IV. ENVIRONMENTAL IMPACT ANALYSIS
C. AIR QUALITY AND GREENHOUSE GAS EMISSIONS

INTRODUCTION

This section describes the expected emissions of air pollutants generated during the construction and operational phases of the proposed project and has been prepared in accordance with the most recent version of the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines.[1]

REGULATORY SETTING

The Federal Clean Air Act (CAA) governs air quality in the United States and is administered by the United States Environment Protection Agency (EPA). In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act, which is administered by the California Air Resources Board (CARB) at the State level and by the Air Quality Management Districts at the regional and local levels. The project site is located in the City of Petaluma, which is situated in the San Francisco Bay Area. The Bay Area Air Quality Management District (BAAQMD) is the regional governmental agency that regulates sources of air pollution in much of the nine counties that make up the San Francisco Bay Area Air Basin.

United States Environmental Protection Agency

The EPA is responsible for enforcing the Federal CAA. The EPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). The NAAQS are required under the 1977 federal CAA and subsequent amendments. The EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships and certain types of locomotives. The agency has jurisdiction over emission sources outside State waters (e.g. beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by the CARB.

California Air Resources Board

In California, the CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for meeting the State requirements of the federal CAA, administering the California CAA, and establishing the California Ambient Air Quality Standards (CAAQS). The

[1] *Bay Area Air Quality Management District (BAAQMD), BAAQMD CEQA Air Quality Guidelines, June 2010.*

California CAAQS, as amended in 1992, require all air districts in the State to endeavor to achieve and maintain the CAAQS. The CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB establishes passenger vehicle fuel specifications, which became effective on March 1996. CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

CARB published the *Air Quality and Land Use Handbook* in 2005 (CARB 2005) to provide guidance, which is intended to encourage local land use agencies to consider the risks from air pollution prior to making decisions that approve the siting of new sensitive receptors (e.g. homes or daycare centers) near sources of air pollution. The primary purpose of the document is to highlight the potential health impacts associated with proximity to common air pollution sources, so that those issues are considered in the planning process. CARB makes recommendations regarding the siting of new sensitive land uses near freeways, truck distribution centers, dry cleaners, gasoline dispensing stations, and other air pollution sources. Examples of CARB siting recommendations are as follows:

- Avoid siting new sensitive land uses within 500 feet of a freeway.
- Avoid siting new sensitive land uses within 1,000 feet of truck distribution centers (accommodating 100 or more trucks per day).
- Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation (500 feet for large operations).

These "advisory" recommendations are based primarily on modeling information based on the State as a whole and are not entirely reflective of conditions in Sonoma County. Siting of new sensitive land uses within these recommendation distances may be possible, but only after site-specific studies are conducted to identify the actual health risks. CARB acknowledges that land use agencies have to balance other siting considerations such as housing and transportation needs, economic development priorities and other quality of life issues.

City of Petaluma General Plan

The City's General Plan 2025 includes a chapter containing air quality policies and programs that seek to maintain or improve Petaluma's air quality. Adopted since the adoption of General Plan 2025 and certification of its EIR, which found certain cumulative air quality and GHG impacts to be significant and unavoidable, the 2010 BAAQMD CEQA Guidelines with thresholds

of significance provide a new methodology for updating General Plan air quality analysis for this project. General Plan 2025 Chapter IV contains several air quality policies and programs, which relate directly to new development or the proposed project. Other policies in the General Plan 2025 indirectly influence air quality. These policies are identified in Table IV.C-1

Table IV.C-1
Petaluma General Plan Policies – Air Quality

Policy Number	Policy
2-P-6	Create a strong sense of entry into the city at key locations, identified as Gateways. Each gateway should be considered individually with some requiring architectural and/or landscape treatments and others more simply protecting/ enhancing what already exists (e.g. cultural landscapes and ecological diversity) to provide a sense of transition or entry to Petaluma.
2-P-7	Encourage creation of a street tree planting program in existing residential areas and industrial areas undergoing revitalization. Such a program may include: • Examples of appropriate tree species to reflect local growing conditions. • Standards for the placement of trees to ensure successful growth and limit impacts to infrastructure from roots. • A privately funded mechanism for replacing, maintaining, and expanding the inventory of street trees.
4-P-6	Improve air quality through required planting of trees along streets and within park and urban separators, and retaining tree and plant resources along the river and creek corridors.
4-P-6 (A)	Require planting of trees for every significant tree removed at a project site. Replacement planting may occur on the project site or on a publicly owned area, with long-term maintenance assured. • Encourage the use of trees which provide biogenic benefits to air quality and are suitable to the local environment. • Establish ratio and size of replacement trees as part of the development code update.
4-P-9	Require a percentage of parking spaces in large parking lots or garages to provide electrical vehicle charging facilities.
4-P-15-	Improve air quality by reducing emissions from stationary point sources of air pollution (e.g. equipment at commercial and industrial facilities) and stationary area sources (e.g. wood-burning fireplaces & gas powered lawn mowers) which cumulatively emit large quantities of emissions.
4-P-15 (A)	Work with the Bay Area Air Quality Management District to achieve emissions reductions for non-attainment pollutants; including carbon monoxide, ozone, and PM_{10}, by implementation of air pollution control measures as required by State and federal statutes. *The BAAQMD's CEQA Guidelines should be used as the foundation for the City's review of air quality impacts under CEQA.*
4-P-15 (B)	Use Petaluma's development review process and the California Environmental Quality Act (CEQA) regulations to evaluate and mitigate the local and cumulative effects of new development on air quality.
4-P-15 (C)	Continue to require development projects to abide by the standard construction dust abatement measures included in BAAQMD's CEQA Guidelines. *These measures would reduce exhaust and particulate emissions from construction and grading activities.*

Policy Number	Policy
4-P-15 (D)	Reduce emissions from residential and commercial uses by requiring the following: • Use of high efficiency heating and other appliances, such as cooking equipment, refrigerators, and furnaces, and low NOx water heaters in new and existing residential units; • Compliance with or exceed requirements of CCR Title 24 for new residential and commercial buildings; • Incorporation of passive solar building design and landscaping conducive to passive solar energy use for both residential and commercial uses, i.e., building orientation in a south to southeast direction, encourage planting of deciduous trees on west sides of structures, landscaping with drought resistant species, and use of groundcovers rather than pavement to reduce heat reflection; • Encourage the use of battery-powered, electric, or other similar equipment that does not impact local air quality for nonresidential maintenance activities
4-P-16	To reduce combustion emissions during construction and demolition phases, the contractor of future individual projects shall encourage the inclusion in construction contracts of the following requirements or measures shown to be equally effective: • Maintain construction equipment engines in good condition and in proper tune per manufacturer's specification for the duration of construction; • Minimize idling time of construction related equipment, including heavy-duty equipment, motor vehicles, and portable equipment; • Use alternative fuel construction equipment (i.e., compressed natural gas, liquid petroleum gas, and unleaded gasoline); • Use add-on control devices such as diesel oxidation catalysts or particulate filters; • Use diesel equipment that meets the ARB's 2000 or newer certification standard for offroad heavy-duty diesel engines; • Phase construction of the project; • Limit the hours of operation of heavy-duty equipment.

National and State Ambient Air Quality Standards

As required by the Federal CAA, NAAQS have been established for six major air pollutants: carbon monoxide (CO), nitrogen dioxides (NO_2), ozone (O_3), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur oxides (SO_2), and lead. The California Ambient Air Quality Standards (CAAQS) apply to these same six criteria and also address sulfates (SO_4), visibility, hydrogen sulfide (H_2S), and vinyl chloride (C_2H_3Cl). The CCAA standards are more stringent than the Federal standards and, in the case of PM_{10} and SO_2, far more stringent. Both Federal and State standards are summarized in Table IV.C-2. The NAAQS "primary" standards have been established to protect the public health while the "secondary" standards are intended

to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation and other aspects of the general welfare. The NAAQS are applicable if a project is federally funded or requires federal action. The proposed project is not federally funded and does not require federal action. Additionally, the CAAQS generally are more stringent than the NAAQS. Thus, the CAAQS are used as the comparative standard in the analysis contained in this report.

Table IV.C-2
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards [a]	
			Primary [b,c]	Secondary [b,d]
Ozone	8-hour	0.070 ppm	0.075 ppm (147µg/m^3)	Same as primary
	1-hour	0.09 ppm (180 µg/m^3)	—	Same as primary
Carbon monoxide	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	—
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
Nitrogen dioxide	Annual	0.030 ppm	53 ppb (100 µg/m^3)	Same as primary
	1-hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	—
Sulfur dioxide	24-hour	0.04 ppm (105 µg/m^3)	—	—
	3-hour	—	—	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	—
PM_{10}	Annual	20 µg/m^3 (arithmetic mean)	—	Same as primary
	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
$PM_{2.5}$	Annual	12µg/m^3	15 µg/m^3	Same as primary
	24-hour	No Separate State Standard	35 µg/m^3	Same as primary
Lead	Calendar quarter	—	1.5 µg/m^3	Same as primary
	30-day average	1.5 µg/m^3	—	—

Notes (a) Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

(b) Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.

(c) Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the EPA.

(d) Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Source: Summarized by WRA from CARB State and National Air Quality Standards Table. http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. September 8, 2010. Accessed October 25, 2010.

Existing Air Pollution Sources in the Region

Air pollution sources can be grouped into three categories: mobile sources, area-wide sources, and stationary sources. Mobile sources include all on-road vehicles as well as off-road mobile equipment, watercraft, and trains. Area-wide sources are stationary but typically occur throughout developed areas. These sources include use of products such as fertilizers, paints, and sprays, and fuel combustion at residences. Stationary sources include industrial sources and facilities. Additional emissions are generated by natural sources such as wildfires.

Exhaust emissions from on-road motor vehicles are the primary source of reactive organic gases (ROGs), NO_x, and CO in the San Francisco Bay Area, and road dust sent airborne by traveling vehicles is a primary source of particulate matter. Area-wide and stationary sources make up the remainder of the emission inventory in the region.

While O_3 serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing ultraviolet radiation potentially harmful to humans, when it reaches elevated concentrations in the lower atmosphere it can be harmful to the human respiratory system and to sensitive species of plants. O_3 concentrations build to peak levels during periods of light winds, bright sunshine, and high temperatures. Short-term O_3 exposure can reduce lung function in children, make persons susceptible to respiratory infection, and produce symptoms that cause people to seek medical treatment for respiratory distress. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. O_3 is formed in the atmosphere by a complex series of photochemical reactions that involve "ozone precursors" that are two families of pollutants: oxides of nitrogen (NO_x) and reactive organic gases (ROG). NO_x and ROG are emitted from a variety of stationary and mobile sources.

Particulate matter is regulated in coarse and fine fractions, with $PM_{2.5}$ constituting the fine fraction and PM_{10} constituting the coarse fraction. The health effects from long-term exposure to high concentrations of particulate matter are increased risk of chronic respiratory disease like asthma, and altered lung function in children. Short-term exposure to high levels of particulate matter has been shown to increase the number of people seeking medical treatment for respiratory distress, and to increase mortality among those with severe respiratory problems. Particulate matter also results in reduced visibility. Ambient particulate matter has many sources. It is emitted directly by combustion sources like motor vehicles, industrial facilities, and residential wood burning, and in the form of dust from ground-disturbing activities such as construction and farming. It also forms in the atmosphere from the chemical reaction of precursor gases. Health effects associated with each of the criteria air pollutants in the Bay Area are shown in Table IV.C-3.

Toxic Air Contaminants (TAC)

Toxic air contaminants (TACs), which may have the potential to cause cancer or may pose a present or potential hazard to human health, are considered separately from the criteria

pollutants in the regulatory process. Unlike criteria pollutants, there are no ambient standards for TACs; this is partially due to the localized nature of the adverse health impacts caused by TACs emissions. Stationary sources of TACs are regulated directly through emission standards and risk reduction strategies implemented at the sources of the emissions. When a new source of TACs is proposed, a health risk assessment may be needed to estimate the project's potential health risks. Individual TACs vary greatly in the risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another. Where data are sufficient to do so, a "unit risk factor" can be developed for cancer risk.

Table IV.C-3
Health Effects Summary of the Major Criteria Air Pollutants in the Bay Area

Air Pollutant	Adverse Effects
Ozone	eye irritation, respiratory function impairment
Carbon Monoxide	impairment of oxygen transport in the blood stream, aggravation of cardiovascular disease, impairment of central nervous system function, fatigue, headache, confusion, dizziness, fatal in the case of very high concentrations in enclosed places
Nitrogen Dioxide	risk of acute and chronic respiratory illness
Sulfur Dioxide	aggravation of chronic obstruction lung disease, increased risk of acute and chronic respiratory illness
Lead	impairment of blood functions and nerve constriction, behavioral and learning problems in children
Particulate Matter (PM_{10} and $PM_{2.5}$)	may be inhaled and lodge in and irritate the lungs, increased risk of chronic respiratory disease with long exposure, altered lung function in children, and may produce acute illness with sulfur dioxide

Source: Bay Area Air Quality Management District (BAAQMD), BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans, Appendix D, April 1996, Revised December 1999.

Federal, State, and local regulations and guidelines govern the level of analysis necessary for sources which appear to have the potential for high TAC emissions. The State Air Toxics Hot Spots Program and the BAAQMD Risk Management Policy require public notification, reporting, and risk assessments for facilities that have the potential to emit TACs that may cause substantial health risks. Many sources of TACs such as gasoline stations and dry cleaning businesses emit in levels that are below the thresholds for public notification and reporting and would not be expected to cause substantial health risks. Indirect sources, such as trucks or warehouses, are not addressed by these programs or regulations.

The State has also adopted various regulations such as Title 13 California Code of Regulations (CCR) Section 1956.1-1956.4, 1956.8 and Title 13 CCR Section 2420 *et seq.*, to reduce diesel

emissions in the overall fleet of diesel-fueled vehicles. These regulations include new standards for diesel fuel, emissions standards, and inspection and maintenance requirements. In particular, the reformulated fuel requirements that have already been adopted by EPA and CARB are expected to reduce, but not eliminate, mobile source TAC emissions. The major concern with air toxics from diesel exhaust is along heavily traveled transportation corridors and around permanent facilities, such as truck depots and distribution centers, with a high concentration of diesel-fueled vehicles. For this reason, the State is taking an active role in devising new standards for these vehicles, for the fuel itself, and for alternative fuels.

CARB has addressed this issue by preparing and approving the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Risk Reduction Plan) (approved on September 28, 2000). This plan represents the State's comprehensive blueprint to substantially reduce diesel particulate emissions throughout the State. The plan contains the following components:

- New regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles to reduce diesel PM emissions by about 90 percent overall from current levels;
- New retrofit requirements for existing on-road, off-road, and stationary diesel-fueled engines and vehicles where determined to be technically feasible and cost effective; and
- New phase 2 diesel fuel regulations to reduce the sulfur content levels of diesel fuel to no more than 15 parts per million to provide the quality of diesel fuel needed by the advanced diesel PM emission controls.

Most of the plan elements have been implemented through the adoption of new regulations. The Risk Reduction Plan shows that on-road mobile sources comprise a good portion of the past, existing, and future (through 2010) diesel PM_{10} emission inventory within the State. Therefore, the risks associated with on-road diesel vehicles have been addressed by the State and will be substantially reduced by Statewide programs over the next decade.

Greenhouse Gas Emissions[2]

The City's General Plan 2025 includes a chapter containing greenhouse gas (GHG) emissions policies and programs that seek to reduce the contribution to greenhouse gases from existing sources and minimize the contribution of greenhouse gases from new construction and sources. Greenhouse gases are described below in a global, regional, and local context.

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[2] *Petaluma General Plan 2025, Greenhouse Gas Emissions Chapter. May 2008.*

Global

Climate change is a shift in the average weather patterns observed on earth, which can be measured by such variables as temperature, wind patterns, storms and precipitation. The temperature on earth is regulated by what is commonly known as the "greenhouse effect." Naturally occurring greenhouse gases in the atmosphere, including carbon dioxide, methane, nitrous oxides, and water vapor, absorb heat from the earth's surface and radiate it back to the surface.

Human activities result in emissions of four principal greenhouse gases: carbon dioxide, methane, nitrous oxide, and halocarbons (fluorine, chlorine and bromine). Of all human activities, the burning of fossil fuels is the largest contributor in overall greenhouse gas emissions, releasing carbon dioxide gas into the atmosphere.

The resulting increases in greenhouse gas emissions from human activities are leading to higher concentrations and a change in composition of the atmosphere. For instance, the concentration of CO_2 in the atmosphere has risen about 30 percent since the late 1800s (National Assessment Synthesis Team [NAST], 2001). Many sources and models indicate that temperatures on earth are currently warming and will continue to warm at unprecedented levels. The global mean surface temperature has increased by 1.1˚ F since the 19th century (IPCC Synthesis report, 2001), and the 10 warmest years of the last century all occurred within the last 15 years.

The many effects of Greenhouse Gas Emissions are still being researched and are not fully known, but are expected to include increased temperatures which would: reduce snowpack, a primary source of drinking water; exacerbate air quality problems and adversely impact human health by increasing heat stress and related deaths; increase the incidence of infectious disease, asthma and respiratory health problems; cause sea levels to rise, threatening urban and natural coastlands; increase pests and pathogens; and cause variations in crop quality and yields.

State of California

In California, the majority of human activity greenhouse gas emissions can be broken down into four sectors: transportation, industrial, electrical power, and agriculture/forestry. The largest source is from the transportation sector.

In 2005, Governor Schwarzenegger issued Executive Order S-02-05, calling for statewide reductions to 2000 levels by 2010, 1990 levels by 2020 and to 80 percent below 1990 levels by 2050. The Executive Order also called for the creation of a state "Climate Action Team", which would report to the Governor every two years on both progress toward meeting the targets and effects of Greenhouse Gas Emissions on the state.

In the fall of 2006, the Governor signed Assembly Bill 32 (AB32), the "Global Warming Solutions Act of 2006," committing the State of California to reducing greenhouse gas emissions to 1990

levels by 2020. The statute requires CARB to track emissions through mandatory reporting, determine what 1990 emissions were, set annual emissions limits that will result in meeting the target, and identify a list of discrete early actions that directly address greenhouse gas emissions, are regulatory, and can be enforced by January 1, 2010.

City of Petaluma

Municipal Greenhouse Gas Emissions

On August 5th, 2002, the City Council adopted Resolution 2002-117 committing to participate in the Cities for Climate Protection. By doing so the City committed to:

- Taking a leadership role in promoting public awareness about the causes and impacts of Greenhouse Gas Emissions.
- Undertaking the Cities for Climate Protection program's five milestones to reduce greenhouse gas and air pollution emissions throughout the community by:
    1. Conducting a greenhouse gas emissions inventory and forecast to determine the source and quantity of GHG emissions.
    2. Establishing a greenhouse gas emissions reduction target.
    3. Developing an action plan with both existing and future actions to meet the greenhouse gas reduction target.
    4. Implementing the action plan.
    5. Monitoring to review progress.

In 2005 the City completed steps 1 and 2. On July 18, 2005 the City passed Resolution 2005-118, "Resolution to Establish GHG Emission Reduction Target(s) for the City of Petaluma". Resolution 2005-118 established greenhouse gas emissions reduction targets of 25% below 1990 levels by 2015 for community emissions and 20% below 2000 levels by 2010 for municipal operations. The City's reduction targets are more stringent than those passed by the State. The City is currently working on Step 3, development of the action plan for municipal emissions. The purpose of the municipal CAP is to identify and prioritize programs, projects, and procedural policies that will help the City achieve the municipal greenhouse gas emission goals of Resolution 2005-118.

Also, the City signed the U.S. Mayors Climate Protection Agreement calling for participating cities to meet or surpass the Kyoto Protocol targets, and the resolutions above do surpass the Kyoto targets.

Since 2005 the City has implemented, or is in the process of implementing, many programs to reach the municipal operations goal. These include: a major lighting retrofit at City Hall, the Police Department and the Lucchesi Community Center; replacement of four traditional fuel fleet vehicles with one zero emission electric vehicle and three hybrid vehicles; retrofit of nine "off-

road" vehicles (dump trucks, vacuum trucks, etc) to comply with the California Air Resources Board lower vehicle emission regulations; replacement of 99 percent of the incandescent traffic lights with LED lights; and replacement of three of nine 1989 diesel buses with four, 2007 Gillig models, which are equipped with clean burning diesel engines that meet the 2010 CARB regulations. As standard procedure, the Public Works Maintenance & Operations staff replaces older lighting fixtures with energy efficient units, as the original fixtures burn out.

Community Greenhouse Gas Emissions

As stated above, Resolution 2005-118 established greenhouse gas emissions reduction targets of 25% below 1990 levels by 2015 for community emissions. In summary, residential and commercial buildings are responsible for about 40 percent; transportation is responsible for about 55 to 59 percent; and municipal services and solid waste management account for about 2 to 5 percent of emissions.

According to the General Plan 2025 Revised Draft EIR (November 2007), emissions have grown from about 434,900 tons in 1990 at about 10.1 tons per person to 610,400 tons in 2005 at about 10.7 tons per person. Without benefit of the policies in the General Plan, emissions in 2025 are estimated to be 721,600 tons at about 9.9 tons per person. Although emissions would continue to increase, the rate of increase is expected to slow in the future based on implementation of the General Plan policies and State measures.

Several of the General Plan 2025 GHG policies and programs relate directly to new development or the proposed project in addition to the Air Quality policies and programs listed in Table IV.C-1. These policies are identified in Table IV.C-4

Table IV.C-4
Petaluma General Plan Policies – Greenhouse Gas Emissions

Policy Number	Policy
4-P-24	Comply with AB 32 and its governing regulations to the full extent of the City's jurisdictional authority.
4-P-25	To the full extent of the City's jurisdictional authority, implement any additional adopted State legislative or regulatory standards, policies and practices designed to reduce greenhouse gas emissions, as those measures are developed.

Applicable Plans and Policies

In addition to policies in General Plan 2025, the federal Clean Air Act, as amended, and the California Clean Air Act of 1988 provide the legal framework for attaining and maintaining ambient air quality standards. Both the federal and State acts require that CARB designate "nonattainment areas" – portions of California where federal or State ambient air quality standards are not met. Where a pollutant exceeds standards, air quality management plans

must be formulated that demonstrate how the standards will be achieved. These plans also provide the basis for the implementing agencies to develop mobile and stationary source performance standards.

The BAAQMD is primarily responsible for planning, implementing, and enforcing the federal and State ambient air quality standards in the Bay Area. Air quality plans addressing the California Clean Air Act are developed about every three years. The BAAQMD recently adopted the 2010 Bay Area Clean Air Plan, which is the latest update to the 1991 Clean Air Plan addressing progress toward attaining the California ozone standard. The plan was prepared to address the more stringent requirements of the California Clean Air Act with respect to ozone, including a comprehensive strategy to reduce emissions from stationary, area, and mobile sources. The plan objective is to indicate how the region would make progress toward attaining the stricter state air quality standards, as mandated by the California Clean Air Act. The plan includes the following:

- Update the recent Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone levels;
- Provide a control strategy to reduce ozone, particulate matter (PM), toxic air contaminants (TACs), and greenhouse gases (GHGs) in a single, integrated plan;
- Review progress in improving air quality in recent years; and
- Establish emission control measures to be adopted or implemented in the 2010-2012 time frame.

The SFBAAB is currently designated as a nonattainment area for state and national ozone standards and national particulate matter ambient air quality standards. SFBAAB's nonattainment status is attributed to the region's development history. Past, present and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant.

In June 2010, the BAAQMD adopted new CEQA Guidelines with the purpose to assist lead agencies in evaluating air quality impacts of projects and plans proposed in the San Francisco Bay Area Air Basin (SFBAAB). The Guidelines provides BAAQMD-recommended procedures for evaluating potential air quality impacts during the environmental review process consistent with CEQA requirements. These revised Guidelines supersede the BAAQMD's previous CEQA guidance titled *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans* (BAAQMD 1999).

ENVIRONMENTAL SETTING

Topography and Meteorology

The San Francisco Bay Area's regional meteorological conditions are cool and dry in the summers and mild and moderately wet in the winters. A daytime sea breeze provides fresh air to the Bay Area, but also tends to cause temperature inversions, or the positioning of cool surface air underneath warmer upper 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.[3]

The project site lies within the City of Petaluma in the southern portion of Sonoma County, approximately 11 miles north of the San Pablo Bay. The valley is bordered by hills which are effective barriers to the prevailing northwesterly winds. During the day, especially during summer afternoons, the prevailing wind flows from the west-northwest through the valley. During the evening, especially in winter, down-valley drainage often occurs. However, during certain conditions that occur mostly in winter, winds may also flow northward from the San Pablo Bay area. Wind speeds in the region generally range from 4 to 12 miles per hour. Summer daytime temperatures generally range from the mid-50's to the mid-80's. Winter temperatures range from the mid-30's to the low 60s.

Air Monitoring Data

To identify ambient concentrations of the six criteria pollutants, the BAAQMD operates about 30 air quality monitoring stations throughout the Bay Area. The Santa Rosa-5th Street Monitoring Station is closest to the project site. This station monitors the levels of O_3, PM_{10}, $PM_{2.5}$, CO, and NO_x (although PM_{10} monitoring was recently discontinued).

Table IV.C-5 lists the concentrations recorded and the exceedances of NAAQS or CAAQS that have occurred at the Santa Rosa-5th Street Monitoring Station based on 2005 through 2009 data obtained from CARB. As shown in the table, no exceedances of the ozone NAAQS or CAAQS have been recorded within the past five years. The PM_{10} CAAQS was exceeded twice in the year 2006 and no data was available for 2009. No exceedances of the PM_{10} CAAQS have occurred since 2006, and the NAAQS has not been exceeded in the past five years. The NAAQS for $PM_{2.5}$ was exceeded once in 2006. No exceedances of the $PM_{2.5}$ NAAQS have occurred since then and the CAAQS has not been exceeded in the past five years. The monitoring station has not recorded exceedances of the NAAQS or CAAQS for CO or NO_x in

[3] *Bay Area Air Quality Management District (BAAQMD), BAAQMD CEQA Guidelines, Air Quality Guidelines, June 2010.*

the past five years. Monitoring of other pollutants is not conducted since levels would be very low due to a lack of emission sources.

Table IV.C-5
Ambient Pollutant Concentrations at the Santa Rosa-5th Street Monitoring Station

Pollutant	Standards[1, 2, 3]	Year				
		2005	2006	2007	2008	2009
Ozone – 1-hour						
Maximum concentration monitored (ppm)		0.072	0.077	0.071	0.076	0.086
Number of days exceeding State standard	>0.09 ppm	0	0	0	0	0
Ozone – 8-hour						
Maximum concentration monitored (ppm)		0.051	0.058	0.059	0.064	0.065
Number of days exceeding federal standard	>0.075 ppm	0	0	0	0	0
Number of days exceeding State standard	>0.070 ppm	0	0	0	0	0
Suspended Particulate Matter (PM_{10}) – 24-hour						
Maximum concentration monitored (µg/m^3)		38.9	89.5	37.2	49.9	-
Number of samples exceeding federal standard	>150 µg/m^3	0	0	0	0	-
Number of samples exceeding State standard	>50 µg/m^3	0	2	0	0	-
Suspended Particulate Matter ($PM_{2.5}$) – 24-hour						
Maximum concentration monitored (µg/m^3)		33.6	59.0	32.0	30.8	29.0
Number of samples exceeding federal standard	>35 µg/m^3	0	1	0	0	0
Carbon Monoxide – 8-hour						
Maximum concentration monitored (ppm)		1.98	1.70	1.71	1.49	1.34
Number of samples exceeding federal standard	>9 ppm	0	0	0	0	0
Number of samples exceeding State standard	>9 ppm					
Nitrogen Dioxide – 1-hour						
Maximum concentration monitored (ppm)		0.047	0.044	0.046	0.049	0.045
Number of samples exceeding federal standard	>100 ppb	0	0	0	0	0
Number of samples exceeding State standard	>0.18 ppm	0	0	0	0	0

Source: California Air Resources Board, "Top 4 Measurements and Days Above the Standard," http://www.arb.ca.gov/adam/topfour/topfourdisplay.php October 25, 2010.

[1] Parts by volume per million of air (ppm) or micrograms per cubic meter of air (µg/m^3).

[2] Federal and State standards are for the same time period as the maximum concentration measurement unless otherwise indicated.

[3] The National 1-hour ozone standard was revoked in June 2005 and is no longer in effect. Statistics are still provided.

Sensitive Receptors

Some groups of people are more affected by air pollution than others. The BAAQMD defines sensitive receptors as "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." Heightened sensitivity may be caused by health problems, proximity to the emissions source, and duration of exposure to air pollutants. Sensitive receptors in Petaluma include approximately 20 elementary schools, two junior high schools, seven high schools, one hospital and several convalescent homes. Any residence can also be considered a sensitive receptor. Recognizing those sensitive members of

the community are also likely to be at parks and in or around any residential area, all residential structures could also be deemed sensitive.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

In accordance with Appendix G to the CEQA Guidelines, the proposed project would have a significant environmental impact if it would:

(a) Conflict with or obstruct implementation of the applicable air quality plan;

(b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

(c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

(d) Expose sensitive receptors to substantial pollutant concentrations;

(e) Create objectionable odors affecting a substantial number of people;

(f) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment;

(g) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

As stated previously, the project site is located within the jurisdiction of the BAAQMD. The revised BAAQMD CEQA Air Quality Guidelines adopted in June 2010, recommend analytical methodologies and provide evaluation criteria for determining the level of significance for project impacts within its jurisdiction. The BAAQMD's evaluation criteria for determining air quality impacts provide defined screening thresholds for pollutant emissions. Projects that would generate emissions below the defined thresholds are considered to have a less-than-significant impact on air quality; projects that exceed the screening thresholds must provide further analysis such as district-approved air dispersion modeling to refute (or validate) a determination of significance or must acknowledge a potentially significant air quality impact. The screening thresholds for air quality impacts from the BAAQMD CEQA Guidelines are presented below.

Construction Emissions

According to the BAAQMD CEQA Guidelines, if daily average emissions of construction-related criteria air pollutants or precursors would exceed any applicable Threshold of Significance listed in Table IV.C-6, the project would result in a significant cumulative impact.

Table IV.C-6
Thresholds of Significance for Construction- and Operational Related Criteria Air Pollutants and Precursors

Pollutant/Precursor	Daily Average Emissions (lb/day)
ROG	54
NOx	54
PM_{10} exhaust	82
$PM_{2.5}$ exhaust	54

Notes: lb/day = pounds per day; ROG = reactive organic gases; NOx = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; and PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less.

Source: BAAQMD CEQA Air Quality Guidelines, June 2010

Operational Emissions

Operational emissions typically represent the majority of a project's air quality impacts. After a project is built, operational emissions, including mobile and area sources, are anticipated to occur continuously throughout the project's lifetime. Operational-related activities, such as area and mobile sources, could generate emissions of criteria air pollutants and their precursors, GHG, TACs, and PM. Area sources generally include fuel combustion from space and water heating, landscape maintenance equipment, and fireplaces/stoves, evaporative emissions from architectural coatings and consumer products and unpermitted emissions from stationary sources. Mobile sources include customer, delivery and employee traffic. The BAAQMD recommends that individual projects impacts involving direct and/or indirect operational emissions that exceed the thresholds identified in Table IV.C-6 be considered significant.

Direct emissions are those that are emitted on a site and include stationary sources and on-site mobile equipment. Examples of land uses and activities that generate direct emissions are industrial operations and sources subject to an operating permit by the BAAQMD. Indirect emissions come from mobile sources that access the project site but generally emit off site. For many types of land-use development projects, the principal sources of air pollutant emissions are direct and indirect emissions from the motor vehicle trips generated by the project.

Local CO Concentrations

CO emissions are considered significant if they will contribute to a violation of the State standards for CO (9 ppm averaged over 8 hours and 20 ppm over 1 hour). CO emissions are localized, and typically analyzed in terms of their impacts to specific roadway segments or

intersections. Construction equipment exhaust contains CO and ozone precursors. However, these exhaust emissions are included in the emission inventory that is the basis for regional air quality plans, and are not expected to impede attainment and maintenance of ozone and CO standards in the Bay Area.

Local Community Risk and Hazard

The Thresholds of Significance for local community risk and hazard impacts are identified below, which apply to both the siting of a new source and to the siting of a new receptor. Local community risk and hazard impacts are associated with TACs and $PM_{2.5}$ because emissions of these pollutants can have significant health impacts at the local level. If emissions of TACs or fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less ($PM_{2.5}$) exceed any of the Thresholds of Significance listed below, the proposed project would result in a significant impact.

- Non-compliance with a qualified risk reduction plan; or
- An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e., chronic or acute) hazard index greater than 1.0 would be a cumulatively considerable contribution; or
- An incremental increase of greater than 0.3 micrograms per cubic meter (µg/m3) annual average $PM_{2.5}$ would be a cumulatively considerable contribution.

A project would have a cumulative considerable impact if the aggregate total of all past, present, and foreseeable future sources within a 1,000 foot radius from the fence line of a source, or from the location of a receptor, plus the contribution from the project, exceeds the following:

- Non-compliance with a qualified risk reduction plan; or,
- An excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0; or
- 0.8 µg/m3 annual average $PM_{2.5}$.

Odors

Odors would be considered significant if the project would result in a frequent exposure of members of the public to objectionable odors or five or more confirmed complaints per year averaged over three years. According to the BAAQMD, typical uses that may result in significant odor impacts include wastewater treatment plant, sanitary landfill, transfer station, composting facility, petroleum refinery, asphalt batch plant, chemical manufacturing, fiberglass manufacturing, painting/coating operations, rendering plant, and coffee roasters.

Greenhouse Gas Emissions

Appendix G of the CEQA Guidelines (Environmental Checklist) contains a list of air quality effects that may be considered significant. The proposed project would have a significant effect on the environment if it were to:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The BAAQMD recently adopted thresholds for evaluating GHG emissions from projects and plans and developed guidelines for assessing these impacts. The thresholds include a bright line emissions threshold of 1,100 metric tons of CO_2 equivalent (CO_2e) per year or an emission efficiency metric of 4.6 tons of CO_2e per year per service population. Service population is the sum of new residents and full time workers.

Cumulative Impacts

According to the BAAQMD CEQA Guidelines, any project that would individually have a significant air quality impact would also have a significant cumulative air quality impact. The BAAQMD emission thresholds measure whether or project would have a contribution that is cumulatively considerable. Therefore, separate analysis to assess cumulatively significant adverse air quality impacts is unnecessary.

Air Quality Issues Not Discussed Further

Conflict with or Obstruct Implementation of the Applicable Air Quality Plan

The BAAQMD is the regional agency responsible for overseeing compliance with State and Federal laws, regulations, and programs within the San Francisco Bay Area Air Basin. The BAAQMD, with assistance from the Association of Bay Area Governments and the Metropolitan Transportation Commission has prepared and implements specific plans to meet the applicable laws, regulations, and programs. Among them are the Carbon Monoxide Maintenance Plan (1994), the 2001 Ozone Attainment Plan, and the Bay Area 2010 Clean Air Plan. The BAAQMD has also developed CEQA guidelines to assist lead agencies in evaluating the significance of air quality impacts. In formulating compliance strategies, the BAAQMD relies on planned land uses established by local general plans. When a project proposes to change planned uses, by requesting a general plan amendment, the project may depart from the assumptions used to formulate BAAQMD in such a way that the cumulative result of incremental changes may hamper or prevent the BAAQMD from achieving its goals. This is because land use patterns influence transportation needs, and motor vehicles are the primary source of air pollution. The

proposed project would not cause changes to local population projections or regional changes in vehicle use. As a result, the proposed project would not conflict with the clean air plan efforts and the impact would be a ***less-than-significant*** impact.

Local CO Impacts

Carbon monoxide emissions from traffic generated by operation of the proposed 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 carbon monoxide. 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. The highest measured levels in Santa Rosa during the last 3 years are 3.5 ppm for 1-hour averaging periods and 1.7 ppm during 8-hour averaging periods. These levels are well below ambient air quality standards. The new BAAQMD CEQA Air Quality Guidelines include criteria to determine if analysis of CO impacts is necessary. Under the screening criteria, dispersion modeling of CO emissions is only necessary in this situation if the total hourly volume of an intersection affected by the proposed project exceeds 44,000 vehicles per hour. The intersections along McDowell Boulevard would have a volume that would be about 10 percent or less of the screening level volume. Therefore, it can be concluded, without performing dispersion modeling, that the proposed project would not cause or contribute to a violation of the ambient air quality standard for CO and the impact is considered ***less than significant***.

Local Community Risk and Hazard

Operation of the proposed project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. The retail uses would be a source of occasional truck traffic for deliveries; however, sensitive receptors are not located adjacent to the project to warrant concern regarding emissions from these trucks. Temporary construction activities would result in localized emissions of dust and diesel exhaust that could result in temporary impacts to adjacent land uses. Mitigation measures are identified for Impact AQ-4 below to reduce these emissions to a ***less-than-significant*** level.

Odors

According to the BAAQMD CEQA Guidelines, the types of projects that commonly result in odor impacts include: wastewater treatment plant, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing, fiberglass manufacturing, auto body shops, rendering plants, and coffer roasters. The proposed project does not include any of these uses and would not create objectionable odors that would affect a substantial number of people. Therefore, project impacts related to odors would be considered ***less than significant***.

Project Impacts and Mitigation Measures

Impact AQ-1 Grading/Construction Impacts

Foreseeable construction activities would occur during site preparation, grading, placement of utilities and other infrastructure, placement of foundations for structures, and fabrication of structures at the project site. Construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

Heavy construction activity on dry soil exposed during construction phases could cause emissions of dust (usually monitored as PM_{10}). ROG, NO_x, CO, and additional particulate matter emissions (PM_{10} and $PM_{2.5}$) also would be created from the combustion of diesel fuel by heavy equipment and construction worker vehicles. Throughout the construction phases, construction-related emissions would vary day to day depending on the specific phase at the time. When considered in the context of long-term project operations, construction and demolition-related emissions would be considered short-term and temporary, but these activities still could cause significant effects on local air quality.

Construction, area and mobile source emissions associated with the proposed project were estimated using the URBEMIS2007 (version 9.2.4) model, which is designed to model emissions from development projects and recommended for use by the BAAQMD. The model predicts daily and annual emissions associated with land use developments. For mobile source emissions the model combines daily traffic activity with emission factors from the State's mobile source emission factor model (EMFAC2007). Construction emissions for the proposed project were calculated with the URBEMIS2007 model assuming the two separate phases for construction. The predicted daily emissions from construction activities are shown in Table IV.C-7. During grading, the first year of construction, average daily emissions would exceed the BAAQMD thresholds. This would be considered a ***significant impact***.

Table IV.C-7
Average Daily Air Pollutant Emissions from Project Construction (lbs/day)

Operational Activity	ROG	NO_x	PM_{10} / $PM_{2.5}$
2012 Project Construction	7.3	61.1	2.9 / 2.7
2013 Project Construction	27.3	30.4	2.2 / 2.0
2014 Project Construction	24.5	15.6	0.9 / 0.9
Significance Threshold	54	54	82 / 54
Significant Impact?	**No**	**Yes**	**No**

Construction-related activities associated with the project would result in dust and equipment exhaust emissions that could, at times, affect at adjacent residential uses including the single-family residential homes to the northeast/east on McDowell Boulevard and/or the Petaluma Valley Hospital to the east on Professional Drive, and could contribute to the general deterioration of local air quality. Dust would be generated during site grading and construction activities. Extensive grading is not envisioned, since the site is already relatively flat and mostly at grade with the surrounding roadways. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed, amount of activity, soil conditions and meteorological conditions. Most dust generating activities would occur during site grading, which would only last a few months. Typical winds during late spring through summer are from the northwest and southeast.

Although these construction activities would be temporary, they would have the potential to create fugitive dust and cause health air quality impacts. PM_{10} is the pollutant of greatest concern associated with dust. If uncontrolled, PM_{10} levels downwind of actively disturbed areas could possibly exceed State standards. If uncontrolled, dust generated by grading and construction activities represents a potentially ***significant*** impact. Implementation of Mitigation Measure AQ-1 would lessen impacts to a less-than-significant level.

Mitigation Measure AQ-1

Because proposed project construction would generate (particulate matter) PM_{10} emissions, the following BAAQMD standard dust abatement measures also required by General Plan 2025 Policy 4-P-15.C, are required to reduce construction-related air quality impacts to a less-than-significant level. The project sponsors shall require that the following practices be implemented by requiring their inclusion in all contractor construction documents:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day or such that a adequate to maintain minimum soil moisture of 12 percent.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. 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 shall be prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. 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.
6. Replant vegetation in disturbed areas as quickly as possible.
7. Suspend construction activities that cause visible dust plumes to extend beyond the construction site.
8. 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.
9. 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.
10. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.
11. During site grading, the developer or contractor shall provide a plan for approval by the City or BAAQMD demonstrating that the heavy-duty (>50 horsepower) off-road vehicles to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a project wide fleet-average 20 percent NO_x reduction and 45 percent particulate reduction compared to the most recent CARB fleet average for the year 2011.
12. The contractor shall install temporary electrical service whenever possible to avoid the need for independently powered equipment (e.g. compressors).
13. Properly tune and maintain equipment for low emissions.

Impact AQ-2 Operational Impacts – Daily Emissions of ROG, NOx, and PM_{10}

Trips generated by the proposed project would result in air pollutant emissions that could affect the regional air quality of the entire San Francisco Bay Area Air Basin. Using the URBEMIS2007 model and assuming that project build-out would be complete by 2014, mobile

and stationary source emissions for the project were computed. The URBEMIS2007 model results combine both vehicle and area source emissions generated by the proposed project.

The project is assumed to regionally increase the number of vehicle trips in the project area, which would also result in an increase in air emissions. Operational emissions for the project were computed using the URBEMIS2007 model with adjustments. As discussed above, the maximum project size in terms of land use types, number of dwelling units, and square footage was input to the model. Unless otherwise noted below, the model defaults for the San Francisco Bay Area were used.

Model Year

The model uses mobile emission factors from the California Air Resources Board's EMFAC2007 model. This model is sensitive to the year selected, since vehicle emissions have and continue to be reduced through emission controls installed on new vehicles. The older vehicles that emit much higher rates of air pollution are being replaced each year by the lower emitting vehicles through attrition. The EMFAC2007 model predicts the effects of adopted vehicle emission standards and fleet turnover on future emissions (i.e., standards adopted through 2006). Year 2014 was selected for operational air pollutant emissions, since this would be about the earliest conceived year that the project could possibly be fully occupied. Later years would have lower emissions. For GHG emissions, the Year 2020 was selected, since BAAQMD thresholds are based on meeting the AB32 reduction goals by 2020.

Traffic

Mobile source emissions estimates rely on vehicle trip generation rates derived from factors published by the Institute of Transportation Engineers from the transportation study prepared for the proposed project. Mitigation options in URBEMIS2007 were used to account for project features that provide walking and bicycling opportunities at the project site. These selections account for the density of the roadway network with sidewalks and bicycle routes along arterial or collector roadways.

Passby and Diverted Trip Adjustment

The URBEMIS2007 model computes both vehicle trips and vehicles miles travelled to combine with EMFAC2007 emission factors. Since the traffic report only provided PM peak hour passby reduction, the passby adjustment in the URBEMIS2007 model was used. This adjustment also accounts for diverted trips. The passby effect adjusts the vehicle miles travelled for retail trips, assuming a certain percentage are passing the site or are diverted from within ¼ mile. The default trip lengths in URBEMIS2007 were used in this analysis.

Entrained Roadway Dust

In addition, modifications to the road dust model default settings for PM_{10} and $PM_{2.5}$ emissions were made by adjusting the silt loading on roadways to 0.35 grams per square meter. This is

the value used by BAAQMD for inventorying PM_{10} and $PM_{2.5}$ emissions from entrained roadway dust on arterial and collector roadways.

As indicated in Table IV.C-8, operational emissions (including vehicle source emissions) associated with the project would not exceed BAAQMD adopted threshold emissions for ROG, NOx, exhaust PM_{10} and exhaust $PM_{2.5}$. As a result, the project would be considered to have a ***less than significant*** impact on regional air quality.

Table IV.C-8
Air Pollutant Emissions from Project Operations (lbs/day)

Operational Activity	ROG	NO_x	PM_{10} / $PM_{2.5}$
Project Operational Emissions	50	50	50 / 11
Significance Threshold	54	54	82 / 54
Significant Impact?	**No**	**No**	**No**
Source: Illingworth & Rodkin, Inc. 2011			

Greenhouse Gas (GHG) Project Impacts

Greenhouse gas emissions associated with the development of the proposed project were calculated. The California Air Pollution Control Officers Association (CAPCOA) and BAAQMD CEQA Air Quality Guidelines provide guidance for calculating project emissions. Emissions from area sources, mobile sources and electricity usage are recommended by CAPCOA. Area and mobile source emissions were calculated using the URBEMIS2007 model, as recommended by BAAQMD and CAPCOA. BAAQMD's Greenhouse Gas Model (BGM) that processes the URBEMIS2007 input file was used to provide CO_2 equivalent (or CO_2e) emissions for projects.

As described above, URBEMIS2007 is a computer model developed by the California Air Resources Board (CARB) to estimate air pollutant emissions from land use developments. The model predicts emissions for construction activities, area sources, and traffic associated with the project. The model uses the latest statewide emission inventory models for mobiles sources (i.e., EMFAC2007) and construction equipment (i.e., OFFROAD2007). The model is periodically updated to reflect most recent emissions estimates for source types and incorporate accuracies in estimating emission from land use activities. The latest version of this model (i.e., Version 9.2.4) was used in this analysis.

Impact AQ-3 Construction Period GHG Impacts

BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions. However, BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices may include, but are not limited to: using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment of at least 15 percent of the fleet; using local building materials of at least 10 percent; and recycling or reusing at least 50 percent of

construction waste or demolition materials. BAAQMD recommends calculating the emissions and disclosure that GHG emissions would occur during construction.

The URBEMIS2007 modeling conducted for the air quality analysis provided the estimate of construction GHG emissions in the form of CO_2. Emissions associated with construction were assumed to all occur in 2011 through 2014. Under this scenario, construction of the project would emit 127 to 560 metric tons of CO_2 annually. Total construction emissions for construction would be 1,029 metric tons of CO_2. This would be the emissions from construction equipment, truck traffic and associated construction worker traffic.

These emissions, of up to 560 metric tons of CO_2 annually, could be conservatively compared to the operational threshold of 1,100 annual metric tons and determined to be a ***less-than-significant*** impact for the construction period.

Impact AQ-4 Operation Period GHG Emissions

The URBEMIS2007 modeling file for the Year 2020 was used in the BGM model. This is the same model input file used to compute project air quality impacts, with the only difference being that GHG emissions were modeled for 2020 to be consistent with AB 32 targets used by BAAQMD to develop GHG significance thresholds. BGM is an Excel workbook tool that uses the URBEMIS2007 file to provide GHG emissions in the form of equivalent CO_2 emissions (CO_2e) in metric tons per year. BGM provides emissions for transportation, areas sources, electricity consumption, natural gas combustion, electricity usage associated with water usage and wastewater discharge, and solid waste land filling and transport. Annual emissions in term of metric tons per year are provided in Table IV.C-9 for proposed project full operation in 2020, which is the anticipated increase caused by the proposed project.

Table IV.C-9
Air Pollutant Emissions from Project Operations (lbs/day)

Source	Unmitigated	Mitigated
Transportation	7,091	6,949
Area Sources	1	1
Electricity usage	983	786
Natural gas	111	89
Water & wastewater	13	13
Solid waste	508	508
Total	8,707	8,346
Emissions per capita*	13.5	13.0
Significance Threshold	4.6	4.6
Significant Impact?	**Yes**	**Yes**
Source: Illingworth & Rodkin, Inc. 2011		

Emissions associated with electricity consumption output by BGM were adjusted to account for PG&E's lower emission rate. BGM uses a Statewide rate of 805 pounds of CO_2 per megawatt

of electricity produced, while CARB the average certified rate for PG&E between 2004 and 2007 is 537 pounds per megawatt[4].

Along with the emissions reported in Table IV.C-9 is the computed GHG efficiency metric. This metric is computed by dividing the total annual emissions in metric tons by the service population. The service population is computed by adding the projected project population and workforce. The proposed project would not include new residences. The workforce for the retail and office uses were computed as 644 new employees, based on 1 new worker per 500 square feet of retail or office floor space.

The proposed project would cause an increase in GHG emissions of 8,707 metric tons of CO_2e annually, which exceeds the BAAQMD "bright line" threshold of 1,100 metric tons per year. Therefore, the significance is evaluated by assessing the GHG emissions efficiency. The proposed project would have annual emissions of 13.5 metric tons per year of CO_2e per capita, which exceeds the BAAQMD threshold of 4.6 metric tons per capita. As a result, the project's GHG emissions could be considered to have a cumulatively considerable contribution to a significant impact and would be considered ***significant***.

Mitigation Measure AQ-4

The applicant shall reduce air pollutant emissions from both vehicle trips and area sources by implementing the following measures:

1. Provide preferential parking near the office building entrance for carpool and vanpool vehicles.
2. Pedestrian facilities shall include easy access and signage to bus stops and roadways that serve the major site uses.
3. Project site employers shall be required to promote transit use by providing transit information and incentives to employees.
4. Provide exterior electrical outlets to encourage use of electrical landscape equipment at retail and office uses.
5. Prohibit idling of trucks at loading docks for more than 5 minutes per State law and include signage indicating such a prohibition.
6. Provide 110- and 220-volt electrical outlets at loading docks.
7. Provide battery-powered, electric, or other similar equipment that does not impact local air quality for project maintenance activities.

[4] *CARB Local Government Operations Protocol – May 2010, Table G.6*

8. Incorporate passive solar building design and landscaping conducive to passive solar energy use (e.g., planting of deciduous trees on west sides of structures, landscaping with drought resistant species, and use of groundcovers rather than pavement in certain areas to reduce heat reflection).
9. During final design, the applicant shall develop Green Building standards or equivalent that would reduce energy-related GHG emissions by at least 20 percent from those that would occur under 2005 Title 24 Building Code requirements. The applicant shall present these to the City prior the issuance of a building permit.
10. As required by the General Plan, the applicant shall incorporate features to reduce energy related GHG emissions including, but not limited, to pedestrian linkages, connections to local transit, bike lanes, bike parking, and showers for employees.
11. In addition to providing trees for shading, provide drought tolerant landscaping to reduce water usage that lead indirectly to electricity usage and GHG emissions.
12. Require a percentage of parking spaces in large parking lots or garages to provide electrical vehicle charging facilities.

CUMULATIVE IMPACTS

As previously described, the Bay Area is considered non-attainment for both State and Federal ambient air quality standards for ozone and particulate matter. Past and present projects have contributed to these air quality problems on a cumulative basis. According to the BAAQMD CEQA Air Quality Guidelines, "no single project is sufficient in size to, by itself, result in non attainment of ambient air quality standards." Therefore, air pollution is largely a cumulative impact. BAAQMD emission-based thresholds measure whether a project's emissions would be cumulatively considerable. Since the project would exceed the BAAQMD's threshold for NO_x during construction and BAAQMD's operational impact threshold for GHG, the project would also result in a ***significant*** cumulative impact on regional air quality.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Construction Impacts

Mitigation Measure AQ-1 would reduce dust or PM_{10} emissions to a less-than-significant level. NOx emissions during grading would be reduced by about 7 percent, remaining above the BAAQMD thresholds. Therefore, the impact would be ***significant and unavoidable***.

GHG Impacts

Mitigation Measure AQ-4 would reduce the GHG emissions associated with the proposed project by about 4 percent. This would be in addition to reductions in the modeling that account for the network of sidewalks and bike paths/bike lanes included in the project design, as well as implementation of General Plan policies. A majority of the emissions (i.e., 83 percent) would come from traffic. Reducing traffic-related emissions from retail-type projects is difficult, due to that nature of the trip attraction. With implementation of Mitigation Measure AQ-4, the emissions per capita would be reduced to 13.0 metric tons per year of CO_2e. This would remain above the BAAQMD per capita threshold of 4.6. Therefore, the impact would be ***significant and unavoidable***.