overriding considerations in order to be approved) simply because it happened to be a large project. Projects such as this hypothetical development with low greenhouse-gas emissions per capita are what California will need in the future in order to do its part in achieving a solution to the problem of global climate change. The determination of significance under CEQA should therefore take these factors into account, and staff's proposed significance thresholds would achieve this important policy goal.

Stationary Source Threshold Recommendation and Justification

For stationary sources, staff recommends Stationary Option 2 as it would address a broad range of combustion sources and thus provide for a greater amount of GHG reductions to be captured and mitigated through the CEQA process. As documented in the Scoping Plan, in order to achieve statewide reduction targets, emissions reductions need to be obtained through a broad range of sources throughout the California economy and Stationary Option 2 would achieve this purpose better than the more limited Stationary Option 1.

This threshold would be considered an interim threshold and Air District staff will reevaluate the threshold as AB 32 Scoping Plan measures such as Cap and Trade are more fully developed at the state level.

4.2.4 LOCAL COMMUNITY RISK AND HAZARD IMPACTS

Phase 1 of the BAAQMD's Community Air Risk Evaluation (CARE) Program compiled and analyzed a regional emissions inventory of toxic air contaminants (TACs), including emissions from stationary sources, area sources, and on-road and off-road mobile sources. Phase 2 of the CARE Program conducted regional computer modeling of selected TAC species, species which collectively posed the greatest risk to Bay Area residents. In both Phases 1 and 2 demographic data were combined with estimates of TAC emissions and concentrations to identify communities that are disproportionally impacted from high concentrations of TACs.

The TAC modeling was performed on a regular grid with one kilometer resolution covering the Bay Area to identify areas that are cumulatively impacted from sources of TACs.

The modeling yielded estimates of annual concentrations of five key compounds—diesel particulate matter, benzene, 1,3-butadiene, formaldehyde, and acetaldehyde—for year 2005. These concentrations were multiplied by their respective unit cancer risk factors, as established by the State's Office of Environmental Health Hazard Assessment (OEHHA) to estimate the expected excess cancer risk per million people from these compounds.

The datasets compiled to identify impacted communities were determined as follows:

- **Exposure of sensitive populations:** Sensitive populations from the 2000 U.S. Census database were identified as youth (under 18) and seniors (over 64) and mapped to the same one kilometer grid used for the toxics modeling. Excess cancers from TAC exposure were determined by multiplying these sensitive populations by the model-estimated excess risk to establish a data set representing sensitive populations with high TAC exposures.

- **TAC emissions:** TAC emissions (year 2005) were mapped to the one kilometer grid and also scaled by their unit cancer risk factor to provide a data set representing source regions for TAC emissions.

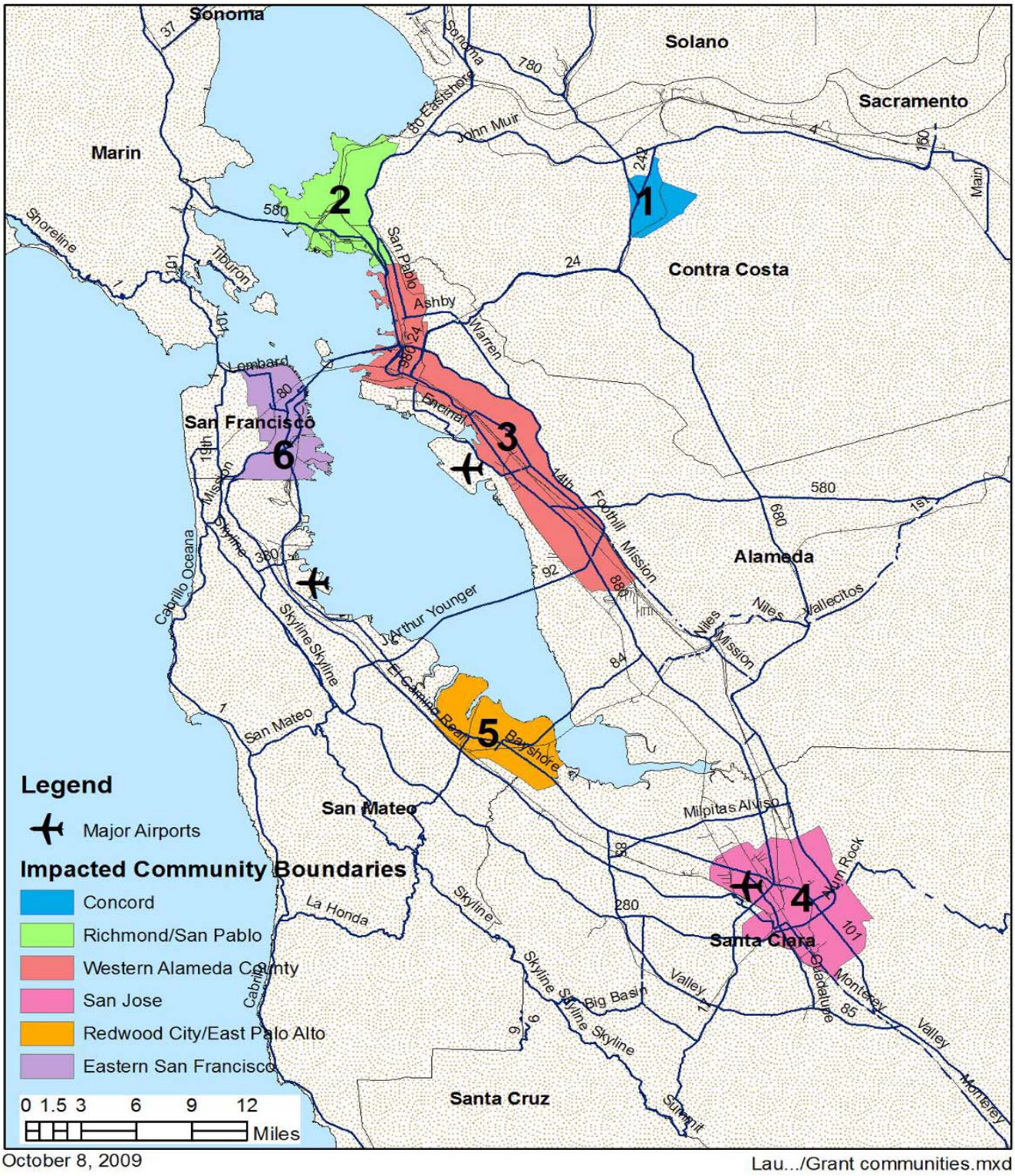
- **Poverty-level:** Block-group level household income data from the U.S. Census database were used to identify block groups with family incomes where more than 40 percent of the population was below 185 percent of the federal poverty level (FPL).

The impacted communities currently identified by the Air District's CARE program (Figure 2) are exemplary of the type of community where Community Risk Reduction Plans (CRRPs) discussed below are intended to be developed and implemented. Agencies are encouraged to contact the Air District to ensure that the most current CARE community designations are used for identifying areas in need of CRRPs. The Air District will also assist agencies to identify other impacted communities within their jurisdiction based on the above criteria.

According to the findings of the CARE Program, diesel PM—mostly from on and off-road mobile sources—accounts for about 80 percent of the inhalation cancer risk from TACs in the Bay Area. The highest diesel PM emissions occur in the urban core areas of Concord, eastern San Francisco, western Alameda County, Redwood City/East Palo Alto, Richmond/San Pablo, and San Jose (BAAQMD 2006). The highest cancer risk levels from ambient TAC in the SFBAAB also tend to occur in the core urban areas, along major roadways and adjacent to freeways (Figure 3). Cancer risks in areas along these major freeways are estimated to range from 200 to over 500 excess cases in a million. Typical annual average ambient levels of diesel PM in the Bay Area are approximately 1.3 micrograms per cubic meter ($\mu g/m^3$), which equates to approximately 400 excess cancer cases in a million. By weighting the cancer risk by the number of sensitive receptors (i.e., people under the age of 18 and over the age of 64) living in each grid cell, areas with high risk and vulnerable populations can be identified.

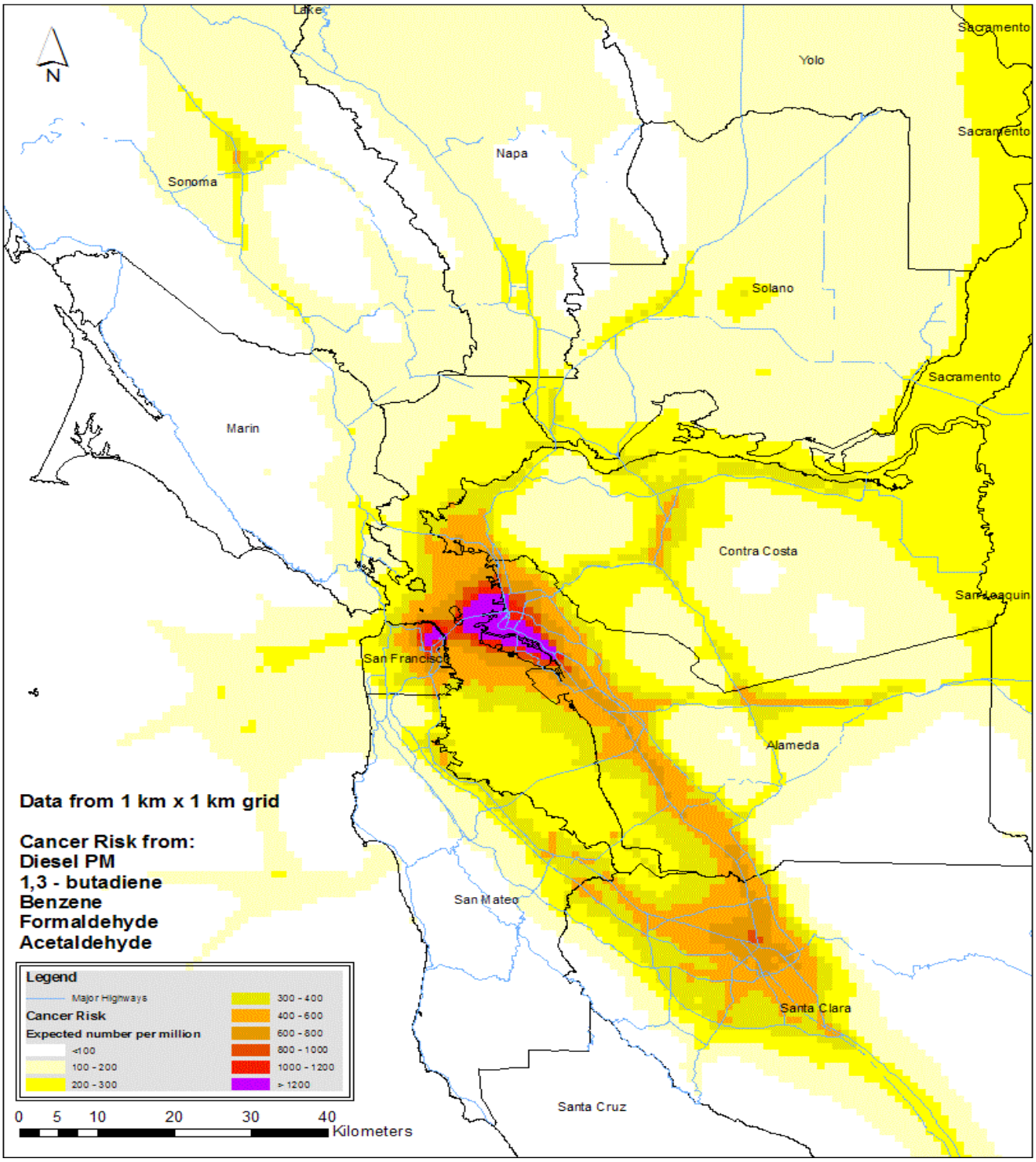
Analysis of the one kilometer resolution modeling predictions of TAC concentrations and risk reveals that 50 percent of the land area in the SFBAAB currently experiences background inhalation cancer risk levels of less than 152 excess cases per one million, with a standard deviation of 180. The frequency distribution of inhalation cancer risk in the SFBAAB is presented in Figure 4 and detailed in Appendix E.

The frequency distribution of risk changes when ambient risk levels are weighted by population. Fifty percent of BAAQMD's population is estimated to have an ambient background inhalation cancer risk of less than 500 cases in one million. Figure 5 presents a frequency distribution of population-weighted risk data. Table 19, using a similar data set, presents a summary of percentages of the population exposed to varying levels of cancer risk from ambient TACs. Approximately two percent of the SFBAAB population is exposed to background risk levels of less than 200 excess cases in one million. This is in contrast to the upper percentile ranges where 8 percent of the SFBAAB population is exposed to background risk levels of greater than 1,000 excess cases per one million.



Source: BAAQMD 2008.

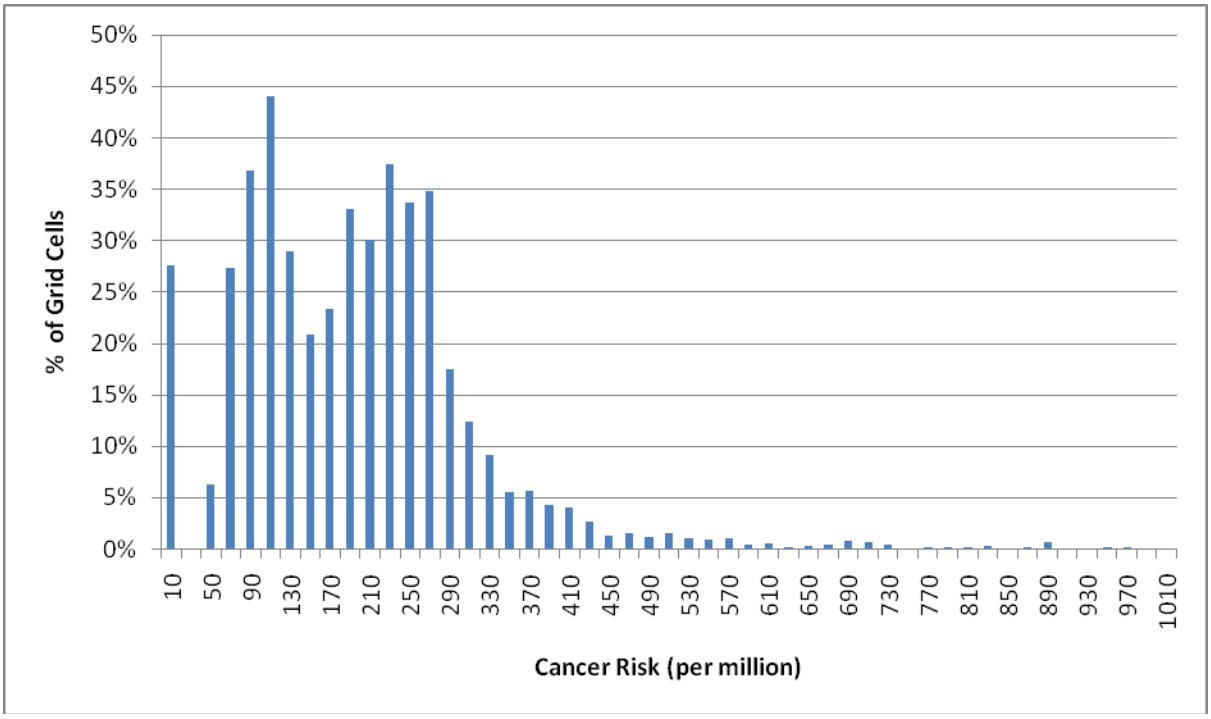
Figure 2: Communities of High Concern



Notes: PM = particulate matter. Source: BAAQMD 2008. Based on Year 2005 emissions.

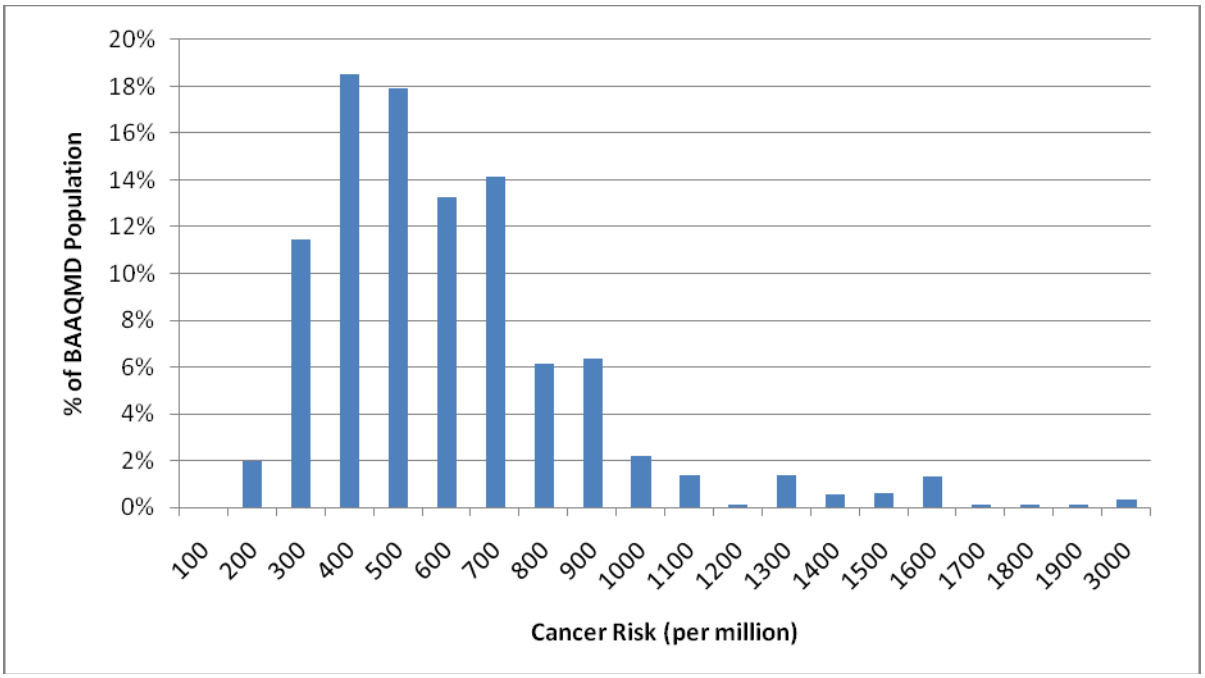
Figure 3: Modeled Inhalation Cancer Risk in the San Francisco Bay Area Air Basin

Table 19 - Statistical Summary of Population-Weighted Ambient Cancer Risk	
Percentage of Population (Percent below level of ambient risk)	Ambient Cancer Risk (inhalation cancer cases in one million)
92	1,000
90	900
83	800
77	700
63	600
50	500
32	400
13	300
2	200
0	100
Source: Data compiled by EDAW 2009. See Appendix G for detailed calculations.	



Source: BAAQMD 2009.

Figure 4: San Francisco Bay Area Air Basin Unweighted Inhalation Cancer Risk



Notes: BAAQMD = Bay Area Air Quality Management District.
Sources: EDAW 2009, BAAQMD 2009.

Figure 5: San Francisco Bay Area Air Basin Population-Weighted Inhalation Cancer Risk

4.2.4.1 SITING A NEW SOURCE

Option 1 - Current Approach

Chronic TAC Exposure

Any project with the potential to expose people (receptors) to substantial levels of TAC is currently deemed to have a significant impact. This applies to new receptors locating near existing sources of TACs, as well as sources of TAC locating near existing receptors. The current TAC threshold of significance applies to all projects, regardless of size, and requires mitigation for TAC impacts above the thresholds listed below.

Proposed development projects that have the potential to expose receptors to TAC in excess of the following thresholds from any source, mobile or stationary would be considered to have a significant air quality impact if the:

- Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million.
- Ground-level concentrations of non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.

Accidental Release of Acutely Hazardous Air Emissions

The BAAQMD currently recommends, at a minimum, that the lead agency, in consultation with the administering agency of the Risk Management Prevention Program (RMPP), find that any project resulting in receptors being within the Emergency Response Planning Guidelines (ERPG) exposure level 2 for a facility has a significant air

quality impact. ERPG exposure level 2 is defined as "the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action."

The current Accidental Release/Hazardous Air Emissions threshold of significance could affect all projects, regardless of size, and require mitigation for Accidental Release/Hazardous Air Emissions impacts.

Option 2: Stationary Source Permit Approach

This option would consist of applying the current stationary source permitting thresholds to project-generated stationary, area-, and mobile-source TAC emissions.

Stationary sources of emissions are subject to BAAQMD's permit process per adopted rules and regulations. The permitting process requires that all new or modified stationary sources that emit TACs perform modeling to determine what the concentration of TACs will be at the boundary of their property. This current permitting approach does not include area or mobile sources of emissions in the modeling or permitting assessment. If a proposed stationary source will have operational TAC concentrations from permitted equipment that result in an estimated 1 excess cancer risk in a million, the project is required to install Toxic Best Available Control Technology (TBACT) to minimize emissions of TACs. The TAC modeling must also demonstrate to BAAQMD that implementation of the proposed project would not result in additional incremental exposure of surrounding receptors to levels that exceed 10 in one million for excess cancer risk or a hazard index above one. The BAAQMD will not issue an authority to construct or permit to operate for any stationary source of TACs that would result in concentrations exceeding a 10 in one million threshold.

This approach would expand on the current approach by requiring the application of the one in a million requirement for stationary sources to install TBACT to projects that have TAC emissions from sources (primarily mobile) not currently required to obtain permits to operate. These non-stationary source type projects would be required to implement TBPs such as site and circulation design, setbacks from roadways, air conditioning, and vegetation buffers, if their modeled cancer risks are above the one in a million threshold. The BAAQMD would identify a list of TBPs for non-stationary sources to implement if they are above the one in a million threshold. The threshold of significant impact, thereby requiring implementation of all feasible onsite mitigation measures would remain at the current 10 in a million excess cancer risk and a HI of 1.0.

Stationary source permits to operate would still not be issued to stationary sources that could not reduce their risk on site below the 10 in a million excess cancer risk threshold or the HI of 1.0.

Option 3: Tiered Approach

This approach would involve application of a tiered (more stringent) CEQA threshold in impacted communities.

Proposed development projects that have the potential to expose sensitive receptors or the general public to TACs in excess of the following thresholds from any source, mobile, area or stationary would be considered to have a significant air quality impact in the following conditions:

- *Increase in Cancer Risk to Maximally Exposed Individual (MEI) in Excess of One in a Million* - Projects not requiring a BAAQMD permit to operate, but that would result in area or mobile sources of TACs would be required to implement TBPs if their modeled cancer risks are above a one in a million excess cancer risk threshold. The BAAQMD would identify a prescribed set of TBPs. Projects that could not feasibly implement prescribed TBPs would be considered to contribute considerably to cumulative cancer risk.

- *Increased Cancer Risk to MEI* - New sources of TACs locating in impacted communities, as identified by the BAAQMD's Community Air Risk Evaluation (CARE) Program, would have to install Toxics Best Available Control Technology (TBACT) and/or TBPs and would be subject to a significance threshold of 5 in one million (after consideration of TBACT and/or TBPs). New sources of TACs locating in a community other than an impacted community would be subject to a significance threshold of 10 in one million.

- *Increased Non-Cancer Risk to MEI* – Project TAC emissions would be considered significant where ground-level concentrations of non-carcinogenic TACs result in a chronic Hazard Index of greater than 0.5 and an acute Hazard Index greater than 1.0 within an impacted community, or greater than 1.0 in all other areas.

- *Increased Ambient Concentration of $PM_{2.5}$ of 0.3 $\mu g/m^3$* – This approach would also include a quantitative concentration threshold for the project-generated annual average increase in $PM_{2.5}$ emissions of 0.3 $\mu g/m^3$. This concentration is the U.S. EPA Significant Impact level (SIL) for $PM_{2.5}$. The SIL is a threshold applied to individual facilities that apply for a permit to emit a regulated pollutant in an area that meets the NAAQS. The state and EPA must determine if emissions from that facility will cause the air quality to worsen. If an individual facility projects an increase in emissions that result in ambient impacts greater than the established SIL, the permit applicant would be required to perform additional analyses to determine if those impacts will be more than the amount of the PSD increment. This analysis would combine the impact of the proposed facility when added on to all other sources in the area.

Option 4: No Net Increase Approach

Option 4 would proposes a no net increase inhalation cancer risk CEQA significance threshold for siting a new source of TACs in CARE priority communities identified as the urban core areas of Concord, eastern San Francisco, western Alameda County, Redwood City/East Palo Alto, Richmond/San Pablo, and San Jose. Thresholds for other parts of the Bay Area would be the same as Option 1. This threshold would not define a "substantial change" (see definition of significant impact in section below), because any increase would be considered significant. The practical implications of essentially setting a zero threshold for TACs in these communities could be substantial. A no net increase or zero threshold could make it extremely difficult for a wide variety of businesses to locate in the CARE communities, businesses that are essential to daily lives. A large number of relatively small projects would need to prepare an EIR since any increase in TACs would be considered a significant impact. There are no adequate mitigation strategies or alternatives available to eliminate all TAC from even the smallest of sources.

4.2.4.2 SITING A NEW RECEPTOR

Impacts of the Existing Environment on a Proposed Project

In addressing the potential for impacts from existing sources of toxic exposure, Lead Agencies should take care to focus their analyses squarely on impacts arising from *changes* to the environment caused by the proposed project. (*See* CEQA § 21068, defining "significant effect on the environment" as "a substantial, or potentially substantial, adverse *change* in the environment" (emphasis added).) A Lead Agency can address a preexisting environmental condition – such as existing sources of toxics – under CEQA only if there is a nexus between the preexisting condition and some physical change arising from the project. For example, the mere existence of preexisting groundwater contamination underneath a property does not constitute a significant environmental impact from a project on the property that would not affect the contamination in any way, as the California Court of Appeal held in the case of *Baird v. County of Contra Costa* (1995) 32 Cal.App.4th 1464, 1468. But where a change caused by the project will implicate the preexisting contamination in some way, such as introducing people to an area with a preexisting hazard, the contamination does warrant consideration under CEQA. Thus, where a developer seeks to acquire contaminated property and the acquisition will require it to manage the contaminated soil, the preexisting contamination is subject to CEQA analysis, as the Court of Appeal held in *McQueen v. Mid-Peninsula Regional*

Open Space District (1988) 202 Cal.App.3d 1136, 1147, 249 Cal.Rptr. 439. In that case the project did entail a change implicating the preexisting contamination, which is the key distinction the court pointed to in *Baird*. (*See also City of Santa Monica v. City of Los Angeles*, 2007 Cal. App. Unpub. LEXIS 7409, *87-*89 n.22 (distinguishing *Baird* in noting that constructing buildings above subterranean methane contamination could concentrate the methane and constitute a physical change triggering CEQA analysis of the methane impacts).)

Lead agencies should, therefore, ensure that they focus on physical changes caused by the project that will implicate existing sources of toxic exposure. An example of such a change caused by the project would be if the project causes additional people to be attracted to the project location and thereby to be exposed to additional toxic risks. This approach to evaluating risks to new occupants of a project from existing sources of risk has been endorsed by the Resources Agency in Section 15126.2(a) of the CEQA Guidelines. Lead agencies using such an approach should specifically identify the changes being caused by the project in relation to existing sources of risk to minimize the chances of falling afoul of *Baird*.

Option 1: Statistical/Percentile Health Impact-Based Approach

This approach considers a method of determining whether a project would result in a significant impact if it would attract or locate new sensitive receptors into an area exposed to TAC concentrations exceeding the ambient median exposure for the entire SFBAAB.

Option 1 for siting new sensitive receptors in areas currently impacted from nearby sources of TACs would set a TBP threshold of 100 in a million excess cancer cases for all new residential projects. The 100 in a million TBP threshold is based on EPA guidance for conducting air toxics analyses and making risk management decisions at the facility and community-scale level which considers a range of "acceptable" cancer risks from one in a million to one in ten thousand. In protecting public health with an ample margin of safety, EPA strives to provide maximum feasible protection against risks to health from Hazardous Air Pollutants (HAPs) by limiting to a no higher than approximately one in ten thousand (100 in a million) the estimated risk that a person living near a source would be exposed to the maximum pollutant concentrations for 70 years. This goal is described in the preamble to the benzene National Emissions Standards for Hazardous Air Pollutants (NESHAP) rulemaking (54 Federal Register 38044, September 14, 1989) and is incorporated by Congress for EPA's residual risk program under Clean Air Act (CAA) section 112(f). The 100 in a million excess cancer cases is also consistent with the ambient cancer risk in the most pristine portions of the Bay Area based on the District's recent regional modeling analysis.

The threshold of significance for CEQA would be based on the median exposure to inhalation cancer risk now occurring in the SFBAAB, of 500 excess cancer cases in a million. This option would attempt to reconcile the issues associated with promoting high density infill transit oriented development, while, at the same time, trying to reduce the public's exposure to TACs. Many of the features that make transit oriented development favorable from a regional air quality perspective (e.g., being located along existing transportation, transit, and train corridors) can also expose sensitive receptors to high concentrations of TACs. At some point the benefits to regional air quality from development in these areas are superseded by the need to protect the public from moving into an area of high TACs. With this option, nearly all residential projects (or other projects that involve new receptors) would implement TBPs, but would not require preparation of an EIR unless those TBPs could not reduce the exposure to a cancer risk level of 500 in a million for those new receptors.

Further complicating this issue is ARB's diesel risk reduction plan, which estimates an 85 percent reduction in statewide diesel particulate matter (PM) emissions by 2020, and whether currently existing areas of high cancer risks from diesel PM will be at acceptable levels in 2020 due to implementation thereof. Since CEQA is concerned about the existing condition at the time the Notice of Preparation is prepared, BAAQMD staff believe it would be premature to assume ARB's plan would ensure significant impacts did not occur at this time.

However, as progress is made with the DRRP, a greater level of confidence may develop such that the future impact of implementation could be taken into consideration as reasonably foreseeable under CEQA.

Option 2: Source-Based Approach

This approach would focus on the cancer and non-cancer risk to new receptors that occur due to existing stationary and mobile sources located within 1,000 feet from the new receptor.

The 1,000 foot distance was selected based on several factors. A summary of research findings in CARB's Land Use Compatibility Handbook (CARB 2005) indicates that traffic-related pollutants were higher than regional levels within approximately 1,000 feet downwind and that differences in health-related effects (such as asthma, bronchitis, reduced lung function, and increased medical visits) could be attributed in part to the proximity to heavy vehicle and truck traffic within 300 to 1,000 feet of receptors. Although CARB has recommended avoiding siting sensitive land uses within 500 feet of a freeway or high-volume urban roads, this option uses 1,000 feet based on research that has indicated attributable increased health effects in some cases out to as far as 1,000 feet. In the same study, CARB recommended avoiding siting sensitive land uses within 1,000 feet of a distribution center and major rail yard, which supports the use of a 1,000 feet evaluation distance in case such sources may be relevant to a particular project setting. A second consideration is that studies have shown that the concentrations of particulate matter tends to be reduced substantially or can even be indistinguishable from upwind background concentrations a distance 1,000 feet downwind from sources such as freeways or large distribution centers (Zhu et al. 2002, CARB 2005). Finally, a 1,000 foot zone of influence is also supported by Health & Safety Code §42301.6 (Notice for Possible Source Near School).

Projects that proposed new receptors would be required to evaluate the potential cancer and non-cancer risks from mobile and stationary sources that are located within 1,000 feet. If the cancer risk from all sources within 1,000 feet exceeds 10 in a million or the non-cancer risk (chronic or acute) would be greater than a Hazard Index of 1.0, then the project TAC impacts would be considered significant.

Where new receptors are located in areas closer than 1,000 feet of major TAC sources such as freeways or high volume urban roadways, distribution centers, rail yards, ports or other TAC sources, it is probable that impacts may exceed the thresholds included in this option. Thus, proposed residential and other development with sensitive receptors (such as senior centers, health centers, and schools) in such areas would likely be identified as having significant impacts through application of this threshold and require CEQA evaluation through a Mitigated Negative Declaration (if mitigation available to reduce to below threshold levels) or an EIR (if feasible mitigation cannot be identified).

Option 3: San Francisco Department of Health Ambient Standard Approach for Roadway Exposure

The City and County of San Francisco Department of Public Health (SFDPH) has recommended a methodology for the analysis of impacts to new receptors relative to roadway exposure. The methodology includes a six step approach to avoid future land use air quality conflicts from busy roadways as follows (City and County of San Francisco Public Health Department 2008):

- *Hazard Identification* - Screening projects for exposure to high traffic volumes using data from Caltrans, local Public Works Departments, the California Environmental Health Tracking Program's (CEHTP) spatial linkage web service, or prior EIRs. In this approach a potential hazard exists if average daily traffic volume exceeds the following thresholds: 100,000 vehicles/day within a 150 meter radius; 50,000 vehicles/day within a 100 meter radius; or 10,000 vehicles /day within a 50 meter radius. The threshold of 100,000 vehicles with a 150 meter radius roughly corresponds to the CARB guidance avoiding sensitive uses. Thresholds for 100 meters and 50 meters are equivalent with regards to area traffic volume density.

- *Exposure Assessment* – If a potential hazard for a new residential project is identified through screening of traffic volumes, then an examination of air quality exposure is done on a project-level basis by estimating the concentration of $PM_{2.5}$ contributed by proximate roadway sources within a 150 meter radius of the project. This analysis can be done using physical based dispersion models using local data on vehicle volumes, vehicle types, emissions characteristics, meteorology. SFDPH recommends CAL3QHCR Line Source Dispersion Model with best available local meteorology. Other dispersion models may be appropriate as well.

- *Action Threshold for Mitigation* - Compare roadway contribution to annual average $PM_{2.5}$ concentration to an action threshold of 0.2 $\mu g/m^3$ of $PM_{2.5}$. SFDPH identified the rationale for this threshold as follows:

    - A threshold of 0.2 $\mu g/m^3$ represents about 8-10 percent of the intra-urban range of $PM_{2.5}$ ambient concentration based on available and reliable monitoring data in San Francisco.

    - A change in ambient concentration of $PM_{2.5}$ by 0.2 $\mu g/m^3$, independent of other vehicle pollutants would result in significant forecasted health impacts. Based on a study of intra-urban pollution in Los Angeles, a 0.2 $\mu g/m^3$ increase in $PM_{2.5}$ would result in a 0.28 percent increase in non-injury mortality or an increase of about twenty-one excess death per 1,000,000 population per year from non-injury causes in San Francisco (Jerrett 2005). Applying the health effects assessment methodology and Concentration Response Functions in the CARB Staff Report on AAQS for PM published in 2002. A 0.2 $\mu g/m^3$ increase in$PM_{2.5}$ affecting a population of 100,000 adults would result in about 20 extra premature deaths per year (CARB 2002). These effects are well above the one-in-a-million lifetime de minimus risk threshold for premature death considered insignificant by most regulatory agencies (Asante-Duah 2002). A 0.2 $\mu g/m^3$ increase in $PM_{2.5}$ would also result in ~160 days per year with respiratory symptoms, 108 days with work limitations, and 577 days with minor activity limitations in the same adult population.

- *Health Effects Analysis* - For sites with roadway contributions to $PM_{2.5}$ above the threshold concentration quantify potential effects of roadway-related exposures to criteria and non-criteria pollutants on health outcomes using established risk assessment principles. Comprehensive health effects analysis involving identifying sensitive (receptors) populations, estimating exposure, and calculating health risks.

- *Mitigation* –For sites with roadway contributions to $PM_{2.5}$ above the threshold concentration, prevent exposure or apply mitigations using the following hierarchy:

    1. Relocate project outside hazardous zones around roadway of concern

    2. Reroute or reduce traffic through circulation changes or traffic demand reduction.

    3. Provide mechanical ventilation systems with best available supply intake air location; with fresh air filtration and building designs; and with reduced infiltration to mitigate particulate exposure.

- *Disclosure* - Disclosure of exposure, health risks and included mitigations to future residents.

Based on modeling completed by SFDPH, the action threshold of 0.2 $\mu g/m^3$ of $PM_{2.5}$ is presently exceeded in areas along Highway 101, Highway 80 (approach to the Bay Bridge), and Highway 280, and along numerous major streets in San Francisco, particularly in the downtown area.

Option 4: Consistency with Community Risk Reduction Plan

This approach consists of evaluating whether a project is consistent with an adopted qualified Community Risk Reduction Plan. The goal of a Community Risk Reduction Plan would be to bring TAC and $PM_{2.5}$ concentrations

for the entire community covered by the Plan down to acceptable levels as identified by the local jurisdiction and approved by the Air District. This approach provides local agencies a proactive alternative to addressing communities with high levels of risk on a project-by-project approach. This approach is supported by CEQA Guidelines Section 15030(a)(3), which provides that a project's contribution to a cumulative problem can be less than cumulatively considerable "if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact." This approach is also further supported by CEQA Guidelines Section 15064(h)(3), which provides that a project's contribution to a cumulative effect is not considerable "if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem."

Qualified Community Risk Reduction Plans

A qualified Community Risk Reduction Plan adopted by a local jurisdiction should:

- Evaluate current and future emissions and concentrations of TACs and $PM_{2.5}$.
- Establish risk and exposure reduction targets for the community, including for subareas located near sources of air pollution.
- Identify measures to reduce exposures.
- Identify implementation measures to reduce exposures.
- Includes procedures for monitoring and updating the TAC inventory, modeling and reduction measures, in coordination with Air District staff.
- Include a certified CEQA document.

Staff Recommendation and Justification for Siting a New Source or New Receptor

Staff is recommending a threshold that combines elements of Siting a New Source Options 1 (Current Approach) and 3 (Tiered Approach), and Siting a New Receptor Option 4 (Consistency with Community Risk Reduction Plan). The recommended threshold would apply to both siting new sources and siting new receptors. Thus the staff-recommendation is a tiered approach to the consideration of community risk and hazard impacts.

Projects consistent with a qualified CRRP adopted by the local jurisdiction that includes enforceable measures to reduce the community risk to acceptable levels would be considered less than significant.

Proposed development projects that are not consistent with a CRRP that has been adopted for the area where the project is proposed to be located would be considered to have a significant impact.

Projects proposed in areas where a CRRP has not been adopted and the potential exits to expose sensitive receptors or the general public to emissions-related risk in excess of the following thresholds from any source would be considered to have a significant air quality impact:

- *Increased Cancer Risk to Maximally Exposed Individual (MEI)* - Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of carcinogenic TACs from any source result in an increased cancer risk greater than 10.0 in one million.

- *Increased Non-Cancer Risk to MEI* – Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of non-carcinogenic TACs result in an increased chronic or acute Hazard Index from any source greater than 1.0.

- *Increased Ambient Concentration of $PM_{2.5}$* – Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of $PM_{2.5}$ from any source would result in an average annual increase greater than 0.3 $\mu g/m^3$.

These thresholds would apply to stationary, area, and mobile sources of TAC emissions.

This combined approach would be protective of ambient air quality through the inclusion of a $PM_{2.5}$ threshold. Further, by providing an ambient threshold for $PM_{2.5,}$ this approach would establish a bright line standard concerning particulate exposure that is consistent with EPA permitting requirements for stationary sources. The 10.0 cancer risk threshold is supported by EPA's guidance for conducting air toxics analyses and making risk management decisions at the facility and community-scale level which considers a range of "acceptable" cancer risks from one in a million to one in ten thousand. The conclusion that land use projects that comply with qualified Community Risk Reduction Plans are less than significant is supported by CEQA Guidelines Sections 15030(a)(3) and 15064(h)(3), which provides that a project's contribution to a cumulative problem can be less that cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.

Accidental Releases of Acutely Hazardous Air Emissions

Staff recommends continuing with the current threshold for the accidental release of hazardous air pollutants. Staff recommends that agencies consult with the California Emergency Management Agency for the most recent guidelines and regulations for the storage of hazardous materials. Staff recommends that projects using or storing acutely hazardous materials locating near existing receptors, and projects resulting in receptors locating near facilities using or storing acutely hazardous materials be considered significant.

4.2.4.3 CUMULATIVE TOXIC AIR CONTAMINANT IMPACTS

Cumulative Option 1 – Incremental Risk Approach

This approach would use the project-level thresholds as the threshold for evaluating a cumulative contribution of TAC emissions. Thus, if a project were determined to be less than significant under a project-level threshold (such as 10 in a million cancer risk for non-impacted communities using the threshold from Siting New Sources Option 1), then the project would also have a less than considerable contribution to cumulative significant TAC impacts. This approach is relatively common in use in assessment of cumulative TAC impacts in CEQA documents in the Bay Area today. The focus would be on assessing the incremental risk increase associated with the project. This approach would only apply to consideration of siting new sources as all of the thresholds for siting new receptors described above are in essence cumulative thresholds already as they consider the existing TAC risk related to the location of new development.

Cumulative Option 2 – Absolute Risk Approach

This approach is a hybrid approach that combines aspects of the health-based approach of Option 1 and the source-based approach of Option 2 described above for siting new receptors. Projects proposing a new TAC source would need to assess their impact within 1,000 feet taking into account cumulative sources (i.e. proposed project plus existing and foreseeable future projects). Projects proposing new receptors would need to assess the impact of cumulative sources located within 1,000 feet of the receptor. Cumulative sources are the combined total risk values of each individual source within the 1,000-foot evaluation zone. The significance threshold of

100 in a million increased excess cancer risk and Hazard Index of 1.0 would be applied to the cumulative emissions within the 1,000-foot evaluation zone. The 100 in a million threshold is based on EPA guidance for conducting air toxics analyses and making risk management decisions at the facility and community-scale level. The guidance considers an "acceptable" range of cancer risks to be from one in a million to one in ten thousand. In protecting public health with an ample margin of safety, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants (HAPs) by limiting risk to a level no higher than the one in ten thousand (100 in a million) estimated risk that a person living near a source would be exposed to at the maximum pollutant concentrations for 70 years. This goal is described in the preamble to the benzene National Emissions Standards for Hazardous Air Pollutants (NESHAP) rulemaking (54 Federal Register 38044, September 14, 1989) and is incorporated by Congress for EPA's residual risk program under Clean Air Act (CAA) section 112(f). The 100 in a million excess cancer cases is also consistent with the ambient cancer risk in the most pristine portions of the Bay Area based on the District's recent regional modeling analysis.

In addition, this option would add an ambient standard for $PM_{2.5}$ of 0.8 $\mu g/m^3$ due to cumulative sources within the 1,000-foot evaluation zone. The $PM_{2.5}$ concentration level of 0.8 $\mu g/m^3$ is based on a proposed rule being evaluated by U.S. EPA in developing significant impacts levels (SILs) for prevention of significant deterioration for particulate matter less than 2.5 micrometers (Federal Register 40 CFR Parts 51 and 52, September 21, 2007). EPA is proposing a PSD threshold of 0.8 $\mu g/m^3$ as the cumulative threshold for all $PM_{2.5}$ sources. The 0.8 $\mu g/m^3$ standard was developed by scaling the PM_{10} SIL values by the ratio of direct $PM_{2.5}$ to direct PM_{10} emissions. The $PM_{2.5}/PM_{10}$ emissions ratio is based on the national average derived from the 2001 extrapolation of the EPA's 1999 National Emissions Inventory. The District believes that the 0.80 $\mu g/m^3$, which is based on direct PM emissions, is more representative of the mixture of PM sources in the Bay Area. In a recent PM study, the Air District found that direct emissions from wood burning and fossil fuel combustion contribute over one-half of annual $PM_{2.5}$ emissions. This threshold is also consistent with the estimated California background level and the estimated background level of the more remote areas of the Bay Area. The rationale for selecting 1,000 feet was explained in the discussion of Option 2 for siting new receptors above.

This threshold is also supported from several medical research studies that have linked near-road pollution exposure to a variety of adverse health outcomes impacting children and adults. One notable study conducted by Dr. Michael Kleinman and colleagues at the EPA-funded Southern California Particle Center studied the potential of roadway particles to aggravate allergic and immune responses in mice. Using mice that were not inherently susceptible, the researchers placed these mice at various distances downwind of State Road 60 and Interstate 5 freeways to test the effect these roadway particles have on their immune system. They found that within 5 meters of the roadway, there was a significant allergic response and elevated production of specific antibodies. At 150 meters (492 feet) and 500 meters (1,640 feet) downwind of the roadway, these effects were not statistically significant.

In another significant study, the University of Washington (Ven Hee et al, 2009) conducted a survey involving 3,827 participants that aimed to determine the effect of residential traffic exposure on two preclinical indicators of heart failure; left ventricular mass index (LVMI), measured by the cardiac magnetic resonance imaging (MRI), and ejection fraction. The studies classified participants based on the distance between their residence and the nearest interstate highway, state or local highway, or major arterial road. Four distance groups were defined: less than 50 meters (165 feet), 50-100 meters, 101-150 meters, and greater than 150 meters. After adjusting for demographics, behavioral, and clinical covariates, the study found that living within 50 meters of a major roadway was associated with a 1.4 g/m^2 higher LVMI than living more than 150 meters from one. This suggests an association between traffic-related air pollution and increased prevalence of a preclinical predictor of heart failure among people living near roadways.

To quantify the roadway concentrations that are contributing to the health impacts, the Air District modeled the scenario studied by Dr. Kleinman. In Dr. Kleinman's study emissions were estimated for Los Angeles using the EMFAC model. Annual average vehicle traffic data taken from Caltrans was used in the roadway model

(CAL3QHCR) to estimate the downwind $PM_{2.5}$ concentrations at 50 meters and 150 meters. Additionally, emissions were assumed to occur from 10:00 a.m. to 2:00 p.m. corresponding to the time in which the mice were exposed during the study. The results of the modeling indicate that at 150 meters, the downwind concentration is 0.78 $\mu g/m^3$, which is consistent with the EPA-recommended SIL of 0.8 $\mu g/m^3$.

Staff Recommendation and Justification

Staff is recommending a threshold that combines elements of Cumulative Option 2 (Absolute Risk Approach) and Siting a New Receptor Option 4 (Consistency with Community Risk Reduction Plan). Staff recommends this approach as the cumulative threshold for siting a new source or receptor. Projects consistent with a qualified CRRP adopted by the local jurisdiction that includes enforceable measures to reduce the community risk to acceptable levels would be considered less than significant. Proposed development projects that are not consistent with a CRRP that has been adopted for the area where the project is proposed to be located would be considered to have a significant impact. Projects proposed in areas where a CRRP has not been adopted and the potential to expose sensitive receptors or the general public to emissions-related risk in excess of the following thresholds from any source would be considered to have a significant air quality.

This approach would require evaluation of cancer and non-cancer risk from cumulative mobile and stationary sources within 1,000 feet of a new source or receptor, and the use of a 100 in a million cancer risk, a non-cancer (chronic or acute) Hazard Index of 1.0, and an ambient standard for $PM_{2.5}$ of 0.8 $\mu g/m^3$ as thresholds for cumulative risk from sources within the 1,000 foot evaluation area.

As noted above, the 1,000-foot evaluation distance is supported by research-based findings concerning dispersion from roadways and large sources showing that emissions diminish substantially between 500 and 1,000 feet from large emission sources. The 100 in a million threshold is supported by EPA air toxics analysis and risk management guidelines which consider the range of acceptable cancer risk to be from one in a million to one in ten thousand (100 in a million). EPA defines this level as the level necessary to protect public health from hazardous air pollutants with an ample margin of safety. The 0.8 $\mu g/m^3$ threshold is supported by EPA's proposed cumulative PSD threshold for all $PM_{2.5}$ sources and studies that examined the potential health impacts of roadway particles. These threshold levels are appropriate for promoting review of emissions sources to prevent deterioration of air quality. Using existing and EPA-proposed environmental standards in this way to establish CEQA thresholds of significance is an appropriate and effective means of promoting consistency in significance determinations and integrating CEQA environmental review activities with other areas of environmental regulation.

4.2.5 ODOR IMPACTS

4.2.5.1 CURRENT APPROACH

The BAAQMD considers a project locating near an existing source of odors as having a significant odor impact if it is proposed for a site that is closer to an existing odor source than any location where there has been:

- More than one confirmed complaint per year averaged over a three year period; or
- More than three unconfirmed complaints per year averaged over a three year period.

If the proposed project is located farther than the screening distance for the source of the odors identified in Table 19, the odor impacts are considered less than significant.

If a proposed project is determined to result in potential odor problems as defined by the criteria in District Regulation 7: Odorous Substances, and sensitive receptors are located closer than the screening distance in Table

20, the BAAQMD recommends that mitigation measures should be identified to reduce a potentially significant impact.

Table 20 - BAAQMD Screening Distances for Potential Odor Sources	
Type of Operation Project Screening	Distance
Wastewater Treatment Plant	2 miles
Wastewater Pumping Facilities	1 mile
Sanitary Landfill	2 miles
Transfer Station	1 mile
Composting Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	2 miles
Chemical Manufacturing	2 miles
Fiberglass Manufacturing	1 mile
Painting/Coating Operations	1 mile
Rendering Plant	2 miles
Coffee Roaster	1 mile
Food Processing Facility	1 mile
Confined Animal Facility/Feed Lot/Dairy	1 mile
Green Waste and Recycling Operations	1 mile
Coffee Roaster	1 mile

The odor threshold of significance could affect all projects, regardless of size, and require mitigation for odor impacts.

4.2.5.2 SITING A NEW RECEPTOR OR SOURCE

Odors are generally considered a nuisance, but can result in a public health concern. Some land uses that are needed to provide services to the population of an area can result in offensive odors, such as filling portable propane tanks or recycling center operations. When a proposed project includes the siting of sensitive receptors in proximity to an existing odor source, or when siting a new source of potential odors, the following qualitative evaluation should be performed.

When determining whether potential for odor impacts exists, it is recommended that Lead Agencies consider the following factors and make a determination based on evidence in each qualitative analysis category:

- **Distance**: Use the screening-level distances in Table 20.
- **Wind Direction:** Consider whether sensitive receptors are located upwind or downwind from the source for the most of the year. If odor occurrences associated with the source are seasonal in nature, consider whether sensitive receptors are located downwind during the season in which odor emissions occur.
- **Complaint History:** Consider whether there is a history of complaints associated with the source. If there is no complaint history associated with a particular source (perhaps because sensitive receptors do not already exist in proximity to the source), consider complaint-history associated with other similar sources in

BAAQMD's jurisdiction with potential to emit the same or similar types of odorous chemicals or compounds, or that accommodate similar types of processes.

- **Character of Source:** Consider the character of the odor source, for example, the type of odor events according to duration of exposure or averaging time (e.g., continuous release, frequent release events, or infrequent events).

- **Exposure:** Consider whether the project would result in the exposure of a substantial number of people to odorous emissions.

4.2.5.3 STAFF RECOMMENDATION AND JUSTIFICATION

BAAQMD staff recommends continuing the current CEQA significance threshold for odors (based on complaint history) and incorporation of the qualitative approach described above, in order to better assist lead agencies with the screening-level analysis. The current approach has proven adaptable to different projects and locations and thus continuation of the current approach with more qualitative guidance is considered an appropriate approach to CEQA evaluation.

4.3 PLAN-LEVEL IMPACT THRESHOLDS

4.3.1 PLAN-LEVEL CRITERIA POLLUTANTS AND OZONE PRECURSORS

4.3.1.1 OPTION 1 – CURRENT APPROACH

General Plans of cities and counties must show consistency with regional plans and policies affecting air quality to claim a less than significant impact on air quality. General plan amendments, redevelopment plans, specific area plans, annexations of lands and services, and similar planning activities should receive the same scrutiny as general plans with respect to consistency with regional air quality plans. For a proposed local plan to be consistent with the regional air quality plan it must be consistent with the most recently adopted AQP, which are updated approximately every three years.

All of the following criteria must be satisfied for a proposed plan to be determined to be consistent with the AQP, and therefore, result in a less than significant impact on air quality.

Determining Local Plan Consistency

Proposed Plans must show over the planning period of the plan that:

- Population growth for the jurisdiction will not exceed the values included in the current AQP, and
- The rate of increase in VMT for the jurisdiction is equal to or lower than the rate of increase in population.

Determining Local Plan Consistency with Clean Air Plan Transportation Control Measures

Determining consistency of local plans with the AQP also involves assessing whether AQP transportation control measures (TCMs) for which local governments are implementing agencies are indeed being implemented and are effective in reducing vehicle travel. The AQP identifies implementing agencies/entities for each of the TCMs included in the AQP. Local plans that do not demonstrate reasonable efforts to implement TCMs in the AQP would be considered to be inconsistent with the regional air quality plan and therefore have a significant air quality impact.

4.3.1.2 OPTION 2 – MODIFIED CURRENT APPROACH

Over the years staff has received comments on the difficulties inherent in the current approach regarding the consistency tests for population and VMT growth. First, the population growth estimates used in the most recent AQP can be up to several years older than growth estimates used in a recent plan update, creating an inconsistency in this analysis. Staff recommends that this test of consistency be eliminated because the Air District and local jurisdictions all use regional population growth estimates that are disaggregated to local cities and counties. In addition, the impact to air quality is not necessarily growth but where that growth is located. The second test, rate of increase in vehicle use compared to growth rate, will determine if planned growth will impact air quality. Compact infill develop inherently has less vehicle travel and more transit opportunities than suburban sprawl.

Second, the consistency test of comparing the rate of increase in VMT to the rate of increase in population has been problematic at times for practitioners because VMT is not always available with the project analysis. Staff recommends that either the rate of increase in VMT or vehicle trips be compared to the rate of increase in population. Staff also recommends that the growth estimates used in this analysis be for the years covered by the plan. Staff also recommends that the growth estimates be obtained from the Association of Bay Area Governments since the Air District uses ABAG growth estimates for air quality planning purposes.

4.3.1.3 STAFF RECOMMENDATION

Staff recommends Option 2. This approach achieves the same goals as the Air District's current approach while alleviating the existing analytical difficulties and the inconsistency of comparing a plan update with AQP growth projections that may be up to several years old. Eliminating the analytical inconsistency provides better nexus and proportionality for evaluating air quality impacts for plans.

4.3.2 PLAN-LEVEL GHG THRESHOLD OPTIONS

4.3.2.1 OPTION 1: GHG EFFICIENCY APPROACH

Option 1 proposes the development of a GHG-efficiency metric (e.g., GHG emissions per unit) which would enable comparison of a proposed general plan to its alternatives and to determine if the proposed general plan meets AB 32 emission reduction goals.

AB 32 identifies local governments as essential partners in achieving California's goal to reduce GHG emissions. Local governments have primary authority to plan, zone, approve, and permit how and where land is developed to accommodate population growth and the changing needs of their jurisdiction. ARB has developed the Local Government Operations Protocol and is developing a protocol to estimate community-wide GHG emissions. ARB encourages local governments to use these protocols to track progress in reducing GHG emissions. ARB encourages local governments to institutionalize the community's strategy for reducing its carbon footprint in its general plan. SB 375 creates a process for regional integration of land development patterns and transportation infrastructure planning with the primary goal of reducing GHG emissions from the largest sector of the GHG emission inventory, light duty vehicles.

If the statewide AB 32 GHG emissions reduction context is established, GHG efficiency can be viewed independently from the jurisdiction in which the plan is located. Normalizing projected 2020 mass of emissions from land use-related emissions sectors by comparison to a demographic unit (e.g., population and employment) provides evaluation of the GHG efficiency of a project and the opportunity to evaluate the project's consistency with AB 32 targets.

Two approaches are considered for efficiency metrics. Option 1A would consider efficiency in terms of the GHG emissions compared to the sum of the number of jobs and the number of residents at a point in time, which is referred to as the "service population" (SP). Option 1B would consider efficiency in terms of GHG emissions per capita. GHG efficiency metrics were developed (see Table 20) for the emissions rates at the State level that would accommodate projected growth (as indicated by population and employment growth) under trend forecast conditions, and the emission rates needed to accommodate growth while allowing for consistency with the goals of AB 32 (i.e., 1990 GHG emissions levels by 2020).

If a general plan demonstrates, through dividing the emissions inventory projections (MT CO_2e) by the amount of growth that would be accommodated in 2020, that it could meet the GHG efficiency metrics proposed in this section (either 6.7 MT CO_2e/capita or 4.6 MT CO_2e/SP as noted in Table 21), then the amount of GHG emissions associated with the general plan would be considered less than significant, regardless of its size (and magnitude of GHG emissions). In other words, the general plan would accommodate growth in a manner that would not hinder the State's ability to achieve AB 32 goals, and thus, would be less than significant for GHG emissions and their contribution to climate change.

Table 21 - California GHG Emissions, Population Projections and GHG Efficiency Thresholds

	1990	2002-2004 Average	2020
Population	29,758,213	36,199,342	44,135,923
Employment	14,294,100	16,413,400	20,194,661
California Service Population (Population + Employment)	44,052,313	52,612,742	64,330,584
Projected GHG emissions (metric tons CO_2e)/capita[1]	9.93	8.92	9.07
Projected GHG emissions (metric tons CO_2e)/SP[1]	6.71	6.14	6.22
AB 32 Goal GHG emissions (metric tons CO_2e)/capita[1]			**6.70**
AB 32 Goal GHG emissions (metric tons CO_2e)/SP[1]			**4.59**

Notes: AB = Assembly Bill; CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; SP = service population.

[1] Greenhouse gas efficiency levels were calculated using only the "land use-related" sectors of ARB's emissions inventory. Please refer to Appendix D for detailed calculations.

Sources: Data compiled by EDAW 2009, ARB 2009a, DOF 2009, EDD 2009, ICF Jones & Stokes 2009.

Both efficiency metrics would not penalize well-planned communities that propose a large amount of development. Instead, GHG efficiency metrics act to encourage the types of development that BAAQMD and OPR support (i.e., infill and transit-oriented development) because they tend to reduce GHG and other air pollutant emissions overall, rather than discourage large developments for being accompanied by a large mass of GHG emissions. Plans that are more GHG efficient would have no or limited mitigation requirements which would help them complete the CEQA process for General Plans and other plans more readily than plans that promote GHG inefficiencies which will require detailed design of mitigation during the CEQA process and could subject a plan to potential challenge as to whether all feasible mitigation was identified and adopted. This type of threshold can shed light on a well-planned general plan that accommodates a large amount of growth in a GHG-efficient way.

However, there are distinct and different advantages to the two sub options for this threshold.

The per-capita approach follows a long history of expressing planning goals on a per person basis. Further per-capita approaches are broadly understood by the public in general and thus use of such an approach for GHG would be readily comprehensible by lead agencies, staff, developers, stakeholders, and local residents. In order to accurately apply a per-capita approach, the transportation emissions of land use development must not be limited

to the jurisdiction itself and must consider regional travel both inbound and outbound from the jurisdiction to get a full picture of the GHG emissions for that jurisdiction. This can be done by running regional travel demand models during General Plan Development and splitting emissions between origins and destinations.

The Service Population metric could allow decision makers to compare GHG efficiency of general plan alternatives that vary residential and non-residential development totals, encourages GHG efficiency through improving jobs/housing balance. This approach would not give preference to communities that accommodate more residential (population-driven) land uses than non-residential (employment driven) land uses which could occur with the per capita approach A potential challenge for the Service Population metric is that within metropolitan areas there is great variation in the balance of land uses within different jurisdictions. Just because a particular jurisdiction or plan area may be heavily residential does not inherently mean that it is necessarily inefficient for GHG transportation emissions; one must consider the geographic placement of that jurisdiction relative to transit and job centers. Further, although a particular jurisdiction may be relatively balanced between residential use and employment, if the employment profile does not match the residential occupational profiles, there could still be substantial inbound and outbound trips that might not be captured by the Service Population metric depending on how the transportation analysis is done. However, similar to that noted above for a per capita approach, if a full regional accounting of transportation emissions from both residential and non-residential land use is conducted then comparative use of the service population metric could be valid.

When analyzing long-range plans, such as general plans, it is important to note that the planning horizon will often surpass the 2020 timeframe for implementation of AB 32. Executive Order S-3-05 establishes a more aggressive emissions reduction goal for the year 2050 of 80 percent below 1990 emissions levels. The year 2020 should be viewed as a milestone year, and the general plan should not preclude the community from a trajectory toward the 2050 goal. However, the 2020 timeframe is examined in this threshold evaluation because doing so for the 2050 timeframe (with respect to population, employment, and GHG emissions projections) would be too speculative. Advances in technology and policy decisions at the state level will be needed to meet the aggressive 2050 goals. It is beyond the scope of the analysis tools available at this time to examine reasonable emissions reductions that can be achieved through CEQA analysis in the year 2050. As the 2020 timeframe draws nearer, BAAQMD will need to reevaluate the threshold to better represent progress toward 2050 goals.

4.3.2.2 OPTION 2: CURRENT APPROACH PLUS CLIMATE ACTION PLAN-FOCUSED APPROACH

This approach would also build on the current approach to evaluating the significance of proposed plans on local and regional air quality by extending it to, and including GHG emissions. Local jurisdictions that may not initiate a general plan update for a number of years, or may decide to address GHG emissions in a stand-alone Climate Action Plan.

Option 2 would require an analysis demonstrating that the Climate Action Plan (or similar adopted policies, ordinances and programs) is consistent with all of the AB 32 Scoping Plan measures and goals. The Climate Action Plan should identify a land use design, transportation network, goals, policies and implementation measures that would achieve a 26.2 percent reduction in GHG emissions relative to 2020 emissions levels as discussed in the section above and calculated in Appendix C. As discussed previously, 26.2 percent was calculated relative to 2020 emissions projections from the "land use-related" GHG emissions sectors only (e.g., the sectors over which local government would have financial, operational, or discretionary control through land use entitlement authority; see Appendix C).

Qualified Climate Action Plans

A qualified Climate Action Plan adopted by a local jurisdiction should include the following:

- GHG Inventory for Current Year and Forecast for 2020 (and for 1990 if the reduction goal is based on 1990 emission levels).
- An adopted GHG Reduction Goal for 2020 for the jurisdiction from all sources (existing and future) which is at least one of the following: 1990 GHG emission levels, 15 percent below 2008 emission levels, or 28 percent below BAU Forecasts for 2020 (if including non-land use sector emissions in the local inventory; otherwise can use 26.2 percent if only including land use sector emissions).
- Identification of feasible reduction measures to reduce GHG emissions for 2020 to the identified target.
- Application of relevant reduction measures included in the AB 32 Scoping Plan that are within the jurisdiction of the local land use authority (such as building energy efficiency, etc.).
- Quantification of the reduction effectiveness of each of the feasible measures identified including disclosure of calculation method and assumptions.
- Identification of implementation steps and financing mechanisms to achieve the identified goal by 2020.
- Procedures for monitoring and updating the GHG inventory and reduction Measures at least twice before 2020 or at least every five years.
- Identification of responsible parties for Implementation.
- Schedule of implementation.
- Certified CEQA document.

Local Climate Action Policies, Ordinances and Programs

Air District staff recognize that many communities in the Bay Area have been proactive in planning for climate change but have not yet developed a stand-alone Climate Action Plan that meets the above criteria. Many cities and counties have adopted climate action policies, ordinances and program that may in fact achieve the goals of a qualified climate action plan. Staff recommends that if a local jurisdiction can demonstrate that its collective set of climate action policies, ordinances and other programs is consistent with AB 32, includes requirements or feasible measures to reduce GHG emissions and achieves one of the following GHG emission reduction goals, the AB 32 consistency demonstration should be considered equivalent to a qualified climate action plan:

- 1990 GHG emission levels,
- 15 percent below 2008 emission levels, or
- 28 percent below BAU Forecasts for 2020 (if including non-land use sector emissions in the local inventory; otherwise can use 26.2 percent if only including land use sector emissions).

4.3.2.3 STAFF RECOMMENDATION AND JUSTIFICATION

Staff's recommendation is to combine Options 1A, 1B and 2. At this time, staff believe that all three are valid approaches to plan evaluation, are tied to the AB 32 reduction goals, would promote reductions on a plan level without impeding the implementation of GHG–efficient development, and would recognize the initiative of many Bay Area communities who have already developed or are in the process of developing a GHG reduction plan. The details required above for a qualified Climate Action Plan (or similar adopted policies, ordinances and

programs) would provide the evidentiary basis for making CEQA findings that development consistent with the plan would result in feasible, measureable, and verifiable GHG reductions consistent with broad state goals such that projects approved under qualified Climate Action Plans or equivalent demonstrations would achieve their fair share of GHG emission reductions. .

4.3.3 LOCAL PLAN IMPACTS ASSOCIATED WITH RISKS AND HAZARDS

4.3.3.1 OPTION 1: OVERLAY ZONES BASED ON QUANTITATIVE EXPOSURE LEVEL

With this approach, for local plans to have a less-than-significant impact with respect to potential TACs, overlay zones would have to be established around existing and proposed land uses that would emit these air pollutants. Overlay zones to avoid toxic impacts should be reflected in local plan policies, land use map(s), and implementing ordinances (e.g., zoning ordinance). The overlay zones around existing and future TAC sources would be delineated using the quantitative approaches described above for project-level review and the resultant TAC buffers would be included in the General Plan (or the EIR for the General Plan) to assist in site planning. BAAQMD will provide guidance as to the methods used to establish the TAC buffers and what standards to be applied for acceptable exposure level in the updated CEQA Guidelines document. Special overlay zones of at least 500 feet on each side of all freeways and high volume roadways would be included in this threshold option.

The threshold of significance for plan impacts could affect all plan adoptions and amendments and require mitigation for a plan's air quality impacts. Where sensitive receptors would be exposed above the acceptable exposure level, the plan impacts would be considered significant and mitigation would be required to be imposed either at the plan level (through policy) or at the project level (through project level requirements).

4.3.3.2 OPTION 2: QUANTITATIVE THRESHOLDS FOR SITING NEW SOURCES AND NEW RECEPTORS

With this approach, quantitative thresholds like those discussed above for siting new receptors and/or new sources would be included in General Plan policies. This approach would be the same as the quantitative approaches to plan compliance but would ensure that local policies matched project-level thresholds.

4.3.3.3 STAFF RECOMMENDATION AND JUSTIFICATION

Staff's recommends Option 1 – Buffer Zones. By designating overlay zones in land use plans, local land use jurisdictions can take preemptive action before project-level review to reduce the potential for significant exposures to TAC emissions. While this will require more up-front work at the general plan level, in the long-run this approach is a more feasible approach consistent with District and CARB guidance about siting sources and sensitive receptors that is more effective than project by project consideration of effects that often has more limited mitigation opportunities. This approach would also promote more robust cumulative consideration of effects of both existing and future development for the plan-level CEQA analysis as well as subsequent project-level analysis.

4.3.4 LOCAL PLAN IMPACTS ASSOCIATED WITH ODORS

For local plans to have a less-than-significant impact with respect to potential odors, overlay zones would have to be established around existing and proposed land uses that would emit nuisance odors. Overlay zones to avoid odors should be reflected in local plan policies, land use map(s), and implementing ordinances (e.g., zoning ordinance).The threshold of significance for plan impacts could affect all plan adoptions and amendments and require mitigation for a plan's air quality impacts. The justification for establishing overlay zone in general plans

is the same as that articulated above for overlay zone for TAC emission sources. Guidance on appropriate buffer zones will be provided in the updated CEQA Guidelines document.

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EXHIBIT 5

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

California Environmental Quality Act Guidelines Update

Proposed Thresholds of Significance

May 3, 2010

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Bay Area Air Quality Management District

Proposed Air Quality CEQA Thresholds of Significance

1 INTRODUCTION

Bay Area Air Quality Management District (BAAQMD or Air District) staff analyzed various options for California Environmental Quality Act (CEQA) air quality thresholds of significance for use within BAAQMD's jurisdiction. The analysis and evaluation undertaken by Air District staff is documented in the *Revised Draft Options and Justification Report – California Environmental Quality Act Thresholds of Significance* (Draft Options Report) (BAAQMD October 2009).

Air District staff hosted public workshops in February, April, September and October 2009, and April 2010 at several locations around the Bay Area. Air District staff also hosted additional workshops in each of the nine Bay Area counties specifically designed for, and to solicit input from, local agency staff. In addition, Air District staff met with regional stakeholder groups to discuss and receive input on the threshold options being evaluated. Throughout the course of the public workshops and stakeholder meetings Air District staff received many comments on the various options under consideration. Based on comments received and additional staff analysis, the threshold options and staff-recommended thresholds were further refined. The culmination of this nearly year and a half-long effort was presented in the Proposed Thresholds of Significance Report published on November 2, 2009 as the Air District staff's proposed air quality thresholds of significance.

The Air District Board of Directors (Board) held public hearings on November 18 and December 2, 2009 and January 6, 2010, to receive comments on staff's Proposed Thresholds of Significance (November 2, 2009; revised December 7, 2009). After public testimony and Board deliberations, the Board requested staff to present additional options for risk and hazard thresholds for Board consideration. This Report includes risks and hazards threshold options, as requested by the Board, in addition to staff's previously recommended thresholds of significance. The proposed thresholds presented herein, upon adoption by the Air District Board of Directors, are intended to replace all of the Air District's currently recommended thresholds. The proposed air quality thresholds of significance, and Board-requested risk and hazard threshold options, are provided in Table 1 at the end of this introduction.

1.1 BAAQMD/CEQA REGULATORY AUTHORITY

The BAAQMD has direct and indirect regulatory authority over sources of air pollution in the San Francisco Bay Area Air Basin (SFBAAB). CEQA requires that public agencies consider the potential adverse environmental impacts of any project that a public agency proposes to carry out, fund or approve. CEQA requires that a lead agency prepare an Environmental Impact Report (EIR) whenever it can be fairly argued (the "fair argument"

standard), based on substantial evidence,[1] that a project may have a significant effect[2] on the environment, even if there is substantial evidence to the contrary (CEQA Guidelines §15064). CEQA requires that the lead agency review not only a project's direct effects on the environment, but also the cumulative impacts of a project and other projects causing related impacts. When the incremental effect of a project is cumulatively considerable, the lead agency must discuss the cumulative impacts in an EIR. (CEQA Guidelines §15064).

The "fair argument" standard refers to whether a fair argument can be made that a project may have a significant effect on the environment (*No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 84). The fair argument standard is generally considered a low threshold requirement for preparation of an EIR. The legal standards reflect a preference for requiring preparation of an EIR and for "resolving doubts in favor of environmental review." *Meija v. City of Los Angeles* (2005) 130 Cal. App. 4th 322, 332. "The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data." (CEQA Guidelines §15064(b).

In determining whether a project may have a significant effect on the environment, CEQA Guidelines Section 15064.7 provides that lead agencies may adopt and/or apply "thresholds of significance." A threshold of significance is "an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant" (CEQA Guidelines §15064.7).

While thresholds of significance give rise to a presumption of insignificance, thresholds are not conclusive, and do not excuse a public agency of the duty to consider evidence that a significant effect may occur under the fair argument standard. *Meija*, 130 Cal. App. 4th at 342. "A public agency cannot apply a threshold of significance or regulatory standard 'in a way that forecloses the consideration of any other substantial evidence showing there may be a significant effect.'" *Id.* This means that if a public agency is presented with factual information or other substantial evidence establishing a fair argument that a project may have a significant effect on the environment, the agency must prepare an EIR to study those impacts even if the project's impacts fall below the applicable threshold of significance.

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[1] "Substantial evidence" includes facts, reasonable assumptions predicated upon facts, or expert opinions supported by facts, but does not include argument, speculation, unsubstantiated opinion or narrative, evidence that is clearly inaccurate or erroneous, or evidence of social or economic impacts that do not contribute to, or are not caused by, physical impacts on the environment. Cal. Pub. Res. C. §21080(c); *see also* CEQA Guidelines §15384.

[2] A "significant effect" on the environment is defined as a "substantial, or potentially substantial, adverse change in the environment." Cal. Pub. Res. C. §21068; *see also* CEQA Guidelines §15382.

Thresholds of significance must be supported by substantial evidence. This Report provides the substantial evidence in support of the thresholds of significance developed by the BAAQMD. If adopted by the BAAQMD Board of Directors, the Air District will recommend that lead agencies within the nine counties of the BAAQMD's jurisdiction use the thresholds of significance in this Report when considering the air quality impacts of projects under their consideration.

1.2 JUSTIFICATION FOR UPDATING CEQA THRESHOLDS

Any analysis of environmental impacts under CEQA includes an assessment of the nature and extent of each impact expected to result from the project to determine whether the impact will be treated as significant or less than significant. CEQA gives lead agencies discretion whether to classify a particular environmental impact as significant. Ultimately, formulation of a standard of significance requires the lead agency to make a policy judgment about where the line should be drawn distinguishing adverse impacts it considers significant from those that are not deemed significant. This judgment must, however, be based on scientific information and other factual data to the extent possible (CEQA Guidelines §15064(b)).

In the sense that advances in science provide new or refined factual data, combined with advances in technology and the gradual improvement or degradation of an environmental resource, the point where an environmental effect is considered significant is fluid over time. Other factors influencing this fluidity include new or revised regulations and standards, and emerging, new areas of concern.

In the ten years since BAAQMD last reviewed its recommended CEQA thresholds of significance for air quality, there have been tremendous changes that affect the quality and management of the air resources in the Bay Area. Traditional criteria air pollutant ambient air quality standards, at both the state and federal levels, have become increasingly more stringent. A new criteria air pollutant standard for fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) has been added to federal and state ambient air quality standards. We have found, through technical advances in impact assessment, that toxic air contaminants are not only worse than previously thought from a health perspective, but that certain communities experience high levels of toxic air contaminants, giving rise to new regulations and programs to reduce the significantly elevated levels of ambient toxic air contaminant concentrations in the Bay Area.

In response to the elevated levels of toxic air contaminants in some Bay Area communities, the Air District created the Community Air Risk Evaluation (CARE) Program. Phase 1 of the BAAQMD's CARE program compiled and analyzed a regional emissions inventory of toxic air contaminants (TACs), including emissions from stationary sources, area sources, and on-road and off-road mobile sources. Phase 2 of the CARE Program conducted regional computer modeling of selected TAC species, species which collectively posed the greatest risk to Bay Area residents. In both Phases 1 and 2, demographic data were combined with estimates of TAC emissions or concentrations to identify communities that are disproportionally impacted from high concentrations of TACs. Bay Area Public Health Officers, in discussions with Air District staff and in comments

to the Air District's Advisory Council (February 11, 2009, Advisory Council Meeting on Air Quality and Public Health), have recommended that $PM_{2.5}$, in addition to TACs, be considered in assessments of community-scale impacts of air pollution.

Another significant issue that affects the quality of life for Bay Area residents is the growing concern with global climate change. In just the past few years, estimates of the global atmospheric temperature and greenhouse gas concentration limits needed to stabilize climate change have been adjusted downward and the impacts of greenhouse gas emissions considered more dire. Previous scientific assessments assumed that limiting global temperature rise to 2-3°C above pre-industrial levels would stabilize greenhouse gas concentrations in the range of 450-550 parts per million (ppm) of carbon dioxide-equivalent (CO_2e). Now the science indicates that a temperature rise of 2°C would not prevent dangerous interference with the climate system. Recent scientific assessments suggest that global temperature rise should be kept below 2°C by stabilizing greenhouse gas concentrations below 350 ppm CO_2e, a significant reduction from the current level of 385 ppm CO_2e.

For the reasons stated above, and to further the goals of other District programs such as encouraging transit-oriented and infill development, BAAQMD has undertaken an effort to review all of its currently-recommended CEQA thresholds, revise them as appropriate, and develop new thresholds where appropriate. The overall goal of this effort is to develop CEQA significance criteria that ensure new development implements appropriate and feasible emission reduction measures to mitigate significant air quality impacts. The Air District's recommended CEQA significance thresholds have been vetted through a public review process and will be presented to the BAAQMD Board of Directors for adoption.

Table 1 – Proposed Air Quality CEQA Thresholds of Significance

Pollutant	**Construction-Related**	**Operational-Related**	
Project-Level			
Criteria Air Pollutants and Precursors (Regional)	**Average Daily Emissions (lb/day)**	**Average Daily Emissions (lb/day)**	**Maximum Annual Emissions (tpy)**
ROG	54	54	10
NO_X	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10
$PM_{10}/PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	

Table 1 – Proposed Air Quality CEQA Thresholds of Significance		
Pollutant	**Construction-Related**	**Operational-Related**
GHGs **Projects other than Stationary Sources**	None	Compliance with Qualified Greenhouse Gas Reduction Strategy OR 1,100 MT of CO_2e/yr OR 4.6 MT CO_2e/SP/yr (residents + employees)
GHGs **Stationary Sources**	None	10,000 MT/yr
Risks and Hazards – New Source (All Areas) (Individual Project) **Staff Proposal**	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase: > 0.3 µg/m^3 annual average Zone of Influence: 1,000-foot radius from fence line of source or receptor
Risks and Hazards – New Receptor (All Areas) (Individual Project) **Staff Proposal**	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase: > 0.3 µg/m^3 annual average Zone of Influence: 1,000-foot radius from fence line of source or receptor
Risks and Hazards (Individual Project) **Tiered Thresholds Option**	Same as Operational Thresholds*	**Impacted Communities:** Siting a New Source Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >5.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase: > 0.2 µg/m^3 annual average Zone of Influence: 1,000-foot radius from fence line of source or receptor

Table 1 – Proposed Air Quality CEQA Thresholds of Significance		
Pollutant	**Construction-Related**	**Operational-Related**
Risks and Hazards (Individual Project) **Tiered Thresholds Option** (Continued)	Same as Operational Thresholds*	**Impacted Communities:** Siting a New Receptor **All Other Areas:** Siting a New Source or Receptor Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase: > 0.3 µg/m^3 annual average Zone of Influence: 1,000-foot radius from fence line of source or receptor
Risks and Hazards – New Source (All Areas) (Cumulative Thresholds)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) $PM_{2.5}$: > 0.8 µg/m^3 annual average (from all local sources) Zone of Influence: 1,000-foot radius from fence line of source or receptor
Risks and Hazards – New Receptor (All Areas) (Cumulative Thresholds)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) $PM_{2.5}$: > 0.8 µg/m^3 annual average (from all local sources) Zone of Influence: 1,000-foot radius from fence line of source or receptor
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous materials locating near receptors or receptors locating near stored or used acutely hazardous materials considered significant
Odors	None	Complaint History—Five confirmed complaints per year averaged over three years

Table 1 – Proposed Air Quality CEQA Thresholds of Significance		
Pollutant	**Construction-Related**	**Operational-Related**
Plan-Level		
Criteria Air Pollutants and Precursors	None	1. Consistency with Current Air Quality Plan control measures 2. Projected VMT or vehicle trip increase is less than or equal to projected population increase
GHGs	None	Compliance with Qualified Greenhouse Gas Reduction Strategy (or similar criteria included in a General Plan) OR 6.6 MT CO2e/ SP/yr (residents + employees)
Risks and Hazards	None	1. Overlay zones around existing and planned sources of TACs (including adopted Risk Reduction Plan areas) 2. Overlay zones of at least 500 feet (or Air District-approved modeled distance) from all freeways and high volume roadways
Odors	None	Identify the location of existing and planned sources of odors
Accidental Release of Acutely Hazardous Air Pollutants	None	None
Regional Plans (Transportation and Air Quality Plans)		
GHGs, Criteria Air Pollutants and Precursors, and Toxic Air Contaminants	None	No net increase in emissions

Notes: CO = carbon monoxide; CO_2e = carbon dioxide equivalent; GHGs = greenhouse gases; lb/day = pounds per day; MT = metric tons; NO_X = oxides of nitrogen; $PM_{2.5}$= fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; ROG = reactive organic gases; SO_2 = sulfur dioxide; SP = service population; TACs = toxic air contaminants; TBP = toxic best practices; tons/day = tons per day; tpy = tons per year; yr= year.

* Note: The Air District recommends that for construction projects that are less than one year duration, Lead Agencies should annualize impacts over the scope of actual days that peak impacts are to occur, rather than the full year.

2 GREENHOUSE GAS THRESHOLDS

BAAQMD does not currently have an adopted threshold of significance for GHG emissions. BAAQMD currently recommends that lead agencies quantify GHG emissions resulting from new development and apply all feasible mitigation measures to lessen the potentially significant adverse impacts. One of the primary objectives in updating the current CEQA Guidelines is to identify a GHG significance threshold, analytical

methodologies, and mitigation measures to ensure new land use development meets its fair share of the emission reductions needed to address the cumulative environmental impact from GHG emissions. GHG emissions contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change. As reviewed herein, climate change impacts include an increase in extreme heat days, higher ambient concentrations of air pollutants, sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental impacts. No single land use project could generate enough GHG emissions to noticeably change the global average temperature. The combination of GHG emissions from past, present, and future projects contribute substantially to the phenomenon of global climate change and its associated environmental impacts.

2.2 PROPOSED THRESHOLDS OF SIGNIFICANCE

Project Type	Proposed Thresholds
Projects other than Stationary Sources	Compliance with Qualified Greenhouse Gas Reduction Strategy OR 1,100 MT of CO_2e/yr OR 4.6 MT CO_2e/SP/yr (residents + employees)
Stationary Sources	10,000 MT of CO_2e/yr
Plans	Compliance with Qualified Greenhouse Gas Reduction Strategy (or similar criteria included in a General Plan) OR 6.6 MT CO_2e/SP/yr (residents + employees)
Regional Plans (Transportation and Air Quality Plans)	No net increase in GHG emissions

2.3 JUSTIFICATION AND SUBSTANTIAL EVIDENCE SUPPORTING THRESHOLDS

BAAQMD's approach to developing a threshold of significance for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions. If a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact, and would be considered significant. If mitigation can be applied to lessen the emissions such that the project meets its share of emission reductions needed to address the cumulative impact, the project would normally be considered less than significant.

As explained in the District's *Revised Draft Options and Justifications Report* (BAAQMD 2009), there are several types of thresholds that may be supported by

substantial evidence and be consistent with existing California legislation and policy to reduce statewide GHG emissions. In determining which thresholds to recommend, Staff studied numerous options, relying on reasonable, environmentally conservative assumptions on growth in the land use sector, predicted emissions reductions from statewide regulatory measures and resulting emissions inventories, and the efficacies of GHG mitigation measures. The thresholds recommended herein were chosen based on the substantial evidence that such thresholds represent quantitative and/or qualitative levels of GHG emissions, compliance with which means that the environmental impact of the GHG emissions will normally not be cumulatively considerable under CEQA. Compliance with such thresholds will be part of the solution to the cumulative GHG emissions problem, rather than hinder the state's ability to meet its goals of reduced statewide GHG emissions. Staff notes that it does not believe there is only one threshold for GHG emissions that can be supported by substantial evidence.

GHG CEQA significance thresholds recommended herein are intended to serve as interim levels during the implementation of the AB 32 Scoping Plan and SB 375, which will occur over time. Until AB 32 has been fully implemented in terms of adopted regulations, incentives, and programs and until SB 375 required plans have been fully adopted, or the California Air Resources Board (ARB) adopts a recommended threshold, the BAAQMD recommends that local agencies in the Bay Area apply the GHG thresholds recommended herein.

If left unchecked, GHG emissions from new land use development in California will result in a cumulatively considerable amount of GHG emissions and a substantial conflict with the State's ability to meet the goals within AB 32. Thus, BAAQMD proposes to adopt interim GHG thresholds for CEQA analysis, which can be used by lead agencies within the Bay Area. This would help lead agencies navigate this dynamic regulatory and technological environment where the field of analysis has remained wide open and inconsistent. BAAQMD's framework for developing a GHG threshold for land development projects that is based on policy and substantial evidence follows.

2.3.1 SCIENTIFIC AND REGULATORY JUSTIFICATION

Climate Science Overview

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, chlorofluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is *extremely unlikely* that global climate change of the past 50 years can be explained without the contribution from human activities (IPCC 2007a).

According to Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC), "Avoiding Dangerous Climate Change" means: *"stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."* Dangerous climate change defined

in the UNFCCC is based on several key indicators including the potential for severe degradation of coral reef systems, disintegration of the West Antarctic Ice Sheet, and shut down of the large-scale, salinity- and thermally-driven circulation of the oceans. (UNFCCC 2009). The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 ppm to 379 ppm in 2005 (IPCC 2007a). "Avoiding dangerous climate change" is generally understood to be achieved by stabilizing global average temperatures between 2 and 2.4°C above pre-industrial levels. In order to limit temperature increases to this level, ambient global CO_2 concentrations must stabilize between 350 and 400 ppm (IPCC 2007b).

Executive Order S-3-05

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed Assembly Bill 32, the California Global Warming Solutions Act of 2006, which set the 2020 greenhouse gas emissions reduction goal into law. AB 32 finds and declares that "Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020, and establishes regulatory, reporting, voluntary, and market mechanisms to achieve quantifiable reductions in GHG emissions to meet the statewide goal.

In December of 2008, ARB adopted its *Climate Change Scoping Plan* (*Scoping Plan*), which is the State's plan to achieve GHG reductions in California, as required by AB 32 (ARB 2008). The Scoping Plan contains strategies California will implement to achieve a reduction of 169 MMT CO_2e emissions, or approximately 28 percent from the state's projected 2020 emission level of 596 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 42 MMT of CO_2e, or almost 10 percent, from 2002-2004 average emissions), so that the state can return to 1990 emission levels, as required by AB 32.

While the Scoping Plan establishes the policy intent to control numerous GHG sources through regulatory, incentive, and market means, given the early phase of implementation and the level of control that local CEQA lead agencies have over numerous GHG sources, CEQA is an important and supporting tool in achieving GHG reductions overall in compliance with AB 32. In this spirit, BAAQMD is considering the adoption of thresholds of significance for GHG emissions for stationary source and land use development projects.

Senate Bill 375

Senate Bill (SB) 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years, but can be updated every four years if advancements in emission technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for State funding programmed after January 1, 2012. New provisions of CEQA incentivize qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

The revised District CEQA Guidelines includes methodology consistent with the recently updated State CEQA Guidelines, which provides that certain residential and mixed use projects, and transit priority projects consistent with an applicable SCS or APS need not analyze GHG impacts from cars and light duty trucks (CEQA Guidelines §15183.5(c)).

2.3.2 PROJECT-LEVEL GHG THRESHOLDS

Staff recommends setting GHG significance thresholds based on AB 32 GHG emission reduction goals while taking into consideration emission reduction strategies outlined in ARB's Scoping Plan. Staff proposes two quantitative thresholds for land use projects: a bright line threshold based on a "gap" analysis and an efficiency threshold based on emission levels required to be met in order to achieve AB 32 goals.

Staff also proposes one qualitative threshold for land use projects: if a project complies with a Qualified Greenhouse Gas Reduction Strategy (as defined in Section 2.3.4 below) that addresses the project it would be considered less than significant. As explained in detail in Section 2.3.4 below, compliance with a Qualified Greenhouse Gas Reduction Strategy (or similar adopted policies, ordinances and programs), would provide the evidentiary basis for making CEQA findings that development consistent with the plan would result in feasible, measureable, and verifiable GHG reductions consistent with broad state goals such that projects approved under qualified Greenhouse Gas Reduction Strategies or equivalent demonstrations would achieve their fair share of GHG emission reductions.

2.3.2.1 LAND USE PROJECTS "GAP-BASED" THRESHOLD

Staff took eight steps in developing this threshold approach, which are summarized here and detailed in the sections that follow. It should be noted that the "gap-based approach" used for threshold development is a conservative approach that focuses on a limited set of state mandates that appear to have the greatest potential to reduce land use development-

related GHG emissions at the time of this writing. It is also important to note that over time, as the effectiveness of the State's implementation of AB 32 (and SB 375) progresses, BAAQMD will need to reconsider the extent of GHG reductions needed over and above those from the implementation thereof for the discretionary approval of land use development projects. Although there is an inherent amount of uncertainty in the estimated capture rates (i.e., frequency at which project-generated emissions would exceed a threshold and would be subject to mitigation under CEQA) and the aggregate emission reductions used in the gap analysis, they are based on BAAQMD's expertise, the best available data, and use conservative assumptions for the amount of emission reductions from legislation in derivation of the gap (e.g., only adopted legislation was relied upon). This approach is intended to attribute an appropriate share of GHG emission reductions necessary to reach AB 32 goals to new land use development projects in BAAQMD's jurisdiction that are evaluated pursuant to CEQA.

Step 1 Estimate from ARB's statewide GHG emissions inventory the growth in emissions between 1990 and 2020 attributable to "land use-driven" sectors of the emission inventory as defined by OPR's guidance document (*CEQA and Climate Change*). Land use-driven emission sectors include Transportation (On-Road Passenger Vehicles; On-Road Heavy Duty), Electric Power (Electricity; Cogeneration), Commercial and Residential (Residential Fuel Use; Commercial Fuel Use) and Recycling and Waste (Domestic Waste Water Treatment).

Result: 1990 GHG emissions were 295.53 MMT CO_2e/yr and projected 2020 business-as-usual GHG emissions would be 400.22 MMT CO_2e/yr; thus a 26.2 percent reduction from statewide land use-driven GHG emissions would be necessary to meet the AB 32 goal of returning to 1990 emission levels by 2020. (See Table 2)

Step 2 Estimate the anticipated GHG emission reductions affecting the same land use-driven emissions inventory sectors associated with adopted statewide regulations identified in the AB 32 Scoping Plan.

Result: Estimated a 23.9 percent reduction can be expected in the land use-driven GHG emissions inventory from adopted Scoping Plan regulations, including AB 1493 (Pavley), LCFS, Heavy/Medium Duty Efficiency, Passenger Vehicle Efficiency, Energy-Efficiency Measures, Renewable Portfolio Standard, and Solar Roofs. (See Table 3)

Step 3 Determine any short fall or "gap" between the 2020 statewide emission inventory estimates and the anticipated emission reductions from adopted Scoping Plan regulations. This "gap" represents additional GHG emission reductions needed statewide from the land use-driven emissions inventory sectors, which represents new land use development's share of the emission reductions needed to meet statewide GHG emission reduction goals.

Result: With the 23.9 percent reductions from AB 32 Scoping Measures, there is a "gap" of 2.3 percent in necessary additional GHG emissions reductions to meet AB 32 goals of a 26.2 percent reduction from statewide land use-driven GHG emissions to return to 1990 levels in 2020. (See Table 2)

Step 4 Determine the percent reduction this "gap" represents in the "land use-driven" emissions inventory sectors from BAAQMD's 2020 GHG emissions inventory. Identify the mass of emission reductions needed in the SFBAAB from land use-driven emissions inventory sectors.

Result: Estimated that a 2.3 percent reduction in BAAQMD's projected 2020 emissions projections requires emissions reductions of 1.6 MMT CO_2e/yr from the land use-driven sectors. (See Table 4)

Step 5 Assess BAAQMD's historical CEQA database (2001-2008) to determine the frequency distribution trend of project sizes and types that have been subject to CEQA over the past several years.

Result: Determined historical patterns of residential, commercial and industrial development by ranges of average sizes of each development type. Results were used in Step 6 below to distribute anticipated Bay Area growth among different future project types and sizes.

Step 6 Forecast new land use development for the Bay Area using DOF/EDD population and employment projections and distribute the anticipated growth into appropriate land use types and sizes needed to accommodate the anticipated growth (based on the trend analysis in Step 5 above). Translate the land use development projections into land use categories consistent with those contained in the Urban Emissions Model (URBEMIS).

Result: Based on population and employment projections and the trend analysis from Step 5 above, forecasted approximately 4,000 new development projects, averaging about 400 projects per year through 2020 in the Bay Area.

Step 7 Estimate the amount of GHG emissions from each land use development project type and size using URBEMIS and post-model manual calculation methods (for emissions not included in URBEMIS). Determine the amount of GHG emissions that can reasonably and feasibly be reduced through currently available mitigation measures ("mitigation effectiveness") for future land use development projects subject to CEQA (based on land use development projections and frequency distribution from Step 6 above).

Result: Based on the information available and on sample URBEMIS calculations, found that mitigation effectiveness of between 25 and 30 percent is feasible.

Step 8 Conduct a sensitivity analysis of the numeric GHG mass emissions threshold needed to achieve the desired emissions reduction (i.e., "gap") determined in Step 4. This mass emission GHG threshold is that which would be needed to achieve the emission reductions necessary by 2020 to meet the Bay Area's share of the statewide "gap" needed from the land use-driven emissions inventory sectors.

Result: The results of the sensitivity analysis conducted in Step 8 found that reductions between about 125,000 MT/yr (an aggregate of 1.3 MMT in 2020) and over 200,000 MT/yr (an aggregate of over 2.0 MMT in 2020) were achievable and feasible. A mass emissions threshold of 1,100 MT of CO_2e/yr would result in approximately 59 percent of all projects being above the significance threshold (e.g., this is approximately the operational GHG emissions that would be associated with a 60 residential unit subdivision) and must implement feasible mitigation measures to meet CEQA requirements. With an estimated 26 percent mitigation effectiveness, the 1,100 MT threshold would achieve 1.6 MMT CO_2e/yr in GHG emissions reductions.

2.3.2.2 DETAILED BASIS AND ANALYSIS

Derivation of Greenhouse Gas Reduction Goal

To meet the target emissions limit established in AB 32 (equivalent to levels in 1990), total GHG emissions would need to be reduced by approximately 28 percent from projected 2020 forecasts (ARB 2009a). The AB 32 Scoping Plan is ARB's plan for meeting this mandate (ARB 2008). While the Scoping Plan does not specifically identify GHG emission reductions from the CEQA process for meeting AB 32 derived emission limits, the scoping plan acknowledges that "other strategies to mitigate climate change . . . should also be explored." The Scoping Plan also acknowledges that "Some of the measures in the plan may deliver more emission reductions than we expect; others less . . . and new ideas and strategies will emerge." In addition, climate change is considered a significant environmental issue and, therefore, warrants consideration under CEQA. SB 97 represents the State Legislature's confirmation of this fact, and it directed the Governor's Office of Planning and Research (OPR) to develop CEQA Guidelines for evaluation of GHG emissions impacts and recommend mitigation strategies. In response, OPR released the *Technical Advisory: CEQA and Climate Change* (OPR 2008), and proposed revisions to the State CEQA guidelines (April 14, 2009) for consideration of GHG emissions. The California Natural Resources Agency adopted the proposed State CEQA Guidelines revisions on December 30, 2009 and the revisions were effective beginning March 18, 2010. It is known that new land use development must also do its fair share toward achieving AB 32 goals (or, at a minimum, should not hinder the State's progress toward the mandated emission reductions).

Foreseeable Scoping Plan Measures Emission Reductions and Remaining "Gap"

Step 1 of the Gap Analysis entailed estimating from ARB's statewide GHG inventory the growth in emissions between 1990 and 2020 attributable to land use driven sectors of the emissions inventory. As stated above, to meet the requirements set forth in AB 32 (i.e., achieve California's 1990-equivalent GHG emissions levels by 2020) California would need to achieve an approximate 28 percent reduction in emissions across all sectors of the GHG emissions inventory compared with 2020 projections. However, to meet the AB 32 reduction goals in the emissions sectors that are related to land use development (e.g., on-road passenger and heavy-duty motor vehicles, commercial and residential area sources [i.e., natural gas], electricity generation/consumption, wastewater treatment, and water distribution/consumption), staff determined that California would need to achieve an approximate 26 percent reduction in GHG emissions from these land use-driven sectors (ARB 2009a) by 2020 to return to 1990 land use emission levels.

Next, in Step 2 of the Gap Analysis, Staff determined the GHG emission reductions within the land use-driven sectors that are anticipated to occur from implementation of the Scoping Plan measures statewide, which are summarized in Table 2 and described below. Since the GHG emission reductions anticipated with the Scoping Plan were not accounted for in ARB's or BAAQMD's 2020 GHG emissions inventory forecasts (i.e., business as usual), an adjustment was made to include (i.e., give credit for) GHG emission reductions associated with key Scoping Plans measures, such as the Renewable Portfolio Standard, improvements in energy efficiency through periodic updates to Title 24, AB 1493 (Pavley) (which recently received a federal waiver to allow it to be enacted in law), the Low Carbon Fuel Standard (LCFS), and other measures. With reductions from these State regulations (Scoping Plan measures) taken into consideration and accounting for an estimated 23.9 percent reduction in GHG emissions, in Step 3 of the Gap Analysis Staff determined that the Bay Area would still need to achieve an additional 2.3 percent reduction from projected 2020 GHG emissions to meet the 1990 GHG emissions goal from the land-use driven sectors. This necessary 2.3 percent reduction in projected GHG emissions from the land use sector is the "gap" the Bay Area needs to fill to do its share to meet the AB 32 goals. Refer to the following explanation and Tables 2 through 4 for data used in this analysis.

Because the transportation sector is the largest emissions sector of the state's GHG emissions inventory, it is aggressively targeted in early actions and other priority actions in the Scoping Plan including measures concerning gas mileage (Pavley), fuel carbon intensity (LCFS) and vehicle efficiency measures.

Table 2 – California 1990, 2002-2004, and 2020 Land Use Sector GHG[1] ($MMT CO_2e/yr$)				
Sector	**1990 Emissions**	**2002-2004 Average**	**2020 BAU Emissions Projections**	**% of 2020 Total**
Transportation	**137.98**	**168.66**	**209.06**	**52%**
On-Road Passenger Vehicles	108.95	133.95	160.78	40%
On-Road Heavy Duty	29.03	34.69	48.28	12%
Electric Power	**110.63**	**110.04**	**140.24**	**35%**
Electricity	95.39	88.97	107.40	27%
Cogeneration[2]	15.24	21.07	32.84	8%
Commercial and Residential	**44.09**	**40.96**	**46.79**	**12%**
Residential Fuel Use	29.66	28.52	32.10	8%
Commercial Fuel Use	14.43	12.45	14.63	4%
Recycling and Waste[1]	**2.83**	**3.39**	**4.19**	**1%**
Domestic Wastewater Treatment	2.83	3.39	4.19	1%
TOTAL GROSS EMISSIONS	**295.53**	**323.05**	**400.22**	
% Reduction Goal from Statewide land use driven sectors (from 2020 levels to reach 1990 levels in these emission inventory sectors)			26.2%	
% Reduction from AB32 Scoping Plan measures applied to land use sectors (see Table 3)			-23.9%	
% Reduction needed statewide beyond Scoping Plan measures (Gap)			2.3%	

Notes: MMT CO_2e /yr = million metric tons of carbon dioxide equivalent emissions per year.
[1] Landfills not included. See text.
[2] Cogeneration included due to many different applications for electricity, in some cases provides substantial power for grid use, and because electricity use served by cogeneration is often amenable to efficiency requirements of local land use authorities.
Sources: Data compiled by EDAW and ICF Jones & Stokes from ARB data.

Pavley Regulations. The AB 32 Scoping Plan assigns an approximate 20 percent reduction in emissions from passenger vehicles associated with the implementation of AB 1493. The AB 32 Scoping Plan also notes that "AB 32 specifically states that if the Pavley regulations do not remain in effect, ARB shall implement alternative regulations to control mobile sources to achieve equivalent or greater reductions of greenhouse gas emissions (HSC §38590)." Thus, it is reasonable to assume full implementation of AB 1493 standards, or equivalent programs that would be implemented by ARB. Furthermore, on April 1, 2010, U.S. EPA and the Department of Transportation's National Highway Safety Administration (NHTSA) announced a joint final rule establishing a national program that will dramatically reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the United States after 2011. Under this national program, automobile manufacturers will be able to build a single light-duty national fleet that satisfies all requirements under both the national program and the standards of California and other states. Nonetheless, BAAQMD may need to revisit this methodology as the federal standards come on line to ensure that vehicle standards are as aggressive as contemplated in development of this threshold.

Table 3 – 2020 Land Use Sector GHG Emission Reductions from State Regulations and AB 32 Measures				
Affected Emissions Source	**California Legislation**	**% Reduction from 2020 GHG inventory**	**End Use Sector (% of Bay Area LU Inventory)**	**Scaled % Emissions Reduction (credit)**
Mobile	AB 1493 (Pavley)	19.7%	On road passenger/light truck transportation (45%)	8.9%
	LCFS	7.2%	On road passenger/light truck transportation (45%)	3.2%
	LCFS	7.2%	On road Heavy/Medium Duty Transportation (5%)	0.4%
	Heavy/Medium Duty Efficiency	2.9%	On road Heavy/Medium Duty Transportation (5%)	0.2%
	Passenger Vehicle Efficiency	2.8%	On road passenger/light truck transportation (45%)	1.3%
Area	Energy-Efficiency Measures	9.5%	Natural gas (Residential, 10%)	1.0%
			Natural gas (Non-residential,13%)	1.2%
Indirect	Renewable Portfolio Standard	21.0%	Electricity (excluding cogen) (17%)	3.5%
	Energy-Efficiency Measures	15.7%	Electricity (26%)	4.0%
	Solar Roofs	1.5%	Electricity (excluding cogen) (17%)	0.2%
Total credits given to land use-driven emission inventory sectors from Scoping Plan measures				**23.9%**
Notes: AB = Assembly Bill; LCFS = Low Carbon Fuel Standard; SB = Senate Bill; RPS = Renewable Portfolio Standard Please refer to Appendix D for detailed calculations. Sources: Data compiled by ICF Jones & Stokes.				

LCFS. According to the adopted LCFS rule (CARB, April 2009), the LCFS is expected to result in approximately 10 percent reduction in the carbon intensity of transportation fuels. However, a portion of the emission reductions required from the LCFS would be achieved over the life cycle of transportation fuel production rather than from mobile-source emission factors. Based on CARB's estimate of nearly 16 MMT reductions in on-road emissions from implementation of the LCFS and comparison to the statewide on-road emissions sector, the LCFS is assumed to result in a 7.2 percent reduction compared to 2020 BAU conditions (CARB 2009e).

Table 4 – SFBAAB 1990, 2007, and 2020 Land Use Sector GHG Emissions Inventories and Projections (MMT CO_2e/yr)				
Sector	**1990 Emissions**	**2007 Emissions**	**2020 Emissions Projections**	**% of 2020 Total[2]**
Transportation	**26.1**	**30.8**	**35.7**	**50%**
On-Road Passenger Vehicles	23.0	27.5	32.0	
On-Road Heavy Duty	3.1	3.3	3.7	
Electric Power	**25.1**	**15.2**	**18.2**	**26%**
Electricity	16.5	9.9	11.8	
Cogeneration	8.6	5.3	6.4	
Commercial and Residential	**8.9**	**15.0**	**16.8**	**24%**
Residential Fuel Use	5.8	7.0	7.5	
Commercial Fuel Use	3.1	8.0	9.3	
Recycling and Waste[1]	**0.2**	**0.4**	**0.4**	**1%**
Domestic Waste Water Treatment	0.2	0.4	0.4	
TOTAL GROSS EMISSIONS	**60.3**	**61.4**	**71.1**	
SFBAAB's "Fair Share" % Reduction (from 2020 levels to reach 1990 levels) with AB-32 Reductions (from Table 3)			2.3%	
SFBAAB's Equivalent Mass Emissions Land Use Reduction Target at 2020 (MMT CO2e/yr)			1.6	

Notes: MMT CO_2e /yr = million metric tons of carbon dioxide equivalent emissions per year; SFBAAB = San Francisco Bay Area Air Basin.
[1] Landfills not included.
[2] Percentages do not sum exactly to 100% in table due to rounding.
Please refer to Appendix D for detailed calculations.
Sources: Data compiled by EDAW 2009, ICF Jones & Stokes 2009, BAAQMD 2008.

Renewable Portfolio Standard, Energy Efficiency and Solar Roofs. Energy efficiency and renewable energy measures from the Scoping Plan were also included in the gap analysis. The Renewable Portfolio Standard (rules) will require the renewable energy portion of the retail electricity portfolio to be 33 percent in 2020. For PG&E, the dominant electricity provider in the Basin, approximately 12 percent of their current portfolio qualifies under the RPS rules and thus the gain by 2020 would be approximately 21 percent. The Scoping Plan also estimates that energy efficiency gains with periodic improvement in building and appliance energy standards and incentives will reach 10 to 15 percent for natural gas and electricity respectively. The final state measure included in this gap analysis is the solar roof initiative, which is estimated to result in reduction of the overall electricity inventory of 1.5 percent.

Landfill emissions are excluded from this analysis. While land use development does generate waste related to both construction and operations, the California Integrated Waste Management Board (CIWMB) has mandatory diversion requirements that will, in all probability, increase over time to promote waste reductions, reuse, and recycle. The Bay Area has relatively high levels of waste diversion and extensive recycling efforts. Further, ARB has established and proposes to increase methane capture requirements for all major landfills. Thus, at this time, landfill emissions associated with land use

development waste generation is not included in the land use sector inventory used to develop this threshold approach.

Industrial stationary sources thresholds were developed separately from the land use threshold development using a market capture approach as described below. However, mobile source and area source emissions, as well as indirect electricity emissions that derive from industrial use are included in the land use inventory above as these particular activities fall within the influence of local land use authorities in terms of the affect on trip generation and energy efficiency.

AB 32 mandates reduction to 1990-equivalent GHG levels by 2020, with foreseeable emission reductions from State regulations and key Scoping Plan measures taken into account, were applied to the land use-driven emission sectors within the SFBAAB (i.e., those that are included in the quantification of emissions from a land use project pursuant to a CEQA analysis [on-road passenger vehicles, commercial and residential natural gas, commercial and residential electricity consumption, and domestic waste water treatment], as directed by OPR in the Technical Advisory: *Climate Change and CEQA* [OPR 2008]). This translates to a 2.3 percent gap in necessary GHG emission reductions by 2020 from these sectors.

2.3.2.3 LAND USE PROJECTS BRIGHT LINE THRESHOLD

In Steps 4 and 5 of the gap analysis, Staff determined that applying a 2.3 percent reduction to these land use emissions sectors in the SFBAAB's GHG emissions inventory would result in an equivalent fair share of 1.6 million metric tons per year (MMT/yr) reductions in GHG emissions from new land use development. As additional regulations and legislation aimed at reducing GHG emissions from land use-related sectors become available in the future, the 1.6 MMT GHG emissions reduction goal may be revisited and recalculated by BAAQMD.

In order to derive the 1.6 MMT "gap," a projected development inventory for the next ten years in the SFBAAB was calculated. (See Table 4 and *Revised Draft Options and Justifications Report* (BAAQMD 2009).) CO_2e emissions were modeled for projected development in the SFBAAB and compiled to estimate the associated GHG emissions inventory. The GHG (i.e., CO_2e) CEQA threshold level was adjusted for projected land use development that would occur within BAAQMD's jurisdiction over the period from 2010 through 2020.

Projects with emissions greater than the threshold would be required to mitigate to the threshold level or reduce project emissions by a percentage (mitigation effectiveness) deemed feasible by the Lead Agency under CEQA compared to a base year condition. The base year condition is defined by an equivalent size and character of project with annual emissions using the defaults in URBEMIS and the California Climate Action Registry's General Reporting Protocol for 2008. By this method, land use project mitigation subject to CEQA would help close the "gap" remaining after application of the key regulations and measures noted above supporting overall AB 32 goals.

This threshold takes into account Steps 1-8 of the gap analysis described above to arrive at a numerical mass emissions threshold. Various mass emissions significance threshold levels (i.e., bright lines) could be chosen based on the mitigation effectiveness and performance anticipated to be achieved per project to meet the aggregate emission reductions of 1.6 MMT needed in the SFBAAB by 2020. (See Table 5 and *Revised Draft Options and Justifications Report* (BAAQMD 2009).) Staff recommends a 1,100 MT CO_2e per year threshold. Choosing a 1,100 MT mass emissions significance threshold level (equivalent to approximately 60 single-family units), would result in about 59 percent of all projects being above the significance threshold and having to implement feasible mitigation measures to meet their CEQA obligations. These projects account for approximately 92 percent of all GHG emissions anticipated to occur between now and 2020 from new land use development in the SFBAAB.

Project applicants and lead agencies could use readily available computer models to estimate a project's GHG emissions, based on project specific attributes, to determine if they are above or below the bright line numeric threshold. With this threshold, projects that are above the threshold level, after consideration of emission-reducing characteristics of the project as proposed, would have to reduce their emissions to below the threshold to be considered less than significant.

Establishing a "bright line" to determine the significance of a project's GHG emissions impact provides a level of certainty to lead agencies in determining if a project needs to reduce its GHG emissions through mitigation measures and when an EIR is required.

Table 5 – Operational GHG Threshold Sensitivity Analysis

Option	Mitigation Effectiveness Assumptions		Mass Emission Threshold Level (MT CO_2e/yr)	% of Projects Captured (>threshold)	% of Emissions Captured (> threshold)	Emissions Reduction per year (MT/yr)	Aggregate Emissions Reduction (MMT) at 2020	Threshold Project Size Equivalent (single family dwelling units)
	Performance Standards Applied to All Projects with Emissions < Threshold Level	Mitigation Effectiveness Applied to Emissions > Threshold Level						
1A	N/A	30%	975	60%	93%	201,664	2.0	53
1A	N/A	25%	110	96%	100%	200,108	2.0	66
1A	N/A	30%	1,225	21%	67%	159,276	1.6	67
1A	N/A	26%	1,100	59%	92%	159,877	1.6	60
1A	N/A	30%	2,000	14%	61%	143,418	1.4	109
1A	N/A	25%	1,200	58%	92%	136,907	1.4	66
1A	N/A	30%	3,000	10%	56%	127,427	1.3	164
1A	N/A	25%	1,500	20%	67%	127,303	1.3	82
1B	26%	N/A	N/A	100%	100%	208,594	2.1	N/A[1]
1C	5%	30%	1,900	15%	62%	160,073	1.6	104
1C	10%	25%	1,250	21%	67%	159,555	1.6	68
1C	5%	30%	3,000	10%	56%	145,261	1.5	164
1C	10%	25%	2,000	4%	61%	151,410	1.5	109
1C	10%	30%	10,000	2%	33%	125,271	1.3	547

Notes: MMT = million metric tons per year; MT CO_2e/yr = metric tons of carbon dioxide equivalent emissions per year; MT/yr = metric tons per year; N/A = not applicable.

[1] Any project subject to CEQA would trigger this threshold.

Please refer to Appendix E for detailed calculations.

Source: Data modeled by ICF Jones & Stokes.