4.2 AIR QUALITY

INTRODUCTION

This section evaluates the potential air quality impacts of the proposed project. The analysis considers both operational and construction effects. The primary focus of the air quality analysis is the evaluation of construction and future operational project-related emissions on regional air quality. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD, 2011).

ENVIRONMENTAL SETTING

SAN FRANCISCO BAY AIR BASIN

The California Air Resources Board (CARB) divides the state into air basins that share similar meteorological and topographical features. Corte Madera is located in the nine-county San Francisco Bay Area Air Basin (SFBAAB) composed of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties. The SFBAAB is affected by a Mediterranean climate of warm, dry summers and cool, damp winters. The SFBAAB is a large shallow air basin ringed by hills that taper into a number of sheltered valleys around the perimeter. Two primary atmospheric outlets exist. One is through the strait known as the Golden Gate, a direct outlet to the Pacific Ocean. The second extends to the northeast, along the west delta region of the Sacramento and San Joaquin rivers.

Air quality conditions in the San Francisco Bay Area have improved significantly since the Bay Area Air Quality Management District (BAAQMD) was created in 1955. Ambient concentrations of air pollutants, and the number of days during which the region exceeds air quality standards, have fallen dramatically. Exceedances of air quality standards occur primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights or hot, sunny summer afternoons.

Ozone levels, measured by peak concentrations and the number of days over the State of California's 1-hour standard, have declined substantially in the San Francisco Bay Area as a result of aggressive programs by BAAQMD and other regional, state, and federal agencies. The reduction of peak concentrations represents progress in improving public health; however, the Bay Area still exceeds the state standard for 1-hour ozone. Levels of PM_{10} (coarse particulate matter) have exceeded state standards 2 of the last 3 years, and the area is considered a nonattainment area for this pollutant relative to the state standards. The Bay Area is an unclassified area for the federal PM_{10} standard. No exceedances of the state or federal carbon monoxide (CO) standards have been recorded at any of the region's monitoring stations since 1991. The Bay Area is currently considered a maintenance area for state and federal CO standards.

Air quality is a function of both local climate and local sources of air pollution. Air quality is the balance of the natural dispersal capacity of the atmosphere and emissions of air pollutants from human uses of the environment. Climate and topography are major influences on air quality in the project site vicinity. Marin County benefits from constant winds, a marine layer of fog (and marine air flow) that lifts in the morning hours during the summer, and heavy winter precipitation compared to other parts of the Bay Area. Wind direction is generally from the southwest, in alignment with the ridges (Corte Madera Ridge and Southern Heights Ridge in Larkspur). The combination of wind direction and topography allows for constant scouring of the ambient air, resulting in good air quality most of the time. It also means that air pollution generated in Marin County is dispersed to other parts of the Bay Area.

AIR POLLUTANTS OF CONCERN AND HEALTH EFFECTS

The most problematic pollutants in the Corte Madera area include ozone and particulate matter. The health effects and major sources of these pollutants, as well as other key pollutants, are described below. Toxic air contaminants are a separate class of pollutants and are discussed later in this section.

Ozone

Ground-level ozone (O_3), commonly referred to as smog, is greatest on warm, windless, sunny days. O_3 is not emitted directly into the air, but is formed through a complex series of chemical reactions between reactive organic gases (ROG) and nitrogen oxides (NO_X). These reactions occur over time in the presence of sunlight. O_3 formation can occur in a matter of hours under ideal conditions. The time required for O_3 formation allows the reacting compounds to spread over a large area, producing a regional pollution concern. Once formed, O_3 can remain in the atmosphere for 1 or 2 days.

O_3 is also a public health concern because it is a respiratory irritant that increases susceptibility to respiratory infections and diseases, and because it can harm lung tissue at high concentrations. In addition, O_3 can cause substantial damage to leaf tissues of crops and natural vegetation and can damage many natural and human-made materials by acting as a chemical oxidizing agent. The principal sources of the O_3 precursors (ROG and NO_X) are the combustion of fuels and the evaporation of solvents, paints, and fuels.

Particulate Matter

Particulate matter (PM) can be divided into several size fractions. Coarse particles (PM_{10}) are smaller than 10 microns in diameter and arise primarily from natural processes, such as wind-blown dust or soil. Fine particles ($PM_{2.5}$) are less than 2.5 microns in diameter and are produced mostly from combustion or burning activities. Fuel burned in cars and trucks, power plants, factories, fireplaces, and wood stoves produces fine particles. $PM_{2.5}$, and to some extent PM_{10}, contain particles formed in the air from primary gaseous emissions. Examples include sulfates formed from sulfur dioxide (SO_2) emissions from power plants and industrial facilities; nitrates formed from NO_X emissions from power plants, automobiles, and other combustion sources; and carbon formed from organic gas emissions from automobiles and industrial facilities.

The level of $PM_{2.5}$ in the air is a public health concern because it can bypass the body's natural filtration system more easily than larger particles and can lodge deep in the lungs. The health effects vary depending on a variety of factors, including the type and size of particles. Research has demonstrated a correlation between high PM concentrations and increased mortality rates. Elevated PM concentrations can also aggravate chronic respiratory illnesses such as bronchitis and asthma.

Carbon Monoxide

CO is an odorless, colorless gas that is formed by the incomplete combustion of fuels. Motor vehicle emissions are the dominant source of CO in the SFBAAB. At high concentrations, CO reduces the oxygen-carrying capacity of the blood and can cause dizziness, headaches, unconsciousness, and even death. CO can also aggravate cardiovascular disease. Relatively low concentrations of CO can significantly affect the amount of oxygen in the bloodstream because CO binds to hemoglobin 220 to 245 times more strongly than oxygen.

CO emissions and ambient concentrations have decreased significantly in recent years. These improvements are due largely to the introduction of cleaner-burning motor vehicles and motor vehicle fuels. CO is still a pollutant that must be closely monitored, however, due to its severe effect on human health.

Elevated CO concentrations are usually localized and are often the result of a combination of high traffic volumes and traffic congestion. Elevated CO levels develop primarily during winter periods of light winds or calm conditions combined with the formation of ground-level temperature inversions. Wintertime CO concentrations are higher because of reduced dispersion of vehicle emissions and because CO emission rates from motor vehicles increase as temperature decreases.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Construction devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X. Because NO_2 is formed and depleted by reactions associated with O_3, the NO_2 concentration in a particular geographic area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of adverse health effects depends primarily on the concentration inhaled rather than the duration of the exposure. Exposure can result in a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation. Symptoms that are more significant may include chemical pneumonitis or pulmonary edema with breathing abnormalities, cyanosis, chest pain, and rapid heartbeat.

Sulfur Dioxide

Sulfur dioxide (SO_2) is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with exposure to SO_2 pertain to the upper respiratory tract. SO_2 is a respiratory irritant, with constriction of the bronchioles occurring with inhalation of SO_2 at 5 parts per million (ppm) or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Similar to NO_2, the severity of adverse health effects depends primarily on the concentration inhaled rather than the duration of the exposure. Exposure to high concentrations of SO_2 may result in edema of the lungs or glottis and respiratory paralysis.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are considered either carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For regulatory purposes, carcinogenic TACs are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as from accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage, and death.

Diesel particulate matter (DPM) is a TAC of growing concern in California. According to the California Almanac of Emissions and Air Quality (CARB, 2009), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being DPM. In 1998, after a 10-year scientific assessment process, CARB identified DPM as a TAC. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. The exhaust from diesel engines contains hundreds of different gaseous and particulate components, many of which are toxic. Many of these compounds adhere to the particles, and because diesel particles are so small, they penetrate deep into the lungs. DPM has been identified as a human carcinogen. Mobile sources, such as trucks, buses, automobiles, trains, ships, and farm equipment, are by far the largest source of diesel emissions. Studies show that DPM concentrations are much higher near heavily traveled highways and intersections.

Although DPM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. No ambient monitoring data are available for DPM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses CARB's emissions inventory PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of DPM. In addition to DPM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest existing ambient risk, for which data are available, in California. However, DPM poses the greatest health risk among the TACs mentioned. Since 1990, the health risk from DPM has been reduced by 52 percent. Overall, levels of most TACs have decreased since 1990 except for para-dichlorobenzene and formaldehyde (CARB, 2009).

Unlike criteria pollutants like CO, TACs do not have ambient air quality standards. Since no safe levels of TACs can be determined, there are no air quality standards for TACs. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. Two types of risk are usually assessed: chronic non-cancer risk and acute non-cancer risk. DPM has been identified as a carcinogenic material but is not considered to have acute non-cancer risks. The State of California has begun a program of identifying and reducing risks associated with DPM. The program consists of new regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles; new retrofit requirements for existing on-road, off-road, and stationary diesel-fueled engines and vehicles; and new diesel fuel regulations to reduce the sulfur content of diesel fuel as required by advanced diesel emission control systems.

Land uses where individuals could be exposed to high levels of diesel exhaust include:
- Railroad operations;
- Warehouses;
- Schools with a high volume of bus traffic;
- High-volume highways; and
- High-volume arterials and local roadways with a high level of diesel traffic.

SENSITIVE RECEPTORS

Some groups of people are more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks.

REGULATORY FRAMEWORK

Air quality in the SFBAAB is addressed through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies primarily responsible for improving the air quality in Corte Madera are discussed below along with their individual responsibilities.

AMBIENT AIR QUALITY STANDARDS

Both the U.S. Environmental Protection Agency (U.S. EPA) and CARB established ambient air quality standards for common air pollutants. These ambient air quality standards are levels of contaminants that represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. The federal and state ambient air quality standards for important pollutants are summarized in **Table 4.2-1.** The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, federal and state standards differ in some cases. In general, California standards are more stringent. This is particularly true for nitrogen dioxide (NO_2) and coarse particulate matter (PM_{10}).

Ambient Air Quality Monitoring

CARB maintains several air quality monitoring sites in the SFBAAB, including a site in San Rafael at 534 4th Street, which is the closest monitoring site to the project site. **Table 4.2-2** shows historical occurrences of pollutant levels exceeding state and federal ambient air quality standards for the 3-year period of 2011 through 2013.

Ambient Air Quality Attainment Status

Table 4.2-3 shows the federal and state attainment status for the SFBAAB. The region is nonattainment for federal ozone and $PM_{2.5}$ standards, and nonattainment for state ozone, $PM_{10,}$ and $PM_{2.5}$ standards.

Areas with air quality that exceeds adopted air quality standards are designated as "nonattainment" areas for the relevant air pollutants. Nonattainment areas are sometimes further classified by degree (marginal, moderate, serious, severe, and extreme for ozone, and moderate and serious for CO and PM_{10}) or status ("nonattainment-transitional"). Areas that comply with air quality standards are designated as "attainment" areas for the relevant air pollutants. "Unclassified" areas are those with insufficient air quality monitoring data to support a designation of attainment or nonattainment, but are generally presumed to comply with the ambient air quality standard. State Implementation Plans (SIPs) must be prepared by states for areas designated as federal nonattainment areas to demonstrate how the area will come into attainment of the exceeded federal ambient air quality standard.

As detailed in the discussion below, both CARB and the U.S. EPA have established air pollution standards in an effort to protect human health and welfare. Geographic areas are designated attainment if these standards are met and nonattainment if they are not met. In addition, each agency has several levels of classifications based on severity of the problem.

FEDERAL REGULATIONS

The U.S. EPA is responsible for enforcing the federal Clean Air Act and the 1990 amendments to it, as well as the national ambient air quality standards (federal standards) that the U.S. EPA establishes. These standards identify levels of air quality for six criteria pollutants, which are considered the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect public health and welfare. The six criteria pollutants are O_3, CO, NO_2, SO_2, PM_{10}, and lead. The U.S. EPA also has regulatory and enforcement jurisdiction

TABLE 4.2-1 FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Federal Primary Standard	State Standard
Ozone (O_3)	1-Hour 8-Hour	-- 0.075 ppm	0.09 ppm 0.07 ppm
Coarse Particulate Matter (PM_{10})	24-Hour Annual Average	150 µg/m3 –	50 µg/m3 20 µg/m3
Fine Particulate Matter ($PM_{2.5}$)	24-Hour Annual Average	35 µg/m3 12µg/m3	– 12 µg/m3
Carbon Monoxide (CO)	1-Hour 8-Hour	35 ppm 9.0 ppm	20 ppm 9.0 ppm
Nitrogen Dioxide (NO_2)	1-Hour Annual Average	0.100 ppm 0.053 ppm	0.18 ppm 0.03 ppm
Sulfur Dioxide (SO_2)	1-Hour 24-Hour Annual Average	0.075 ppm 0.14 ppm 0.03 ppm	0.25 ppm 0.04 ppm --

Notes: ppm = parts per million; µg/m3 = micrograms per cubic meter
Source: BAAQMD, 2014; U.S. EPA, 2013.

TABLE 4.2-2 AMBIENT AIR QUALITY MONITORING DATA FOR SAN RAFAEL

Pollutant Standards	2011	2012	2013
Ozone			
Maximum 1-hour concentration (ppm)	0.092	0.076	0.081
Maximum 8-hour concentration (ppm)	0.070	0.058	0.070
Coarse Particulate Matter (PM_{10})			
Maximum 24-hour concentration (µg/m3)	**54.1**	37.1	**54.4**
Annual average concentration (µg/m3)	16.5	13.3	15.6
Fine Particulate Matter ($PM_{2.5}$)			
Maximum 24-hour concentration (µg/m3)	**42.2**	26.5	**44.9**
Annual average concentration (µg/m3)	9.8	8.0	10.7
Carbon Monoxide (CO)			
Maximum 8-hour concentration (ppm)	1.21	1.11	ND
Nitrogen Dioxide (NO_2)			
Maximum 1-hour concentration (ppm)	0.053	0.052	0.049
Annual Average Concentration (ppm)	0.012	0.011	0.012

Notes: ND = No Data; ppm = parts per million; µg/m3 = micrograms per cubic meter
Values reported in **bold** exceeded ambient air quality standard. An exceedance is not necessarily a violation.
Source: CARB, 2014.

over emission sources beyond state waters (outer continental shelf) and sources that are under the exclusive authority of the federal government, such as aircraft, locomotives, and interstate trucking.

As part of its enforcement responsibilities, the U.S. EPA requires each state with nonattainment areas to prepare and submit a SIP that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify

TABLE 4.2-3 FEDERAL AND STATE AMBIENT AIR QUALITY MONITORING ATTAINMENT STATUS FOR SAN FRANCISCO BAY AREA AIR BASIN

Pollutant	Federal	State
1-Hour Ozone (O_3)	–	Nonattainment
8-Hour Ozone (O_3)	Nonattainment	Nonattainment
Coarse Particulate Matter (PM_{10})	Unclassified	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment

Source: BAAQMD, 2014.

specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs.

STATE REGULATIONS

California Air Resources Board

California Air Resources Board (CARB), a department of the California Environmental Protection Agency, oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the 1989 amendments to the California Clean Air Act (CCAA), responding to the federal Clean Air Act (federal CAA) requirements, and regulating emissions from motor vehicles and consumer products within the state. CARB has established emission standards for vehicles sold in California and for various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions.

The amendments to the CCAA establish ambient air quality standards for the state (state standards) and a legal mandate to achieve these standards by the earliest practical date. These standards apply to the same six criteria pollutants as the federal CAA and also include sulfate, visibility, hydrogen sulfide, and vinyl chloride. They are more stringent than the federal standards and, in the case of PM_{10} and NO_2, far more stringent.

DPM emissions in California are projected to decrease in the future and are reflected in the EMFAC2011 emissions data. New CARB regulations require on-road diesel trucks to be retrofitted with particulate matter controls or replaced to meet new 2010 engine standards that have much lower DPM and $PM_{2.5}$ emissions. This regulation will substantially reduce these emissions between 2013 and 2023, with the greatest reductions occurring in 2013 through 2015. While new trucks and buses will meet strict federal standards, this measure is intended to accelerate the rate at which the fleet either turns over so there are more cleaner vehicles on the road or is retrofitted to meet similar standards. With this regulation, older, more polluting trucks would be removed from the roads much more quickly.

Tanner Air Toxics Act

California regulates TACs primarily through the Tanner Air Toxics Act (Tanner Act) and the Air Toxics 'Hot Spots' Information and Assessment Act of 1987 (Assembly Bill 2588). The Tanner Act sets forth a formal procedure for CARB to designate substances as TACs. This includes research, public participation, and scientific peer review before CARB can designate a substance as a TAC. Once a TAC is identified, CARB then adopts an Airborne Toxics Control Measure (ATCM) 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 best available control technology (BACT) to minimize emissions.

Assembly Bill 2588 requires that existing facilities that emit toxic substances above a 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, and 4) prepare and implement risk reduction measures. (See more discussion under "Assembly Bill 2588 Air Toxics 'Hot Spots' Information and Assessment Act of 1987" below.) CARB 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).

Senate Bill 656

In 2003, the California Legislature enacted Senate Bill 656 to reduce public exposure to PM_{10} and $PM_{2.5}$. In 2004, CARB approved a list of the most readily available, feasible, and cost-effective control measures that can be employed by air districts to reduce PM_{10} and $PM_{2.5}$ (collectively referred to as PM). The list is based on rules, regulations, and programs existing in California as of January 1, 2004, for stationary, area-wide, and mobile sources. In 2005, air districts adopted implementation schedules for selected measures from the list. The implementation schedules identify the appropriate subset of measures and the dates for final adoption, implementation, and the sequencing of selected control measures. In developing the implementation schedules, each air district prioritized measures based on the nature and severity of the PM problem in their area and cost-effectiveness. Consideration was also given to ongoing programs such as measures being adopted to meet national air quality standards or the state ozone planning process.

Assembly Bill 2588 Air Toxics "Hot Spots" Information and Assessment Act of 1987

In 1987, the California Legislature established the Air Toxics "Hot Spots" Information and Assessment Act of 1987, Assembly Bill 2588 (Health and Safety Code Sections 44300-44394). It requires facilities to report their air toxics emissions, ascertain health risks, and notify nearby residents of significant risks. The emissions inventory and risk assessment information from this program has been incorporated into this report. In 1992, the "Hot Spots" Act was amended by Senate Bill 1731, which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan.

REGIONAL REGULATIONS

In 1955, the California Legislature created the Bay Area Air Quality Management District (BAAQMD). The agency is primarily responsible for assuring that the federal and state ambient air quality standards are attained and maintained in the Bay Area. BAAQMD regulates air quality within Corte Madera. BAAQMD is responsible for many other activities, including:

- Adopting and enforcing rules and regulations concerning air pollutant sources;
- Issuing permits for stationary sources of air pollutants;
- Inspecting stationary sources of air pollutants;
- Responding to citizen complaints;
- Monitoring ambient air quality and meteorological conditions;
- Awarding grants to reduce motor vehicle emissions; and
- Conducting public education campaigns.

BAAQMD Regulation of Building Demolition

BAAQMD regulates the demolition of buildings and structures that may contain asbestos. Asbestos is a fibrous mineral that occurs naturally in ultramafic rock—a rock type commonly found in California—and was used in the past as a processed component of building materials. Because asbestos has been proven to cause serious adverse health effects, such as asbestosis and lung cancer, it is strictly regulated. The relevant local regulations are found in BAAQMD Regulation 11, Rule 2: Hazardous Materials; Asbestos Demolition, Renovation and Manufacturing.

BAAQMD Regulation of Particulate Matter Emissions

In addition, BAAQMD adopted Regulation 6, Rule 3, to control particulate matter emissions from wood-burning devices. The rule restricts operation of any indoor or outdoor fireplace, fire pit, wood or pellet stove, masonry heater, or fireplace insert on days during the winter when air quality conditions are forecasted to exceed the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$. The rule also limits excess visible emissions from wood-burning devices and requires clean burning technology for wood-burning devices that are sold, resold, or installed in the Bay Area.

BAAQMD Regulation of Odors

BAAQMD's Regulation 7 limits odors from many different sources, excluding restaurants and agricultural practices. The requirements of this regulation become applicable when BAAQMD receives odor complaints from 10 or more complainants within a 90-day period, alleging that a source has caused odors perceived at or beyond the property line of the source and deemed to be objectionable.

BAAQMD Air Quality Guidelines

In May 2011, BAAQMD updated its guidelines for evaluating air quality impacts from projects (BAAQMD, 2011). These guidelines included evaluation criteria for siting new sensitive receptors near sources of toxic air contaminants and air pollutants, as well as criteria for evaluating potential odor impacts. "Sensitive receptors" are defined as facilities where sensitive population groups, such as children, the elderly, the acutely ill, and the chronically ill, are likely to be located. These land uses include residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals, and medical clinics.

The guidelines recommend that plans identify special overlay zones around existing and proposed sources of toxic air contaminants, and that these overlay zones be included in General Plans as well as other land use plans. The purpose of the overlay zones is to reduce exposures of sensitive land uses to unhealthy levels of toxic air contaminants, including $PM_{2.5}$, from substantial nearby sources. BAAQMD's guidelines rely on the guidance from CARB's *Air Quality and Land Use Handbook* (CARB, 2005). BAAQMD has also recommended that lead agencies address the effects of permitted stationary sources of air pollutants that could affect the planning area.

BAAQMD's guidelines also provide methods for analyzing the impacts of TAC sources to develop more refined overlay zones. These methods rely on modeling specific emissions from the roadways or sources, using emission factor models, dispersion modeling, and health risk criteria to determine where such sources result in significant exposures. These guidelines provide criteria for judging source-specific and cumulative impacts. The guidelines also recommend screening distances for various types of odor sources.

BAAQMD Community Air Risk Evaluation (CARE) Program

BAAQMD initiated its Community Air Risk Evaluation (CARE) program in 2004 to evaluate and reduce health risks associated with exposures to outdoor TACs in the Bay Area. The program examines TAC emissions from point sources; area sources; on-road mobile sources, such as cars and trucks; and off-road mobile sources, such as construction equipment, trains, and aircraft. The CARE program focuses on DPM emissions, which are the major contributor to airborne health risk in California. Its goal is to identify areas with high emissions of TACs that have sensitive populations nearby, then reduce exposure to TACs through new regulations, incentive funding, and other programs.

In Phase I of the program, a 2-kilometer-by-2-kilometer gridded inventory of TAC emissions was developed for the year 2000. The data were then updated to include 2005 emission data. This emissions inventory was risk-weighted to reflect the differences in potency of the various TACs. For example, benzene has far higher cancer potency than many other compounds, such as methyl tertiary butyl ether (MTBE). In contrast, while DPM is not as potent as benzene, DPM emissions are much more prevalent. The Phase I study identifies diesel emissions from heavy-duty trucks as a major source of TAC emissions and identifies programs available to reduce these emissions.

In Phase II of the CARE program, BAAQMD is performing regional- and local-scale modeling to determine the significant sources of DPM and other TAC emissions locally in priority communities, as well as for the entire Bay Area. BAAQMD has partnered with CARB, the Port of Oakland, the Pacific Institute, the West Oakland Environmental Indicators Project, and major railroads to prepare specific health risk assessments.

One highlight of the CARE program is the development of a Mitigation Action Plan, in which risk reduction activities are focused on the most at-risk communities. This plan identified six different at-risk communities that would benefit from targeted mitigation, based on TAC emissions and presence of sensitive land uses. Corte Madera is not located in any of these at-risk communities.

In Phase III, BAAQMD plans to conduct an extensive exposure assessment to identify and rank the communities as to their potential TAC exposures and determine the types of activities that place the communities at highest risk. BAAQMD will also pursue additional mitigations and attempt to develop a metric to measure the effectiveness of these efforts. The BAAQMD CEQA Guidelines (BAAQMD, 2011) included new significance thresholds for community risk and hazards that originated from this process. These thresholds address both project (single-source) and cumulative exposures.

Air Quality Plans

The 1977 federal CAA amendments require that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve all standards specified in the federal CAA. The 1988 CCAA also requires development of air quality plans and strategies to meet state air quality standards. To protect public health, BAAQMD has adopted plans to achieve ambient air quality standards. BAAQMD must continuously monitor its progress in implementing attainment plans and must periodically report to CARB and the U.S. EPA. It must also periodically revise its attainment plans to reflect new conditions and requirements.

In 1991, BAAQMD, the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG) prepared the Bay Area 1991 Clean Air Plan. This air quality plan addresses the California Clean Air Act. Updates to this plan are developed approximately every 3 years. The plans are meant to demonstrate progress toward meeting the more stringent 1-hour ozone California ambient air quality standard (AAQS). In 2010, BAAQMD adopted the Bay Area 2010 Clean Air Plan (BAAQMD, 2010a). This Clean Air Plan updates the most recent ozone plan, the 2005 Ozone Strategy. Unlike previous Bay Area Clean Air Plans, the 2010 Clean Air Plan is a multi-pollutant air quality plan addressing four categories of air pollutants:

- Ground-level ozone and the key ozone precursor pollutants (reactive organic gases and NO_X), as required by state law;
- Particulate matter, primarily $PM_{2.5}$, as well as the precursors to secondary $PM_{2.5}$;
- Toxic air contaminants; and
- Greenhouse gases (GHGs).

While previous Clean Air Plans have relied upon a combination of stationary and transportation control measures, the 2010 Clean Air Plan adds two new types of control measures: 1) Land Use and Local Impact Measures, and 2) Energy and Climate Measures. These types of measures would indirectly reduce air pollutant and GHG emissions through reductions in vehicle use and energy usage. In addition, the plan includes Further Study Measures, which will be evaluated as potential control measures.

The Bay Area 2010 Clean Air Plan proposes expanded implementation of transportation control measures (TCMs) and includes public outreach programs designed to educate the public about air pollution in the Bay Area and promote individual behavior changes that improve air quality. New measures in the Clean Air Plan are aimed at helping guide land use policies that would indirectly reduce air pollutant emissions. Some of these measures or programs rely on local governments for implementation. The clean air planning efforts for O_3 also will reduce PM_{10} and $PM_{2.5}$, as a substantial amount of particulate matter comes from combustion emissions such as vehicle exhaust. Conversely, strategies to reduce O_3 precursor emissions will reduce secondary formation of $PM_{2.5}$ and PM_{10}.

While the Clean Air Plan addresses state requirements, it also provides the basis for developing future control plans to meet federal requirements (NAAQS) for ozone and $PM_{2.5}$.

The Bay Area 2001 Ozone Attainment Plan was prepared to achieve the 1-hour NAAQS for ozone. Since that plan was submitted, the region was designated as a marginal nonattainment area for the 8-hour ozone NAAQS, and the 1-hour ozone NAAQS was revoked. This plan was a proposed revision to the Bay Area part of California's plan (State Implementation Plan, or SIP) to achieve the 1-hour ozone NAAQS. The plan was prepared in response to the U.S. EPA's partial approval and partial disapproval of the Bay Area's 1999 Ozone Attainment Plan. The U.S. EPA designated the Bay Area as marginal nonattainment with respect to the 2008 8-hour ozone NAAQS.

There is no formal clean air plan addressing PM_{10}. However, the clean air planning efforts for ozone will also reduce PM_{10} and $PM_{2.5}$, since a substantial amount of this air pollutant comes from combustion emissions such as vehicle exhaust. In addition, BAAQMD adopts and enforces rules to reduce particulate matter emissions and develops public outreach programs to educate the public to reduce PM_{10} and $PM_{2.5}$ emissions. One such program is the Winter Spare the Air program, which is similar to the standard Spare the Air program but focuses on $PM_{2.5}$ emissions that result from the use of fireplaces and wood stoves.

In addition, California's Senate Bill 656 (Sher, 2003) that amended Section 39614 of the Health and Safety Code, required further action by CARB and air districts to reduce public exposure to PM_{10} and $PM_{2.5}$. Efforts identified by BAAQMD in response to Senate Bill 656 are primarily targeting reductions in wood smoke emissions, adoption of new rules to further reduce NO_X and particulate matter from internal combustion engines, and reductions in particulate matter from commercial charbroiling activities.

Because the U.S. EPA designated the Bay Area nonattainment for the 24-hour $PM_{2.5}$ standard, CARB and BAAQMD will have to develop a plan for meeting the standard by December 2014. CARB requested that the U.S. EPA make a determination that the Bay Area has attained the 2006 $PM_{2.5}$ NAAQS and determine that attainment-related SIP submittal requirements are not applicable for as long as the area continues to attain the standard. A determination of whether an area's air quality currently meets the $PM_{2.5}$ NAAQS is generally based upon the most recent 3 years of complete, quality-assured data. On December 18, 2012, the U.S. EPA determined that the San Francisco Bay Area has attained the $PM_{2.5}$ NAAQS. This determination was based on ambient air monitoring data showing that this area has monitored attainment of the $PM_{2.5}$ NAAQS based on the 2009–2011 monitoring period. The only SIP requirements would then include an updated emission inventory for primary $PM_{2.5}$, as well as precursor pollutants that contribute to formation of secondary particulate matter and amendments to BAAQMD's New Source Review (NSR) to address $PM_{2.5.}$ (These amendments were adopted in 2009.) The Bay Area's $PM_{2.5}$ emission inventory was submitted to the U.S. EPA in 2013.

LOCAL REGULATIONS

The Town of Corte Madera General Plan includes the following goal, policies, and implementation programs relevant to the air quality impacts of the proposed project:

GOAL RCS-10: Attainment of air quality standards in the San Francisco Bay Area Basin.

Policy RCS-10.1: Reduce the potential for air quality impact of new development and redevelopment by requiring pedestrian, bicycle, and transit oriented features.

Policy RCS-10.3: Require the incorporation of air quality mitigation measures for development projects.

Implementation Program RCS-10.3c: Construction Dust Control. As a condition of approval for discretionary projects, require dust control measures consistent with the "Feasible Control Measures for Construction Emissions of PM_{10}" of the BAQQMD CEQA Guidelines of its successor document.

Policy RCS-10.6: Support the Bay Area Air Quality Management District in monitoring air pollutants of concern, the Governor's Office of Planning and Research (OPR) in developing CEQA guidelines related to GHG emissions and energy for all projects, and in meeting federal and State air quality standards.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

In accordance with Appendix G of the California Environmental Quality Act (CEQA) Guidelines and BAAQMD recommendations, air quality impacts are considered significant if implementation of the proposed project would:

- Conflict with or obstruct implementation of an applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

BAAQMD provides lead agencies in the Bay Area with guidance in assessing impacts. In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA. They were posted on BAAQMD's website and included in BAAQMD's updated CEQA Guidelines (updated May 2011).

The significance thresholds identified by BAAQMD and used in this analysis are summarized in **Table 4.2-4.**

BAAQMD's adoption of significance thresholds contained in the 2011 CEQA Air Quality Guidelines was called into question by an order issued March 5, 2012, in California Building Industry Association (CBIA) v. BAAQMD (Alameda Superior Court Case No. RGI0548693). The order required BAAQMD to set aside its approval of the thresholds until it conducted environmental review under CEQA. The ruling made in the case concerned the environmental impacts of adopting the thresholds and how the thresholds would indirectly affect land use development patterns. In August 2013, the Appellate Court struck down the lower court's order to set aside the thresholds. However, this litigation remains pending as the California Supreme Court recently accepted a portion of CBIA's petition to review the appellate court's decision to uphold BAAQMD's adoption of the thresholds. The specific portion of the argument to be considered is in regard to whether CEQA requires consideration of the effects of the environment on a project (as contrasted to the effects of a proposed project on the environment). Scientific information supporting the thresholds was documented in BAAQMD's proposed thresholds of significance analysis (BAAQMD, 2009). Accordingly, the analysis herein uses the thresholds and methodologies from BAAQMD's May 2011 CEQA Air Quality Guidelines to determine the potential impacts of the project on the existing environment.

LESS-THAN-SIGNIFICANT IMPACTS

Conflict with or Obstruct Implementation of Air Quality Plan

The proposed project would not conflict with the latest clean air planning efforts since the project would have emissions below the BAAQMD thresholds (see Impact AIR-1) and development would be in proximity to existing transit with regional connections. The most recent clean air plan is the *Bay Area 2010 Clean Air Plan* that was adopted by BAAQMD in September 2010. The project site has served as a hotel site for many years and would continue to serve as a hotel site with development of the proposed project. The project is too small to incorporate project-specific transportation control measures listed in the latest Clean Air Plan for its employees. Therefore, this impact is considered *less than significant*.

Violate Air Quality Standards or Contribute Substantially to an Existing or Projected Air Quality Violation

As discussed under Impact AIR-1, the project would have emissions less than the significance thresholds adopted by BAAQMD for evaluating impacts of ozone and particulate matter. *Therefore, the project would not contribute substantially to existing or projected violations of those standards, and its impact would be less than significant.*

CO emissions from traffic generated by the project would be the pollutant of greatest concern at the local level. Congested intersections with a large volume of traffic have the greatest potential to cause high, localized concentrations of CO. Air pollutant monitoring data indicate that CO levels have been at healthy levels (i.e., below state and federal standards) in the Bay Area since the early 1990s. As a result, the region has been designated as attainment for the standard. There is an ambient air quality monitoring station in San Rafael that measures CO concentrations. The highest

TABLE 4.2-4 BAY AREA AIR QUALITY MANAGEMENT DISTRICT IMPACT SIGNIFICANCE THRESHOLDS

Pollutant	Construction Thresholds Average Daily Emissions (pounds/day)	Operational Thresholds: Average Daily Emissions (pounds/day)	Operational Thresholds: Annual Average Emissions (tons/year)
Criteria Air Pollutants			
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Best Management Practices	Not Applicable	
Health Risks and Hazards for New Sources and Sensitive Receptors			
Excess Cancer Risk	10 per one million	10 per one million	
Chronic or Acute Hazard Index	1.0	1.0	
Incremental annual average $PM_{2.5}$	0.3 µg/m^3	0.3 µg/m^3	
Health Risks and Hazards for Sensitive Receptors (Cumulative from all Sources within 1,000-Foot Zone of Influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	100 per one million		
Chronic Hazard Index	10.0		
Annual Average $PM_{2.5}$	0.8 µg/m3		

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = coarse particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5 µm or less, CO = carbon monoxide, ppm = parts per million, µg/m^3 = micrograms per cubic meter
Source: BAAQMD, 2011.

measured level over any 8-hour averaging period during the last 3 years is less than 2.0 parts per million (ppm), compared to the ambient air quality standard of 9.0 ppm. BAAQMD screening guidance indicates that the project would have a less-than-significant impact with respect to CO levels if project traffic projections indicate traffic levels would not increase at any affected intersection to more than 44,000 vehicles per hour. Because 2035 + project traffic volumes at all intersections affected by the project together would be less than 10,000 vehicles per hour, the project would have a *less-than-significant impact* with respect to CO.

Create Objectionable Odors Affecting a Substantial Number of People

The project's odor impacts would be less than significant. Typical sources of odors that result in complaints are wastewater treatment facilities, landfills including composting operations, food processing facilities, and chemical plants. Other sources such as restaurants, paint or body shops, and coffee roasters typically result in localized sources of odors. According to the BAAQMD CEQA Guidelines, an odor source with five or more confirmed complaints per year averaged over three years is considered to have a significant impact. The project would generate localized emissions of diesel exhaust during construction equipment operation and truck activity. These emissions may be noticeable from time to time over the 15-month construction period by adjacent receptors. However, they would be localized and are not likely to adversely affect people off-site by resulting in five or more confirmed odor complaints per year. The project would not include any operational sources of significant odors that would cause complaints from surrounding uses.

POTENTIALLY SIGNIFICANT IMPACTS

This section addresses the potentially significant air quality impacts of the project and recommended mitigation measures.

Impact AIR-1: During construction, the project could result in a cumulatively considerable net increase of criteria pollutants (i.e., fugitive dust) for which the project region is nonattainment under an applicable national or state ambient air quality standard. (PS)

The Bay Area is considered a nonattainment area for ground-level ozone and $PM_{2.5}$ under both the federal Clean Air Act and the California Clean Air Act. The area is also considered nonattainment for PM_{10} under the California Clean Air Act, but not the federal Clean Air Act. The area has attained both state and federal ambient air quality standards for CO. As part of an effort to attain and maintain ambient air quality standards for ozone, $PM_{2.5}$, and PM_{10}, BAAQMD has established the thresholds summarized above under "Significance Criteria."

The California Emissions Estimator Model Version 2013.2.2 (CalEEMod) was used to predict emissions from construction of the project. The project land use types and size and other project-specific information were input to the model. The use of this model for evaluating air pollutant emissions from land use projects is recommended by BAAQMD.

Operational Emissions

Due to the project size, operational-period emissions would be *less than significant*. In its latest update to the CEQA Air Quality Guidelines, BAAQMD identifies screening criteria for the sizes of land use projects that could result in significant air pollutant emissions. For operational impacts, the screening project size is identified at 489 rooms. Hotel projects of a smaller size would be expected to have less-than-significant impacts with respect to operational-period emissions. Since the project would have a total of 187 hotel rooms, it is concluded that emissions would be below the BAAQMD significance thresholds for the operational period.

The project would include installation of one 80-kilowatt (kW) emergency back-up diesel generator. The generator would be located near the northwest corner of the property. The new generator would use a diesel engine that meets the EPA Tier 4 off-road diesel emission standards. DPM emissions (assumed to be the same as $PM_{2.5}$ emissions) were calculated assuming use of a Tier 4 diesel engine with operation of 50 hours per year, the maximum allowed by BAAQMD for periodic testing and maintenance of emergency generators. Maximum daily emissions from this generator would be less than 0.1 pound for each of the following criteria pollutants: ROG, NO_X, PM_{10}, and

$PM_{2.5}$. This would be negligible when compared to the BAAQMD daily thresholds for these criteria pollutants. Yearly emissions would be far below BAAQMD annual thresholds. **Appendix E** contains calculated emissions from operation and routine testing and maintenance of the back-up generator.

Construction Emissions

Because project construction would involve demolition, use of the BAAQMD screening criteria is not recommended and CalEEMod modeling was conducted.

Construction Fugitive Dust

During grading and construction activities, dust would be generated. Most of the dust would result during grading activities. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed at any given time, amount of activity, soil conditions, and meteorological conditions. Winds in the area typically blow from the northwest.

Nearby residences could be adversely affected by dust generated during project construction activities. The BAAQMD CEQA Air Quality Guidelines (BAAQMD, 2011) consider these impacts to be less than significant if best management practices are employed to reduce these emissions. The project's impact is considered *potentially significant* unless appropriate measures are implemented to reduce fugitive dust generated by project construction. Implementation of Mitigation Measure AIR-1 would reduce this impact to a less-than-significant level.

In addition, based on the date of past construction on the project site, buildings that would be demolished for the project likely contain asbestos and other hazardous materials. Mitigation Measure HAZ-1 in Section 4.7, Hazards and Hazardous Materials, would reduce this impact to a less-than-significant level.

Construction Exhaust Emissions

Annual and average daily emissions for construction were calculated, including both on-site and off-site activities, as well as the proposed sewer line along Monona Drive. On-site activities would consist of the operation of off-road construction equipment, and off-site activities would include trips by trucks hauling demolished materials, as well as vendor and worker trips. Emissions from proposed construction activities were calculated by using the CalEEMod model, along with the project construction schedule.

A construction build-out scenario, including an equipment list and phasing schedule, was provided by the project applicant. Approximately 21,403 cubic yards of soil/materials import would be required. In addition, the anticipated 15,819 tons of building and pavement demolition were entered into the model, along with approximately 648 cement truck trips needed during building construction. **Appendix E** includes the CalEEMod input and output values for construction emissions.

The proposed project land uses were input into CalEEMod, which included 187 rooms entered as "Hotel" and 257 parking lot spaces on a 5.47-acre site.

The modeling scenario assumes that the project would be built out over a period of approximately 15 months beginning in September 2015 and ending in December 2016, or an estimated 330 construction workdays (based on an average of 22 workdays per month). Average daily emissions were computed by dividing the total construction emissions by the number of construction days. **Table 4.2-5** shows average daily construction emissions of ROG, NO_X, PM_{10} exhaust, and $PM_{2.5}$ exhaust during construction of the project. As indicated in Table 4.2-5, predicted project emissions would not exceed the BAAQMD significance thresholds. The impact associated with construction-period exhaust emissions is, therefore, considered *less than significant*. CalEEMod input and output worksheets are provided in **Appendix E.**

TABLE 4.2-5 PROJECT CONSTRUCTION EXHAUST EMISSIONS

	ROG	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
Total Emissions (tons)	1.16	3.74	0.17	0.17
Average Emissions (pounds/day) based on 330 Construction Days	7.0	22.7	1.0	1.0
BAAQMD Thresholds (pounds/day)	54	54	82	54
Exceed Threshold?	No	No	No	No

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = coarse particulate matter or particulates with an aerodynamic diameter of 10 micrometers (μm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5μm or less, BAAQMD = Bay Area Air Quality Management District
Source: BAAQMD, 2011.

Mitigation Measure AIR-1: The project shall include the following measures recommended by the Bay Area Air Quality Management District (BAAQMD) (i.e., best management practices) to reduce construction dust and on-site construction dust emissions:

- *All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.*
- *All haul trucks transporting soil, sand, or other loose material off-site shall be covered.*
- *All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.*
- *All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).*
- *All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.*
- *Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.*
- *All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.*

- *A publicly visible sign shall be posted with the telephone number and person to contact at BAAQMD regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.*

The above procedures shall be included in contract specifications that shall be reviewed by the Town of Corte Madera prior to issuance of grading and building permits. (LTS)

<u>Impact AIR-2</u>: Existing sensitive receptors could be exposed to substantial pollutant (dust) concentrations during construction the project. (PS)

The proposed project would have emissions of fugitive dust and exhaust emissions during the construction period. As discussed under Impact AIR-1, implementation of Mitigation Measure AIR-1 (see also Mitigation Measure AIR-2 below) would be necessary to reduce the potentially significant impact from fugitive dust. A health risk assessment of the project construction activities, described below, indicates that the community health risk impact from construction of the proposed project would be less than significant. Risk modeling of the project's proposed emergency generator indicates a less-than-significant impact with respect to community health risk during project operation.

Construction Emissions

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. As indicated under Impact AIR-1, these exhaust air pollutant emissions would not be considered to contribute substantially to existing or projected air quality violations. Construction exhaust emissions may still pose health risks for sensitive receptors such as surrounding residents, however. The primary community risk impact issues associated with construction emissions are cancer risk and exposure to $PM_{2.5}$. Diesel exhaust poses both a potential health and nuisance impact to nearby receptors. A health risk assessment of the project construction activities was conducted that evaluated potential health effects of sensitive receptors at these nearby residences from construction emissions of diesel particulate matter (DPM) and $PM_{2.5}$.[1] Exposure to construction equipment and truck exhaust can cause increased cancer risk and other adverse non-cancer health effects.

The closest sensitive receptors to the project site are residences across the street from and west of the project site along Tamal Vista Boulevard. Additional residences are located farther north and south of the project site along Tamal Vista Boulevard. Along Monona Drive, the nearest sensitive receptors are approximately 30 feet from the proposed sewer line. Since sensitive receptors (existing residences) are located near where project construction would occur, a refined health risk assessment of the construction activity was conducted that evaluated emissions of DPM and $PM_{2.5}$. Since construction of the proposed sewer line along Monona Drive is anticipated to last for a duration of three weeks, work is expected to progress at a rate of about 50 feet per day. Therefore, sensitive receptors along the proposed sewer line would only be exposed to TAC emissions for several days, which would not be expected to have a substantial contribution to community health risk caused by construction activities.

[1] DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.

Emissions and dispersion modeling was conducted to predict the off-site concentrations resulting from project construction, so that lifetime cancer risks and non-cancer health effects could be evaluated. **Figure 4.2-1** shows the project site, nearby sensitive receptor locations where potential health impacts were evaluated, and emission sources used in the air quality dispersion modeling analysis.

Construction activity is anticipated to include demolition of the existing on-site buildings and parking lot areas, grading and site preparation, trenching, building construction, and paving. Construction period emissions were modeled using CalEEMod along with the anticipated project construction activity. The number and types of construction equipment and diesel vehicles, along with the anticipated length of their use for different phases of construction were based on a site-specific construction schedule. The project would be constructed over about a 15-month period beginning in September 2015 and completed in December 2016.

The CalEEMod model provided total annual $PM_{2.5}$ exhaust emissions (assumed to be diesel particulate matter) for the off-road construction equipment and for exhaust emissions from on-road vehicles, with total emissions from all construction stages of 0.149 ton (298 pounds). The on-road emissions are a result of haul truck travel during demolition and grading activities, worker travel, and vendor deliveries during construction. A trip length of 0.3 mile was used to represent vehicle travel while at or near the construction site. It was assumed that these emissions from on-road vehicles traveling at or near the site would occur at the construction site. Fugitive $PM_{2.5}$ dust emissions were calculated by CalEEMod as 0.0528 (106 pounds) for the overall construction period. The project emission calculations are provided in **Appendix E**.

Dispersion Modeling

The U.S. EPA ISCST3 dispersion model was used to predict concentrations of DPM and $PM_{2.5}$ concentrations at existing sensitive receptors (residences) in the vicinity of the project construction area. Emission sources for the construction site were grouped into two categories: exhaust emissions of DPM and fugitive $PM_{2.5}$ dust emissions. Combustion equipment exhaust emissions were modeled as point sources with a 9-foot release height (construction equipment exhaust stack height) placed at 15-meter (49-foot) intervals throughout the construction site. This resulted in 105 point sources being used to represent mobile equipment DPM exhaust emissions occurring throughout the project site. Emissions from vehicle travel on- and off-site were distributed among the point sources throughout the site. Construction fugitive $PM_{2.5}$ dust emissions were modeled as an area source encompassing the entire project site with a near ground level release height of 2 meters. DPM and $PM_{2.5}$ concentrations were calculated at nearby residential locations at a receptor height of 1.5 meters (4.9 feet).

Since representative historical meteorological data are not available for the area being modeled, the modeling relied upon screening meteorological data provided by BAAQMD. The screening meteorological data, which are comprised of 54 combinations of wind speed and atmospheric stability that represent meteorological conditions that may exist over a 24-hour period (daytime and nighttime conditions), are based on the meteorological conditions used by the SCREEN3 model. The screening meteorological conditions were used to model worst-case maximum 1-hour concentrations. These worst-hour concentrations were then converted to annual concentrations, needed to address cancer, non-cancer chronic health risk impacts, and annual $PM_{2.5}$

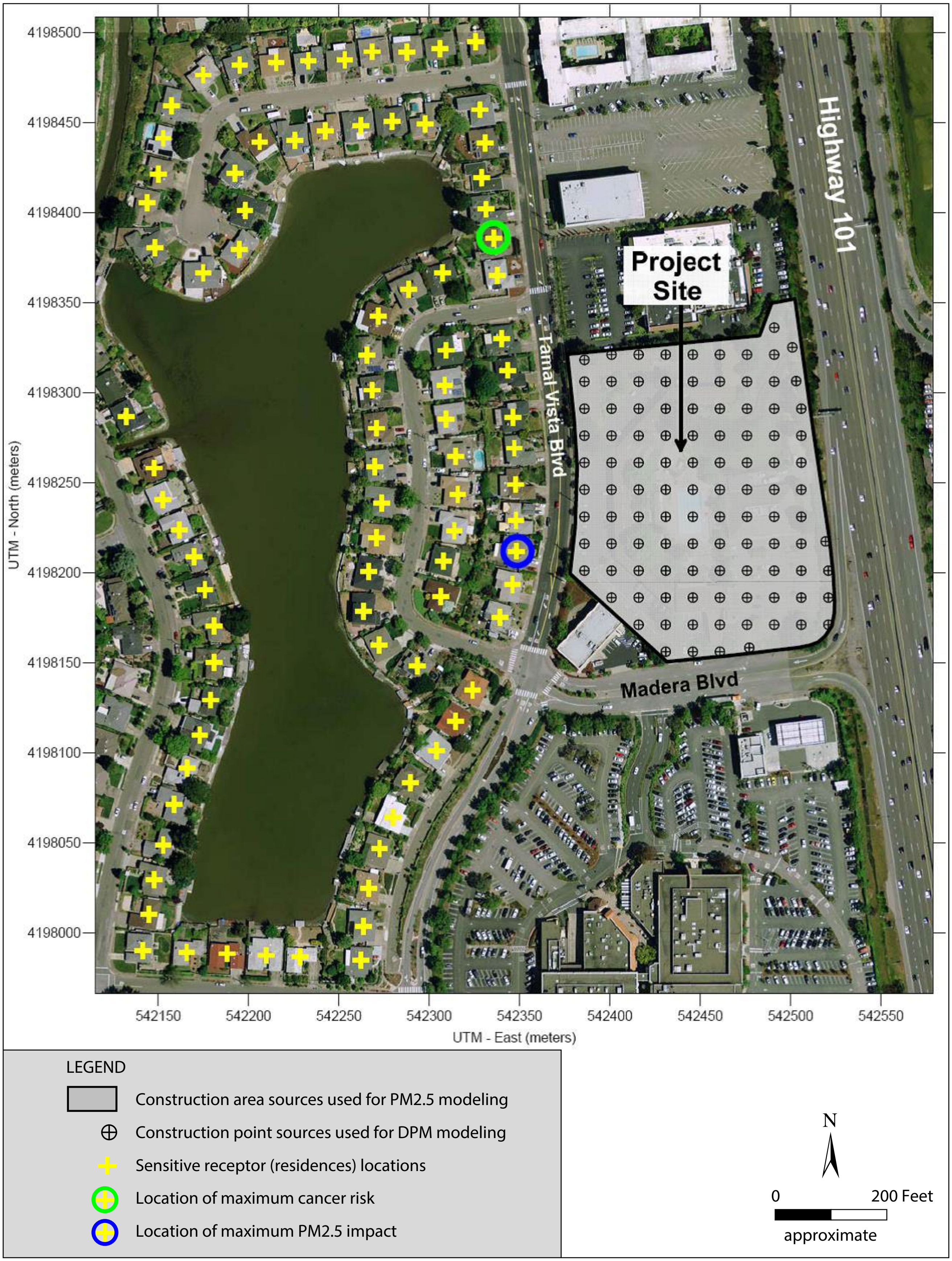

Figure 4.2-1

RESIDENTIAL RECEPTOR LOCATIONS

SOURCE: Illingworth & Rodkin, Inc., 2014

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concentrations, by applying the BAAQMD recommended conversion factor of 0.1 to the 1-hour concentrations.

The maximum-modeled $PM_{2.5}$ concentration occurred directly across from the project construction site at a residence on Tamal Vista Boulevard and the maximum DPM concentration occurred at a residence farther north on Tamal Boulevard. The locations where the maximum $PM_{2.5}$ concentration and DPM concentration (and maximum cancer risk) occurred are identified on Figure 4.2-1.

Predicted Cancer Risk and Hazards

Increased cancer risks were calculated using the annual concentrations for 2015 and 2016 calculated based on the maximum 1-hour concentration from the modeling using screening meteorological data and BAAQMD recommended risk assessment methods for infant exposure (3rd trimester through 2 years of age), child exposure, and for an adult exposure (BAAQMD, 2012). The cancer risk calculations were based on applying the BAAQMD recommended age sensitivity factors to the TAC concentrations. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing TACs. Since the modeling was conducted under the assumption that emissions occurred daily for a full year during each construction year, the default BAAQMD exposure period of 350 days per year was used for children and adults (BAAQMD, 2010b). Infant, child, and adult exposures were assumed to occur at all residences through the entire construction period.

Results of the assessment for project construction indicate the maximum incremental residential child cancer risk at the maximally exposed individual (MEI) receptor would be 6.1 in one million and the residential adult incremental cancer risk would be 0.3 in one million. These increased cancer risks would be lower than the BAAQMD significance threshold of a cancer risk of 10 in one million or greater.

The maximum-modeled annual $PM_{2.5}$ concentration was 0.27 $\mu g/m^3$. This $PM_{2.5}$ concentration is below the BAAQMD threshold of 0.3 $\mu g/m^3$ used to judge the significance of health impacts from $PM_{2.5}$.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. Non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). California's Office of Environmental Health and Hazards (OEHHA) has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The chronic inhalation REL for DPM is 5 $\mu g/m^3$. The maximum modeled annual residential DPM concentration was 0.0554 $\mu g/m^3$, which is much lower than the REL. The maximum computed hazard index based on this DPM concentration is 0.011 which is much lower than the BAAQMD significance criterion of a hazard index greater than 1.0.

Appendix E includes the emission calculations and source information used in the modeling and the cancer risk calculations. The project would have a *less-than-significant impact* with respect to community risk caused by construction activities.

Operational Emissions (Emergency Generator)

As described under Impact AIR-1, the project would include installation of one 80-kilowatt (kW) emergency back-up diesel generator. The generator would be located near the northwest corner of the property. The new generator would use a diesel engine that meets the EPA Tier 4 off-road diesel emission standards. DPM emissions (assumed to be the same as $PM_{2.5}$ emissions) were calculated assuming use of a Tier 4 diesel engine with operation of 50 hours per year, the maximum allowed by the BAAQMD for periodic testing and maintenance of emergency generators. Annual DPM emissions from this generator would be 0.11 pound per year.

To obtain an estimate of potential cancer risks from this source, the ISCST3 dispersion model was used, along with screening meteorological data (discussed under modeling of construction impacts), to calculate DPM concentrations at nearby residential locations. The modeling included evaluating the potential effects of building downwash of the new hotel building on the generator exhaust plume. Stack parameters for generator screening modeling (5-foot-high stack, 4-inch diameter, 130 feet/second exit velocity, and exit temperature of 1,074 degrees Fahrenheit) were based on manufacturer specifications (Kohler) for an 80-kW emergency diesel generator.

The maximum modeled annual average DPM and $PM_{2.5}$ concentrations were 0.00073 $\mu g/m^3$. Using BAAQMD risk calculation methods the maximum estimated cancer risk would be 0.4 in one million, which is well below the BAAQMD significance threshold of 10 in one million. The maximum Hazard Index is 0.0001. Details of the modeling and risk calculations are included in **Appendix E**. Thus, the impact of emissions from the emergency generator would be *less than significant*.

> *Mitigation Measure AIR-2: The project applicant shall implement Mitigation Measure AIR-1, which would reduce the impact of construction dust on sensitive receptors to a less-than-significant level. (LTS)*

CUMULATIVE IMPACTS

Project emissions of criteria air pollutants or their precursors would not make a considerable contribution to cumulative air quality impacts.

Air pollution, by nature, is mostly a cumulative impact. The significance thresholds applicable to construction and operational aspects of a project represent the levels at which a project's individual emissions of criteria pollutants and precursors would result in a cumulatively considerable contribution to the region's air quality conditions as determined by BAAQMD.

The proposed project's construction-period emissions exhaust would not exceed the significance thresholds, and fugitive dust emissions would be adequately controlled through implementation of BAAQMD best management practices. Therefore, project construction would not make a considerable contribution to cumulative air quality impacts. This analysis included cumulative traffic conditions for the project area and found that violations of the CO standards would not occur. A review of cumulative construction projects that are planned and approved in Corte Madera (see Chapter 6 of this Draft EIR) did not reveal any close enough to the project site to result in a potentially significant cumulative construction health risk impact.

For cumulative community risk impacts, the BAAQMD CEQA Guidelines recommend that lead agencies consider sources of TAC emissions located within 1,000 feet of the MEI. There are no stationary sources of TAC emissions within 1,000 feet of the MEI that could adversely affect nearby sensitive receptors; however, U.S. Highway 101 is located approximately 500 feet east of the nearest sensitive receptors (residences on Tamal Vista Boulevard) affected by project construction. BAAQMD provides a Highway Screening Analysis Tool - Google Earth map tool to identify estimated risk and hazard impacts from highways throughout the Bay Area. This tool provides the screening level estimate of lifetime excess cancer risk and hazard impacts that representative of the average annual daily traffic (AADT) count, fleet mix, and other modeling parameters specific to a selected segment of the highway. The BAAQMD Highway Screening Analysis Tool provided cancer risk, hazard, and $PM_{2.5}$ impact levels for this segment of roadway at a distance of 500 feet west and height of 6 feet. As shown in **Table 4.2-6**, the cumulative cancer risk, annual $PM_{2.5}$ concentration and hazard index associated with project construction and U.S. Highway 101 exposure are below the significance threshold. Finally, the combination of the project's proposed back-up diesel generator and U.S. Highway 101 would not result in a significant cumulative operational health risk impact.

TABLE 4.2-6 CUMULATIVE RISK

Source	Receptor Distance (feet)	Cancer Risk (per million)	$PM_{2.5}$ Concentration (μg/m^3)	Acute or Chronic Hazard (HI)
Project Construction	<100	6.1	0.27	0.011
U.S. Highway 101	500	8.4	0.08	0.027
Project Back-Up Generator	154	0.4	<0.01	<0.001
Cumulative		14.9	0.36	0.039
BAAQMD Thresholds		100	0.8	10.0
Exceed Threshold?		No	No	No

Note: μg/m^3 = micrograms per cubic meter, HI = hazard index, BAAQMD = Bay Area Air Quality Management District
Source: Illingworth & Rodkin, 2014

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