4.3 AIR QUALITY

This section includes a summary of applicable regulations, a description of existing air quality conditions in the Planning Area and an analysis of potential air quality impacts of the 2030 General Plan.

4.3.1 REGULATORY SETTING

Air quality in the Live Oak Planning Area is regulated by U.S. Environmental Protection Agency (EPA), the California Air Resources Board (ARB), and the Feather River Air Quality Management District (FRAQMD). Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent than federal regulations.

CRITERIA AIR POLLUTANTS

Concentrations of several air pollutants—ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead—are indicators of ambient air quality conditions, and are therefore the premise of air quality regulations. Because these are the most prevalent air pollutants known to be deleterious to human health, and extensive health-effects criteria documents are available, these pollutants are commonly referred to as "criteria air pollutants."

Federal Plans, Policies, Regulations, and Laws

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments to the CAA were made by Congress in 1990.

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in Table 4.3-2, EPA has established primary and secondary NAAQS for ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The primary standards protect the public health, while the secondary standards protect the public welfare.

The CAA also required each state to prepare an air quality control plan, referred to as a state implementation plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins, as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and to determine whether implementing the SIPs will achieve air quality goals. If EPA determines a SIP to be inadequate, a federal implementation plan that imposes additional control measures may be prepared for the nonattainment area. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary sources of air pollution in the air basin.

State Plans, Policies, Regulations, and Laws

ARB is responsible for coordination and oversight of state and local air pollution control programs in California and for implementation of the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (Table 4.3-2). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases, the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained through interpretation of the health effects studies considered during the standard-setting process. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires all local air districts in the state to craft air quality plans to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts shall focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Among ARB's other responsibilities are:

- overseeing compliance by local air districts with California and federal laws;
- approving local air quality plans, submitting SIPs to EPA;
- monitoring air quality;
- determining and updating area designations and maps; and
- setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

Regional and Local Plans, Policies, Regulations, and Ordinances

FRAQMD attains and maintains air quality conditions in Sutter and Yuba Counties through air quality planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues.

The clean-air strategy of FRAQMD involves the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. FRAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA, CAAA, and CCAA.

Feather River Air Quality Management District

In 1998, FRAQMD released and adopted its Indirect Source Review guidelines document for assessment and mitigation of air quality impacts under the California Environmental Quality Act (CEQA). The guidelines provide lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The guide contains criteria and thresholds for determining whether a project may have a significant adverse impact on air quality, and methods available to mitigate impacts to air quality.

Projects in the Planning Area are subject to applicable FRAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the 2030 General Plan may include but are not limited to the following:

- Rule 2.0: Open Burning,
- Rule 3.0: Visible Emissions,
- Rule 3.15: Architectural Coatings, and
- Rule 3.16: Fugitive Dust Emissions.

Air Quality Plans

FRAQMD, which comprises Yuba and Sutter counties, in coordination with the other Northern Sacramento Valley Air Basin (NSVAB) air quality management districts and air pollution control districts of Butte, Colusa, Glenn, Shasta, and Tehama counties, prepared and submitted the 2006 *Air Quality Attainment Plan* (AQAP). The AQAP was drafted in compliance with the requirements set forth in the CCAA and specifically addresses the nonattainment status for ozone and PM_{10}. The CCAA also requires a triennial assessment of the extent of air quality improvements and emissions reductions achieved through the use of control measures. As part of the assessment, the AQAP must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections.

In July 1997, EPA promulgated a new 8-hour ozone standard. This change lowered the standard for ambient ozone from 0.12 ppm averaged over 1 hour to 0.08 ppm averaged over 8 hours. In general, the 8-hour standard is more protective of public health and more stringent than the 1-hour standard. The promulgation of this standard prompted new designations and nonattainment classifications in June of 2004, and resulted in the revocation of the 1-hour standard in June 2005. Northern Sutter County has been designated as unclassified for the national (8-hour) ozone standard. Sutter County has also been designated nonattainment for the State PM_{10} standard.

Transportation Conformity

Transportation conformity is the federal regulatory procedure for linking and coordinating the transportation and air quality planning processes. Conformity provisions require that federal funding and approvals be given only to those transportation plans and projects that are consistent with air quality goals specified in the SIP. The SIP applies to the Sacramento Federal Nonattainment Area (SFNA), which includes southern Sutter County, but not the Planning Area. However, some vehicle trips from the Planning Area likely contribute emissions to the SFNA. Conformity with the SIP means that emissions from transportation activities are at or below the motor vehicle emission budgets established in the SIP.

The region's transportation plan must conform to the SIP and show that implementation will not harm the region's chances of attaining the ozone standard. The Sacramento Area Council of Governments (SACOG), of which the city of Live Oak is a part, updated the Metropolitan Transportation Plan (MTP) in 2008, and a conformity determination was conducted by SACOG. The transportation air quality conformity determination performed for the 2008 MTP demonstrated that transportation projects planned for the region are consistent with the applicable SIP (SACOG 2008).

TOXIC AIR CONTAMINANTS

Air quality regulations also focus on toxic air contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs). Examples of TACs are discussed in detail in Section 4.3.2, "Existing Setting," under "Existing Air Quality—Toxic Air Contaminants." In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no safe level of exposure. This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 4.3-2). EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT) to limit emissions. These statutes and regulations, in conjunction with additional rules set forth by the districts, establish the regulatory framework for TACs.

Federal Programs for Hazardous Air Pollutants

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP may differ for major sources than for area sources of HAPs. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (TPY) of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources. The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions of, at a minimum, benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State and Local Programs for Toxic Air Contaminants

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [Chapter 1047, Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [Chapter 1252, Statutes of 1987]). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB then adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

The Air Toxics Hot Spots Information and Assessment Act requires existing facilities emitting toxic substances above a specified level to prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted diesel-exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a public-transit bus fleet rule and emissions standards for new urban buses. These new rules and standards provide:

(1) more stringent emission standards for some new urban bus engines beginning with 2002 model year engines,

(2) zero-emission bus demonstration and purchase requirements applicable to transit agencies, and

(3) reporting requirements under which transit agencies must demonstrate compliance with the public-transit bus fleet rule.

Milestones include the low-sulfur diesel fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than current vehicles. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade, and they will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's risk reduction plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year 2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

ARB published the *Air Quality and Land Use Handbook: A Community Health Perspective*, which provides guidance concerning land use compatibility with TAC sources (ARB 2005). Although it is not a law or adopted policy, the handbook offers advisory recommendations for the siting of sensitive receptors near that generate TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities, to help keep children and other sensitive populations out of harm's way. A number of comments on the handbook were provided to ARB by air districts, other agencies, real estate representatives, and others. The comments included concern about whether ARB was playing a role in local land use planning, questions regarding the validity of relying on static air quality conditions over the next several decades in light of technological improvements, and support for providing information that can be used in local decision making.

At the local level, air pollution control or air quality management districts (such as the FRAQMD) may adopt and enforce ARB control measures. Under FRAQMD Rule 4-1 ("Permit Requirements"), Rule 10-1 ("New Source Review"), and Rule 10-3 ("Federal Operating Permit"), all sources that possess the potential to emit TACs are required to obtain permits from the district. FRAQMD limits emissions and public exposure to TACs through a number of programs and prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

ODORS

FRAQMD has identified some common types of facilities that have been known to produce odors:

- wastewater treatment facilities,
- chemical manufacturing plants,
- painting/coating operations,
- feed lots/dairies,
- composting facilities,
- landfills, and
- solid waste transfer stations.

Because offensive odors rarely cause any physical harm and no requirements for their control are included in federal or state air quality regulations, FRAQMD has no rules or standards related to odor emissions other than its rules that address public nuisance (e.g., Regulation 2, Rules 3-19, 3-17). Any actions related to odors are based on citizen complaints to local governments and FRAQMD.

Two situations increase the potential for odor problems. The first occurs when a new odor source is located near existing sensitive receptors. The second occurs when new sensitive receptors are developed near existing sources of odor. In the first situation, FRAQMD recommends operational changes, add-on controls, process changes, or buffer zones where feasible to address odor complaints. In the second situation, the potential conflict is considered significant if the project site is at least as close as any other site that has already experienced significant odor problems related to the odor source. For projects locating near a source of odors where there is no nearby development that may have filed complaints, and for odor sources locating near existing sensitive receptors, one approach to the determination of potential conflict is based on the distance and frequency at which odor complaints from the public have occurred in the vicinity of a similar facility.

4.3.2 ENVIRONMENTAL SETTING

The Live Oak Planning Area is located within the NSVAB. In addition to Sutter County, the NSVAB also comprises all of Butte, Colusa, Glenn, Shasta, Tehama, and Yuba counties. The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Existing air quality conditions in the Planning Area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed below.

TOPOGRAPHY, METEOROLOGY, AND CLIMATE

The NSVAB is bounded on the north and west by the Coastal Mountain Range and on the east by the southern portion of the Cascade Mountain Range and the northern portion of the Sierra Nevada Mountains. These mountain ranges reach heights in excess of 6,000 feet with peaks rising much higher. This provides a substantial physical barrier to locally created pollution, as well as that transported northward on prevailing winds from the Sacramento Metropolitan area.

Although a significant area of the NSVAB is located at an elevation of more than 1,000 feet above sea level, the vast majority of its populace lives and works below that elevation. The valley is often subjected to inversion layers that, coupled with geographic barriers and high summer temperatures, create a high potential for air pollution problems.

Most precipitation in the area results from air masses that move in from the Pacific Ocean, usually from the west or northwest, during the winter months. More than half the total annual precipitation falls during the winter rainy season (November–February). Characteristic of NSVAB winters are periods of dense and persistent low-level fog, which are most prevalent between storms. The prevailing winds are moderate in speed and vary from moisture-laden breezes from the south to dryland flows from the north.

The mountains surrounding the NSVAB create a barrier to airflow, which leads to the entrapment of air pollutants when meteorological conditions are unfavorable for transport and dilution. The highest frequency of poor air movement occurs in the fall and winter when high-pressure cells are present over the NSVAB. The lack of surface wind during these periods, combined with the reduced vertical flow because of less surface heating, reduces the influx of air and leads to the concentration of air pollutants under stable meteorological conditions. Surface concentrations of air pollutant emissions are highest when these conditions occur in combination with agricultural burning activities or temperature inversions, which hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground.

May through October is ozone season in the NSVAB. This period is characterized by poor air movement in the mornings and the arrival of the Delta sea breeze from the southwest in the afternoons. Longer daylight hours provide a plentiful amount of sunlight to fuel photochemical reactions between reactive organic gases (ROG) and oxides of nitrogen (NO_X), which result in ozone formation.

Local meteorology of the Planning Area is represented by measurements recorded at the Marysville station (located in the City of Marysville, roughly 10 miles southeast of the Planning Area). The normal annual precipitation is approximately 21 inches. January temperatures range from a normal minimum of 37°F to a normal maximum of 54°F. July temperatures range from a normal minimum of 62°F to a normal maximum of 96°F (NOAA 1992). The predominant wind direction and speed, as measured at the Beale Air Force Base station, is from the south-southeast at around 2 miles per hour (mph) (ARB 1994).

EXISTING AIR QUALITY—CRITERIA AIR POLLUTANTS

Concentrations of criteria air pollutant emissions are used as indicators of ambient air quality conditions. A brief description of each criteria air pollutant (source types, health effects, and future trends) is provided below, along with the most current attainment area designations and monitoring data for the Live Oak vicinity.

Ozone

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not emitted directly into the air, but is formed through complex chemical reactions between precursor emissions of ROG and NO_X in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 2004).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 parts per million (ppm) for 1 or 2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence also exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increase in the respiratory system’s responsiveness to challenges and the interference or inhibition of the immune system’s ability to defend against infection (Godish 2004).

Emissions of ozone precursors ROG and NO_X have decreased over the past several years as a result of more stringent motor vehicle standards and cleaner burning fuels. Consequently, peak 1-hour and 8-hour ozone concentrations in the NSVAB have declined overall by about 14% and 26%, respectively, during the last 20 years. Peak ozone values in the NSVAB have not declined as rapidly over the last several years as they have in other urban areas. This can be attributed to the influx of pollutants into the NSVAB from other urbanized areas, making the region both a transport contributor and a receptor of pollutants (ARB 2009a).

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 microns or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires, and natural windblown dust; and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (EPA 2009a). $PM_{2.5}$ includes a subgroup of finer particles that have an aerodynamic diameter of 2.5 microns or less (ARB 2009a).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with adsorption of metals, polycyclic aromatic hydrocarbons, and other toxic substances onto fine particulate matter (which is referred to as the “piggybacking effect”), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (EPA 2009a).

$PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health. Based on reviews of the latest scientific literature, ARB has concluded that $PM_{2.5}$ is much more dangerous than previously estimated. New research suggests that even small increases in exposure increase the potential for earlier deaths. Every increase of 10 micrograms per cubic meter ($\mu g/m^3$) of $PM_{2.5}$ creates a 10% increase in risk of premature death to a person exposed. State ambient air quality standards are periodically reviewed to assess their adequacy in protecting public health, and this new information will be considered when the PM standards are next reviewed. Nonetheless, the new information indicates the need to continue to reduce exposure to $PM_{2.5}$ (ARB 2009a).

Direct emissions of both PM_{10} and $PM_{2.5}$ increased slightly in the NSVAB between 1975 and 2005, and are projected to increase through 2020. These emissions are dominated by areawide sources and primary attributable to urban development. Direct emissions of particulate matter from mobile and stationary sources have remained relatively steady (ARB 2009a).

Carbon Monoxide

CO is a colorless, odorless, and poisonous gas produced by incomplete combustion of fuels, primarily from mobile (transportation) sources. In fact, 71% of the CO emissions in Sutter County are from mobile sources. The other 29% consist of CO emissions from area and stationary sources, such as residential fuel combustion, wood-burning stoves, open burning, electric utilities, and industrial sources (ARB 2009b).

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2009a).

The highest CO concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to ozone, which tends to be a regional pollutant, CO tends to cause localized problems.

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile, and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (EPA 2009a). The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung functions.

Sulfur Dioxide

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Lead

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

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2009a).

As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector declined dramatically (95% between 1980 and 1999), and levels of lead in the air decreased by 94% between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (EPA 2009a).

Lead emissions and ambient lead concentrations have decreased dramatically in California over the past 25 years. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have eliminated virtually all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB has identified lead as a TAC.

Monitoring-Station Data and Attainment-Area Designations

Concentrations of criteria air pollutants are measured at several monitoring stations in the NSVAB. The Yuba City-Almond Street station is the only station within Sutter County with recent data for ozone, CO, PM_{10}, and $PM_{2.5}$. In general, the ambient air quality measurements from this station are representative of the air quality in the vicinity of Live Oak. Table 4.3-1 summarizes the air quality data from the most recent 3 years.

Both ARB and EPA use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The unclassified designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. State and national attainment designations for northern Sutter County are shown in Table 4.3-2 for each criteria air pollutant.

Emission Sources

Sources of criteria air pollutant emissions in Sutter County include stationary, area, and mobile sources. According to the 2008 emissions inventory (Exhibit 4.3-1) for the county, the majority of ROG and NO_X emissions are attributable to mobile sources, while areawide sources are the greatest contributor of particulate-matter emissions (ARB 2009b).

Table 4.3-1
Summary of Annual Ambient Air Quality Data (2006–2008)[a]

	2006	2007	2008
Ozone			
Maximum concentration (1-hour/8-hour average, ppm)	0.102/0.081	0.095/0.082	0.092/0.080
Number of days state standard exceeded (1-hour)	1	1	0
Number of days state/national standard exceeded (8-hour)	13/4	6/3	2/1
Carbon Monoxide			
Maximum concentration (1-hour/8-hour average, ppm)	3.1/2.3	-	-
Number of days state standard exceeded	0/0	-	-
Number of days national standard exceeded	0/0	-	-
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration ($\mu g/m^3$)	51.6	55.8	147.1
Number of days national standard exceeded (measured/estimated[b])	3/16.2	6/8.1	9/9.7
Respirable Particulate Matter (PM_{10})			
Maximum concentration ($\mu g/m^3$)	66.0	54.0	66.9
Number of days state standard exceeded (measured/estimated[b])	4/*	1/*	4/*
Number of days national standard exceeded (measured/estimated[b])	0/0	0/0	0/0

Notes: $\mu g/m^3$ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; ppm = parts per million

* Insufficient data to determine the value.

\- No data.

[a] Measurements from the Yuba City-Almond Street station.

[b] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Estimated days mathematically estimate how many days concentrations would have been greater than the level of the standard had each day been monitored. The number of days above the standard is not necessarily the number of violations of the standard for the year.

Sources: ARB 2009c, EPA 2009b

.

Table 4.3-2
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards[a]		
		Standards[b, c]	Attainment Status[d]	Primary[c,e]	Secondary[c,f]	Attainment Status[g]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	N	–[h]	Same as Primary Standard	–[h]
	8-hour	0.070 ppm (137 µg/m^3)	–	0.75 ppm (147 µg/m^3)		U/A
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	–	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (56 µg/m^3)	–	0.053 ppm (100 µg/m^3)	Same as Primary Standard	U/A
	1-hour	0.18 ppm (338 µg/m^3)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 µg/m^3)	–	U
	24-hour	0.04 ppm (105 µg/m^3)	A	0.14 ppm (365 µg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 µg/m^3)	
	1-hour	0.25 ppm (655 µg/m^3)	A	–	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N	–[h]	Same as Primary Standard	U
	24-hour	50 µg/m^3		150 µg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	U	15 µg/m^3	Same as Primary Standard	U/A
	24-hour	–	–	35 µg/m^3		
Lead[i]	30-day Average	1.5 µg/m^3	A	–	–	–
	Calendar Quarter	–	–	1.5 µg/m^3	Same as Primary Standard	–
Sulfates	24-hour	25 µg/m^3	A	**No National Standards**		
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	U			
Vinyl Chloride[i]	24-hour	0.01 ppm (26 µg/m^3)	–			

Table 4.3-2
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards[a]		
		Standards[b, c]	Attainment Status[d]	Primary[c,e]	Secondary[c,f]	Attainment Status[g]
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U	**No National Standards**		

Notes:
μg/m³ = micrograms per cubic meter; ppm = parts per million

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

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

c Concentration expressed first in units in which it was promulgated (i.e., parts per million [ppm] or micrograms per cubic meter [μg/m³]). Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

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

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

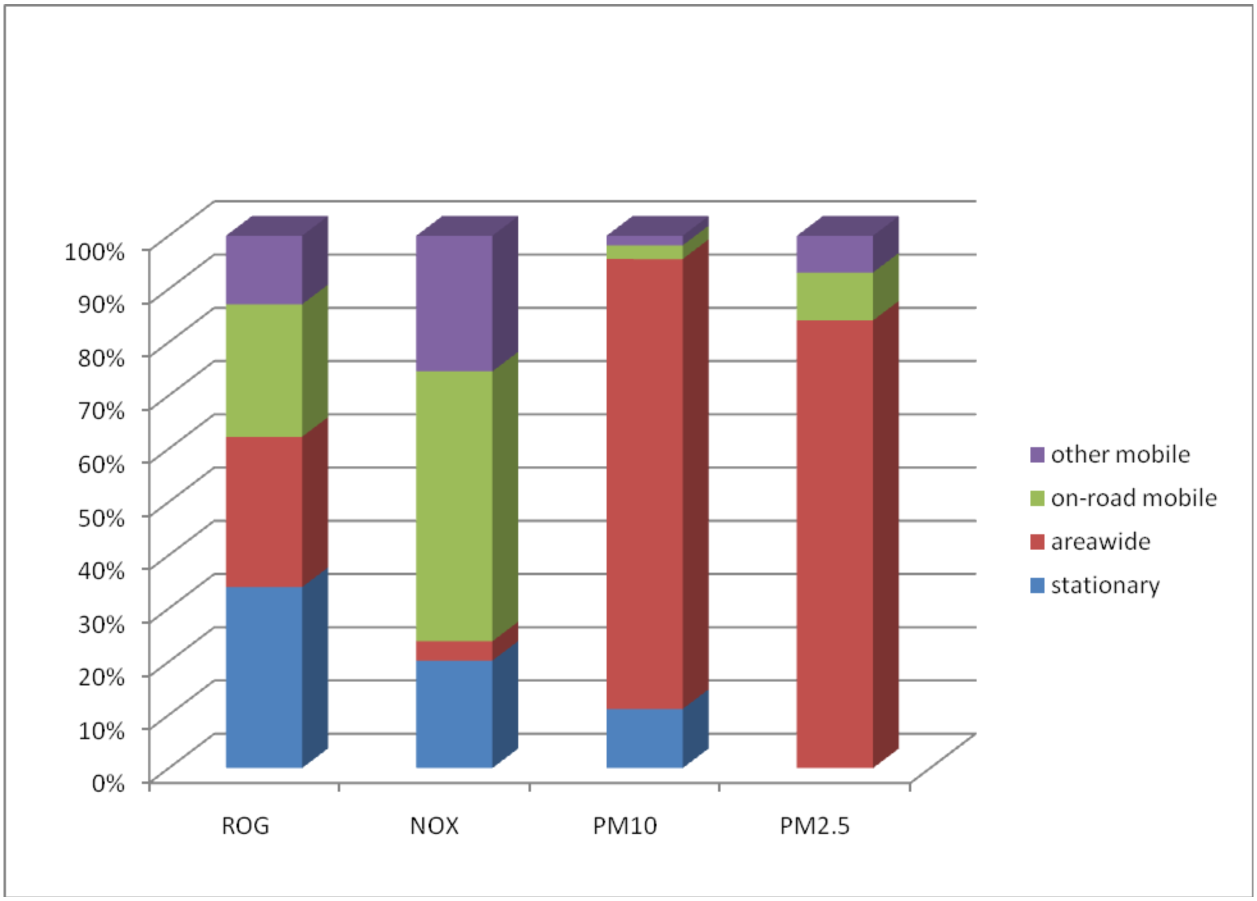
f National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

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

h The 1-hour ozone national ambient air quality standard (NAAQS) was revoked in 2005, and the annual PM_{10} NAAQS was revoked in 2006.

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

Sources: ARB 2009d



1 On-road sources include automobiles, motorcycles, and trucks; other mobile sources (off-road mobile sources) include small off-road engines and equipment, off-road recreational vehicles, farm and construction equipment, forklifts, locomotives, commercial marine vessels, and marine pleasure craft. Stationary sources include non-mobile sources such as power plants, refineries, and manufacturing facilities. Areawide sources of pollution are those where the emissions are spread over a wide area, such as consumer products, fireplaces, road dust, and farming operations. Natural sources are nonhuman-made emission sources, which include biological and geological sources, wildfires, windblown dust, and biogenic emissions from plants and trees.

Source: ARB 2009b

Sutter County 2008 Emissions Inventory—
Relative Contributions from Emission Sources[1] **Exhibit 4.3-1**

EXISTING AIR QUALITY—TOXIC AIR CONTAMINANTS

Stationary Sources

Major stationary sources of air pollutant emissions within the county include industrial processes, fuel combustion from electric utilities and other processes, waste disposal, surface coating and cleaning, petroleum production, and other sources. Local air districts issue permits to various types of stationary sources, which must demonstrate implementation of BACT.

Areawide Sources

Areawide sources of emissions include consumer products, application of architectural coatings, residential fuel combustion, farming operations, construction and demolition, road dust, fugitive dust, landscaping, fires, and other miscellaneous sources. Unpaved road dust is the largest contributor to particulate matter emissions within the county.

Mobile Sources

On-road and other mobile sources are the largest contributors of ozone precursor emissions within the county. On-road sources consist of passenger vehicles, trucks, buses, and motorcycles, while off-road vehicles and other mobile sources comprise heavy-duty equipment, boats, aircraft, trains, recreational vehicles, and farm equipment. Major roadways in the vicinity of Live Oak include SR 99, which handles, on a maximum of approximately 19,000 vehicles per day (Caltrans 2008). A Union Pacific railroad line also traverses the Planning Area.

TACs are air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air. However, their high toxicity or health risk may pose a threat to public health even at low concentrations. According to the *2009 California Almanac of Emissions and Air Quality* (ARB 2009a), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being diesel PM. Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal-combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies on chemical speciation to estimate concentrations of diesel PM. Of the TACs for which data are available in California, diesel PM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest existing ambient risks.

Diesel PM poses the greatest health risk among the 10 TACs mentioned. Based on receptor modeling techniques, ARB estimated its health risk to be 360 excess cancer cases per million people in the SVAB (including Sutter County). Since 1990, the health risk associated with diesel PM has been reduced by 52% in the SVAB. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (ARB 2009a). As stated earlier, new research suggests that diesel PM, which is a component of $PM_{2.5}$, is much more toxic than previously estimated (ARB 2009a). Thus, ARB's diesel PM reduction efforts and reductions in public exposure to diesel PM are of increased importance.

Sources of TACs located throughout the Planning Area could include, but are not limited to, large volume roadways, gasoline dispensing stations, dry cleaners, auto body painting establishments, and crematoriums.

Sensitive Land Uses

Sensitive land uses or sensitive receptors are people or facilities that generally house people (e.g., schools, hospitals, residences) that may experience adverse effects from unhealthful concentrations of air pollutants. There are numerous types of these receptors throughout Live Oak.

EXISTING AIR QUALITY—ODORS

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The ability to detect odors varies considerably among the population and is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast food restaurant) may be perfectly acceptable to another. Unfamiliar odors are more easily detected than familiar odors and are more likely to cause complaints.

This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition occurs only with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word “strong” to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the intensity of the odor weakens and eventually becomes so low that detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Land uses in and around the City of Live Oak that constitute odor sources include agricultural land uses, food processing facilities (specifically, Sunsweet Growers, located 9310 Broadway), and the City’s wastewater treatment facility.

4.3.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

Regional and local emissions of criteria air pollutants and precursors, TACs, and odors throughout buildout of the 2030 General Plan were assessed in accordance with the methodologies described below.

Construction-related emissions of criteria air pollutants (e.g., PM_{10}) and ozone precursors (ROG and NO_X) were assessed in accordance with methodologies recommended by ARB and FRAQMD. Where quantification was required, emissions were modeled using the Urban Emissions (URBEMIS) 2007 Version 9.2.4 computer model. Model default parameters were assumed where project-specific data (e.g., construction equipment types and number requirements, and maximum daily acreage disturbed) were not available at the General Plan level. Construction-related emissions were compared to applicable FRAQMD thresholds to determine significance.

Regional operational emissions of criteria air pollutants and precursors (e.g., mobile and area sources) were also quantified using the URBEMIS 2007 Version 9.2.4 computer model. Modeling was based on buildout assumptions in the 2030 General Plan and information about vehicle trip generation from the traffic analysis prepared to support the General Plan and EIR (see Section 4.2, “Transportation and Circulation,” in this DEIR).

Other air quality impacts (i.e., local emissions of CO, odors, and operation-related TACs) were assessed in accordance with methodologies recommended by ARB and FRAQMD.

THRESHOLDS OF SIGNIFICANCE

For the purpose of this analysis, the following thresholds of significance, as identified by the State CEQA Guidelines (Appendix G) and FRAQMD have been used to determine whether implementation of the 2030 General Plan would result in significant air quality impacts.

Based on Appendix G of the State CEQA Guidelines, an air quality impact is considered significant if the proposed project would:

- conflict with or obstruct implementation of the applicable air quality plan;
- violate any air quality standard or contribute substantially to an existing or projected air quality violation;

- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable NAAQS or CAAQS (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- expose sensitive receptors to substantial pollutant concentrations; or,
- create objectionable odors affecting a substantial number or people.

As stated in Appendix G, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. Thus, according to FRAQMD, an air quality impact is considered significant if the proposed project would:

- violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations (25 pounds per day [lb/day] of ROG or NO_X, or 80 lb/day of PM_{10}).

IMPACT ANALYSIS

IMPACT 4.3-1 **Generation of Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors.** *Emissions of Criteria Air Pollutants and precursors during construction of the 2030 General Plan would exceed FRAQMD's significance thresholds of 25 lb/day for ROG and NO_X and 80 lb/day for PM_{10}. Policies contained in the 2030 General Plan would support compliance with FRAQMD-recommended standard construction mitigation practices. This would appreciably reduce construction-generated air pollutant emissions from buildout of the 2030 General Plan. However, due to the large amount of total development proposed over the buildout period, construction-generated emissions of criteria air pollutants and precursors is considered substantial, and could violate an ambient air quality standard, contribute substantially to an existing or predicted air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact is considered* ***significant****.*

Construction-related emissions are described as short-term or temporary in duration and have the potential to represent a significant impact with respect to air quality. The timing or phasing of General Plan buildout is dependent on economic, demographic, and other factors, many of which are not knowable at this time.

Individual projects brought forward under the 2030 General Plan would continue to define phasing at a detailed level and be reviewed by the City to ensure that development occurs in a logical manner consistent with policies in the General Plan, and that additional environmental review is conducted under CEQA, as needed.

Construction-related activities would result in emissions of criteria air pollutants (e.g., PM_{10}) and precursors (e.g., ROG and NO_X) from site preparation (e.g., excavation, grading, and clearing); exhaust from off-road equipment, material delivery vehicles, and worker commute vehicles; vehicle travel on paved and unpaved roads; and other miscellaneous activities (e.g., building construction, asphalt paving, application of architectural coatings, and trenching for utility installation).

Emissions of Ozone Precursors and Fugitive Dust

Emissions of ozone precursors are associated primarily with exhaust from off-road construction equipment. Worker commute trips and other construction-related activities also contribute to short-term increases in ozone precursors. Emissions of fugitive PM dust (e.g., PM_{10} and $PM_{2.5}$) are associated primarily with ground disturbance activities during site preparation (e.g., grading) and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled (VMT) on- and off-site. Exhaust emissions from diesel equipment and worker commute trips also contribute to short-term increases in PM_{10}

emissions, but to a much lesser extent (see Table 4.3-3). Construction-related activities would result primarily in project-generated emissions of fugitive PM_{10} dust from site preparation (e.g., excavation, grading, and clearing).

Table 4.3-3
Summary of Modeled Construction-Related Emissions of Criteria Air Pollutants and Precursors—Buildout of the 2030 General Plan in the Worst-Case Year (2010)

	Emissions (lb/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Construction Activities Associated with GPU [1, 2]				
Grading	11.34	95.53	877.08	186.49
Building Construction	43.53	334.22	16.1	12.68
Asphalt Paving	3.79	20.67	1.75	0
Architectural Coatings	312.12	0.33	0.03	0.01
Trenching	2.12	17.78	0.88	0.81
Total Unmitigated Worst-case Daily Emissions (GPU)	**372.90**	**468.53**	**895.84**	**199.99**
FRAQMD Significance Threshold	25	25	80	-
Total Mitigated Daily Emissions (GPU) [4]	354.26	374.82	223.96	199.99
Construction Activities Associated with Existing GP (No Project Alternative) [3]				
Total Unmitigated Worst-case Daily Emissions (Existing GP)	**173.90**	**243.33**	**407.35**	**93.45**
FRAQMD Significance Threshold	25	25	80	-
Total Mitigated Daily Emissions (Existing GP) [4]	165.21	194.66	101.84	93.45
Unmitigated Net Change in Daily Emissions from No Project (GPU – Existing GP)	199.00	225.20	488.49	106.54
Mitigated Net Change in Daily Emissions from No Project (GPU – Existing GP) [4]	189.05	180.16	122.12	106.54

Notes: GP = General Plan; GPU = General Plan Update; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter ROG = reactive organic gases; FRAQMD = Feather River Air Quality Management District

Emissions totals may not sum exactly due to rounding.

1 No emissions were modeled for demolition activities. Existing land uses to be demolished are unknown at this time.

2 It was assumed that, on average, 175 acres would be developed annually and a maximum of 43 acres/day would be actively disturbed associated with construction of the GPU.

3 It was assumed that, on average, 79 acres would be developed annually and a maximum of 20 acres/day would be actively disturbed associated with buildout of the existing GP.

4 Implementation of FRAQMD-recommended construction mitigation measures was assumed to result in a 5%, 20% and 75% reduction in ROG, NO_X, and PM_{10}, respectively.

Refer to Appendix C for detailed input parameters and modeling results.

Source: Modeling performed by EDAW in 2009

Construction-related emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ were modeled using the URBEMIS 2007 Version 9.2.4 computer program. URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Detailed phasing and construction information (e.g., construction equipment type and number requirements, maximum daily acreage disturbed, number of workers, hours of operation) is not possible to determine at the level of the General Plan.

Modeling was performed assuming a 20-year planning horizon (2010 through the General Plan time horizon of 2030). It is assumed that 1/20 or roughly 5% of the proposed uses would be constructed during any given year over a 20-year time frame. This would represent approximately 175 acres of development per year over 20 years. Modeling was conducted for the year 2010 to represent worst-case conditions. If construction would not occur until future years, emission factors associated with off-road construction equipment would be lower due to the regulatory trend of more stringent emissions standards for engines. As older models of equipment are replaced by newer models with cleaner engines, fleetwide emission factors would decline.

Table 4.3-3 summarizes the estimated construction-related emissions of criteria air pollutants and ozone precursors from site preparation (e.g., grading) and building construction activities from buildout of the 2030 General Plan, and from the concurrent buildout of the existing (pre-update) General Plan. Construction-related air quality impacts were determined by comparing these modeling results with applicable FRAQMD significance thresholds. Refer to Appendix C for detailed modeling input parameters and results.

As summarized in Table 4.3-3, construction-related activities associated with the buildout of the reasonable worst-case year (2010) would result in annual unmitigated emissions of approximately 373, 469, 896, and 200 lb/day of ROG, NO_X, PM_{10}, and $PM_{2.5}$, respectively. FRAQMD does not have a threshold for emissions of $PM_{2.5}$, which are listed for informational purposes only, and are a subset of PM_{10}.

Based on the modeling conducted, construction-related activities associated with buildout of the 2030 General Plan would result in emissions of ROG, NO_X, and PM_{10} that exceed FRAQMD's significance thresholds. It should be noted that buildout of the existing (1994) General Plan would also result in construction-generated emissions that exceed FRAQMD's significance thresholds. Taken together, or individually, buildout of land uses designated under the existing (pre-update) General Plan and proposed 2030 General Plan would result in construction-related emissions of criteria air pollutants and precursors that could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations.

FRAQMD-recommended control measures for construction are incorporated into the 2030 General Plan under Conservation and Open Space Policy Air-2.1. In addition, the following policies proposed in the 2030 General Plan Conservation and Open Space Element would be relevant to construction emissions:

- **Policy Air-2.1:** New development shall implement standard emission control measures recommended by the Feather River Air Quality Management District for construction, grading, excavation, and demolition, to the maximum extent feasible.

- **Policy Air-2.2:** The City will identify a preference for contractors that use low-emission equipment and other practices with air quality benefits (e.g., using locally produced and/or recycled construction materials, recovering demolition materials for reuse, or otherwise diverting refuse or waste from a landfill) for City-sponsored construction projects.

However, the FRAQMD-recommended control measures are not necessarily a requirement of individual project approval. As a result, construction-related emissions of fugitive dust could violate an air quality standard, contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations.

Because of the large amount of development and potential for simultaneous construction of multiple sites, the nonattainment status of Sutter County, and modeled emissions that exceed applicable thresholds (Table 4.3-3), implementation of the 2030 General Plan could result in or substantially contribute to an air quality violation. However, the City has included policy within the 2030 General Plan to avoid significant impacts:

- **Policy Air-2.1.** New development shall implement standard emission control measures recommended by the Feather River Air Quality Management District for construction, grading, excavation, and demolition, to the maximum extent feasible.

FRAQMD standard mitigation typically would include fugitive dust reduction measures. Open burning of vegetative waste (natural plant growth wastes) or other burn materials (trash, demolition debris) would normally be prohibited. FRAMQMD would normally regulate construction equipment exhaust emissions, fuels, and idling time. Instead of fuel-powered equipment, existing power sources (e.g., power poles) or clean fuel generators would be used wherever feasible.

Implementation of FRAQMD would reduce short-term, construction-related emissions. However, the City cannot demonstrate that these measures would reduce impacts to a less-than-significant level. It is possible that construction-related emissions of criteria air pollutants and precursors could still exceed significance thresholds. Such emissions could violate or contribute substantially to an existing or projected air quality violation and/or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact is considered **significant and unavoidable**.

IMPACT 4.3-2 Consistency with Air Quality Planning Efforts. *Future development in Live Oak would generate emissions of criteria air pollutants (PM_{10} and $PM_{2.5}$) and ozone precursors, both of which affect regional air quality. The 2030 General Plan would result in fewer emissions of criteria pollutants and precursors per capita than under the 1994 General Plan, and would accommodate growth in a more emissions-efficient manner. However, anticipated population and development consistent with the 2030 General Plan could lead to operational (mobile-source and area-source) emissions that are not accounted for in the current applicable air quality plan and would exceed FRAQMD thresholds. This impact would be* ***significant****.*

Future changes to air pollutant emissions in Live Oak were calculated based on vehicle travel data provided in the traffic analysis prepared to support the 2030 General Plan and this EIR, and area-source emissions from proposed land uses. ARB's motor vehicle emissions model (EMFAC 2007) factors, as contained in the URBEMIS 2007 (Version 9.2.4) computer model, were used along with VMT estimates from the traffic analysis prepared for this project (see Section 4.2, "Transportation and Circulation," of this DEIR) to calculate emissions in units of lb/day for future (2030) conditions upon buildout of the 2030 General Plan relative to existing (on-the-ground) land uses (i.e., the baseline). For informational purposes, buildout of the existing 1994 General Plan was also analyzed. The net change in daily air pollutant emissions is shown in Table 4.3-4.

Emissions of PM_{10} and ozone precursors (ROG and NO_X) associated with land use change under the 2030 General Plan are treated as new to the region. (This is a conservative [worst-case] assumption because many "new vehicle trips" may actually be moved from one part of the region to another partly as a result of the 2030 General Plan.)

Because the 2030 General Plan would result in emissions in excess of thresholds for criteria air pollutants and precursors for which the region is in nonattainment, and would increase population (and thus VMT) beyond those anticipated by SACOG (SACOG 2008), this could conflict with FRAQMD air quality planning efforts.

It should be noted that due to the anticipated reduction in total VMT between buildout of the 1994 General Plan and the 2030 General Plan, a net reduction in mobile-source emissions of PM would occur, despite an increase in the magnitude of vehicle trips associated with increased development. The decrease in VMT associated with the 2030 General Plan relative to the 1994 General Plan can be attributed to reduced average trip length despite the increase in population under the 2030 General Plan. Average trip length would be reduced under the GPU due to siting of proposed residents in Live Oak nearer to daily amenities (i.e., presence of neighborhood centers). It is also important to note that buildout of the existing (pre-update) General Plan and buildout of the 2030 General Plan would result in lower ratios of ROG, NO_X, PM_{10}, and $PM_{2.5}$ per person compared to existing conditions. This is due to the decrease in average VMT/vehicle trip compared to existing conditions. In other words, the *rate* of emissions per person in Live Oak would be lower under the 2030 General Plan buildout scenario than under existing conditions (i.e., more efficient than under existing conditions).

Table 4.3-4
Summary of Modeled Operational Emissions of Criteria Air Pollutants and Precursors—2030 Conditions upon Buildout of the General Plan

Source	Emissions (lb/day)[1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Buildout of Existing GP (No Project Alternative)				
Area Sources[2]	436.74	102.4	0.88	0.87
Mobile Sources[3]	259.48	285.41	1,413.78	266.32
Total Existing GP Daily Emissions	696.22	387.81	1,414.66	267.19
Daily Emissions/capita	0.043	0.024	0.088	0.017
Buildout of GPU				
Area Sources[2]	1,117.75	229.05	1.96	1.95
Mobile Sources[3]	272.18	280.29	1,311.04	247.54
Total GPU Daily Emissions	1,389.93	509.34	1,313.00	249.49
Daily Emissions/capita	0.035	0.013	0.033	0.006
Net Change in Unmitigated Emissions from GPU (GPU - Existing [On-the-Ground])	1,389.93	509.34	1,313.00	249.49
Net Change in Unmitigated Emissions from GPU (GPU - Existing GP Buildout)	693.71	121.53	-101.66	-17.7
FRAQMD Significance Threshold	25 lb/day	25 lb/day	80 lb/day	-

Notes: FRAQMD = Feather River Air Quality Management District; GP = General Plan; GPU = General Plan Update; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; ROG = reactive organic gases

[1] Emissions modeled using the URBEMIS 2007 (Version 9.2.4) computer model, for analysis year 2030 based on trip generation rates obtained from the analysis prepared for this project and proposed land uses identified in Chapter 3, "Project Description," and Section 4.2, "Transportation and Circulation," of this DEIR.

[2] For this estimate, it was assumed that all proposed new residences would be equipped with natural gas fireplaces, and no wood-burning appliances would be installed.

[3] Trip generation rates were obtained from the traffic analysis for the respective land uses (see Section 4.2, "Transportation and Circulation").

Refer to Appendix C for detailed assumptions and modeling output files.

Source: Data modeled by EDAW in 2009

Relevant Goals, Policies, and Implementation Strategies of the Proposed 2030 General Plan

The Conservation and Open Space, Land Use, and Circulation Elements of the 2030 General Plan include numerous policies and implementation strategies that seek to reduce operational air pollution and minimize the air quality impacts of new development.

Conservation and Open Space

See pages 10-14 of the Conservation and Open Space Element for proposed policies and implementation strategies that would act to minimize operational mobile and area-source emissions from the 2030 General Plan. Specifically, the following policies are relevant to operational emissions:

- **Policy Air-1.1:** New neighborhoods will include a mix of land uses, including pedestrian-friendly Civic Centers and Neighborhood Centers ("Centers") that accommodate destination land uses (e.g., local-serving retail, neighborhood services, employment uses, and entertainment uses) to allow neighborhood residents to meet daily needs without the use of an automobile, and also to provide supportable locations for future transit stops.

- **Policy Air-1.2:** New development shall provide highly connected street networks, which provide many route choices between any given origin and destination point, encourage alternatives to vehicular travel, and shorten trip lengths for vehicular travel.

- **Policy Air-1.3:** City administrative facilities and other government offices established in Live Oak should be located downtown or in Centers, to be accessible by transit, walking, and bicycling.

- **Policy Air-1.4:** The City will encourage and provide incentives for infill development, defined as development that has water and sewer infrastructure available in adjacent streets and does not require extension of such infrastructure to serve the subject project.

- **Policy Air-2.4:** City parks and open space will use low-maintenance, drought-tolerant landscaping, except in the case of playing fields. For landscape maintenance that is required, the City will encourage use of low-emission equipment.

- **Policy Air-2.6.** New development shall, as a condition of project approval, implement feasible elements from Feather River Air Quality Management District's standard and supplemental mitigation measures, where required to reduce project level operational impacts to a less-than-significant level.

- **Implementation Program Air-4.** The City shall continue to coordinate with FRAQMD to ensure that assumptions and control measures from new air quality plan updates are implemented, as appropriate, as part of General Plan implementation.

Circulation Element

See the Circulation Element for proposed policies and implementation programs that would act to minimize operational mobile-source emissions from the proposed project.

Land Use Element

See the Land Use Element for proposed policies and implementation strategies that would act to minimize operational mobile-source emissions from the proposed project.

Additionally, please refer to the balance of the 2030 General Plan, under separate cover, for the wide range of land use, community design, transportation, conservation, and other policies that would directly or indirectly address air quality.

Conclusion

Future development in Live Oak would generate emissions of ozone precursors, PM_{10}, and $PM_{2.5}$. The 2030 General Plan contains numerous goals, policies, and programs intended to reduce per-capita VMT and resulting air pollution; however, even with implementation of these goals, policies, and programs, anticipated population and development accommodated under the 2030 General Plan could lead to operational (mobile-source and area-source) emissions that exceed applicable thresholds, and could result in associated air quality impacts. Therefore, this impact would be **significant**.

Implementation Program Air-4 and the various 2030 General Plan goals, policies, and programs outlined above would reduce air pollutant emissions that affect both Live Oak and the region. However, the 2030 General Plan would still result in operational emissions in excess of threshold assumptions used by FRAQMD for relevant clean air plans. Buildout of the 2030 General Plan would continue to conflict with current air quality planning efforts. This impact is **significant and unavoidable**.

IMPACT 4.3-3 **Generation of Long-Term Operational, Regional Emissions of Criteria Air Pollutants and Precursors.** *Long-term operational activities consistent with the 2030 General Plan would result in lower emissions of criteria air pollutants and precursors per capita than under the 1994 General Plan. However, emissions associated with the 2030 General Plan would result in emissions of ROG, NO_X, and PM_{10} that exceed FRAQMD's significance thresholds of 25, 25, and 80 lb/day, respectively. Thus, operational emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation and/or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be **significant**.*

Area- and Mobile-Source Emissions

Regional area- and mobile-source emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ were modeled using the URBEMIS 2007 Version 9.2.4 computer program, which is designed to estimate emissions for land use development projects. URBEMIS allows land use data entries that include project location specifics and trip generation rates. URBEMIS accounts for area-source emissions from the use of natural gas, wood stoves, fireplaces, landscape maintenance equipment, and consumer products; and mobile-source emissions associated with vehicle trip generation. Regional area- and mobile-source emissions were modeled based on proposed land use types and sizes (see Chapter 3, "Project Description"), the increase in trip generation from the traffic analysis prepared for this project (see Section 4.2, "Transportation and Circulation"), and default settings and parameters attributable to construction period and site location.

Modeled operational emissions are summarized in Table 4.3-4 for 2030 full buildout conditions. As shown in Table 4.3-4, operational activities associated with the 2030 General Plan would result in annual unmitigated emissions of approximately 1,390 lb/day of ROG, 509 lb/day of NO_X, 1,313 lb/day of PM_{10}, and 249 lb/day of $PM_{2.5}$ under full buildout conditions.

Based on the modeling conducted, operational activities would result in emissions of ROG, NO_X, and PM_{10} that exceed FRAQMD's applicable thresholds of 25, 25, and 80 lb/day, respectively. Thus, operational emissions of these ozone precursors and PM could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations.

Stationary-Source Emissions

The 2030 General Plan could accommodate stationary sources of pollutants that would be required to obtain permits to operate in compliance with FRAQMD rules. These sources could include, but not be limited to, diesel-engine or gas turbine generators for emergency power generation; central-heating boilers for commercial, industrial, or large residential buildings; process equipment for light-industrial uses; kitchen equipment at restaurants and schools; service-station equipment; and dry-cleaning equipment. The permit process would assure that these sources would be equipped with the required emission controls, and that individually, these sources would not cause a significant environmental impact. There is no available methodology to reliably estimate these emissions; nonetheless, the emissions from these sources would be additive to the estimated area-source and mobile-source emissions described above.

Relevant Policies and Implementation Strategies of the 2030 General Plan

As noted previously, the 2030 General Plan includes goals, policies, and implementation strategies designed to minimize adverse effects related to long-term operational emissions. Relevant goals and policies are outlined above under Impact 4.3-2. Please refer to the 2030 General Plan, under separate cover, for more information.

Conclusion

Even with the implementation of relevant policies and implementation strategies from the 2030 General Plan, operational emissions under buildout conditions is still estimated to exceed the 25, 25, and 80 lb/day and significance thresholds for ROG, NO_X, and PM_{10}, respectively (see Table 4.3-4). As a result, this impact is considered **significant**.

Significance after Mitigation

Implementation of the above mitigation measure, in addition to compliance with the above 2030 General Plan policies and implementation strategies and existing regulations, would reduce operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$, but the City cannot demonstrate that these measures would reduce impacts to a less-than-significant level. This impact, therefore, is considered **significant and unavoidable**.

IMPACT 4.3-4	**Generation of Long-Term, Operational, Local Mobile-Source Emissions of CO.** *Local mobile-source emissions of CO would not be expected to substantially contribute to emissions concentrations that would exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. As a result, this impact would be* ***less than significant****.*

The concentration of CO is a direct function of motor vehicle activity, particularly during periods of peak travel demand, and of meteorological conditions. Under specific meteorological conditions, CO concentrations may reach unhealthy levels with respect to local sensitive land uses (e.g., residential areas, schools, and hospitals). The California Department of Transportation (Caltrans) has established preliminary screening criteria for long-term, local mobile-source emissions of CO. If these criteria are not violated with implementation of the 2030 General Plan, it is unlikely that such CO emissions would result in, or substantially contribute to emissions concentrations exceeding the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. Caltrans' preliminary screening criteria for significance are as follows (Garza et al 1997):

- A traffic study for the project indicates that the peak-hour Level of Service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduce to an unacceptable LOS (typically LOS E or F, with A being best and F being worst); or,

- A traffic study indicates that the project will substantially worsen an already existing peak-hour LOS F on one or more streets or at one or more intersections in the project vicinity. "Substantially worsen" includes situations where delay would increase by 10 seconds or more when project-generated traffic is included.

According to the traffic analysis prepared for the 2030 General Plan (see Section 4.2, "Transportation and Circulation"), signalized roadway intersections could be reduced to LOS E or LOS F from LOS A–D under buildout (2030) conditions for both a.m. and p.m. peak hours. Specifically, the intersection of SR 99 and Pennington Road would deteriorate from LOS C under existing conditions to LOS F during the P.M. peak hour under the 2030 General Plan scenario. With the recommended improvements included in the 2030 General Plan and mitigation in place, all other affected intersections would operate at LOS D or better under 2030 conditions. However, the City's ability to implement the proposed mitigation measures on SR 99 (a State highway, which is under the control of the California Department of Transportation [Caltrans]) is limited. Therefore, this impact does not meet the screening criteria listed above.

Because local mobile-source CO impacts did not meet the screening-level criteria identified by Caltrans, CO concentrations were modeled using the California Line Source Dispersion Model (CALINE4) with emission factors from the EMFAC 2007 computer model. Modeling was conducted in accordance with the University of California (UC) Davis Transportation Project-Level Carbon Monoxide Protocol (Garza, et al. 1997). Background (ambient) CO concentrations were obtained from the ARB, and were identified as the highest concentrations recorded during the last three years at the monitoring station nearest the project site. However, it is expected that background CO concentrations in the year 2030 would be lower than those recorded during 2006, due to continuous improvement in CO emissions control technology over time, making this analysis conservative. According to the data summarized in Table 4.3-1, the 1- and 8-hour background CO concentrations for the year 2030 were estimated to be 3.1 ppm and 2.3 ppm, respectively.

The maximum project-generated 1- hour CO concentration from p.m. peak hour daily trips at the modeled intersection was calculated to be 0.6 ppm. Assuming a persistence factor of 0.7, the project-generated 8-hour concentration was estimated at 0.4 ppm. Total 1-hour and 8-hour estimated CO concentrations associated with 2030 General Plan buildout conditions would be approximately 3.7 and 2.7 ppm, respectively. Pennington Road and SR 99 would be among the busiest intersections in the Planning Area. Other delayed intersections would be expected to have similar or lower CO concentrations at buildout of the 2030 General Plan. The proposed project would not be anticipated to result in or contribute to local CO concentrations that exceed the California 1-hour or 8-hour ambient air quality standards of 20 ppm or 9 ppm, respectively. As a result, the impact of long-term operational emissions of local CO associated with the proposed project is considered **less than significant**.

Mitigation Measures

No mitigation measures are required.

IMPACT 4.3-5	Exposure of Sensitive Receptors to Emissions of Toxic Air Contaminants. *With implementation of the 2030 General Plan, proposed sensitive land uses and TAC sources would be adequately sited to minimize exposure to substantial concentrations of TACs. This impact is* ***less than significant****.*

Emissions of TACs during project construction consistent with the 2030 General Plan (e.g., emissions from on-site heavy-duty diesel equipment) and from project operation under the 2030 General Plan (e.g., emissions from both on-site and off-site area, stationary, and mobile sources) are discussed and their resulting levels of TAC exposure of sensitive receptors are analyzed separately below.

Construction-Related Emissions

Construction-related activities would result in short-term emissions of diesel PM from the exhaust of off-road heavy-duty diesel equipment for site preparation (e.g., excavation, grading, and clearing); paving; application of architectural coatings; and other miscellaneous activities. Diesel PM was identified as a TAC by ARB in 1998. The potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential for all other health impacts (ARB 2003).

It is important to note that emissions from construction equipment would be reduced over the period of buildout of the 2030 General Plan. In January 2001, EPA promulgated a final rule to reduce emissions standards for heavy-duty diesel engines in 2007 and subsequent model years. These emissions standards represent a 90% reduction in NO_X emissions, 72% reduction of nonmethane hydrocarbon emissions, and 90% reduction of PM emissions in comparison to the emissions standards for the 2004 model year. In December 2004, ARB adopted a fourth phase of emission standards (Tier 4) in the Clean Air Non-road Diesel Rule that are nearly identical to those finalized by EPA on May 11, 2004. As such, engine manufacturers are now required to meet after-treatment-based exhaust standards for NO_X and PM starting in 2011 that are more than 90% lower than current levels, putting emissions from off-road engines virtually on par with those from on-road heavy-duty diesel engines.

More specifically, the dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time.

According to the California Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period and duration of activities associated with the project, in this case the 2030 General Plan (Salinas, pers. comm., 2004). Thus, because the use of off-road heavy-duty diesel equipment would be temporary and intermittent, and would combine with the highly dispersive properties of diesel PM (Zhu et al. 2002), further reductions in exhaust emissions would occur, and construction-related activities would be typical to similar development-type projects, construction-related TAC emissions would not expose sensitive receptors to substantial emissions of TACs. It is also important to note that compliance with the construction dust mitigation requirements would also reduce PM exhaust emissions.

Operational Emissions

Stationary Sources

The 2030 General Plan anticipates construction of commercial land uses, which may potentially include stationary sources of TACs, such as dry-cleaning establishments, gasoline-dispensing facilities, and diesel-fueled backup generators. These types of stationary sources, in addition to any other stationary sources that may emit TACs, would be subject to FRAQMD rules and regulations. Thus, as discussed above, FRAQMD would analyze such sources (e.g., conduct a health risk assessment) based on the source's potential to emit TACs. If it is determined that the sources would emit TACs in excess of FRAQMD's applicable significance threshold, MACT or BACT would be implemented to reduce emissions. If the implementation of MACT or BACT would not reduce the risk below the applicable threshold, FRAQMD would deny the required permit. As a result, given compliance with applicable rules and regulations, operation of stationary sources would not result in the exposure of sensitive receptors to TACs at levels exceeding FRAQMD significance thresholds, and this impact would be less than significant.

Furthermore, only two major stationary sources of TACs currently exist in Live Oak (ARB 2009e). These stationary sources are permitted and regulated to prevent new land use compatibility conflicts. Therefore, there would be no incompatibility of proposed land uses with major existing sources of TAC emissions.

Mobile Sources

On-site mobile sources of TACs would be associated primarily with the operation of on-road heavy-duty diesel trucks used for proposed on-site commercial/industrial activities (e.g., unloading/loading). According to the ARB guidance document *Air Quality and Land Use Handbook: A Community Health Perspective*, ARB recommends avoiding the siting of new commercial trucking facilities that accommodate more than 100 trucks per day, or 40 trucks equipped with transportation refrigeration units (TRUs), within 1,000 feet of sensitive receptors (e.g., residences) (ARB 2005). The ARB guidance document is advisory, not regulatory. Operational activities that require the use of diesel-fueled vehicles for extended periods, such as commercial trucking facilities or delivery/distribution areas, may generate diesel PM emissions that could expose sensitive receptors to diesel PM emissions. Although commercial and industrial uses that would be developed under the 2030 General Plan have not been identified, some of the tenants would require large delivery and shipping trucks that use diesel fuel. The diesel exhaust PM emissions generated by these uses would be produced primarily at single locations on a regular basis (e.g., loading dock areas). Idling trucks, including TRUs, increase diesel PM levels at these locations. Occupants of nearby existing and proposed residences may be exposed to diesel exhaust PM emissions on a reoccurring basis.

ARB has adopted an idling restriction ATCM for large commercial diesel-powered vehicles, which became effective February 1, 2005. In accordance with this measure, affected vehicles are required to limit idling to no longer than 5 minutes under most circumstances. ARB is currently evaluating additional ATCMs intended to further reduce TACs associated with commercial operations, including a similar requirement to limit idling of smaller diesel-powered commercial vehicles. In addition, the 2030 General Plan contains goals, policies, and implementation strategies (see below) designed to minimize exposure of sensitive receptors to concentrations of TACs from mobile sources.

The 2030 General Plan includes a mix of land uses, including commercial, industrial, and residential uses. The ARB guidance document *Air Quality and Land Use Handbook: A Community Health Perspective* recommends avoiding the placement of new sensitive land uses (e.g., residences and schools) within 500 feet of major freeways (those with 100,000+ vehicles per day). There are no major freeways in the Planning Area. The largest thoroughfare in Live Oak is SR 99, which carries a maximum of approximately 19,000 vehicles per day (Caltrans 2008), and is not expected to approach capacity of a major freeway during the planning horizon. Sensitive receptors would not be sited within 500 feet of a major freeway, and risk associated with implementation of the 2030 General Plan would be compatible with ARB's (and subsequently FRAQMD's) recommendations. Nonetheless, the 2030 General Plan contains goals, policies, and implementation strategies (see below) designed to minimize exposure of sensitive receptors to concentrations of TACs from mobile sources.

Rail Traffic Sources

There is one major rail line that passes through Live Oak. The Union Pacific Railroad (UPRR) operates the rail line. Railroad operations within the City of Live Oak consist of freight and Amtrak passenger service on the UP mainline track. This track runs through the central part of Live Oak in a north-south direction adjacent to many of the City's industrial land uses. The noise monitoring conducted to support the 2030 General Plan and EIR identified 21 train passages per day. Please refer to the 2006 General Plan Technical Background Reports (under separate cover) for more information.

In October 2004, ARB released a study that provided a health risk characterization and assessment of the diesel PM from locomotives at the J. R. Davis Rail Yard in Roseville, California (ARB 2004). The study indicated that locomotive-related activities at the rail yard would result in the exposure of sensitive receptors near the yard to a cancer risk level of in excess of the applicable threshold. However, the UPRR rail line in Live Oak is used specifically for passenger and freight service and experience extremely light daily rail traffic relative to the traffic occurring at the rail yard in Roseville. In addition, unlike the locomotives in Live Oak, the locomotives at the Roseville rail yard undergo engine testing, and they idle for extended periods of time, so emissions are higher and persist in one localized area for greater amounts of time. The rail yard study describes conditions that are unlike those associated with the rail line through Live Oak, which would not expose sensitive receptors to diesel PM concentrations that would result in a health risk in excess of the threshold.

Relevant Policies and Implementation Strategies of the 2030 General Plan

The 2030 General Plan contains the following policies and implementation strategies designed to reduce exposure of sensitive receptors to concentrations of TACs and help reduce future land use incompatibilities of sources that could potentially emit TACs and exposure of sensitive uses to harmful air pollutants:

Conservation and Open Space Element

- **Policy Air-3.1:** Development of sensitive uses (such as residences and schools) shall be located an adequate distance from existing and potential sources of air pollutant emissions (including TACs), such as SR 99.

- **Policy Air-3.2:** The City will ensure that industrial, manufacturing, and processing facilities that may produce toxic or hazardous air pollutants are located at an adequate distance from residential areas and other sensitive receptors, taking into consideration weather patterns, the quantity and toxicity of pollutants emitted, and other relevant parameters.

- **Policy Air-3.3:** The City will coordinate with the Feather River Air Quality Management District to identify sources of TACs and determine the need for health risk assessments for proposed development.

- **Policy Air-3.4:** The City will continue to work with local businesses and other agencies to monitor and provide rapid response and communication with the public in the event of an emergency involving air pollution.

Land Use Element

- **Policy LU-5.4:** Commercial or industrial uses that create noise, air pollution, or other substantial impacts for existing or planned residential uses shall be located, buffered, or otherwise designed to minimize such impacts.

- **Policy LU-5.5:** New residential projects near the Union Pacific railroad line and SR 99 will provide buffering and/or other mitigation from these rights-of-way, to avoid adverse air quality, noise, and aesthetic issues.

- **Policy LU-5.6:** New residential development proposed adjacent to cultivated agricultural lands outside the City's Sphere of Influence shall provide buffers to reduce potential conflicts. The width of such buffers will be determined on a case-by-case basis, considering prevailing winds, crop types, agricultural practices, and other relevant factors. Buffers should be designed to minimize adverse dust, spraying, and noise impacts to newly established residents near ongoing agricultural operations and to avoid nuisance complaints from these newly established residents against farmers in the area. The width of public rights-of-way, drainages, and easements may count as part of the buffer. Within agricultural buffer areas, allowed land uses include drainage swales, trails, other infrastructure, community gardens, landscaped areas, linear parks, roads, and other uses that would be compatible with ongoing agricultural operations.

Conclusion

For the reasons described above, and with implementation of the above 2030 General Plan policies and implementation strategies, this impact would be **less than significant** for construction-related emissions, and for operational emissions from stationary, mobile, and rail sources.

IMPACT 4.3-6	Exposure of Sensitive Receptors to Emissions of Odors. *Implementation of the 2030 General Plan could result in the exposure of sensitive receptors to emissions of objectionable odors. As a result, this impact would be significant.*

As discussed previously, the human response to odors is subjective, and sensitivity to odors varies greatly among the public. Minor sources of odors, such as exhaust from mobile sources, garbage collection areas, and charbroilers associated with commercial uses, are not typically associated with numerous odor complaints, but are known to have some temporary, less concentrated odorous emissions. Major and minor sources of odors are discussed separately below.

Major Sources of Odors

The following land use types are widely considered major sources of odors: wastewater treatment facilities, chemical manufacturing facilities, sanitary landfills, fiberglass manufacturing facilities, transfer stations, painting/coating operations (e.g., auto body shops), composting facilities, food processing facilities, confined animal facilities, asphalt batch plants, rendering plants, and coffee roasters. This list is meant not to be entirely inclusive, but to act as general guidance. The primary odor sources of concern in Live Oak are food processing facilities and the City's wastewater treatment plant. The Live Oak Wastewater Treatment Plant is planned to be upgraded during the planning period. As part of the wastewater treatment plant upgrade, an odor control system will be constructed at the existing headworks facility. A ventilation fan and ducting will be installed that will draw the foul air from the headworks channels to a packaged odor control system that utilizes a biofilter followed by a carbon adsorption scrubbing system. Thus, odor control systems would be installed as part of that project.

Though odor impacts are subjective, it is possible that land use conflicts between major odor sources and proposed sensitive receptors could occur. The following policies proposed in the Land Use Element would minimize land use incompatibilities that would occur from odor-generating land uses.

- **Land Use Policy-5.1:** Commercial or industrial uses that create noise, air pollution, or other substantial impacts on existing or planned residential uses shall be located, buffered, or otherwise designed to avoid such impacts.

- **Land Use Policy-5.3:** New residential development adjacent to cultivated agricultural lands shall provide buffers to reduce potential conflicts. The width of such buffers will be determined on a case-by-case basis considering prevailing winds, crop types, agricultural practices, and other relevant factors. In most cases, agricultural buffers should be no less than 300 feet in width. The width of public rights-of-way, drainages, and easements may count as part of the buffer. Lower density residential development may be able to cluster development so that houses are located away from adjacent farmland as a way of providing buffers.

Minor Sources of Odors

Minor sources of odors associated with the 2030 General Plan would be associated with the construction of the proposed land uses. The predominant source of power for construction equipment is diesel engines. Exhaust odors from diesel engines, as well as emissions associated with asphalt paving and the application of architectural coatings may be considered offensive to some individuals. Similarly, diesel-fueled locomotives traveling along the UPRR and diesel-fueled trucks traveling on local roadways would produce associated diesel exhaust fumes.

However, because odors associated with diesel fumes would be temporary and would disperse rapidly with distance from the source, construction-generated and mobile-source odors would not result in the frequent exposure of on-site receptors to objectionable odor emissions. In addition, the following policy would further minimize exposure of residents to odors from diesel exhaust:

- **Land Use Policy-5.2:** New residential projects near the Union Pacific railroad and Highway 99 will provide buffering from these rights-of-way to avoid adverse air quality, noise, and aesthetic issues.

Conclusion

Current agricultural operations in the vicinity of the Live Oak Planning Area include row crops and the other activities that do not generally produce offensive odors. As noted elsewhere, the City will require agricultural buffers in new development proposed adjacent to the City's sphere of influence, designed to reduce adverse impacts and complaints associated with encroaching urban development. It would be speculative for the City to imagine that agricultural processing facilities, dairies, feedlots, or other future agriculture related uses that produce odors would occur directly adjacent to the Planning Area in the future, creating odor impacts. Due to the current nature of agricultural activities and the fertile soils around the Live Oak Planning Area, it is considered unlikely that dairies or feedlots would become established there. In summary, minor sources of odors (e.g., construction equipment, Highway 99, and the UPRR line) would not result in exposure of sensitive receptors (on- or off-site) to excessive project-generated odor sources. However, proposed on-site receptors could be exposed to excessive odors from existing land uses (e.g., food processing facilities, waste water treatment plant expansion, and agricultural land uses) on a recurring basis.

The 2030 General Plan includes a policy and program designed to reduce this impact:

- **Policy Air-3.5.** Odor controls should be installed on new and existing sources, as feasible, to reduce exposure for existing and future residents.

- **Implementation Program Air-3.** The City will require implementation of measures to reduce exposure of sensitive receptors to odorous emissions, where necessary, to avoid significant impacts. Odor controls will be required on existing and proposed major odor sources, as feasible, to reduce exposure to existing and future residents. The deeds to all properties of proposed residential uses located near substantial odors shall include a disclosure clause advising buyers and tenants of the potential adverse odor impacts from major sources of odors.

Implementation of the above policy and program would reduce the exposure of sensitive receptors to odorous emissions. The impact is **less than significant**.