

3.4 AIR QUALITY

The purpose of this section is to provide the environmental and regulatory settings necessary to identify any potential project impacts on surrounding air quality. This section evaluates the proposed project's air quality emissions from construction activities, operation of the hospital, helicopter operations, and emergency diesel generator testing. The proposed project's air quality emissions are evaluated against the thresholds of significance set forth in Appendix G of the CEQA Guidelines and against Bay Area Air Quality Management District (BAAQMD) CEQA significance thresholds to determine the level of impact.¹ State and county greenhouse gas reduction goals are also considered in evaluating the significance of the project's contribution to the cumulative impact of global climate change.

In addition a health risk assessment is conducted to determine if diesel particulate matter (DPM) from construction and operation of the project would expose sensitive receptors to substantial toxic air contaminant concentrations. A health risk assessment for DPM on hospital patients and workers from nearby US 101 was also evaluated.

This section includes information from the *Imported Fill Sources Letter* (Simpkins 2009), *Environmental Air Quality Assessment* (Illingworth & Rodkins 2009a), *Attachment for Environmental Air Quality Assessment* (Illingworth & Rodkins 2009d), *Air Pollution Emissions for Helicopter Operations* (Illingworth & Rodkins 2009c), and *Global Climate Change* (Zischke 2009), which are included as **Appendix C** in the Technical Appendices, Vol. 2 of this document.

3.4.1 Environmental Setting

3.4.1.1 *Climate, Meteorology, and Topography*

Due to its topographic diversity, the meteorology and climate of the Bay Area is often described in terms of different subregions and their microclimates. The proposed project is located in the Cotati and Petaluma Valley subregion, as defined by the Bay Area Air Quality Management District (BAAQMD).

This climatological subregion stretches from Santa Rosa to the San Pablo Bay and is known as the Cotati Valley at the north end and the Petaluma Valley at the south end. The largest city in the Cotati Valley is Santa Rosa. To the east, the valley is bordered by the Sonoma Mountains, with the San Pablo Bay at the southeast end of the valley. To the immediate west are a series of

¹ BAAQMD's guidance on determining significance is set forth in the December 1999 publication, *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*. BAAQMD has proposed the adoption of new recommended thresholds of significance for project emissions, including emissions of greenhouse gasses. BAAQMD, *California Environmental Quality Act Guidelines Update – Proposed Thresholds of Significance*, November 2009. BAAQMD's staff recommendations for these proposed new thresholds are likely to be considered by the BAAQMD Board in December. The proposed new BAAQMD guidelines do not specify when they will be effective, however the BAAQMD staff has recommended the effective date of the proposed thresholds be 90 days from the Board decision in December (Pers.comm., Sigalle R. Michael to URS, November 2009). As this Draft EIR is being finalized, it is not certain when these proposals will be adopted, when they will take effect, and whether the BAAQMD Board will adopt the staff recommendations. In the interest of full disclosure, this EIR discusses the recommended draft thresholds in the following impact analysis.

low hills and further west are the Estero Lowlands, which opens to the Pacific Ocean. The region from the Estero Lowlands to the San Pablo Bay is known as the Petaluma Gap. This low-terrain area is a major transport corridor allowing marine air to pass into the Bay Area.

Wind patterns in the Petaluma and Cotati Valleys are strongly influenced by the Petaluma Gap. The predominant wind pattern in this region is for marine air to move eastward through the Petaluma Gap, then to split into northward and southward paths as it moves into the Cotati and Petaluma valleys. The southward path crosses the San Pablo Bay and moves eastward through the Carquinez Straits. Winds are usually stronger in the Petaluma Valley than the Cotati Valley because it is part of the Petaluma Gap. The low terrain in the Petaluma Gap does not offer much resistance to the marine air as it flows to the San Pablo Bay. The Cotati Valley, being slightly north of the Petaluma Gap experiences lower wind speeds. In Santa Rosa, the annual average wind speed is 5.4 mph.

Summer maximum temperatures for this region are in the low 80's, while winter maximum temperatures are in the high 50s to low 60s. Summer minimum temperatures are 50-51 degrees, and wintertime minimum temperatures are 36-40 degrees. Rainfall averages are 24 inches per year at Petaluma, and 30 inches at Santa Rosa. Santa Rosa's rainfall is higher because the air is lifted and cooled in advance of the Sonoma Mountains, thereby causing condensation of the moisture. Consistent with the Bay Area Mediterranean climate, Santa Rosa receives 81% of its annual rainfall from November through March.

3.4.1.2 Air Pollution Potential

The clear skies with relatively warm conditions that are typical in summer in the Bay Area combine with localized air pollutant emissions to elevate O₃ (ozone) levels. Air quality standards for O₃ traditionally are exceeded when relatively stagnant conditions occur for periods of several days during the warmer months of the year. Weak wind flow patterns combined with strong inversions substantially reduces normal atmospheric mixing. Key components of ground-level O₃ formation are sunlight and heat; therefore, significant O₃ formation only occurs during the months from late spring through early fall. Air pollution potential in the project area is not as high as other parts of the Bay Area because winds generally do not transport enough of the precursor pollutants into that area (highest concentrations occur at monitoring stations in the eastern and southern portions of the Bay Area that are usually downwind of the major urban areas). However, pollutants emitted in the Santa Rosa area can be transported down-wind and contribute to air quality problems in those areas. Light winds that are common in winter combine with strong surface-based inversions, caused by cold air trapped near the surface, to trap pollutants such as particulates (e.g., wood smoke) and carbon monoxide. This can lead to localized high concentrations of these pollutants.

3.4.1.3 Criteria Air Pollutants

Carbon Monoxide (CO)

CO, a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue, and can impair central nervous system functions. CO is emitted almost exclusively from the incomplete combustion of fossil fuels. Automobile exhaust and residential wood burning in fireplaces and woodstoves emit most of the CO in the Bay Area. CO is a non-

reactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. The highest CO concentrations measured in the Bay Area are typically recorded during the winter. Monitored levels of CO are below the Federal and State ambient air quality standards, but 10 urban areas (including Sonoma County) in the Bay Area are considered maintenance areas.

Ozone (O₃)

O₃, a colorless toxic gas, is the chief component of urban smog. O₃ enters the blood stream and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. O₃ also damages vegetation by inhibiting growth. Although O₃ is not directly emitted, it forms in the atmosphere through a chemical reaction between reactive organic gas (ROG) and nitrogen oxides (NO_x) under sunlight. ROG and NO_x are primarily emitted from automobiles and industrial sources. O₃ is present in relatively high concentrations within portions of the Bay Area. Highest O₃ concentrations occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies.

Nitrogen Dioxide (NO₂)

NO₂, a reddish-brown gas, irritates the lungs. Exposure to NO₂ can cause breathing difficulties at high concentrations. Clinical studies suggest that NO₂ exposure to levels near the current standard may worsen the effect of allergens in allergic asthmatics, especially in children. Similar to ozone, NO₂ is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO₂ are collectively referred to as nitrogen oxides (NO_x) and are major contributors to ozone formation. NO_x is emitted from combustion of fuels, with higher rates at higher combustion temperatures. NO₂ also contributes to the formation of PM₁₀ (see discussion of PM₁₀ below). Monitored levels in the Bay Area are well below ambient air quality standards.

Sulfur Oxides

Sulfur oxides, primarily SO₂, are a product of high-sulfur fuel combustion. The main sources of SO₂ are coal and oil used in power stations, in industries, and for domestic heating. Industrial chemical manufacturing is another source of SO₂. SO₂ is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. Due to the lack of sources, SO₂ is found at low concentrations in the North Bay region.

Suspended Particulate Matter

Respirable particulate matter (PM₁₀), and fine particulate matter (PM_{2.5}) consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. PM₁₀ and PM_{2.5} represent fractions of particulate matter that can be inhaled and cause adverse health effects. Major sources of PM_{2.5} results primarily from diesel fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. PM₁₀ include all PM_{2.5} sources as well as emissions from dust generated by construction, landfills, and agriculture; wildfires and brush/waste burning, industrial sources, windblown dust from open lands, and atmospheric chemical and photochemical reactions.

PM₁₀ and PM_{2.5} are a health concern, particularly at levels above the Federal and State ambient air quality standards. PM_{2.5} (including diesel exhaust particles) is thought to have greater effects on health because minute particles are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Children are more susceptible to the health risks of PM_{2.5} because their immune and respiratory systems are still developing.

PM_{2.5} are miniscule and can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility. The USEPA recently adopted a new, more stringent PM_{2.5} standard of 35 µg/m³ for 24-hour exposures based on a review of the latest new scientific evidence. At the same time, the USEPA revoked the annual PM₁₀ standard due to a lack of scientific evidence correlating long-term exposures of ambient PM₁₀ with adverse health effects. Most stations in the Bay Area report elevated PM₁₀ and PM_{2.5} levels on similar fall/winter days, indicating a regional air quality problem. The primary sources of these pollutants are wood smoke and traffic. Meteorological conditions that are common during this time of the year result in calm winds and strong surface-based inversions that trap pollutants near the surface. The buildup of these pollutants is greatest during the evenings and early morning periods. The high levels of PM₁₀ result in not only health effects, but also reduced visibility. The San Francisco Bay Area air basin (SFBAAB) is unclassified for the national 24-hour standard for PM₁₀, even though the basin has attained the standard over the past two years. The air basin is considered attainment for the national annual standard for PM_{2.5}. The air basin has not achieved attainment with respect to the 24-hour standard for PM_{2.5} since the USEPA lowered the 24-hour standard from 65 µg/m³ to 35 µg/m³ in 2006. The USEPA recommends that the SFBAAB be considered non-attainment for the 24-hour PM_{2.5} standard; however the designation is not official yet.

3.4.1.4 Greenhouse Gases

The earth's atmosphere naturally contains a number of gases, including (but not limited to) carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), which are collectively referred to as greenhouse gases. In this report, greenhouse gas (GHG) emissions are numerically depicted as carbon dioxide (CO₂) since it is the predominant GHG associated with fuel combustion. Manmade emissions of GHG occur through the combustion of fuels, as well as a variety of other sources.^{2 3}

² Appendix C-5 to this EIR, entitled *Global Climate Change (2009)* is an analysis of greenhouse gas emissions and global climate change submitted by Sutter in February 2009 and later revised. This analysis includes additional discussion of greenhouse gasses and the impacts of greenhouse gas emissions. This is one of the documents evaluated by the County in preparing this EIR analysis.

³ In October 2009, the Governor signed Senate Bill 104, which adds nitrogen trifluoride to the list of greenhouse gasses that are to be regulated under AB 32. Nitrogen trifluoride is primarily used in the manufacture of several consumer items, including photovoltaic solar panels, microprocessors, and LCD television screens. *Assembly Committee on Appropriations, SB 104 Bill Analysis* (July 15, 2009). Nitrogen trifluoride is not generally used in hospitals or medical offices.

These gases trap some amount of solar radiation and the earth's own radiation, preventing it from passing through earth's atmosphere and into space. GHGs are vital to life on earth; without them earth would be an icy planet. For example, CO₂ is also a trace element that is essential to the cycle of life. However, increasing GHG concentrations are believed to be warming the planet.

As the average temperature of the earth increases, weather may be affected, including changes in precipitation patterns, accumulation of snow pack, and intensity and duration of spring snowmelt. The sea level may rise, resulting in coastal erosion and inundation of coastal areas. Emissions of air pollutants and ambient levels of pollutants also may be affected in areas. Climate zones may change, affecting the ecology and biological resources of a region. There may be changes in fire hazards due to the changes in precipitation and climate zones.

While scientists have established a connection between increasing GHG concentrations and increasing average temperatures, important scientific questions remain about how much warming will occur, how fast it will occur, and how the warming will affect the rest of the climate system. At this point, scientific efforts are unable to quantify the degree to which human activity impacts climate change. The phenomenon is worldwide, yet it is expected that there will be substantial regional and local variability in climate changes. It is not possible with today's science to determine the effects of global climate change in a specific locale, or whether the effect of one aspect of climate change may be counteracted by another aspect of climate change, or exacerbated by it.

Human activities generate GHG emissions. Since pre-industrial times, there has been a build-up of levels of GHG in the atmosphere. Anthropogenic GHG emissions worldwide as of 2005 (the latest year for which data are available for Annex 1 countries⁴) totaled approximately 30,800 CO₂ equivalent million metric tons (MMTCO₂e⁵). It should be noted that global emissions inventory data are not all from the same year and may vary depending on the source of the emissions inventory data (UNFCCC n.d.[a] and UNFCCC n.d.[b]⁶). Six countries and the European Community accounted for approximately 70 percent of the total global emissions.

The United States was the top producer of greenhouse gas emissions as of 2005. Based on GHG emissions in 2004, six of the states—Texas, California, Pennsylvania, Ohio, Illinois, and Florida, in ranked order—would each rank among the top 30 GHG emitters internationally (World Resources Institute 2006). The primary greenhouse gas emitted by human activities in the United States was CO₂, representing approximately 84 percent of total greenhouse gas emissions (USEPA 2008). Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 80 percent of US GHG emissions (USEPA 2008).

⁴ Annex 1 countries are developed countries which have adopted greenhouse gas emission reduction obligations under the Kyoto Protocol.

⁵ The CO₂ equivalent emissions are commonly expressed as “million metric tons of carbon dioxide equivalent (MMTCO₂e)” The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP, such that MMTCO₂e = (million metric tons of a GHG) x (GWP of the GHG). For example, the GWP for methane is 21. This means that emissions of one million metric tons of methane are equivalent to emissions of 21 million metric tons of CO₂.

⁶ The global emissions are the sum of Annex I and non-Annex I countries without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries that 2004 data were unavailable, the UNFCCC data for the most recent year were used.

Based upon the 2004 GHG inventory data (the latest year available) compiled by the California Air Resources Board (CARB) for the California 1990 greenhouse gas emissions inventory, California emitted emissions of 484 MMTCO₂e, including emissions resulting from out-of-state electrical generation (CARB 2007). Based on the CARB inventory and GHG inventories for countries contributing to the worldwide GHG emissions inventory compiled by the United Nations Framework Convention on Climate Change (UNFCCC) for 2005, California's GHG emissions rank second in the United States (Texas is number one) with emissions of 423 MMTCO₂e (excluding emissions related to imported power) and internationally between Ukraine (418.9 MMTCO₂e) and Spain (440.6 MMTCO₂e) (UNFCCC n.d.[a]).

A California Energy Commission (CEC) emissions inventory report placed CO₂ produced by fossil fuel combustion in California as the largest source of GHG emissions in 2004, accounting for 81 percent of the total GHG emissions (CEC 2006a). CO₂ emissions from other sources contributed 2.8 percent of the total GHG emissions, methane emissions 5.7 percent, nitrous oxide emissions 6.8 percent, and the remaining 2.9 percent was composed of emissions of high-GWP gases (CEC 2006a). The primary contributors to GHG emissions in California are transportation, electric power production from both in state and out-of-state sources, industry, agriculture and forestry, and other sources, which include commercial and residential activities.

3.4.1.5 Toxic Air Contaminants (TAC)

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Hazardous Air Pollutants (HAPs) under the Federal Clean Air Act and Toxic Air Contaminants (TACs) under the California Clean Air Act. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. They are regulated at the local, State, and Federal level.

The particles emitted by diesel engines are coated with chemicals, many of which have been identified by the USEPA as HAPs, and by CARB as TACs. Diesel engines emit particulate matter at a rate about 20 times greater than comparable gasoline engines. The vast majority of diesel exhaust particles (over 90 percent) consist of PM_{2.5}, which are particles that can be inhaled deep into the lung. Like other particles of this size, a portion will eventually become trapped within the lung possibly leading to adverse health effects. CARB estimates that about 70 percent of the cancer risk that the average Californian faces from breathing toxic air pollutants stems from diesel exhaust particles (OEHHA 2001). California has adopted a comprehensive diesel risk reduction program to reduce Diesel Particulate Matter (DPM) emissions 85 percent by 2020. The USEPA and CARB adopted low sulfur diesel fuel standards in 2006 that reduce DPM substantially.

3.4.1.6 Existing Air Quality

The BAAQMD monitors air quality conditions at over 30 locations throughout the Bay Area. The Santa Rosa Monitoring Station on Fifth Street is closest and most representative of the project site. Criteria pollutants monitored include O₃, CO, NO₂, hydrocarbons, PM₁₀, and PM_{2.5}. The gaseous pollutants (i.e., O₃, CO and NO₂) are monitored continuously while particulate matter (i.e., PM₁₀ and PM_{2.5}) are sampled for 24 hours every sixth day. A summary of the data recorded at this station is shown in **Table 3.4-1** for the period 2004 through 2008.

Table 3.4-1. Highest Measured Air Pollutant Concentrations

Pollutant	Average Time	Measured Air Pollutant Levels				
		2004	2005	2006	2007	2008
Santa Rosa						
Ozone (O ₃)	1-Hour	0.076 ppm	0.072 ppm	0.077 ppm	0.071 ppm	0.076 ppm
	8-Hour	0.06 ppm	0.051 ppm	0.058 ppm	0.059 ppm	0.064 ppm
Carbon Monoxide (CO)	8-Hour	1.57 ppm	1.98 ppm	1.70 ppm	1.71 ppm	1.49 ppm
	1-Hour	2.70 ppm	2.50 ppm	2.40 ppm	2.60 ppm	3.50 ppm
Nitrogen Dioxide (NO ₂)	1-Hour	0.048 ppm	0.047 ppm	0.044 ppm	0.046 ppm	0.049 ppm
	Annual	0.011 ppm	0.011 ppm	0.011 ppm	0.011 ppm	0.011 ppm
Fine Particulate Matter (PM _{2.5})	24-Hour	27 µg/m ³	34 µg/m ³	59 µg/m³	32 µg/m ³	31 µg/m ³
	Annual	8 µg/m ³	8 µg/m ³	9 µg/m ³	8 µg/m ³	7 µg/m ³
Respirable Particulate Matter (PM ₁₀)	24-Hour	48 µg/m ³	39 µg/m ³	90 µg/m³	37 µg/m ³	50 µg/m ³
	Annual	17 µg/m ³	15 µg/m ³	18 µg/m ³	17 µg/m ³	17 µg/m ³
Bay Area (Basin Summary)						
Ozone (O ₃)	1-Hour	0.113 ppm	0.120 ppm	0.127 ppm	0.120 ppm	0.141 ppm
	8-Hour	0.085 ppm	0.090 ppm	0.106 ppm	0.091 ppm	0.111 ppm
Carbon Monoxide (CO)	8-Hour	3.4 ppm	3.1 ppm	2.9 ppm	2.7 ppm	2.5 ppm
Nitrogen Dioxide (NO ₂)	1-Hour	0.073 ppm	0.074 ppm	0.107 ppm	0.069 ppm	0.080 ppm
	Annual	0.013 ppm	0.013 ppm	0.013 ppm	0.012 ppm	0.012 ppm
Fine Particulate Matter (PM _{2.5})	1-Hour	78 ug/m³	56 ug/m³	75 ug/m³	58 ug/m³	75 µg/m ³
	Annual	12 ug/m³	12 ug/m³	11 ug/m³	11 ug/m³	--
Respirable Particulate Matter (PM ₁₀)	24-Hour	65 ug/m ³	81 ug/m ³	106 ug/m³	78 ug/m³	77 µg/m ³
	Annual	25 ug/m ³	23 ug/m ³	34 ug/m ³	25 ug/m ³	23 µg/m ³

Source: CARB ADAM website, accessed March 2009; EPA Report and Map, accessed March 2009.

Note:

ppm = parts per million

Values reported in bold exceed ambient air quality standard

NA = data not available.

3.4.1.7 Attainment Status for State and Federal Ambient Air Quality Standards

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The Bay Area as a whole does not meet State or Federal ambient air quality standards for ground level O₃ and PM_{2.5} nor does it meet State standards for PM₁₀. For O₃, the entire Bay Area is designated non-attainment at both the Federal and State levels. **Table 3.4-2** summarizes the number of violations of ambient standards at the nearest monitoring station.

Table 3.4-2. Number of Days Measured Air Quality Levels Exceeded Standards

Pollutant	Standard	Monitoring Station	Days Exceeding Standard				
			2004	2005	2006	2007	2008
Ozone (O ₃)	NAAQS 1-hr	Santa Rosa	0	X	X	X	X
		BAY AREA	0	X	X	X	X
	NAAQS 8-hr	Santa Rosa	0	0	0	0	0
		BAY AREA	7	5	17	2	12
CAAQS 1-hr	Santa Rosa	0	0	0	0	0	
	BAY AREA	7	9	18	4	9	
CAAQS 8-hr	Santa Rosa	0	0	5	0	0	
	BAY AREA	13	9	22	9	20	
Fine Particulate Matter (PM ₁₀)	NAAQS 24-hr	Santa Rosa	0	0	0	0	0
		BAY AREA	0	0	0	0	0
CAAQS 24-hr	Santa Rosa	0	0	2	0	0	
	BAY AREA	4	4	13	4	2	
Fine Particulate Matter (PM _{2.5})	NAAQS 24-hr	Santa Rosa	0	0	1	0	0
		BAY AREA	1	0	10	14	--
All Other (CO, NO ₂ , Lead, SO ₂)	All Other	Santa Rosa	0	0	0	0	--
		BAY AREA	0	0	0	0	--

* Based on standard of 65 µg/m³ that was in place until September 21, 2006, then 35 µg/m³ standard in 2006.

X = Standard revoked in 2004. --- = Insufficient data.

Source: CARB ADAM website, accessed March 2009; EPA Report and Map, accessed March 2009; Bay Area Air Quality Management District – Bay Area Air Pollution Summaries

Under the Federal Clean Air Act (CAA), the USEPA has designated the region as *moderate non-attainment* for ground level O₃. However, the USEPA recently revoked the 1-hour standard and replaced it with an 8-hour standard. The USEPA classified the region as *marginally non-attainment* for the 8-hour O₃ standard. The USEPA requires the region to adopt a plan that will bring it into attainment with that standard by 2007. The Bay Area has met the CO standards for over a decade and is classified as *attainment* by the USEPA. The Bay Area has met the 24-hour PM₁₀ standard for the last two years but is considered *unclassified*. The Bay Area is considered *attainment* for the annual PM_{2.5} standard. The USEPA has recommended the Bay Area be classified as *non-attainment* for the 24-hour PM_{2.5} standard, but the designation is not official yet. The USEPA has classified the area as *attainment* for SO₂ and *unclassified* for N₂O. When a region is graded as unclassified, it means that the area likely meets the standard.

At the State level, the region is considered *serious non-attainment* for ground level O₃ and non-attainment for PM₁₀. California ambient air quality standards are more stringent than the national ambient air quality standards. The region is required to adopt plans on a triennial basis, the latest being the *2005 Bay Area Ozone Strategy* that show progress towards meeting the State O₃ standard. The area is considered attainment or unclassified for all other pollutants.

3.4.2 Regulatory Setting

The Federal Clean Air Act governs air quality in the United States. 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. At the Federal level, the United States Environmental Protection Agency (USEPA) administers the Clean Air Act (CAA). The California Clean Air Act 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 Bay Area Air Quality Management District (BAAQMD) regulates air quality at the regional level, which includes much of the nine-county Bay Area, including the southern portion of Sonoma County. The project site is within the BAAQMD's jurisdiction.

3.4.2.1 Federal

United States Environmental Protection Agency

The USEPA is responsible for enforcing the Federal Clean Air Act (CAA). The USEPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). The NAAQS are required under the 1977 CAA and subsequent amendments. The USEPA 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.

The Federal Clean Air Acts establish ambient air quality standards for different pollutants. National Ambient Air Quality Standards (NAAQS) were established by the federal Clean Air Act of 1970 (amended in 1977 and 1990) for six criteria pollutants. These criteria pollutants include carbon monoxide (CO), ozone (O₃), nitrogen dioxide (NO₂), particulate matter with a diameter less than 10 microns (PM₁₀), sulfur dioxide (SO₂), and lead (Pb). Recently, the USEPA added fine particulate matter or PM_{2.5} as a criteria pollutant. Air quality studies generally focus on five pollutants that are most commonly measured and regulated: CO, O₃, NO₂, SO₂, and suspended particulate, i.e., PM₁₀ and PM_{2.5}.

The USEPA does not currently regulate greenhouse gases (GHGs), a category that includes carbon dioxide and other pollutants that could contribute significantly to climate change. However, in the 2007 case *Massachusetts v. The Environmental Protection Agency*, the United States Supreme Court held that the USEPA has a mandatory duty to enact rules regulating mobile GHG emissions pursuant to the Federal Clean Air Act. The court held that GHGs fit the definition of an air pollutant that causes and contributes to air pollution and may reasonably be anticipated to endanger public health or welfare. Upon the final decision, President Bush signed Executive Order 13432 on May 14, 2007, directing the USEPA, along with the Departments of Transportation, Energy, and Agriculture, to initiate a regulatory process that responds to the Supreme Court's decision. The order requires the US EPA to coordinate closely with other federal agencies and to consider the president's Twenty-in-Ten plan in this process. The Twenty-in-Ten plan would establish a new alternative fuel standard that would require the use of 35 billion gallons of alternative and renewable fuels by 2017. The USEPA will be working closely with the Department of Transportation in developing new automotive efficiency standards.

3.4.2.2 State

California Air Resources Board

The CARB, part of the California Environmental Protection Agency, 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 California CAA, as amended in 1992, requires all air districts in the State to endeavor to achieve and maintain the California Ambient Air Quality Standards (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. The 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. The CARB established passenger vehicle fuel specifications, which became effective on March 1996. The 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. The CARB also monitors ambient air quality throughout the State.

California established ambient air quality standards as early as 1969 through the Mulford-Carroll Act. Pollutants regulated under the California Clean Air Act are similar to those regulated under the Federal Clean Air Act. In many cases, California standards are more stringent than the NAAQS. Federal and State air quality standards are shown in **Table 3.4-3**. Both the National and California ambient air quality standards have been adopted by the BAAQMD.

Table 3.4-3. 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	—
	1-hour	0.09 ppm	— ^e	Same as primary
Carbon monoxide	8-hour	9.0 ppm	9 ppm	—
	1-hour	20 ppm	35 ppm	—
Nitrogen dioxide	Annual	0.03 ppm	0.053 ppm	Same as primary
	1-hour	0.18 ppm	—	—
Sulfur dioxide	Annual	—	0.03 ppm	—
	24-hour	0.04 ppm	0.14 ppm	—
	3-hour	—	—	0.5 ppm
	1-hour	0.25 ppm	—	—

Table 3.4-3. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards ^(a)	
			Primary ^(b,c)	Secondary ^(b,d)
PM ₁₀	Annual	20 µg/m ³	— ^e	Same as primary
	24-hour	50 µg/m ³	150 µg/m ³	Same as primary
PM _{2.5}	Annual	12 µg/m ³	15 µg/m ³	
	24-hour	—	35 µg/m ^{3e}	
Lead	Calendar quarter	—	1.5 µg/m ³	Same as primary
	30-day average	1.5 µg/m ³	—	—

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.

e) The national 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005. A new 8-hour standard was established in May 2008. The annual PM₁₀ standard was revoked by U.S. EPA on September 21, 2006 and a new PM_{2.5} 24-hour standard was established.

Source: California Air Resources Board, May 2009.

Climate Change/Greenhouse Gas Legislation and Plans

The State of California has been studying the impacts of climate change for more than 20 years. State actions to address global climate change target automobile emissions, stationary sources and power generation, land use planning, and the development of sustainable communities. Summaries of applicable State legislation dealing with global climate change and greenhouse gas emissions are presented in **Table 3.4-4**.⁷

AB 32 Scoping Plan

Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, sets a goal of reducing GHG emissions statewide to 1990 levels by 2020. The CARB is the lead agency for implementing the Act. AB 32 requires the CARB to prepare a Scoping Plan containing the main strategies that will be used to achieve reductions in GHG emissions in California.

⁷ Table 3.4-4 is a list of legislation, and does not include Executive Order S-03-05, which established greenhouse gas emissions reduction goals and directed State agencies to report annually on efforts to meet those goals. This Executive Order directs CalEPA to coordinate agency efforts to reduce emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 per cent below 1990 levels by 2050.

Table 3.4-4. Summary of State of California Relevant Greenhouse Gas Legislation

Bill, Year	Action
AB 4420, 1988	Directed California Energy Commission, in consultation with the CARB and other agencies, to “study and report...on how global warming trends may affect California’s energy supply and demand, economy, environment, agriculture, and water supplies
AB 1493, 2002	Requires CARB “develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of greenhouse gases from motor vehicles”.
AB 32, 2006 California Global Warming Solutions Act of 2006	Requires statewide GHG emissions be reduced to 1990 levels by 2020 Reduction accomplished via enforceable statewide cap on GHGs to be phased in starting in 2012. Directs CARB to develop and implement regulations to reduce statewide emissions from stationary sources. Specifies that regulations adopted in response to AB 1493 be used to address GHG emissions from vehicles Requires CARB adopt a quantified cap on GHG emissions representing 1990 emissions levels Includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.
Senate Bill 1368, 2007	Companion bill to AB32. Requires California Public Utility Commission (CPUC) to establish GHG emission performance standards for investor and publicly owned electrical generation facilities June 30, 2007. Requires all electricity provided to California, including imported, be generated by plants standards set by Public Utility Commission (PUC) and CEC.
Senate Bill 97, 2007	Directs Governor’s Office of Planning and Research (OPR) to develop proposed CEQA Guidelines by July 1, 2009, and adopt guidelines by January 1, 2010.
Senate Bill 375, 2008	Requires coordination between transportation planning and land use planning. Directs CARB to develop regional greenhouse gas emission reduction targets to be achieved from automobile and light truck sectors by 2020 and 2035 CARB will work with California’s 18 metropolitan planning organizations to align their regional transportation, housing and land-use plans and prepare a “sustainable communities strategy” to reduce vehicle miles traveled in their respective communities.

CARB released the Climate Change Proposed Scoping Plan in October 2008 and adopted the Plan on December 12, 2008. This plan contains an outline of the proposed State strategies to achieve the 2020 greenhouse gas emission limits. Key elements of the Scoping Plan include the following recommendations:

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
2. Achieving a statewide renewables energy mix of 33 percent;
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;

4. Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
5. Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel standard;
6. Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

Under the Scoping Plan, approximately 85 percent of the state's emissions would be subject to a cap-and-trade program where covered sectors are placed under a declining emissions cap. Emissions reductions will be achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations. It is expected that emission reduction from this cap-and trade program will account for a large portion of the reductions required by AB 32.

Proposed CEQA Guidelines (SB 97)

Pursuant to SB 97, on July 3, 2009, the California Natural Resources Agency began the formal rulemaking process for the adoption of CEQA Guideline Amendments for greenhouse gas emissions. Generally, the proposed guidelines seek to apply CEQA's existing rules for impact analysis to the topic of greenhouse gas emissions, specifying in several instances, for example, that determinations on greenhouse gas emissions must be supported by substantial evidence, as with other CEQA determinations. The draft guidelines do not propose a particular threshold of significance to be applied in determining whether a project's contribution to global climate change is significant. Rather, the draft guidelines provide guidance on determining the significance of impacts resulting from a project's greenhouse gas emissions as well as appropriate mitigation measures (proposed Guidelines 15064.4 and 15126.4). The guidelines indicate that lead agencies have discretion to determine which type of methodology to use to evaluate greenhouse gas emissions, given that such methodologies are evolving (proposed Guideline 15064.4). The proposed Guidelines were revised in response to public comments, and those revised proposed Guidelines were circulated for a second, shorter round of public comment in November 2009. The Guidelines are anticipated to be certified by the Secretary of the Resources Agency by January 1, and the proposed Guidelines will then undergo the formal rulemaking process overseen by the Office of Administrative Law. It is thus anticipated that these Guidelines will be incorporated into the California Code of Regulations sometime in early 2010.

CAPCOA CEQA and Climate Change White Paper

The California Air Pollution Control Officers Association (CAPCOA) prepared a "white paper" on CEQA and climate change in January 2008. The white paper was intended to be used as a resource by lead agencies when considering policy options and not as a guidance document. Specifically, the white paper discusses three possible approaches to evaluating the significance of GHG emissions and possible mitigation measures, without endorsing any particular approach. The three alternative significance approaches are: (1) not establishing a significance threshold for

GHG emissions; (2) setting the GHG emission threshold at zero; and (3) setting the GHG emission threshold at some non-zero level. The white paper provides a list of potential mitigation measures and discusses each in terms of emissions reduction effectiveness, cost effectiveness, and technical and logistical feasibility. While programs are still being developed by CARB, the white paper is intended to provide public agencies with information to ensure that GHG emissions are, according to CAPCOA, "appropriately considered and addressed under CEQA."

Health Risk Assessments

In 2005, CARB issued guidance to local governments that recommended buffers between sources of air pollution and sensitive receptors. CARB identified medical facilities, such as a hospital, as sensitive land uses. For freeways, CARB recommended that sensitive land uses be avoided within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day (OEHHA 2003). The CARB recommendations are advisory in nature and do not reflect local conditions. In their guidance, CARB notes that land use agencies have to balance other considerations including housing and transportation needs, economic development priorities, and other quality of life issues.

CARB established the 500-foot buffer recommendation based on review of air pollution studies and air dispersion modeling. Air pollution studies indicate that residing close to freeways or busy roadways may result in adverse health effects beyond those typically found in urban areas. Several studies found an association between adverse non-cancer health effects (e.g., asthma) and living or attending school near heavily traveled urban roadways. In addition, proximity to freeways increases exposure to particulate matter and cancer risk. Diesel particulate matter, or DPM, poses the greatest cancer risk from roadways. On average, CARB reports that DPM represents about 70 percent of the potential cancer risk from vehicle travel.

Studies reviewed by CARB found measured air pollution concentrations from motor vehicles drop off dramatically between the source and 500 feet. These studies were consistent with CARB air quality modeling and risk analyses performed for freeways. CARB's modeling was based on 2000 information that included higher DPM emissions rates. CARB's EMFAC2007 model shows that new vehicle standards, diesel fuel reformulation, and CARB adopted Diesel Risk Reduction Measures has resulted in lower vehicle emissions. CARB's published health risk maps show that potential cancer risks near freeways will be substantially reduced in 2010 from 2000 levels. In addition, CARB recently adopted new rules requiring retrofit of large diesel-fueled vehicles that will further reduce DPM emissions by over 50 percent in 2014.

The BAAQMD Draft CEQA guidelines released in September 2009 and updated in October and November 2009 propose to require analysis of risks within a 1,000 foot radius around proposed new sensitive receptors for the measurement of potential cancer risks from sources of air pollution.

3.4.2.3 Local

Bay Area Air Quality Management District

In 1955, the California Legislature created the Bay Area Air Quality Management District (BAAQMD). The agency is primarily responsible for assuring that the National and State

ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also responsible for 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, conducting public education campaigns, as well as many other activities. The BAAQMD does not have authority to regulate emissions from motor vehicles.

The BAAQMD regulates air quality in the southern portion of Sonoma County where the project will be located. Certain stationary and area emission sources are subject to BAAQMD Regulations and Rules. Mobile sources, both off-and on-road are not subject to BAAQMD authority. BAAQMD rules and regulations that may apply to the proposed hospital facility are described below.

- Permitting Rule 2-1-301 requires that any person installing, modifying, or replacing any equipment, the use of which may reduce or control the emission of air contaminants, shall first secure written authorization from the Air Pollution Control Officer (APCO). Project equipment that may require permitting includes the boiler, cooling tower, chillers, and diesel-fueled emergency generator. Rule 2-1-302 requires that written authorization from the APCO be secured before any such equipment is used or operated.
- New Source Review Rule 2-2, New Source Review (NSR), applies to all new and modified sources or facilities that are subject to the requirements of Rule 2-1-301. The purpose of the rule is to provide for review of such sources and to provide mechanisms by which no net increase in emissions will result.
- Best Available Control Technology Rule 2-2-301 requires that an applicant for an Authority to Construct (ATC) or Permit to Operate (PTO) apply best available control technology (BACT) to any new or modified source that results in an increase in emissions and has emissions of precursor organic compounds, non-precursor organic compounds, NO_x, SO₂, PM₁₀, or CO of 10.0 pounds or more per highest day.
- Equipment Specific Requirements Both the boiler and the diesel-fueled emergency generator would be subject to equipment-specific requirements.
 - *Boiler Requirements* – The boiler will be subject to Rule 9-7, Nitrogen Oxides and Carbon Monoxide From Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters, which applies to boilers and other equipment with a rated heat input of 10 million Btu per hour (MMBtu) or greater. The rule includes minimum emission limits for NO_x and CO to be met, as well as monitoring, record keeping and reporting requirements. The boiler would also be subject to the federal New Source Performance Standards (NSPS) for boilers, which have been adopted by the BAAQMD under Regulation 10, Standards of Performance for New Stationary Sources.
 - *Diesel Fueled Engines* – Rule 9-8, Nitrogen Oxides and Carbon Monoxide From Stationary Internal Combustion Engines, includes NO_x and CO emission limits for internal combustion engines, as well as operating, monitoring, record keeping, and reporting requirements for emergency generators. In addition to Rule 9-8, diesel-fueled engines that emit diesel exhaust particulate matter are subject to the District's Risk

Management Policy for Diesel-Fueled Engines in addition to the standard permitting requirements. The applicant must demonstrate through air dispersion modeling that the diesel exhaust particulate matter would not cause a significant health risk. The acceptable health risk is an increased cancer risk of one in one million (1×10^{-6}), unless the engine used Best Available Control Technology for Toxics (TBACT), in which case the acceptable risk is 10 in one million (10×10^{-6}).

- *Prohibitory Rules* – Regulation 6 pertains to particulate matter and visible emissions and limits the quantity of particulate matter emitted into the atmosphere through the establishment of limitations on emission rates, concentration, visible emissions, and opacity. Visible emissions from a source are required to be less than 20% opacity (No. 1 Ringelmann) for any period aggregating to 3 minutes in any one hour. Additionally, for heat transfer operations (e.g., the boiler), the particulate matter emissions are not to exceed 0.15 grains per dry standard cubic foot, corrected to 6% oxygen. Although, the engine for the emergency generator will be fired with diesel fuel, the BAAQMD will require that the engine be a modern, low emissions engine, and is not expected to exceed the opacity limit. For the boiler, since it will be fired on natural gas, no visible emissions are expected and particulate matter emissions will be negligible.

Specific requirements, including emission control technology requirements and emission limitations, as well as operating, monitoring, record keeping, and reporting requirements for the equipment that need to be permitted by the BAAQMD would be determined during the permitting process prior to installation of the applicable equipment.

BAAQMD Draft CEQA Thresholds

The BAAQMD published a set of guidelines for determining the significance of pollutant emissions in 1999. *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans (December 1999)*. The BAAQMD released a draft update of these CEQA guidelines entitled “*California Environmental Quality Act Draft Air Quality Guidelines*” in September 2009. In October, BAAQMD released revised proposed guidelines and a further revision was released in early November for public comments. *BAAQMD California Environmental Quality Act Guidelines Update – Proposed Thresholds of Significance (November 2009)*. These guidelines have not been approved by the BAAQMD Board, and therefore are not yet effective. The proposed new guidelines do not contain a proposed effective date, and BAAQMD staff have advised that the effective date of the proposals will be considered by the BAAQMD Board when it considers the proposed thresholds. As this Draft EIR is being finalized, it is not certain when these proposals will be adopted, when the adopted proposals would become effective, and whether the BAAQMD Board will adopt the staff recommendations.

There are new thresholds of significance that have been proposed for criteria pollutants emitted during operational activities, criteria pollutants emitted during construction activities and greenhouse gases.

Criteria Pollutants

In the proposed BAAQMD CEQA guidelines the operational-related thresholds of significance were updated to include a $PM_{2.5}$ emission threshold. The daily threshold of significance for ROG and NO_x were reduced from 82 pounds per day to 54 pounds per day. The annual thresholds of

significance for ROG and NO_x and the daily and annual thresholds of significance for PM₁₀ remained unchanged. The table below shows the proposed updated thresholds of significance for operational-related emissions.

Thresholds of Significance for Operational-Related Emissions		
Pollutant/ Precursor	Annual Threshold (tpy)	Daily Threshold (lbs/day)
ROG	10	54
NO _x	10	54
PM ₁₀	15	82
PM _{2.5}	10	54

The previous BAAQMD CEQA Guidelines (“*BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*,” December 1999) did not set forth thresholds of significance for construction-related emissions. The BAAQMD suggested a list of mitigation measures for construction-related emissions (specifically PM₁₀ emissions) to reduce the impacts to be less than significant. The proposed BAAQMD CEQA guidelines have included thresholds of significance for construction-related emissions.

The BAAQMD proposed daily thresholds of significance for NO_x, ROG and PM_{2.5} of 54 pounds per day and a daily threshold of significance for PM₁₀ of 82 pounds per day (for construction exhaust emissions only). The table below shows the updated thresholds of significance for construction-related emissions.

Thresholds of Significance for Construction-Related Emissions	
Pollutant/ Precursor	Daily Threshold (lbs/day)
ROG	54
NO _x	54
PM ₁₀	82
PM _{2.5}	54

Greenhouse Gases (GHG)

The proposed BAAQMD CEQA guidelines include suggested thresholds of significance for greenhouse gases (GHG). These thresholds of significance were developed to comply with the existing California legislation adopted to reduce statewide GHG emissions. The proposed guidelines set forth a proposed threshold of significance for operational-related GHG emissions for land use projects that would allow any one of three factors to be used in determining significance. The significance threshold recommended by BAAQMD staff would be (a) compliance with a qualified climate action plan (b) project-related emissions of 1,100 metric tons per year (MT/yr) of CO₂ equivalent (CO₂e), or (c) project-related emissions of 4.6 metric tons of

CO₂e per service population per year⁸ (BAAQMD, November 2009), pp. 6). There are no thresholds of significance for construction-related GHG emissions in the proposed BAAQMD CEQA guidelines. BAAQMD staff recommends case by case consideration of construction GHG emissions and encourages project applicants to implement construction GHG reduction strategies where feasible. The October version of the proposed BAAQMD CEQA Guidelines generally refer to best management practices, including use of alternative fuels, use of local materials, and recycling of construction and demolition waste. (BAAQMD, October 2009, p. 28).

Sonoma County General Plan

The Open Space and Resource Conservation Element of the Sonoma County General Plan 2020 (Sonoma County, 2008) has the following goals, objectives and policies pertaining to this project and air quality:

Goal OSRC-14: Promote energy conservation and contribute to energy demand reduction in the County.

Objective OSRC-14.4: Reduce greenhouse gas emissions by 25 per cent below 1990 levels by 2015.

Goal OSRC-16: Preserve and maintain good air quality and provide for an air quality standard that will protect human health and preclude crop, plant and property damage in accordance with the requirements of the Federal and State Clean Air Acts.

Objective OSRC-16.1: Minimize air pollutant and greenhouse gas emissions.

Objective OSRC-16.2: Encourage reduced motor vehicle use as a means of reducing resultant air pollution.

The Sonoma County General Plan includes the following policies, in addition to those of the Circulation and Transit Element, to carry out those objectives.

Policy OSRC-16a: Require that commercial and industrial development projects be designed to minimize air emissions. Reduce direct emissions by decreasing the need for space heating.

Policy OSRC-16c: Refer projects to the local air quality districts for their review.

Policy OSRC-16d: Review proposed changes in land use designations for potential deterioration of air quality and deny them unless they are consistent with the air quality levels projected in the general plan EIR.

Policy OSRC-16h: Require that development within the Bay Area Air Quality Management District that generates high numbers of vehicle trips, such as shopping centers and business parks, incorporate air quality mitigation measures in their design.

Policy OSRC-16i: Ensure that any proposed new sources of toxic air contaminants or odors provide adequate buffers to protect sensitive receptors and comply with applicable health standards. Promote land use compatibility for new development by using buffering

⁸ The October 2009 *Revised Draft Options and Justification Report* prepared by BAAQMD staff and its consultant evaluates four other potential thresholds of significance for operational greenhouse gas emissions. One of these thresholds is a performance standard pursuant to which all projects would be required to achieve a 26% reduction in greenhouse gas emissions compared to business as usual.

techniques such as landscaping, setbacks, and screening in areas where such land uses abut one another.

Policy OSRC-16k: Require that discretionary projects involving sensitive receptors (facilities or land uses that include members of the population sensitive to the effects of air pollutants such as children, the elderly, and people with illnesses) proposed near the Highway 101 corridor include an analysis of mobile source toxic air contaminant health risks. Project review should, if necessary, identify design mitigation measures to reduce health risks to acceptable levels.

With respect to the General Plan goal of reducing greenhouse gas emissions, Assembly Bill 881 was enacted in 2009 to establish the Sonoma County Regional Climate Protection Authority. The Authority is governed by the same board as the Sonoma County Transportation Authority, but acts as a separate legal entity, and is authorized to perform coordination and implementation activities to assist local agencies in meeting their greenhouse gas reduction goals. Assembly Bill 881 was approved October 11, 2009 and the Authority will remain in effect until December 1, 2015.

Regional Clean Air Plans

The BAAQMD and other agencies prepare clean air plans in response to the State and Federal Clean Air Acts. Sonoma County also has General Plan policies that encourage development that reduces air quality impacts. In addition, BAAQMD has developed CEQA Guidelines (BAAQMD 1999) to assist local agencies in evaluating and mitigation air quality impacts.

2005 Ozone Attainment Plan

The latest Clean Air Plan, which was adopted in January 2006, is called the *Bay Area 2005 Ozone Strategy* (BAAQMD 2006). This plan includes 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 is designed to achieve a region-wide reduction of ozone precursor pollutants through the expeditious implementation of all feasible measures. The plan proposes expanded implementation of transportation control measures (TCMs) and programs such as Spare the Air. Spare the Air is a public outreach program designed to educate the public about air pollution in the Bay Area and promote individual behavior changes that improve air quality. Some of these measures or programs rely on local governments for implementation. An update to the plan is currently being developed and should be available by 2009.

PM₁₀ and PM_{2.5} Plans

The clean air planning efforts for ozone will also reduce PM₁₀ 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 PM₁₀ and PM_{2.5} emissions (e.g., Spare the Air Program). In 2003, the Legislature passed Senate Bill 656 (SB 656) that required further action by CARB and air districts to reduce public exposure to PM₁₀ and PM_{2.5}. Efforts identified by BAAQMD in response to SB 656 are primarily targeting reductions in wood

smoke emissions and adoption of new rules to further reduce nitrogen oxides (NO_x) and particulate matter from internal combustion engines and reduce particulate matter from commercial charbroiling activities. BAAQMD recently adopted a rule addressing residential wood burning. The rule restricts operation of any indoor or outdoor fireplace, fire pit, wood or pellet stove, masonry heater or fireplace insert on specific days during the winter when air quality conditions are forecasted to exceed the NAAQS for PM_{2.5}. The rule would also limit excess visible emissions from wood burning devices and require clean burning technology for wood burning devices sold (or resold) or installed in the Bay Area. NO_x emissions contribute to ammonium nitrate formation that resides in the atmosphere as particulate matter, so a reduction in NO_x emissions would reduce wintertime PM_{2.5} levels. The Bay Area experiences the highest PM₁₀ and PM_{2.5} in winter when wood smoke contributions to particulate matter are highest.

3.4.3 Impact Analysis

3.4.3.1 Approach and Methodology

Regional Emission Calculation Methodology

Air quality regional construction emissions were calculated based on the amount of fill material required by the project, the heavy equipment usage, and the area undergoing grading. For project operation, regional emissions calculations were based on the specifications for the proposed Medical Campus (e.g., building sizes, boiler use, and generator testing and specifications) and transportation emission associated with the Medical Campus. Project operation regional emissions also include emissions from potential increases in helicopter flights.

The primary sources of air pollutant emissions from the project include indirect emissions from traffic, area-source emissions (e.g., natural gas usage and landscaping), natural gas fired boilers for steam generation, increased helicopter trips, and emissions associated with daily testing of an emergency generator.

Phase I: Site Grading and Preparation

Haul Truck Trips. About 100,000 cubic yards of fill may be imported to the site for surcharging during Phase I activities (explanation of surcharging is provided in Section 3.7.3.9). The applicant estimates that about 180 loads of material would be brought to the site per day for a total of about 50 days, or about 9,000 round-trips (round-trips represent the total number of loads per year). Approximately 30,000 cubic yards of fill may be removed from the site after surcharging has taken place. The applicant estimates that about 7 loads of material will be removed from the site per day for a total of 365 days (one year), or about 2,700 round-trips.

The capacity of each truck was assumed to be about 11 cubic yards, based on information provided by Ghilotti Construction in January 2009 (Appendix C-1). Each load would include two trips: one in and one out. Sources of fill material have been identified within a 9-12-miles travel distance of the site according to Ghilotti Construction. For the emissions analysis, the fill material is conservatively assumed to be imported from and exported to an area about 15 miles away from the project site. For this analysis, each truck was assumed to travel along Mark West

Springs Road for the entire frontage of the project at 30 miles per hour. Travel to the center of the site was also assumed in the truck emission calculations.

Instead of surcharging the site, the applicant may choose to drive piles into the soil for the foundation of the hospital buildings. In that case, only 75,000 cubic yards of fill would be imported to the project site for site grading. The applicant estimates that about 6,750 round-trips are required to bring the fill to the project site or approximately 135 loads per day. The total time required to import the fill (50 days) and capacity of the truck will be the same as in the previous analysis. The fill is assumed to be imported from the same site as was previously assumed.

The emissions for criteria pollutants such as Reactive Organic Compounds (ROG), NO_x and PM₁₀ were estimated using the emission factors from CARB EMFAC2007 model for heavy-heavy-duty trucks for the year 2010. EMFAC2007 is an emission inventory model that calculates emission inventories for motor vehicles operating on roads in California. The model takes into account the change in emissions for future on-road vehicles by considering the changes in the fuel burning technology. In addition, travel activity and emission rates were combined to estimate daily air pollutant emissions during this activity. Calculated emissions from haul truck activity are conservative, since the EMFAC2007 model assumes the truck fleet will include heavy duty trucks from 1966 to 2010, with a majority of the fleet being from pre-1990. This will not be the case in actuality, and the actual emissions would be lower than estimated using the EMFAC2007 model.

Construction Activities. The BAAQMD does not require quantification of regional construction emissions. Therefore, these emissions are discussed qualitatively in the impacts section (see **Section 3.4.3.4**).

Phase II and III Build-Out Hospital/ Medical Office/ Physician Medical Center Building Operation

Under Phase II, the project hospital, PMC, and medical office building would be constructed and hospital services would be relocated to the project site. This would result in changes in traffic patterns that would affect air pollution emissions. The primary sources of new air pollutant emissions to the region from Phase II of the hospital portion of the project would be vehicle trips associated with the new hospital facility, emissions from testing of an emergency generator system (required by State law), and area source emissions such as natural gas emissions from space and water heating. Emissions for Phase II were calculated for 2014, the earliest date of operation.

Operation of the project would include on-site emissions and traffic-related emissions from activity associated with the new Medical Campus. These emissions at the current hospital location are part of the existing air quality conditions. However, they are presented here as a new source because the future uses of the existing hospital facilities on Chanate Road, which are being replaced with this project, are unknown at this time and could represent an addition to the existing emissions. The one exception to this is the helicopter flight emissions as it is unlikely that the future use of the existing hospital building will include helicopter flights. However, to provide a conservative impact analysis, this EIR assumes a maximum of 240 helicopter trips per year, compared to the current average of approximately 200 trips per year. Therefore, emissions from these assumed additional helicopter trips are included in the analysis.

Area sources from Phase II build-out of the proposed project were predicted by using the URBEMIS2007 model and separately computing emissions from natural gas consumption. (The URBEMIS2007 modeling did not include natural gas consumption.) Using annual natural gas consumption rates provided by the applicant, emissions were averaged over the entire year (i.e., daily consumption was the annual consumption divided by 365 days).

Projected trip generation (i.e., 4,584 daily trips) (see section 3.15 for more details) along with the project's land use types and sizes were input to the URBEMIS2007 model. Emissions were computed for a summer day and annually. For purposes of this analysis it was assumed that build-out of the project occurs by 2014. The year of analysis is important to consider when modeling vehicle emissions. The vehicle emission rates for ROG and NO_x are decreasing each year and are predicted to decrease substantially between 2010 and 2020. For instance, NO_x emission rates will decrease by 56 percent during that period because of improvements in vehicle emissions and retirement of older, more polluting vehicles from the roadways. Therefore, for years after 2014, actual vehicle emission rates will likely be less than the calculated emission rates.

Natural Gas and Boiler Emissions. Criteria pollutants like ROG, NO_x and PM₁₀ emissions from the boilers are included as part of the natural gas consumption emissions. Emission factors for the natural gas used by the URBEMIS2007 model were multiplied by the natural gas consumption rates.

Emergency Generator Emissions. The hospital facilities would require diesel-powered generators to provide electrical power to the hospitals during power outages. These generators must be tested routinely. Emergency generator emissions were computed for two Caterpillar 1500 kW generator sets. These emissions are based on the manufacturer data at 100 percent load. A testing schedule of 5 minutes per week, 0.5 hour each month, and annual testing on one day for eight hours (18.3 hours per year operation) was assumed for these calculations. Since normal Medical Campus emissions would occur simultaneously on days with testing, those emissions were added to the generator testing emissions.

The emergency generators at the existing facility have only been used on an average of 5.5 hours per year (Personal Communication from Nadin Sponamore, August 13, 2009). The emergency generators at the proposed project site will mostly likely be in operation for the same number of hours per year (less than 10 hours per year).

In Phase III, Sutter could expand the hospital by up to 29 beds. Such expansion would entail approximately 36,000 square feet of additional floor area; approximately 25,000 square feet of additional building "footprint"; and one- and two-story building additions. Emissions with full build out of the project, as defined in Phase III, were also modeled with URBEMIS2007. For purposes of this analysis, full build-out of Phase III is assumed to occur in 2014.

Helicopter Flight Emissions

Helicopter flight emissions are represented as a change between existing emissions and proposed emissions due to the new facility. Helicopter emissions were calculated using published

emissions factors for landing/takeoff operations (LTO) for a Bell 222 or similar helicopter⁹. The hospital was assumed to currently generate 200 annual helicopter trips¹⁰. For purposes of providing a conservative impact analysis, the number of helicopter trips is calculated at a worst case maximum of 240 trips per year with full buildout of Phase III. This increase would equate to about three additional trips per month. The average trip length for air pollutant emissions was assumed to be 15 miles for a one-way trip and 30 miles for a two-way trip (to and from the hospital). These assumptions are based on the fact that direct travel from the project site to the boundaries of the air basin (Bay Area Air Basin) is estimated to be about 15 miles. When looking at project air pollutant emission that affect regional air quality in the Bay Area Air Basin (e.g., hospital generated vehicle traffic emissions), emissions outside of the air basin are not considered as it is assumed that those emissions do not affect the basin. Travel speed was assumed to be 80 miles per hour.

Localized Emissions Methodology

Air quality localized emissions will have an effect on the sensitive receptors in the area. The localized construction and operation emissions were modeled to determine the health impact risks on the residential receptors in the vicinity. In addition, the emissions from heavy-duty trucks on US 101 were modeled to determine the health risk impacts to hospital patients and hospital workers.

Localized Project Construction and Operation Emissions

Haul Truck Trips. The localized emissions (such as DPM emissions) were estimated using the same methodology as was used for the regional haul truck emissions. The PM₁₀ gram per mile exhaust emission rate (assumed to be the DPM emission rate) was estimated using the EMFAC2007 model for heavy-duty trucks for the year 2010, when the fill would be imported.

Construction Activities. The localized construction emissions from Phase I were estimated by the URBEMIS2007 model using default values and the estimated area of disturbance from construction. URBEMIS is a model that was developed with the cooperation and input of several California air districts. It is widely approved within California for use in estimating emissions from land use development projects. URBEMIS2007 provides exhaust PM₁₀ emissions, which were assumed to be DPM from the construction activities.

Localized emissions from roadway construction adjacent to the project site were estimated using the Roadway Construction Emissions Model (Version 6.3.1) with default assumptions. The Roadway Construction Emissions Model was developed by the Sacramento Metropolitan Air Quality Management District (SMAQMD) to assist in determining the emission impacts of transportation projects. The SMAQMD Roadway Construction Model is based on the CARB-approved OFFROAD Model. The model has PM₁₀ (assumed to be DPM) emission factors that are based on the specific type of equipment, the horsepower of the equipment, and the year the construction activities occur. These emission factors are more site-specific than the BAAQMD

⁹ Guidance on Determination of Helicopter Emissions. Swiss Confederation, Federal Department of the Environment, Transport, Energy and Conservation. March 2009.

¹⁰ There were 199 helicopter trips in 2008 (the most recent complete year), 186 in 2007, and 213 in 2006.

emission factors, which do not account for the type of equipment used or the year in which the construction activities take place. Roadway construction was assumed to cover about 5 acres and occur over 6 months. The roadway emissions from the Roadway Construction Emission Model and construction emissions from the URBEMIS2007 model were combined and then modeled as two separate area sources across the site.

Emissions from pile driving hammers are from the combustion of diesel fuel in the engine or generator that powers the hammer. Since emission factors for pile driving hammers were not provided in URBEMIS, the localized emissions were estimated using emission factors based on manufacturer's data¹¹ for a Delmag D46-32- 96 kW-120 hp or similar hammer. Approximately 700 piles were assumed to be driven to a depth of 45 feet over the construction period based on information provided by the applicant. Based on professional engineering judgment using site-specific information, it was assumed that approximately 3 piles per hour would be driven by the hammer.

Operation Emissions. The primary source of TACs from routine operation of the project would be DPM emitted from truck deliveries. On average, there would be approximately 6 heavy-duty truck and 5 medium-duty truck trip daily deliveries anticipated. According to the EMFAC2007 guidance, medium-duty trucks weigh 14,001 to 33,000 pounds and heavy-duty trucks weigh 33,001 to 60,000 pounds. These deliveries would have two trips associated with them: one in and one out. The PM₁₀ gram per mile exhaust emission rate was estimated using the EMFAC2007 model for heavy and medium-duty trucks for the year 2014, which is the first year of full operation. Predicted PM₁₀ truck exhaust emissions were assumed to be DPM. These emissions were assumed to occur 6 days per week over 70 years of project operation. While emissions of DPM from trucks are anticipated to decrease substantially over the 70 year operation period, the higher 2014 emission factor was assumed for this assessment. Use of this factor would overstate the health risk associated with this activity. Similar to haul truck trips, these trucks were assumed to travel the entire frontage of Mark West Springs Road and travel on site to the loading areas.

Helicopters combust aviation fuel, which will not emit any DPM. Since DPM is the TAC of greatest concern, helicopter operations are not included in the localized emission analysis.

Emergency Generator Emissions. Emissions of DPM from the routine testing of the generators were included in the localized emission analysis/ health risk assessment analysis performed for the project's diesel sources. Two Caterpillar 1500 kW Generator Sets would be used for emergency power needs. The generator emissions information is provided in the *Environmental Air Quality Assessment, Sutter Hospital, Sonoma County, California* (Illingworth & Rodkin 2009a) (Appendix C-2). As mentioned above, testing of the generator set would occur on a weekly basis for 5 minutes, on a monthly basis for 30 minutes, and one day annually for 8 hours. During testing, the generators are assumed to operate at full load or over 2,200 horsepower.

Localized Emissions from US 101

The proposed project would place a hospital within 500 feet of the travel lanes of US 101. The EMFAC2007 model results were adjusted to the traffic mix on US 101 reported by Caltrans.

¹¹ Technical Data for exhaust emissions from diesel hammers: www.pileco.com/products/specifications/diesel-hammers/diesel-emission.pdf

Emission factors were developed for 2014, 2020 and 2030, using the calculated mix of diesel-fueled vehicles. Future DPM emissions for traffic on US 101 were developed using the latest version of the CARB EMFAC2007 emission factor model with defaults for Sonoma County. Future traffic increases projected on US 101 were provided by Dowling and Associates (Appendix K to this Draft EIR).

Health Risk Assessments

Residential Receptors. The Industrial Source Complex Short Term (ISCST3) model provided 1-hour concentrations at nearby residential receptor locations due to project construction and operation emissions (estimated using methodology mentioned above). The ISCST3 model is the USEPA's current regulatory model and is based on a steady-state Gaussian plume algorithm. The model can be used for estimating ambient impacts from point, area, and volume sources out to a distance of about 50 kilometers.

Hospital Receptors. Dispersion modeling for sensitive receptors at the hospital was conducted using the CAL3QHCR model, which is acceptable to the BAAQMD for this type of analysis. A 4-year set of hourly meteorological data for the Sonoma County Airport was obtained from the BAAQMD's website and used in the modeling. The station, located one mile south-southwest of the project site, is considered to have metrological conditions that are reasonably representative of the project site. Other inputs to the model included geometry (based on site plans), current traffic conditions reported by Caltrans for US 101, and the DPM emission factors obtained from the EMFAC 2007 model for traffic on US 101.

3.4.3.2 Thresholds of Significance

The primary sources of air pollutant emissions from the project include indirect emissions from traffic, area-source emissions (e.g., natural gas usage and landscaping), natural gas fired boilers for steam generation, helicopter trips, and emissions associated with daily testing of an emergency generator.

The CEQA Guidelines (Appendix G) provide the following checklist of significance criteria for air quality impacts. For the purposes of this EIR, an impact is considered significant if the implementation of the proposed project would:

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

Where applicable, the evaluation of significance is accomplished by comparing estimated project emissions to significance thresholds established by the BAAQMD. As previously noted,

BAAQMD has proposed the adoption of new recommended thresholds of significance for project emissions, including emissions of greenhouse gasses, but it is not certain when these proposals will be adopted, when they will take effect, and whether the BAAQMD Board will adopt the staff recommendations. In the interest of full disclosure, this EIR discusses the recommended draft thresholds in the following impact analysis.

Criteria Pollutants

To attain and maintain ambient air quality standards for ozone and PM₁₀, the BAAQMD has established thresholds of significance for evaluating direct and indirect emissions of air pollutants from projects. These thresholds are for ozone precursors (reactive organic gases and nitrogen oxides) and PM₁₀. There are no thresholds for PM_{2.5} in the current BAAQMD CEQA Guidelines; however, these guidelines are being updated. The annual BAAQMD threshold for ROG, NO_x and PM₁₀ is 15 tons per year. The daily BAAQMD threshold for ROG, NO_x and PM₁₀ is 80 pounds per day.

The BAAQMD CEQA Guidelines do not recommend quantification of construction period emissions because these emissions are temporary and construction equipment is considered to be included in the regional air pollutant emissions inventories that are the basis of regional attainment plans. The BAAQMD does not have thresholds for construction emissions. However, PM₁₀ emissions are the pollutant of greatest concern from construction activities, according to the BAAQMD CEQA Guidelines. BAAQMD lists mitigation measures in Table 2 of its CEQA Guidelines to reduce the construction fugitive dust emission impacts from these emissions to be less than significant. In addition, mitigation measures are included to reduce equipment exhaust emissions.

GHG Emissions

To date, no local or state air quality agency has adopted significance criteria for determining whether a land use project's GHG emissions would make a cumulatively considerable impact¹² on the environment. While the Global Warming Solutions Act (AB 32) created a framework for the reduction of GHGs in California, the Act did not address the role of CEQA in achieving the goals of the Act. In August 2007, the governor signed SB 97 into law, which requires the Office of Planning and Research (OPR) to prepare CEQA guidelines for the mitigation of GHG emissions or the effects of greenhouse gas emissions. On July 3, 2009, the California Natural Resources Agency began the formal rulemaking process for the adoption of CEQA Guideline amendments concerning the evaluation of greenhouse gas emissions, and the proposed guidelines, which remain subject to further comment and revision, are expected to become effective early in 2010. The draft guidelines as currently proposed do not set forth a specific

¹² While no guidance exists to indicate what level of GHG emissions would be considered substantial enough to result in a project-specific significant adverse impact on global climate, it is generally the case that an individual project of any size is of insufficient magnitude by itself to influence climate change or result in a substantial contribution to the global GHG inventory. Thus, GHG impacts are recognized as exclusively cumulative impacts; as no single project generates significant climate change or greenhouse gas emissions impacts (BAAQMD, October 2009, p. 1; CAPCOA 2008). Accordingly, discussion of the Proposed Project's GHG emissions and their impact on global climate are addressed in terms of the its contribution to the cumulative impact of global climate change.

proposed threshold of significance, but indicate that lead agencies assessing the significance of greenhouse gas emissions on the environment may consider factors that include whether the project increases or reduces greenhouse gas emissions as compared to the existing environmental setting, whether project emissions exceed a significance threshold that the lead agency determines may apply to the project, and whether the project complies with regulations or requirements adopted to implement a greenhouse gas reduction plan.¹³

CEQA requires analysis of a project's environmental effects based on the net increment of change that would occur as a result of the project. Such an analysis requires a methodology to determine the increment of change, as well as appropriate standards for determining whether the change is significant. In the case of GHG emissions, the relevant federal, state, and local agencies have not yet identified either a methodology or standards for determining the incremental impact on climate change from this type of land use development project. Furthermore, neither the state nor the County has yet adopted regulations or requirements implementing a state or local greenhouse gas reduction plan.

As indicated in the Governor's letter to the Senate upon signing SB 37 (<http://www.opr.ca.gov/ceqa/pdfs/SB-97-signing-message.pdf>), the development of CEQA significance thresholds and methodologies should be guided by the appropriate responsible agencies to achieve a standardized approach consistent with AB 32. This is especially important given the complexity of climate change and the state's leadership role in establishing California's response to this important environmental issue.

The BAAQMD released draft thresholds of significance in September 2009 (these were updated in October 2009 and again in November 2009). BAAQMD proposes three different project thresholds of significance for GHG emissions: (1) compliance with a qualified Climate Action Plan, (2) a bright line emissions threshold of 1,100 metric tons of CO₂e (carbon dioxide equivalent) per year, or (3) emissions of 4.6 metric tons of CO₂e per capita per year for mixed use projects. The emissions based thresholds are for operational impacts. BAAQMD did not identify emission based thresholds for construction activities. Instead, best management practices are suggested for construction projects. These draft thresholds are currently under review and may be further revised, with adoption not expected to occur until December 2009 or early 2010.¹⁴

TACs

According to the BAAQMD, TAC emissions would be significant if they increased the probability for contracting cancer for the Maximally-Exposed Individual that exceeds 10 in one million.

¹³ Proposed Guideline 15064.4, *Determining the Significance of Impacts from Greenhouse Gas Emissions*, July 3, 2009.

¹⁴ The BAAQMD proposals and updated versions of those proposals can be viewed on the BAAQMD website at <http://www.baaqmd.gov/Divisions/Planning-and-Research/Planning-Programs-and-Initiatives/CEQA-GUIDELINES.aspx>

3.4.3.3 *Less Than Significant Impacts Not Requiring Further Analysis*

The project is not expected to be a source of objectionable odors that would affect the general public. Existing sources of odors that could affect the proposed project were not identified.

3.4.3.4 *Impacts and Mitigation*

The primary sources of air pollutant emissions from the project include indirect emissions from traffic, area-source emissions (e.g., natural gas usage and landscaping), natural gas fired boilers for steam generation, helicopter trips, and emissions associated with daily testing of an emergency generator.

Construction Impacts

Impact AIR-1: Temporary Increase of Criteria Pollutants for Which the Project Region Is Non-Attainment Haul truck trips bringing fill to the proposed project site could potentially result in a net increase of criteria pollutants (ROG, NO_x and PM₁₀) 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)

Significance: Potentially significant

Discussion:

Standard construction equipment (including pile driving hammers) generates criteria pollutants (such as NO_x and ROG) from fossil fuel combustion. The BAAQMD's 1999 CEQA Guidelines do not include thresholds for standard construction emissions and do not typically require quantification of these emissions. However, for the purpose of this EIR, haul trips to import or remove fill material were considered to be non-standard construction activities. Emissions from haul trucks trips were calculated using travel estimates and emission factors from the EMFAC2007 model and compared to the BAAQMD's 1999 CEQA Guidelines emissions thresholds for long-term operations.

About 100,000 cubic yards of fill may be imported to the site for surcharging activities requiring approximately 9,000 round-trips. Each truck is assumed to have a capacity of about 11 cubic yards. The truck capacity was provided in a letter from Ghilotti Construction dated January 2009 (Appendix C-1). This amounts to approximately 180 loads of material brought to the site per day for a total of approximately 50 days. About 30,000 cubic yards of fill will be removed from the project site, after surcharging has taken place. Approximately 7 loads of material will be removed from the site per day for a total of 365 days (one year), or about 2,700 round-trips. Again, each truck is assumed to have a capacity of about 11 cubic yards.

Instead of importing these large quantities of fill, the applicant may choose to drive piles into the soil for the foundation of the hospital buildings. In this case, only 75,000 cubic yards of fill will be imported to the project site for surcharging. The applicant estimates that about 6,700 round-trips are required to bring the fill to the project site or approximately 135 loads per day for a total of about 50 days.

Each load would include two trips: one in and one out. The PM₁₀ gram per mile exhaust emission rate was estimated using the EMFAC2007 model for heavy-duty trucks for the year 2010. Each truck was assumed to travel along Mark West Springs Road for the entire frontage of the project. Travel to the center of the site was also assumed in the truck modeling.

Truck haul emissions are reported in **Table 3.4-5** and **Table 3.4-6**. Assuming all haul trips are conducted in 2010, annual emissions from this activity would not exceed the annual thresholds established by the BAAQMD. However, daily emissions from this activity would exceed thresholds for NO_x and PM₁₀. The NO_x emissions would be associated with vehicle exhaust, while most of the PM₁₀ emissions would be associated with entrained dust from truck travel. Although temporary (less than 5 years), the daily emissions associated with haul truck trips would be considered significant. Mitigation is recommended to reduce this impact but even after implementation of the mitigation the impact is still considered significant.

Table 3.4-5. Project Emissions from Haul Truck Trip Activity (No Pile Driving)

Scenario	Modeled Emissions in pounds per day and tons per year		
	Reactive Organic Gases (ROG)	Nitrogen Oxides (NO _x)	Respirable Particulates (PM ₁₀)
Daily Haul Trips (Import)	13 pounds	171 pounds	171 pounds
2010 Annual Haul Trips (Import)	0.33 tons	4.27 tons	4.28 tons
Daily Haul Trips (Export)	1 pound	7 pounds	7 pounds
2010 Annual Haul Trips (Export)	0.10 tons	1.28 tons	1.28 tons
Total Daily Emissions	14 pounds	178 pounds*	178 pounds*
Total Annual Emissions	0.43 tons	5.55 tons	5.56 tons
<i>BAAQMD Thresholds</i>	<i>80 pounds per day and 15 tons per year</i> <i>* Exceedances are presented in bold¹⁵</i>		

Table 3.4-6. Project Emissions from Haul Truck Trip Activity (With Pile Driving)

Scenario	Modeled Emissions in pounds per day and tons per year		
	Reactive Organic Gases (ROG)	Nitrogen Oxides (NO _x)	Respirable Particulates (PM ₁₀)
Daily Haul Trips (Import)	10 pounds	128 pounds *	128 pounds*
2010 Annual Haul Trips (Import)	0.25 tons	3.20 tons	3.21 tons
<i>BAAQMD Thresholds</i>	<i>80 pounds per day and 15 tons per year</i> <i>* Exceedances are presented in bold¹⁶</i>		

¹⁵ These would also be exceedances under BAAQMD's 2009 proposed emissions thresholds for construction emissions.

¹⁶ These would also be exceedances under BAAQMD's 2009 proposed emissions thresholds for construction emissions.

**Mitigation AIR-1:
Reduce Length of Haul
Truck Trips, Restrict
Idling**

The following measures could reduce emissions associated with haul truck trips to the project site.

- a) Preference for material to be imported to the site should be given to sources closest to the project site;
- b) Enforce state idling restrictions that apply to large trucks and construction equipment by posting clearly visible signs at the haul truck entrances that clearly stating the restrictions (no idling for greater than 5 minutes at any location);
- c) If possible, avoid haul truck trips on days when Spare the Air Days are forecasted by the BAAQMD.

Because the source of the fill material and schedule for importing fill has not been determined at this time, the exact effectiveness of these measures is unknown. However, it is known that haul truck trips will be within a 15-mile radius of the project and impacts were calculated based on 15-mile distance from fill source.

Fugitive dust control measures associated with the haul truck activities are addressed in Mitigation AIR-2a.

**Significance After
Mitigation:**

Significant and unavoidable because effectiveness of mitigation measures are difficult to quantify without information regarding the distance to the fill source. Even if information about the distance from the fill source was known, due to the large quantities of fill imported and exported, mitigation measures might not reduce impacts to a less than significant level. This is because of the significant daily NO_x and PM₁₀ exceedances from haul truck activities.

**Impact AIR-2:
Temporary Exposure of
Sensitive Receptors to
Construction Dust and
Exhaust Emissions**

Fugitive dust and exhaust emissions (from construction equipment and pile driving fuel combustion) during demolition, construction, and grading could expose sensitive receptors to substantial criteria pollutant concentrations

Significance: Potentially significant

Discussion:

Construction Dust

During demolition, grading and construction activities (including site surcharging), dust would be generated. Most of the dust would result during grading activities, while some dust might result from hauling of fill material to and from the site as well as pile driving activities. 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. Typical winds

during late spring through summer are from the west-southwest. Nearby residences could be adversely affected by dust generated during construction activities.

Although grading and construction activities would be temporary, they would have the potential to cause both nuisance and health air quality impacts. PM₁₀ is the pollutant of greatest concern associated with dust. If uncontrolled, PM₁₀ levels downwind of actively disturbed areas could possibly exceed State standards. In addition, dust fall on adjacent properties could be a nuisance. If uncontrolled, dust generated by demolition, grading, hauling and construction activities represents a *potentially significant* impact. Implementation of the measures recommended by the BAAQMD and listed in Mitigation AIR-2a would reduce the air quality impacts associated with construction dust emissions to a less than significant level.

Construction Equipment Exhaust

Construction equipment (including pile driving hammers) generates criteria pollutants (such as NO_x and ROG) from fossil fuel combustion. Such emissions would be temporary and cease as soon as the construction period ends. Mitigation to reduce criteria pollutant exhaust from construction equipment is provided in Mitigation AIR-2b. Construction equipment also emits toxic air contaminants (TAC) in the form of diesel particulate matter (DPM). Exposure of sensitive receptors to DPM emissions are addressed in Impact AIR-6.

Mitigation AIR-2a: Include Measures to Control Dust Emissions

Implementation of the measures recommended by the BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less than significant level:

- 1) Water all active construction areas at least twice daily and more often during windy periods. Active areas adjacent to residences should be kept damp at all times.
- 2) Cover trucks or maintain at least two feet of freeboard. Dust-proof chutes shall be used to load debris onto trucks during demolition.
- 3) Pave, apply water at least twice daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas.
- 4) Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads.
- 5) Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (i.e., within 10 days for previously-graded areas where final grading has occurred and for other construction areas that have been inactive for 30 days or more).
- 6) Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles.

- 7) Limit traffic speeds on any unpaved roads to 15 mph.
- 8) Replant vegetation in disturbed areas as quickly as possible.
- 9) Suspend construction activities that cause visible dust plumes to extend beyond the construction site.
- 10) Limit the area subject to excavation, grading and other construction activity at any one time

**Mitigation AIR-2b:
Include Measures to
Reduce Criteria
Pollutant Exhaust From
Construction Equipment**

- 1) The project shall ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately. This measure means that equipment with continuous dark emissions is in violation of the requirement. A visual survey of all in-operation equipment shall be made at least weekly throughout the duration of the project construction. A record of the inspection shall be maintained on-site. The BAAQMD and/or other officials may conduct periodic site inspections to determine compliance.
- 2) The contractor shall install temporary electrical service whenever possible to avoid the need for independently powered equipment (e.g., compressors).
- 3) Signs shall be posted that indicate diesel-powered equipment standing idle for more than five minutes shall be turned off or operators would be subject to fines. This would include trucks waiting to deliver or receive soil, aggregate, or other bulk materials. Rotating drum concrete trucks could keep their engines running continuously as long as they were onsite.
- 4) Properly tune and maintain equipment for low emissions.
- 5) The applicant shall designate a Disturbance Coordinator responsible for ensuring that mitigation measures to reduce air quality impacts to nearby residences from construction are properly implemented. The Disturbance Coordinator shall be responsible for notifying adjacent land uses of construction activities and schedule and shall provide a written list of the aforementioned dust control measures. The list shall identify a contact person that will respond to any complaints. A log shall be kept of all complaints and the actions taken to remedy any valid complaint as well as the response period.

**Significance After
Mitigation:**

Less than significant. According to BAAQMD, although construction emissions are not quantified, implementation of recommended mitigation measures will ensure impacts will be less than significant.

Operational Impacts

**Impact AIR-3:
Consistency With
Applicable Air Quality
Plan** Operation of the new Medical Campus would generate air emissions which could conflict with or obstruct implementation of the applicable air quality plan

Significance: Less than significant

Discussion:

BAAQMD is the regional agency responsible for overseeing compliance with State and Federal air quality laws, regulations, and programs within the San Francisco Bay Area Air Basin. The BAAQMD has prepared and/or implements specific plans to meet the applicable laws, regulations, and programs. The Bay Area 2005 Ozone Strategy is the latest adopted Clean Air Plan (BAAQMD 2006). This plan describes the Bay Area's strategy for compliance with State one-hour ozone standard planning requirements. 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 (GPA), the project may depart from the assumptions used to formulate clean air plan strategies in such a way that the cumulative result of incremental changes may hamper or prevent the Plan from achieving the goals. This is because land use patterns influence transportation needs, and motor vehicles are the primary source of air pollution. Projects proposed in jurisdictions with general plans that are consistent with the BAAQMD's *Clean Air Plan* and projects that conform to the applicable general plan would not have significant cumulative impacts. The BAAQMD's 2005 Ozone Strategy also contains a list of transportation control measures that are intended to reduce emissions from vehicles travel. Among this list are 7 measures that the BAAQMD relies on local jurisdictions such as the County to implement through General Plan policies. Exhibit 4.3-5 to the Sonoma County General Plan 2020 environmental impact report lists the relevant general plan 2020 programs which implement the 7 BAAQMD transportation control measures. Sonoma County General Plan 2020 EIR, p. 4.3-12 to 4.3-14. The Sonoma County Board of Supervisors adopted the County General Plan 2020 in September 2008.

This project, which will replace Sutter's existing hospital campus on Chanate Road, is anticipated to continue to serve the needs of forecasted population growth in the region. Both the current General Plan and the zoning allow for the proposed development and land use. Development of the project is not anticipated to interfere with population projections used in Clean Air Plans.

Mitigation: No mitigation required

**Impact AIR-4:
Insignificant Long-Term
Increases in Carbon
Monoxide Emissions** Carbon monoxide emissions from traffic associated with the operation of the proposed Medical Campus could violate carbon monoxide standards.

Significance: Less than significant

Discussion:

Carbon monoxide emissions from traffic generated by the project would be a pollutant of concern at the local level. Congested intersections with a large volume of traffic have the greatest potential to cause highly-localized concentrations of carbon monoxide. The intersection of Mark West Springs Road and Old Redwood Highway would be most affected by project traffic that could lead to the highest carbon monoxide concentrations at sensitive receptors (i.e., residences). There are 1- and 8-hour standards for carbon monoxide. The 8-hour standard is the most stringent and historically has always been exceeded if the 1-hour standard is exceeded. Therefore, this analysis evaluated impacts against the 8-hour standard.

Carbon monoxide concentrations were modeled using screening methods recommended by the BAAQMD that are based on the CALINE4 Line-Source dispersion model. This method uses traffic volumes, emissions, meteorology, and the roadway/receptor geometry. For this assessment, meteorological conditions most conducive for high carbon monoxide concentrations in the Bay Area, peak-hour traffic conditions (i.e., evening period), slow traffic speeds and emission factors generated by the California Air Resources Board emission factor model (i.e., EMFAC2007) were used as input to the model. Modeled concentrations were added to background levels to predict total carbon monoxide concentrations. This assessment was conducted for existing conditions (2008) and 2014 both with and without the project. Results of this assessment are shown in **Table 3.4-7**.

Table 3.4-7. Predicted 8-Hour Worst Case Carbon Monoxide Levels (in ppm)

Description	2008 Existing	2014 No Project	2014 with Project (Ph. I & II)
Mark West Springs Road and Old Redwood Highway*	4.3 ppm	4.4 ppm	4.4 ppm
Mark West Springs Road and Old Redwood Highway **	4.4 ppm	4.1 ppm	4.2 ppm
Worst-Case Emissions	4.4 ppm	4.4 ppm	4.4 ppm
<i>Significance Thresholds (CAAQS)</i>	<i>9.0 ppm for 8-hour exposure</i>		

* Mark West Springs Road is the primary roadway

** Old Redwood Highway is the primary roadway

This table indicates that carbon monoxide conditions would remain below ambient air quality standards. Assumptions used for the prediction of project-related carbon monoxide concentrations are provided in the Environmental Air Quality Assessment, Sutter Hospital, Sonoma County, California (Illingworth & Rodkin 2009a) (Appendix C-2).

Although the CALINE4 model predicts worst-case 8-hour CO emissions in 2014 both with and without project would 4.4 ppm, actual emission rates are anticipated to decrease by about 45 percent between 2008 and 2014, due to improvements in engine efficiencies.

Mitigation: No mitigation required

Impact AIR-5: Long-Term Increases in Criteria Pollutant Emissions Criteria pollutant emissions associated with the operation of the proposed Medical Campus could exceed BAAQMD CEQA significance thresholds, potentially resulting in a significant net increase of NO_x, PM₁₀, or ROG.

Significance: Potentially Significant

Discussion:

The primary sources of air pollutant emissions from operation of the project include indirect emissions from traffic, area-source emissions (e.g., natural gas usage and landscaping), natural gas fired boilers for steam generation, helicopter trips, and emissions associated with routine testing of emergency generators. Inclusion of these criteria pollutant emissions in the air quality analysis of the new medical center represents a conservative impact analysis, as the existing medical center already emits these pollutants within the air basin.

Project-related emissions of air pollutants from traffic and area sources were predicted using the URBEMIS2007 model (Version 9.3), which is approved for use by the BAAQMD. Area source emissions include emissions from natural gas usage, landscape equipment, and ROG emissions from consumer products (e.g., architectural coatings). The URBEMIS2007 model predicts daily emissions associated with land use developments. The model combines predicted daily traffic activity associated with the different land use types, with emission factors from the State's mobile emission factor model (i.e., EMFAC2007). Dowling and Associates (the project applicant's traffic consultant) provided trip generation. Assumptions used for predicting project-related emissions of air pollutants that affect the region are provided in the *Environmental Air Quality Assessment, Sutter Hospital, Sonoma County, California* (Illingworth & Rodkin 2009a) (Appendix C-2).

Build out of the project would result in the construction or modification of stationary air pollutant sources that are not properly accounted for in the URBEMIS 2007 modeling. Emissions for these stationary sources are calculated separately from the source emissions included in URBEMIS2007 model. Stationary sources identified at this design phase include natural-gas fired boilers and two 1500-kilowatt Standby Generator Sets. The boilers would be fired by natural gas and the generator sets would use diesel fuel. These sources would be subject to BAAQMD permit requirements. Overall, these sources would result in minor emissions, compared to those from traffic generation reported above.

ROG, NO_x, and PM₁₀ emissions from the boilers are included as part of the natural gas consumption emissions. The project applicant's Engineer provided estimated annual natural gas consumption rates. Emission factors for natural gas used by the URBEMIS2007 model were applied to these usage rates to develop daily and annual emissions. The calculations provided in this assessment would over predict the emissions, since emission standards, specified by BAAQMD regulations, would likely apply to these boilers (Illingworth & Rodkin 2009a) (Appendix C-2).

Daily emissions from typical operation of the hospital under Phase II are reported in **Table 3.4-8**. The typical daily operation of the hospital facilities and medical office building built out in Phase II would have daily emissions that are below the BAAQMD significance thresholds. Typical

operation of the proposed project would have *less than significant* daily emissions.

Table 3.4-8. Phase II Daily Operation Emissions

Scenario	Modeled Emissions in pounds per day		
	Reactive Organic Gases (ROG)	Nitrogen Oxides (NOx)	Respirable Particulates (PM ₁₀)
Area Sources	3 pounds	10 pounds	<1 pounds
Mobile Sources	29 pounds	31 pounds	32 pounds
Total	32 pounds	41 pounds	32 pounds
<i>BAAQMD Thresholds</i>	<i>80 pounds per day and 15 tons per year</i>		

Emissions associated with Phase III buildout of the hospital, with the expansion of the hospital by 29 beds, are summarized in **Table 3.4-9**. In addition, helicopter emission increases for the proposed project versus existing project were computed for the Bell 222 helicopter, and included in **Table 3.4-9**. The applicant provided the increase in daily and yearly flight numbers. Emissions factors for the helicopter were obtained from the *Guidance on Determination of Helicopter Emissions* (Swiss Confederation, Federal Department of the Environment, 2009). The increase in helicopter emissions will be a minor source compared to other mobile source emissions that were predicted using the URBEMIS2007 model.

Table 3.4-9. Phase III Daily Operation Emissions

Scenario	Modeled Emissions in pounds per day		
	Reactive Organic Gases (ROG)	Nitrogen Oxides (NOx)	Respirable Particulates (PM ₁₀)
Area Sources	3 pounds	10 pounds	<1 pounds
Mobile Sources	33 pounds	35 pounds	35 pounds
Total	36 pounds	45 pounds	35 pounds
<i>BAAQMD Thresholds</i>	<i>80 pounds per day and 15 tons per year</i>		

Emergency generator emissions were computed for two Caterpillar 1500 kW Generator Sets. These emissions are based on the manufacturer data at 100% load. A testing schedule of 5 minutes per week, ½ hour each month and annual testing on one day for eight hours (18.3 hours per year operation) was assumed for these calculations.

Emissions associated with operation of both generators during each of the three types of testing, under Phase III buildout, are reported in **Table 3.4-10**. Since normal hospital and medical office building operation emissions would occur simultaneously on days with testing, those emissions were added to the generator testing emissions. Both daily and annual emissions are presented for comparison to BAAQMD thresholds.

Table 3.4-10. Operational Emissions with Generator Testing

	Modeled Emissions		
	Reactive Organic Gases (ROG)	Nitrogen Oxides (NO _x)	Respirable Particulates (PM ₁₀)
Scenario 1			
5-minute Generator Test once per week (lbs/day)	<1	4	<1
Operation Sources - Total from Table 3.4-9 above (lbs/day)	36	45	35
<i>Total (lbs/day)</i>	36	49	35
<i>BAAQMD Thresholds(lbs/day)</i>	80	80	80
Scenario 2			
30-minute Generator Test once per month (lbs/day)	<1	24	<1
Operation Sources (lbs/day)	36	45	35
<i>Total (lbs/day)</i>	36	69 ¹⁷	35
<i>BAAQMD Thresholds</i>		80	80
Scenario 3			
8-hour Generator Test once annually (lbs/day)	9	387*	2
Operation Sources (lbs/day)	36	45	35
<i>Total (lbs/day)</i>	45	432	37
<i>BAAQMD Thresholds(lbs/day)</i>	80	80	80
<i>Total Annual Emissions (tons)</i>	6.8	9.5	6.5
<i>BAAQMD Thresholds(tons/year)</i>	15	15	15

Source: *Environmental Air Quality Assessment, Sutter Hospital, Sonoma County, California* (Illingworth & Rodkin 2009a)

* Only occurs on one day during the year

Daily emissions under Scenarios 1 and 2, when the generators are tested less than an hour during each test, are estimated to be less than the BAAQMD daily thresholds. However, under Scenario 3 when the generators are tested for 8 hours, estimated NO_x emissions are greater than the BAAQMD daily thresholds. This would be considered a significant impact for that one day per year. For the remainder of the year (Scenarios 1 and 2) the daily and annual emissions would be less than significant.

**Mitigation AIR-5a:
Schedule Generator
Testing to Avoid Ozone
Exceedances**

Testing of the diesel generators for more than one hour per day shall not occur during the months of May through October, to ensure that these emissions would not contribute to exceedances of State ozone standards in the region.

¹⁷ BAAQMD has proposed a new emissions threshold for NO_x of 54 lbs/day. If this threshold is adopted, the operational emissions with generator testing would exceed this new threshold..

Mitigation AIR-5b: Ensure Compliance With BAAQMD Rules and Regulations	Some mechanical equipment (e.g., natural gas fired boiler and diesel emergency generators) used at the hospital would require permits from the BAAQMD. The applicant shall consult with the BAAQMD to ensure compliance with appropriate rules and regulations so that emissions are properly controlled and do not exceed levels reported in this analysis.
Mitigation AIR-5c: Reduce Air Pollutant Emissions on Spare the Air Days	The hospital administrators shall sign up with the BAAQMD to receive Spare the Air notifications and avoid scheduling generator testing on these days. In addition, Hospital and office building staffs should be informed of the Spare the Air Days so that they may voluntarily reduce emissions through carpooling, using transit or other means.
Significance After Mitigation:	Significant and unavoidable. Even though the applicant will implement mitigation measures, the testing for the emergency generator for 8-hour continuously will exceed the existing BAAQMD daily significance threshold, and will therefore be significant on that one day. ¹⁸

DPM Health Risk Assessment

Impact AIR-6: Insignificant Increases in TAC Emissions	Diesel particulate matter from construction and operation of the project could expose sensitive receptors to substantial TAC concentrations that would lead to an increased probability of cancer greater than 10 in one million.
Significance:	Less than significant

Discussion:

Toxic Air Contaminant Emissions from Construction and Operation of the Project

Residences near the proposed project could be exposed to emissions of TACs from project construction and operation. The primary sources of TACs would include DPM emitted from construction activities, routine truck deliveries during operation, and testing of the generators. Although other TACs might be emitted, they will be emitted in much smaller quantities as compared to DPM, therefore DPM will be the TAC of greatest concern.

The health risks, in terms of incremental lifetime cancer risk, were assessed for nearby residences. Emissions for each activity or process were computed and used in the ISCST3 dispersion model to predict DPM concentrations. The modeled used screening meteorological conditions that typically result in over predictions of the concentrations. Modeling assumptions

¹⁸ If the proposed new daily significance threshold of 54 lbs/day is adopted by BAAQMD, then operational emissions with generator testing would be significant one day a month (see Scenario 2 in Table 3.4-10) instead of one day per year..

are described in the *Environmental Air Quality Assessment, Sutter Hospital, Sonoma County, California* (Illingworth & Rodkin 2009a) (Appendix C-2). A screening analysis is typically done as a first step in evaluating health risks. If risks are found to be below thresholds, no further analysis is required.

Construction Activity

DPM emissions were estimated from the campus building construction with URBEMIS2007 model using default values and the estimated area of disturbance due to construction. URBEMIS2007 provides exhaust PM₁₀ emissions, which were assumed to be DPM. There would also be emissions from roadway construction adjacent to the project site. These emissions were estimated using the Roadway Construction Emission Model (Version 6.3.1) with default assumptions. Roadway construction was assumed to cover about 5 acres and occur over 6 months. The roadway and construction emissions were combined and then modeled as two separate area sources across the site.

The first option for hospital construction was to import about 100,000 cubic yards of fill to the site for surcharging activities, as discussed above, requiring approximately 9,000 round-trips. Each load would include two trips: one in and one out. The PM₁₀ gram per mile exhaust emission rate was estimated using the EMFAC2007 model for heavy-duty trucks for the year 2010, when the fill would be imported. Each truck was assumed to travel along Mark West Springs Road for the entire frontage of the project. Travel to the center of the site was also assumed in the truck modeling. About 30,000 cubic yards of fill would be removed from the project site after the surcharging activities are completed, requiring approximately 2,700 round-trips.

The second option for hospital construction was to drive piles for the building foundation and only import 75,000 cubic yards of fill material as opposed to importing the 100,000 cubic yard of fill.

PM₁₀ emissions (assumed to be DPM emissions) from pile driving activity were estimated from manufacturer emission factor data for a Delmag D46-32- 96 kW-120 hp or similar hammer, as discussed above. Approximately 700 piles were assumed to be driven to a depth of 45 feet. Based on professional engineering judgment using site specific information, it was assumed that approximately 3 piles per hour were driven by the hammer.

Routine Operation of the Project Site

The primary source of TACs from routine operation of the project would be DPM emitted from truck deliveries. On average, there would be approximately 6 heavy-duty truck and 5 medium-duty truck trip daily deliveries anticipated. According to the EMFAC2007 guidance, medium-duty trucks weigh 14,001 to 33,000 pounds and heavy-duty trucks weigh 33,001 to 60,000 pounds. These deliveries would have two trips associated with them: one in and one out. The PM₁₀ gram per mile exhaust emission rate was estimated using the EMFAC2007 model for heavy and medium-duty trucks for the year 2014, which is the first year of full operation. Predicted PM₁₀ truck exhaust emissions were assumed to be DPM. These emissions were assumed to occur 6 days per week over 70 years of project operation. While emissions of DPM from trucks are anticipated to decrease substantially over the 70-year operation period, the higher 2014 emission factor was assumed for this assessment to be conservative. Use of this factor would overstate the health risk associated with this activity. Similar to haul truck trips, these

trucks were assumed to travel the entire frontage of Mark West Springs Road and travel on site to the loading areas.

Helicopters will be used during hospital operation and will be a minor source of TAC emissions. Helicopters combust aviation fuel, which will not emit any DPM. Since DPM is the TAC of greatest concern, helicopter operations are not included in the health risk assessment.

Emergency Generator Testing

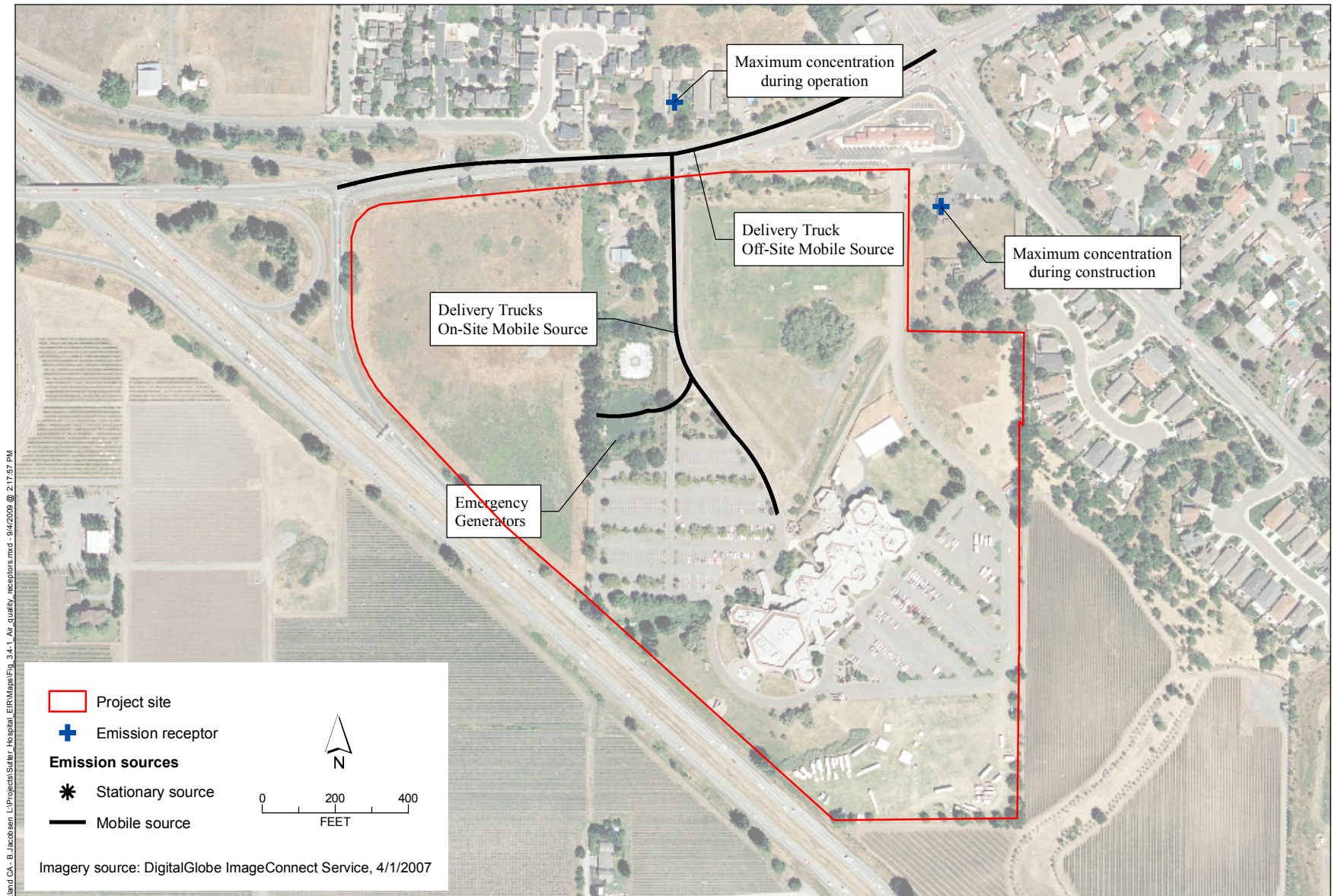
The project would include the installation and weekly testing of an emergency generator. These generators would be powered by diesel fuel. While operation under emergency conditions is anticipated to be minimal, State law and the manufacturer would require testing. Diesel particulate matter from the exhaust could pose a health risk to nearby sensitive receptors. The nearest residences are estimated to be over 700 feet from the proposed central location where the generators would be located. Emissions of DPM from the routine testing of the generators were included in the health risk assessment analysis performed for the project's diesel sources.

As currently proposed, two Caterpillar 1500 kW Generator Sets would be used for emergency power needs. The generator emissions information is provided in the *Environmental Air Quality Assessment, Sutter Hospital, Sonoma County, California* (Illingworth & Rodkin 2009a) (Appendix C-2). As mentioned above, testing of the generator set would occur on a weekly basis for 5 minutes, on a monthly basis for 30 minutes, and one day annually for 8 hours. During testing, the generators are assumed to operate at full load or over 2,200 horsepower.

Predicted Incremental Cancer Risk

The ISCST3 model provided 1-hour concentrations at nearby receptor locations from each source. **Figure 3.4-1** shows the locations of the receptors (shown as +), the proposed project and the DPM sources. The closest sensitive receptor during project construction is approximately 100 feet from the project site boundary and the closest sensitive receptor during project operation is 200 feet from the project boundary (see **Figure 3.4-1**). The 1-hour diesel particulate matter concentrations predicted by the model were adjusted to annual concentrations using a factor of 0.10. The maximum-modeled annual concentrations resulting from construction activities would range from 0.17 to 0.21 $\mu\text{g}/\text{m}^3$ of DPM, based on the first option (soil surcharging) as the worst case scenario for the two construction options. The lifetime incremental cancer risk associated with this exposure would be 1.52 excess cancer cases per million people. The highest annual DPM concentration for exposure to project operation would be 0.0018 $\mu\text{g}/\text{m}^3$. Assuming emissions remained similar through a 70-year lifetime exposure period, the incremental cancer risk would be 0.58 excess cancer cases per million people. Note that heavy-duty truck DPM emissions are anticipated to decrease in the future, so the cancer risk would also decrease. The maximum DPM concentrations from construction and operational activities occur at different locations. However, the maximum risk from construction was added to the maximum risk from operation for this screening assessment (even though maximum concentrations occurred at two different receptors). This resulted in a predicted lifetime incremental cancer risk of 2.10 excess cancer cases per million people.

The BAAQMD uses a lifetime cancer risk of 10 in one million as a threshold for determining whether a project would cause a significant health risk. The risk of 2 excess cancer cases per million caused by the project would result in a *less-than-significant* impact.



URS Corp. - Oakland CA - B. Jacobsen, Li. Projects/Sutter_Hospital_EIR/Maps/Fig. 3.4-1_Air_quality_receptors.mxd - 9/4/2009 @ 2:17:57 PM



Figure 3.4-1
Project Emission Sources and Receptors

It should be noted that the risk presented in this assessment are overstated and would be less. Key factors contributing to this overestimate are: (1) use of a lifetime exposure that assumes nearly continuous exposure to these sources over a 70-year lifetime; (2) use of 2014 truck emission factors to assess DPM exposure from almost 70 years of project operation; (3) use of screening meteorology in the dispersion modeling assessment; and (4) addition of maximum construction risks to maximum operation risks that occur at two different locations.

Exposure of Hospital Patients and Workers to Toxic Air Contaminants from US 101 Traffic

The proposed project would place a hospital within 500 feet of the travel lanes of US 101. US 101 near the project site currently has relatively low truck traffic volumes, when compared to urban freeways. This portion of US 101 through Santa Rosa carries about 91,000 average daily trips (Caltrans 2007). Of these trips, 5% are trucks (3% are considered large trucks that are almost all diesel-fueled). This is a relatively low fraction of diesel vehicles, when compared to urban freeways that can have up to 20% diesel powered vehicles. In the *Air Quality and Land use Handbook* (CARB, 2005), CARB identified a typical freeway as having truck traffic of 10,000 to 20,000 trucks per day. US 101 near the project has about 3,000 daily large truck trips, about 1/3rd to 1/6th the volumes of the roadways considered by CARB. Based on site-specific traffic levels alone, the siting of sensitive receptors near US 101 could be 1/3rd less than the CARB recommended criteria of 500 feet. In addition, Figure 1-1 of the *Air Quality and Land use Handbook* shows that DPM concentrations decrease sharply after 300 feet. The closest hospital building is located approximately 335 feet from US 101. Given that US 101 experiences much lower truck traffic volumes (the source for DPM) than was included in the CARB guidance, and given that the closest hospital building is not within 300 feet from the freeway, where the DPM concentration decreases dramatically, DPM from the freeway would not have a significant adverse affect on the hospital.

Sonoma County's recent General Plan update requires analysis of health risks for projects near the US 101 corridor:

Policy OSRC-16k: Require that discretionary projects involving sensitive receptors (facilities or land uses that include members of the population sensitive to the effects of air pollutants such as children, the elderly, and people with illnesses) proposed near the Highway 101 corridor include an analysis of mobile source toxic air contaminant health risks. Project review should, if necessary, identify design mitigation measures to reduce health risks to acceptable levels.

In response to CARB guidance and the Sonoma County General Plan policy, a health risk assessment was performed to evaluate the cancer risks at the project site. The health risk involved prediction of vehicle emission rates, prediction of traffic levels, and dispersion modeling of emissions associated with US 101 traffic.

Emissions

Lower future vehicle emission rates that have been established by regulations through 2006 were taken into account in the analysis. Note that DPM emissions are anticipated to decrease in the future. CARB has been developing new regulations and emission standards since identifying DPM as a carcinogenic. Some of these requirements take time to provide substantial emission

reductions. For example, new trucks would have considerably lower emission rates than older trucks, but older trucks will only slowly leave the vehicle fleet. Since this analysis assessed the risk of proposed hospital uses to future exposures, the lower future emissions were taken into account. The EMFAC2007 results were then adjusted to the traffic mix on US 101 reported by Caltrans. Emission factors were developed for 2014, 2020 and 2030, using the calculated mix of diesel-fueled vehicles. Emissions factors were developed for 2014, 2020 and 2030 to consider a modeling scenario representative of actual emissions.

CARB's diesel reduction plan includes proposed regulatory actions developed in 2000 that are intended to substantially decrease emissions of DPM. CARB has implemented many of the control measures outlined in the plan and many of those actions are reflected in the EMFAC2007 model runs. Future regulatory actions and additional measures not yet adopted that would lower emissions rates were not included. Such measures include a recent regulation to reduce DPM emissions from in-use on-road diesel-fueled vehicles, which requires truck fleet owners to either retrofit or phase out older engines over time. CARB predicts substantial short-term reductions in DPM as a result of this action.

Traffic Levels

Future DPM emissions for traffic on US 101 were developed using the latest version of the CARB EMFAC2007 emission factor model with defaults for Sonoma County. Future traffic increases projected on US 101 were provided by Dowling and Associates.

Dispersion Model

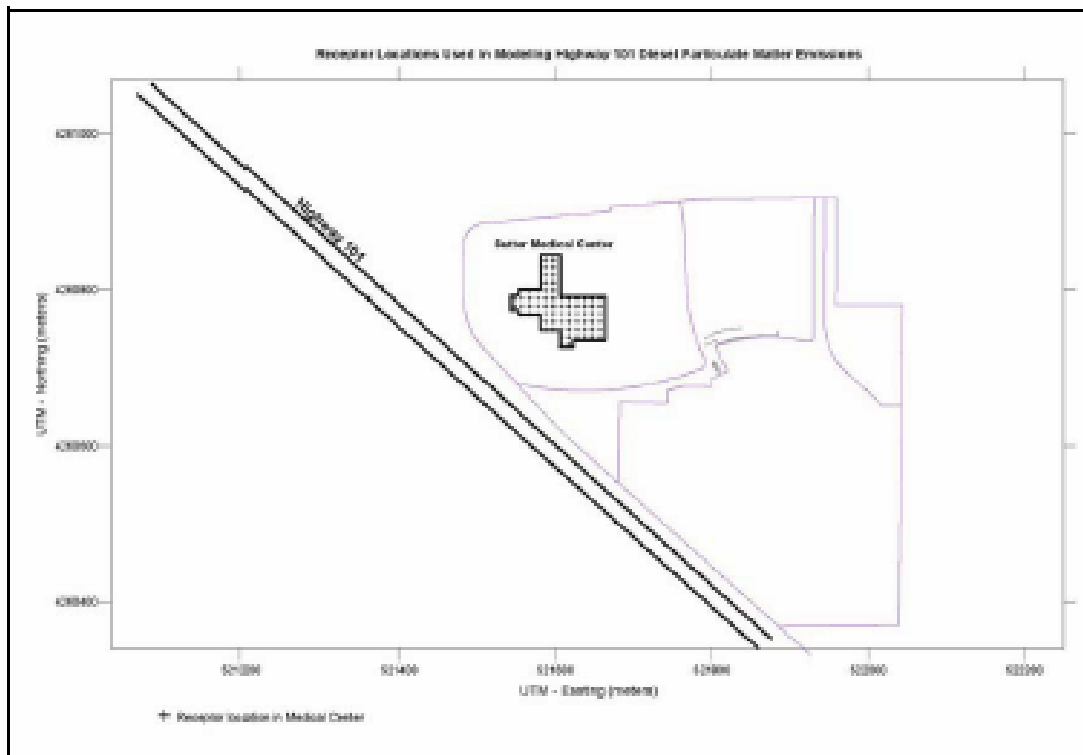
Dispersion modeling was conducted using the CAL3QHCR model, which is acceptable to the BAAQMD for this type of analysis. A 4-year set of hourly meteorological data for the Sonoma County Airport was obtained from the BAAQMD's website and used in the modeling. The station, located one mile south-southwest of the project site, is considered to have meteorological conditions that are reasonably representative of the project site. This meteorological data set was used for the refined modeling analysis, that was required to accurately represent the expected risks from US 101 at the hospital receptors. An initial screening analysis was performed, but results were above the screening thresholds, therefore a more refined analysis was required. **Figure 3.4-2** shows US 101 and the modeled hospital receptors. Other inputs to the model included geometry (based on site plans), current traffic conditions reported by Caltrans for US 101, and the DPM emission factors obtained from the EMFAC 2007 model. Inputs along with computed results at receptors are contained in Appendix C-2, the Environmental Air Quality Assessment prepared by Illingworth & Rodkin.

Cancer Risk

The maximum-modeled annual concentrations at the hospital resulting from US 101 traffic would be $0.12 \mu\text{g}/\text{m}^3$ of DPM, annualized for 2014. This concentration would decrease to $0.08 \mu\text{g}/\text{m}^3$ in 2020 and $0.06 \mu\text{g}/\text{m}^3$ in 2030 as emission rates from traffic decrease. The California Office Of Environmental Health Hazard Assessment (OEHHA) does not have recommendations for determining hospital patient cancer risks. Hospital patients tend to spend relatively short periods at the hospital and their time is spent mostly indoors. Therefore, this assessment considered two different exposures: a continuous exposure of a hospital patient for one year (using 2014 emission rates and traffic) and a worker exposure for workers who would work at

the hospital and live off-site for 40 years (beginning with 2014 emission rates and traffic). The cancer risk assessment is consistent with the BAAQMD guidelines, which are based on the statewide AB 2588 guidelines.

Figure 3.4-2. US 101 and Modeled Hospital Receptors



The highest modeled DPM concentrations and associated health risk were considered for this impact evaluation. Over the course of a 1-year continuous exposure during the first year of hospital operation, the incremental risk is calculated at 0.6 excess cancer cases per for a hospital patient. This is based on highway traffic DPM emissions during 2014. Because highway DPM emissions are anticipated by the EMFAC2007 model to decrease, cancer risk for future years would be less. A worker continuously exposed at this location would have a cancer risk of 4.5 excess cancer cases. The DPM concentrations decrease at positions (within hospital complex) further from the freeway. The closest hospital building to the US 101 is approximately 335 feet away from the freeway. It should be clearly noted that these risks are based on outdoor exposures. The indoor risks, especially those inside a hospital, would be less.

On-Site Sources

The project would include DPM emissions from routine testing of emergency power generators and truck deliveries. Emissions and dispersion modeling of these sources were conducted to predict the impact to the project (i.e., hospital). This assessment was similar to that conducted for off-site residential uses. The difference for this impact is that the 4-year meteorological data set obtained from the BAAQMD was used. Results of this assessment show that on-site sources

would have a negligible effect on the overall cancer risk predicted for the hospital uses. The cancer risks reported above include the contribution of these sources.

Other Factors Not Considered

The predicted cancer risk is based on outdoor exposures. Patients and workers at the hospital would spend most of their time indoors. While building codes for hospitals require operable windows, most indoor air would be provided through air handling systems. Natural ventilation through windows or other openings such as louvers is considered as supplemental to the required mechanical ventilation systems. Filtration is required in hospital mechanical ventilation systems. CARB estimates a 1/3rd reduction in cancer risk between outdoor and indoor air in a residence. This reduction would be greater in a hospital, since most indoor air is mechanically supplied and conditioned with filtration. Also, air intakes are usually located on the rooftops, which have lower exposure than near the ground. Predicted DPM concentrations for this assessment were predicted near ground level, since details of the proposed project mechanical ventilation system were not available.

These results show that a hospital patient exposed continuously for one year or a worker exposed continuously while working at the hospital for 40 years would have incremental cancer risks from US 101 traffic that would be less than ten in one million. This would be below the BAAQMD incremental cancer risk criteria of 10 in one million. As a result, this impact would be *less than significant*.

Mitigation: No mitigation required

Cumulative Impacts

Criteria Pollutants

Future growth in the County is expected to result in significant cumulative impacts according to the General Plan 2020 EIR. Construction and operation of the proposed project would incrementally contribute to these impacts. The Bay Area as a whole (including the southern portion of Sonoma County where the proposed project is located) does not meet state or federal ambient air quality standards for ground level O₃ and PM_{2.5}, nor does it meet state standards for PM₁₀. For O₃, the entire Bay Area is designated non-attainment at both the federal and state levels. The area is considered attainment or unclassified for all other pollutants.

Pollutant emissions associated with the proposed project's typical daily operations would not exceed BAAQMD CEQA significance thresholds and would not result in a cumulatively considerable net increase of NO_x, PM₁₀, or ROG. The primary sources of air pollutant emissions from operation of the project include indirect emissions from traffic, area-source emissions (e.g., natural gas usage and landscaping), natural gas fired boilers for steam generation, helicopter trips, and emissions associated with testing of an emergency generator. The annual 8-hour testing of the emergency generator would exceed the daily NO_x emissions threshold and would be significant that one day a year. Mitigation Measure AIR-5a requires the annual testing to be done outside of the ozone season (i.e., testing would occur November -April), which would reduce the project's contribution to unhealthy air pollutant levels. However, if BAAQMD's proposed new emissions threshold of 54 lb/day for daily NO_x is adopted, the project would exceed the threshold

during monthly testing of the generator. This would be a cumulatively considerable contribution to a significant cumulative impact.

Construction-related emissions are generally short-term in duration but may still cause adverse air quality impacts. According to the BAAQMD CEQA Guidelines, PM₁₀ is the pollutant of greatest concern during construction. Construction equipment also emits carbon monoxide and the precursors to ozone and could lead to further violations of the ozone standards. The BAAQMD does not have thresholds for construction emissions and typically does not require quantification of emissions. However, haul trips to import the estimated 100,000 cubic yards of surcharge materials and fill in 2010 are considered to be non-standard construction activities. Haul truck trips bringing fill to the proposed project site would potentially result in a cumulatively considerable net increase of criteria pollutants for which the project region is non-attainment under an applicable federal or state ambient air quality standard. This would include emissions which exceed quantitative thresholds for ozone precursors that are normally applied to operational impacts but are used in this analysis for construction impacts as well. Implementation of Mitigation Measure AIR-1 would reduce these impacts, although not to a less than significant level. As a result, the project would have a temporary significant cumulative impact on air quality when haul truck trips occur in 2010.

PM₁₀ and PM_{2.5} emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction emissions of these particulates can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors. Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to significantly reduce particulate emissions from construction. The BAAQMD's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions (BAAQMD 1999).

The BAAQMD has identified a set of feasible particulate control measures for construction activities that are provided in the BAAQMD CEQA Guidelines (BAAQMD 1999). If all of the appropriate control measures are implemented on a project, then BAAQMD considers air pollutant emissions from construction activities a less-than-significant impact with respect to particulate matter from fugitive dust. These control measures are included as Mitigation Measures AIR-2(a) and 2(b) for the project. With the application of these control measures, particulate emissions from fugitive dust would be reduced to a less-than-significant level. Therefore, the incremental particulate emissions associated with the proposed project would not be considered cumulative considerable.

Greenhouse Gas Emissions

As previously noted, the connection between climate change (or global warming) and emissions of greenhouse gases (GHGs) is widely recognized by the scientific community. These GHGs, composed primarily of carbon dioxide (CO₂), methane (CH₄), nitrous oxides (NO_x), and water vapor, are emitted by both natural and human-made sources. However, the increase in human-made GHGs over the past several decades has caused global atmospheric temperatures to rise above historic levels. While there is some uncertainty regarding exactly how and when the

earth's climate will respond to increasing concentrations of greenhouse gases, observations as well as climate modeling indicate that observable changes are underway.¹⁹ The sources of human-made GHGs that are of the greatest concern include power plants, industry, agriculture, home heating, open burning, motor vehicles, and other transportation modes that use fossil fuels (i.e., ships, trains, aircraft, and construction vehicles).

No local or state air quality agency has yet adopted significance criteria for determining whether a land use project's GHG emissions would make a cumulatively considerable contribution to climate change. Draft thresholds proposed by the BAAQMD staff are currently under review and are not expected to be adopted until December 2009 or early 2010.

Nevertheless, this EIR quantifies the greenhouse gases that would be emitted by this project, discusses the project's consistency with the state's and County's GHG emissions reduction goals and identifies appropriate, feasible mitigation measures to further reduce the project's contribution to GHG emissions. In addition, because the BAAQMD is likely to adopt GHG emissions thresholds in some form while this project is still pending, the analysis below also considers the extent to which the project would meet the BAAQMD's proposed draft thresholds of significance as proposed at this time.

Impact Analysis:

**Impact AIR-7:
Generation of
Greenhouse Gas
Emissions** The proposed project would result in emissions of greenhouse gases, and would thus contribute to the global inventory of greenhouse gas emissions and climate change

Significance: Potentially significant

The proposed project would result in emissions of GHGs due to fuel combustion in motor vehicles using the project, mobile construction equipment, and building heating and water systems associated with the Medical Campus and thus would contribute to the global GHG inventory. Building and motor vehicle air conditioning systems may also use HFCs (and HCFCs and CFCs to the extent that they have not been completely phased out at later dates), which may result in emissions through leaks. The other primary GHGs (perfluorocarbons and sulfur hexafluoride) are associated with specific industrial sources and are not expected to be associated with the proposed project. Nitrogen trifluoride, added to the California list of GHGs by SB 104 (2009), is not generally used in hospitals or medical office buildings, and also not expected to be associated with the proposed project.

Project GHG Emissions Inventory

To provide an analysis of the proposed project's GHG emissions (presented as CO₂ emissions), Sutter prepared and the County reviewed an estimate of the GHG construction-related and operational emissions. The proposed project's GHG emissions might also include methane (CH₄) and nitrous oxide (N₂O), but since CO₂ is the GHG pollutant emitted in the largest quantity at this project site and is the pollutant of greatest concern, only CO₂ emissions are presented below.

¹⁹ CalEPA, *Climate Action Team Report to Governor Schwarzenegger and the California Legislature* (2006).

The construction-related CO₂ emissions estimates were calculated using EMFAC2007 CO₂ emission factors for the heavy-heavy duty trucks in Sonoma County for import and export of fill material, URBEMIS2007 CO₂ emissions for hospital campus construction activity and the Roadway Construction Emissions Model (Version 6.3.1) CO₂ emission factors for roadway construction. Construction-related CO₂ emissions estimates are presented in Table 3.4-11.

Table 3.4-11. Proposed Project Estimated Construction GHG Emissions

Annual Total Emissions	CO₂ (tons/year)
2010	707.9
2011	539.1

The operational CO₂ emissions from operational (mobile) sources and area sources were estimated using the URBEMIS2007 model and the estimated hospital, medical office and buildings acreage upon full build out. Operational (mobile sources) include emissions from worker commute trips while area sources include emissions from activities like landscaping. The operational CO₂ emissions from energy consumption were based on the mitigated facility electricity consumption of 6,520,577 kWh (see Section 4.0 for more details) and the CO₂ emission factor from the PG&E carbon footprint calculator assumptions on the PG&E website (<http://www.pge.com/myhome/environment/calculator/assumptions.shtml>). The operational CO₂ emissions from the emergency generator testing were calculated using CO₂ emission factor provided by the manufacturer. The operational CO₂ emissions from natural gas consumption was based on the California Climate Action Registry (CCAR) Reporting Protocol, Version 3.1 Table C.7 (January 2009) emission factor and the mitigated natural gas consumption rates of 10,667,024 scf. The operational CO₂ emissions from helicopter trips were based on the CCAR Reporting Protocol Table C.3 emission factor for jet fuel and the fuel usage. Similar to the helicopter criteria pollutant emissions, the helicopter CO₂ emissions represent the difference between the existing helicopter CO₂ emissions generated at the Chanate facility and the CO₂ emissions that would be generated by helicopters at full buildout of the proposed project. Operational CO₂ emissions estimates are presented in Table 3.4-12.

Table 3.4-12. Proposed Project Estimated Operational GHG Emissions (Phase II and Phase III)

Emission Source	CO₂ (tons/year)
Operational (Mobile) & Area Sources	6,494
Electricity (including water)	1,708
Emergency Generator Testing	42
Natural Gas	640
Helicopter Trips (increase only)	103
Total	8,987

Consistency with State's and County's GHG Emissions Reductions Goals

As estimated above, the project would result in the emissions of approximately 8,987 tons of CO₂e per year (or 8,153 metric tons of CO₂e per year). To put the proposed project's GHG emissions in context, the applicant has provided an estimate of the GHG construction-related and operational emissions that would be expected with the construction and operation of a "standard" hospital and medical office project of the scale and location of the proposed project (a "business-as-usual" calculation), and then compared that with an estimate of the construction and operational emissions of the project as proposed with design features and emissions reduction measures included to reduce energy usage and greenhouse gas emissions (see Appendix C-3). According to the applicant, the project as proposed would achieve a reduction of just over eleven percent (11%), comparing "proposed project" operational emissions to "standard" operational emissions. Sutter has also provided a qualitative evaluation of the project relative to pertinent measures included in ARB's Scoping Plan for the state's compliance with AB 32. Table 4, Consistency of Campus Project Features with AB 32 Scoping Plan Measures, in Appendix C-5, lists all pertinent measures included in CARB's Scoping Plan for the state's compliance with AB 32, and identifies sustainability policies, programs, and design features proposed for the project that would that comply with the Scoping Plan measures.

Although the actual emissions reductions achieved by the project may be higher or lower than those calculated by the applicant, the replacement of the existing hospital complex with a new energy-efficient, LEED-certified hospital complex is likely to achieve some reductions in GHG emissions and in doing so, would likely help rather than hinder the state's and County's GHG reduction goals.

BAAQMD proposed significance thresholds: One criteria, proposed as the sole recommendation by BAAQMD staff in September 2009 and then proposed as one of several possible options in October 2009, is a threshold of 1,100 metric tons of CO₂ equivalent per year in operational emissions associated with the project. The project's estimated operational greenhouse gas emissions of 8,153 metric tons per year would exceed this threshold, were it to be adopted.

Another criteria proposed by BAAQMD staff is 4.6 metric tons per year of CO₂ equivalent operational emissions per service population associated with the project, with "service population" being defined as the sum of the number of jobs and the number of residents provided by a project. If this threshold were adopted and if it applied to this project, based on the projected employment at the project, it is anticipated that the project would exceed this threshold.

Given the substantial regulatory uncertainty regarding whether significance thresholds will be adopted that should be applied to this project, and given that project emissions would appear to exceed some of the potential thresholds that are currently being considered, the impact is considered to be potentially cumulatively considerable.

The following mitigation measures would further reduce the project's GHG emissions:

**Mitigation AIR-7:
Develop project with the
project design features
and emissions reduction
measures**

The project shall be developed with the project design features and emissions reduction measures set forth in Table 1 of Appendix C-5:

- 1) Incorporate energy conservation measures, including Leadership in Energy and Environmental Design (LEED) or equivalent standards in the design and construction of the new campus. Such measures to be incorporated to the extent feasible include passive energy conservation designs, green roof designs, low flow and waterless fixtures, and low impact development practices. Participate in PG&E's Energy by Design program or the equivalent to optimize solar to the extent feasible (see **Section 4.4.2** for more details).
- 2) Include measures to reduce vehicle trips and encourage transit, such as coordinating with Sonoma County Transit, providing bus stops adjacent to the hospital, providing priority parking for vanpools and carpools, and recharge stations or similar facilities for electric vehicles or other alternate fuel vehicles. Where feasible, use low emission of alternate fuel vehicles in the campus service fleet (see **Section 4.4.2** for more details).
- 3) Provide sidewalks/pedestrian paths to encourage walking; provide bicycle parking, and develop off peak hour work shifts to the maximum extent feasible
- 4) Reduce water usage and associated energy demands by maximizing use of on-site water (rainwater or grey water) where appropriate, utilizing high performance fixtures and equipment, and drip irrigation and high efficiency irrigation control on any new landscaping. (The project's wastewater offset program will also reduce water usage).
- 5) Monitor the efforts of CARB and other state agencies charged with reducing the state's contribution to global climate change and implement any applicable strategies adopted through promulgated regulations.

**Significance After
Mitigation:**

Potentially significant and unavoidable on a cumulative basis.

Although the project will replace an old and inefficient medical complex and will incorporate numerous energy efficiency features that will reduce GHG emissions, the project emissions would exceed some of the potential thresholds that are currently being considered for adoption by the applicable air quality management district. Accordingly, the impact is considered to be potentially cumulatively considerable, and thus for purposes of this EIR, the impact is determined to be significant and unavoidable.

