CITY OF MODESTO GENERAL PLAN UPDATE AIR QUALITY AND GREENHOUSE GAS EMISSIONS ASSESSMENT MODESTO, CALIFORNIA

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INTRODUCTION

This report examines air quality and greenhouse gas (GHG) emissions in the Planning Area and region, includes a summary of applicable air quality and GHG regulations, and analyzes potential air quality and GHG impacts associated with the proposed Modesto General Plan Update.

REGULATORY FRAMEWORK

Pursuant to the federal Clean Air Act (CAA) of 1970, the U.S. Environmental Protection Agency (EPA) established national ambient air quality standards (NAAQS). The NAAQS were established for major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health.

Both the EPA and the California Air Resources Board (CARB) have established ambient air quality standards for common pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter (PM). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are designed to protect the health and welfare of the public with a reasonable margin of safety. These ambient air quality standards are levels of contaminants which represent safe levels that avoid specific adverse health effects associated with each criteria pollutant.

Health effects of criteria pollutants and their potential sources are described below and summarized in Table 1.

TABLE 1 Health Effects of Air Pollutants

Pollutants	Sources	Primary Effects
Carbon Monoxide (CO)	• Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust. • Natural events, such as decomposition of organic matter.	• Reduced tolerance for exercise. • Impairment of mental function. • Impairment of fetal development. • Death at high levels of exposure. • Aggravation of some heart diseases (angina).
Nitrogen Dioxide (NO_2)	• Motor vehicle exhaust. • High temperature stationary combustion. • Atmospheric reactions.	• Aggravation of respiratory illness. • Reduced visibility. • Reduced plant growth. • Formation of acid rain.

Pollutants	Sources	Primary Effects
Ozone (O_3)	• Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	• Aggravation of respiratory and cardiovascular diseases. • Irritation of eyes. • Impairment of cardiopulmonary function. • Plant leaf injury.
Lead (Pb)	• Contaminated soil.	• Impairment of blood functions and nerve construction. • Behavioral and hearing problems in children.
Suspended Particulate Matter ($PM_{2.5}$ and PM_{10})	• Stationary combustion of solid fuels. • Construction activities. • Industrial processes. • Atmospheric chemical reactions.	• Reduced lung function. • Aggravation of the effects of gaseous pollutants. • Aggravation of respiratory and cardiorespiratory diseases. • Increased cough and chest discomfort. • Soiling. • Reduced visibility.
Sulfur Dioxide (SO_2)	• Combustion of sulfur-containing fossil fuels. • Smelting of sulfur-bearing metal ores. • Industrial processes.	• Aggravation of respiratory diseases (asthma, emphysema). • Reduced lung function. • Irritation of eyes. • Reduced visibility. • Plant injury. • Deterioration of metals, textiles, leather, finishes, coatings, etc.
Toxic Air Contaminants (TACs)	• Cars and trucks, especially diesels. • Industrial sources such as chrome platers. • Neighborhood businesses such as dry cleaners and service stations. • Building materials and product.	• Cancer. • Chronic eye, lung, or skin irritation. • Neurological and reproductive disorders.

Source: CARB, 2008.

Air Pollutants

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and oxides of nitrogen (NO_X). The main sources of ROG and NO_X, often referred to as ozone precursors, are combustion processes (including combustion in motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, shortness of breath, and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles. While CO transport is limited, it disperses with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations near congested roadways or intersections may reach unhealthful levels that adversely affect local sensitive receptors (e.g., residents, schoolchildren, the elderly, hospital patients, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service (LOS) or with extremely high traffic volumes. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, fatigue, impair central nervous system function, and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal.

Nitrogen Dioxide

NO_2 is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 also contribute to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition. NO_2 may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels. NO_2 decreases lung function and may reduce resistance to infection. On January 22, 2010 the EPA strengthened the health-based NAAQS for NO_2.

Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels in the region. SO_2

irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight.

Particulate Matter

Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles are those that are larger than 2.5 microns but smaller than 10 microns (PM_{10}). $PM_{2.5}$ refers to fine suspended particulate matter with an aerodynamic diameter of 2.5 microns or less that is not readily filtered out by the lungs. Nitrates, sulfates, dust, and combustion particulates are major components of PM_{10} and $PM_{2.5}$. These small particles can be directly emitted into the atmosphere as by-products of fuel combustion, through abrasion, such as tire or brake lining wear, or through fugitive dust (wind or mechanical erosion of soil). They can also be formed in the atmosphere through chemical reactions. Particulates may transport carcinogens and other toxic compounds that adhere to the particle surfaces, and can enter the human body through the lungs. Health effects can include lung irritation and aggravation of chronic lung diseases, increased susceptibility to pneumonia, and heart issues.

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, 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 manufactures. Lead can have serious health effects, particularly for children. At high levels, lead can cause brain and central nervous system damage. Lead exposure can cause anemia, hypertension, kidney impairment, and toxicity to reproductive organs.

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

Toxic Air Contaminants (TACs)

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

HAPs are the air contaminants identified by US EPA as known or suspected to cancer, serious illness, birth defects, or death. Many of these contaminants originate from human activities, such as fuel combustion and solvent use. Mobile source air toxics (MSATs) are a subset of the 188 HAPS. Of the 21 HAPs identified by EPA as MSATs, a priority list of six priority HAPs were identified that include: diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene. While vehicle miles traveled in the United States is expected to increase by 64 percent over the period 2000 to 2020, emissions of MSATs are anticipated to decrease substantially as a result of efforts to control mobile source emissions (by 57 percent to 67 percent depending on the contaminant).[1]

California developed a program under the Tanner Toxics Act (Assembly Bill [AB] 1807) to identify, characterize and control TACs. Subsequently, AB 2728 incorporated all 188 HAPs into the AB 1807 process. TACs include all HAPs plus other containments identified by CARB. These are a broad class of compounds known to cause morbidity or mortality (cancer risk). TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter [DPM] near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level.

Particulate matter from diesel exhaust is the predominant TAC in urban air and is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). According to CARB, diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by ARB, and are listed as carcinogens either under State Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB reports that recent air pollution studies have shown an association that diesel exhaust and other cancer-causing toxic air contaminants emitted from vehicles are responsible for much of the overall cancer risk from TACs in California. Particulate matter emitted from diesel-fueled engines (DPM) was found to comprise much of that risk. In August 1998, CARB formally identified DPM as a TAC. DPM is of particular concern since it can be distributed over large regions, thus leading to widespread public exposure. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by EPA as HAPs, and by CARB as TACs. Diesel engines emit particulate matter at a rate about 20 times greater than comparable gasoline engines. The vast majority of diesel exhaust particles (over 90 percent) consist of $PM_{2.5}$, which are the particles that can be inhaled deep into the lung. Like other particles of this size, a portion will eventually become trapped within the lung possibly leading to adverse health effects. While the gaseous portion of diesel exhaust also contains TACs, CARB's 1998 action was specific to DPM, which accounts for much of the cancer-causing potential from diesel exhaust. California has adopted a comprehensive

[1] Federal Highway Administration, 2006. Interim Guidance on Air Toxic Analysis in NEPA Documents.

diesel risk reduction program to reduce DPM emissions 85 percent by 2020. The US EPA and CARB adopted low sulfur diesel fuel standards in 2006 that reduce diesel particulate matter substantially.

Smoke from residential wood combustion can be a source of TACs. Wood smoke is typically emitted during wintertime when dispersion conditions are poor. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind; the pollution can persist for many hours, especially in sheltered valleys during winter. Wood smoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

High volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic (e.g., truck stops) were identified as posing the highest risk to adjacent receptors. Other facilities associated with increased risk include warehouse distribution centers, large retail or industrial facilities, and high-volume transit centers. Health risks from TACs are a function of both concentration and duration of exposure.

Sensitive Receptors

Some groups of people are more affected by air pollution than others. The State has identified the following people who are most likely to be affected by air pollution: children under 16, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks.

Federal Air Quality Regulations

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

The FCAA required EPA to establish primary and secondary NAAQS and required each state to prepare an air quality control plan referred to as a State Implement Plan (SIP). Federal standards include both primary and secondary standards. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.[2] The Federal Clean Air Act Amendments of 1990 (FCAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations

[2] U.S. Environmental Protection Agency, 2013. Available online: www.epa.gov/air/criteria.html. February.

of the air basins as reported by their jurisdictional agencies. The EPA has a responsibility to review all state SIPs to determine conformity with the mandates of the FCAAA and determine if implementation will achieve air quality goals. If the EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area which imposes additional control measures. Failure to submit an approvable SIP or to implement the plan within the mandated timeframe may result in the application of sanctions on transportation funding and stationary air pollution sources in the air basin.

The 1970 FCAA authorized the establishment of national health-based air quality standards and also set deadlines for their attainment. The FCAA Amendments of 1990 changed deadlines for attaining NAAQS as well as the remedial actions required of areas of the nation that exceed the standards. Under the FCAA, State and local agencies in areas that exceed the NAAQS are required to develop SIPs to show how they will achieve the NAAQS by specific dates. The FCAA requires that projects receiving federal funds demonstrate conformity to the approved SIP and local air quality attainment plan for the region. Conformity with the SIP requirements would satisfy the FCAA requirements.

State Air Quality Regulations

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

CARB is also responsible for developing and implementing air pollution control plans to achieve and maintain the NAAQS. CARB is primarily responsible for statewide pollution sources and produces a major part of the SIP. Local air districts provide additional strategies for sources under their jurisdiction. CARB combines this data and submits the completed SIP to the EPA. Other CARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control and air quality management districts), establishing CAAQS (which in many cases are more stringent than the NAAQS), determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, and off-road vehicles. Table 2 shows the State and federal standards for criteria pollutants.

Attainment Status Designations

The CARB is required to designate areas of the State as attainment, nonattainment, or unclassified for all State standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the standard for that pollutant in that area. A “nonattainment” designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. An “unclassified” designation signifies that data does not support either an attainment or nonattainment status. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The attainment status for the Valley with respect to various pollutants of concern is described in Table 3.

TABLE 2 Ambient Air Quality Standards

Pollutant	**Averaging Time**	**California Standards Concentration**	**National Standards Concentration**
Ozone	1-hour	0.09 ppm (180 μg/m^3)	—
	8-hour	0.070 ppm (137 μg/m^3)	0.070 ppm (137 μg/m^3)
Carbon Monoxide	8-hour	9.0 ppm (10,000 μg/m^3)	9 ppm (10,000 μg/m^3)
	1-hour	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)
Nitrogen dioxide	Annual Average	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)
	1-hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3) (3-year average of annual 98th percentile daily maxima)
Sulfur dioxide			
	24-hour	0.04 ppm (105 μg/m^3)	—
	3-hour	—	0.5 ppm (1,300 μg/m^3)
	1-hour	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3) (3-year average of annual 99th percentile daily maxima)
Respirable particulate matter (10 micron)	24-hour	50 μg/m^3	150 μg/m^3
	Annual Arithmetic Mean	20 μg/m^3	—
Fine particulate matter (2.5 micron)	Annual Arithmetic Mean	12 μg/m^3	12.0 μg/m^3 (3-year average)
	24-hour	—	35 μg/m^3 (3-year average of annual 98th percentile daily concentrations)
Sulfates	24-hour	25 μg/m^3	—
Lead	30-day	1.5 μg/m^3	—

	3 Month Rolling Average	—	0.15 μg/m³

Source: CARB, 2016.
SO_2 Federal 24 hour and annual standards are not applicable in the SJVAPCD.
μg/m³ = micrograms per cubic meter
ppm = parts per million

TABLE 3 Plan Area Attainment Status

Pollutant	Federal Status	State Status
Ozone (O_3) – 1-Hour Standard	No Designation	Severe Nonattainment
Ozone (O_3) – 8-Hour Standard	Extreme Nonattainment	Nonattainment
Respirable Particulate Matter (PM_{10})	Attainment-Maintenance	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment-Maintenance	Attainment
Nitrogen Dioxide (NO2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Sulfates and Lead	No Designation	Attainment
Hydrogen Sulfide	No Designation	Unclassified
Visibility Reducing Particles	No Designation	Unclassified

Source: CARB and U.S. EPA, 2018

Under the Federal Clean Air Act, the US EPA has classified the region as *serious nonattainment* for the 8-hour O_3 standard. On March 19, 2008, the US EPA posted a final rule in the Federal Register affirming the agency's October 30, 2006 determination that the Valley has attained the NAAQS for PM_{10}. The Valley is designated *nonattainment* for the older 1997 $PM_{2.5}$ NAAQS. SJVAPCD has determined, based on the 2004-06 $PM_{2.5}$ data, that the Valley has attained the 1997 24-Hour $PM_{2.5}$ standard; however, US EPA recently designated the Valley as nonattainment for the newer 2006 24-hour $PM_{2.5}$ standard. The US EPA classifies the region as *attainment* or *unclassified* for all other air pollutants, which include CO and NO_2.

At the State level, the region is considered *serious non-attainment* for ground level O_3 and *non-attainment* for PM_{10} and $PM_{2.5}$. California ambient air quality standards are more stringent than the national ambient air quality standards. The region is required to adopt plans on a triennial basis that show progress towards meeting the State O_3 standard. The area is considered attainment or unclassified for all other pollutants.

California Clean Air Act

In 1988, the CCAA required that all air districts in the State endeavor to achieve and maintain CAAQS for carbon monoxide (CO), ozone (O_3), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2) by the earliest practical date. The CCAA provides districts with authority to regulate indirect sources and mandates that air quality districts focus particular attention on reducing emissions from transportation and area-wide emission sources. Each nonattainment district is required to adopt a plan to achieve a 5 percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each nonattainment pollutant or its precursors. A Clean Air Plan shows how a district would reduce emissions to achieve air quality standards. Generally, the State standards for these pollutants are more stringent than the national standards.

California Air Resources Board Handbook

In 1998, CARB identified particulate matter from diesel-fueled engines as a toxic air contaminant. CARB has completed a risk management process that identified potential cancer risks for a range of activities using diesel-fueled engines.[3] CARB subsequently developed an Air Quality and Land Use Handbook[4] (Handbook) in 2005 that is intended to serve as a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process. The CARB Handbook recommends that planning agencies consider proximity to air pollution sources when considering new locations for "sensitive" land uses, such as residences, medical facilities, daycare centers, schools, and playgrounds.

Air pollution sources of concern include freeways, rail yards, ports, refineries, distribution centers, chrome plating facilities, dry cleaners, and large gasoline service stations. Key recommendations in the Handbook relative to the Plan Area include taking steps to consider or avoid siting new, sensitive land uses:

- Within 500 feet of a freeway, urban roads with 100,000 vehicles/day or rural roads with 50,000 vehicles/day.
- Within 300 feet of gasoline fueling stations.
- Within 300 feet of dry cleaning operations (note that dry cleaning with TACs will is being phased out and will be prohibited in 2023).

San Joaquin Valley Air Pollution Control District (SJVAPCD)

The SJVAPCD is made up of eight counties in California's Central Valley: San Joaquin,

[3] California Air Resources Board, 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October.
[4] California Air Resources Board, 2005. *Air Quality and Land Use Handbook: A Community Health Perspective.* April.

Stanislaus, Merced, Madera, Fresno, Kings Tulare, and the San Joaquin Valley portion of Kern. The primary role of the SJVAPCD is to develop plans and implement control measures in the San Joaquin Valley to control air pollution. These controls primarily affect stationary sources such as industry and power plants. Rules and regulations have been developed by SJVAPCD to control air pollution from a wide range of air pollution sources. In March 2007, an Indirect Source Review (ISR) rule was adopted that controls air pollution from new land developments. SJVAPCD also conducts public education and outreach efforts such as the Spare the Air, Wood Burning, and Smoking Vehicle voluntary programs.

Regional Air Quality Plans

In response to not meeting the NAAQS, the region is required to submit attainment plans to US EPA through the State, which are referred to as SIP.

CARB submitted the 2004 Extreme Ozone Attainment Demonstration Plan to EPA in 2004, which addressed the old 1-hour NAAQS. The region's 2007 Ozone Plan, addressing the 8-hour ozone NAAQS, was submitted to US EPA and approved in March 2012. That plan predicts attainment of the standard throughout 90 percent of the district by 2020 and the entire district by 2024. To accomplish these goals, the plan would reduce NO_x emissions further by 75 percent and ROG emissions by 25 percent. A wide variety of control measures are included in these plans, such as reducing or offsetting emissions from construction and traffic associated with land use developments. The air basin was recently designated as an extreme ozone nonattainment area for the more stringent 2008 8-hour ozone NAAQS. The plan to address this standard is expected to be due to EPA in 2016. Addressing the 2008 8-hour ozone standard will pose a tremendous challenge for the Valley, given the naturally high background ozone levels and ozone transport into the Valley.

On April 25, 2008, US EPA proposed to approve the 2007 PM_{10} Maintenance Plan and Request for Redesignation. The region now meets the NAAQS for PM_{10}. The SJVAPCD adopted the 2008 $PM_{2.5}$ Plan on April 30, 2008. US EPA has designated the basin as Attainment.

The SJVAPCD adopted the 2012 $PM_{2.5}$ Plan on December 20, 2012. This plan was approved by CARB on January 24, 2013. This plan will assure that the Valley will attain the 2006 $PM_{2.5}$ NAAQS by the 2019 deadline. The plan uses control measures to reduce NO_x, which also leads to fine particulate formation in the atmosphere. The plan incorporates measures to reduce direct emissions of $PM_{2.5}$, including a strengthening of regulations for various San Joaquin Valley Air Basin industries and the general public through new rules and amendments.

Both the ozone and $PM_{2.5}$ plans include all measures (i.e., federal, State, and local) that would be implemented through rule making or program funding to reduce air pollutant emissions. Transportation Control Measures (TCMs) are part of these plans. The plans described above addressing ozone also meet the state planning requirements.

SJVAPCD Rules and Regulations

The SJVAPCD has adopted rules and regulations that apply to land use projects. Included in the SJVAPCD Guidance for Assessing and Mitigating Air Quality Impacts[5] are project-level thresholds and land use screening sizes for criteria air pollutants. However, these are not appropriate for use at the plan level, but would be used to assess the impact of individual proposed projects under buildout of the Plan.. In addition, the following SJVAPCD rules would apply to individual proposed projects:

SJVAPCD Indirect Source Review Rule

On December 15, 2005, the SJVAPCD adopted the Indirect Source Review Rule (ISR or Rule 9510) to reduce ozone precursor (i.e., ROG and NO_x) and PM_{10} emissions from new land use development projects. The rule is the result of state requirements outlined in the regions' portion of the SIP. The SJVAPCD's SIP commitments are contained in the 2016 Ozone Plan and the 2007 PM_{10} Plan. New projects that would generate substantial air pollutant emissions, for which final discretionary approval was granted after March 1, 2006 are subject to this rule. The rule requires projects to mitigate both construction and operational period emissions by applying the SJVAPCD-approved mitigation measures and paying fees to support programs that reduce emissions. Fees apply to the unmitigated portion of the emissions and are based on estimated costs to reduce the emissions from other sources plus expected costs to cover administration of the program.

Regulation VIII – Fugitive PM_{10}

SJVAPCD controls fugitive PM_{10} through Regulation VIII (Fugitive PM_{10} Prohibitions). The purpose of this regulation is to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce or mitigate anthropogenic (human caused) fugitive dust emissions. This applies to activities such as construction, bulk materials, open areas, paved and unpaved roads, material transport, and agricultural areas. Sources regulated are required to provide dust control plans that meet the regulation requirements. Fees are collected by SJVAPCD to cover costs for reviewing plans and conducting field inspections.

EXISTING CLIMATE AND AIR QUALITY

Topography

The project site is located in Stanislaus County in the northern portion of the San Joaquin Valley Air Basin. The California Air Resources Board (CARB) defines the boundaries of the basin by

[5] SJVAPCD, 2015. *Guidance for Assessing and Mitigating Air Quality Impacts*. March 19.

the San Joaquin Valley within the Sierra Nevada Mountains to the east, the Coast Ranges in the west, and the Tehachapi mountains in the south. The valley is basically flat with a slight downward gradient to the northwest. The valley opens to the ocean at the Carquinez Straits where the San Joaquin-Sacramento Delta empties into San Francisco Bay. The San Joaquin Valley, thus, could be considered a "bowl" with the primary opening to the north. The surrounding topographic features restrict air movement through and out of the basin and, as a result, impede the dispersion of air pollutants from the basin. Wind flow is usually down the valley from the north, but the Tehachapi Mountains block or restrict the southward progression of airflow. The Sierra Nevada is a substantial barrier from the usual winds that have a general westerly flow. The topographical features result in weak airflow. The flow is further restricted vertically by inversion layers that are common in the San Joaquin Valley air basin throughout the year. An inversion layer is created when a mass of warm dry air sits over cooler air near the ground, preventing vertical dispersion of pollutants from the air mass below. During the summer, the San Joaquin Valley experiences daytime temperature inversions at elevations from 1,500 to 3,000 feet above the valley floor. Airflow is considerably restricted since mountain ranges surrounding the valley are generally above the inversion. These inversions lead to a buildup of ozone and ozone precursor pollutants. During the fall and winter months, strong surface-based inversions occur from 500 to 1,000 feet above the valley floor (SJVAPCD 1998). Wintertime inversions trap very stable air near the surface and lead primarily to a buildup of particulate matter air pollutants. Very light winds are also characteristic with these wintertime surface-based inversions.

Local Climate and Air Quality

Air quality is a function of both local climate and local sources of air pollution. Air quality is the balance of the natural dispersal capacity of the atmosphere and emissions of air pollutants from human uses of the environment. Climate and topography are major influences on air quality in the Plan area.

Climate and Meteorology

The climate of the project area is characterized by hot dry summers and cool, mild winters. Clear days are common from spring through fall. Daytime temperatures in the summer often approach or exceed 100 degrees Fahrenheit, with lows in the 60s. In the winter, daytime temperatures are usually in the 50s, with lows around 35 degrees Fahrenheit. Radiation fog is common in the winter, and may persist for days. Partly to mostly cloudy days are common in winter, as most precipitation received in the Valley falls from November through April.

Superimposed on this seasonal regime is the diurnal wind cycle. In the San Joaquin Valley, this cycle takes the form of a combination of a modified sea breeze-land breeze and mountain-valley regimes. The sea breeze-land breeze regime typically has a modified sea breeze flowing into the

Valley from the north during the late day and evening and then a land breeze flowing out of the Valley late at night and early in the morning. The mountain-valley regime has an upslope (mountain) flow during the day and a down slope (valley) flow at night. These effects create a complexity of regional wind flow and pollutant transport within the Valley.

Air Pollution Potential

The pollution potential of the San Joaquin Valley is very high. The San Joaquin Valley has one of the most severe air pollution problems in the State and the Country. Surrounding elevated terrain in conjunction with temperature inversions frequently restrict lateral and vertical dilution of pollutants. Abundant sunshine and warm temperatures in late spring, summer, and early fall are ideal conditions for the formation of ozone, where the Valley frequently experiences unhealthy air pollution days. Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high PM_{10} concentrations.

Existing Air Pollutant Levels

The significance of a pollutant concentration is determined by comparing the concentration to an appropriate ambient air quality standard. The standards represent the allowable pollutant concentrations designed to ensure that the public health and welfare are protected, while including a reasonable margin of safety to protect the more sensitive individuals in the population. The California Air Resources Board (CARB), in cooperation with SJVAPCD, monitors air quality throughout the San Joaquin Valley Air Basin. The closest monitoring station to the project site is in Modesto, located at 814 14th Street. NO_2 concentrations were not available at Modesto, so reporting values from the S. Minaret Street monitoring station in Turlock were used. Summarized air pollutant data for this station is provided in Table 4. This table shows the highest air pollutant concentrations measured at the station over the three year period from 2014 through 2016.

TABLE 4 Highest Measured Air Pollutant Concentrations in Modesto

Pollutant	Average Time	Measured Air Pollutant Levels		
		2014	2015	2016
Ozone (O_3)	1-Hour	**0.103 ppm**	**0.111 ppm**	**0.105 ppm**
	8-Hour	**0.091 ppm**	**0.093 ppm**	**0.092 ppm**
Carbon Monoxide (CO)	8-Hour	ND	ND	ND
Nitrogen Dioxide (NO_2)[1]	1-Hour	0.055 ppm	0.042 ppm	0.047 ppm
	Annual	ND	0.009 ppm	0.009 ppm
	24-Hour	**127.7 μg/m³**	**90.3 μg/m³**	**83.5 μg/m³**

Respirable Particulate Matter (PM_{10})	Annual	**29.6 μg/m³**	**27.7 μg/m³**	**27.6 μg/m³**
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	**58.2 μg/m³**	**46.4 μg/m³**	**53.3 μg/m³**
	Annual	11.4 μg/m³	ND	11.1 μg/m³

Source: CARB, iADAM Air Quality Statistics, see http://www.arb.ca.gov/adam/.

Note: ppm = parts per million and μg/m³ = micrograms per cubic meter

Values reported in **bold** exceed ambient air quality standard

ND = No Data available.

[1] Values reported from Turlock monitoring station.

GREENHOUSE GASES

Global temperatures are affected by naturally occurring and anthropogenic-generated (generated by humankind) atmospheric gases, such as water vapor, carbon dioxide, methane, and nitrous oxide. Gases that trap heat in the atmosphere are called greenhouse gases (GHG). Solar radiation enters the earth's atmosphere from space, and a portion of the radiation is absorbed at the surface. The earth emits this radiation back toward space as infrared radiation. Greenhouse gases, which are mostly transparent to incoming solar radiation, are effective in absorbing infrared radiation and redirecting some of this back to the earth's surface. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This is known as the greenhouse effect. The greenhouse effect helps maintain a habitable climate. Emissions of GHGs from human activities, such as electricity production, motor vehicle use, and agriculture, are elevating the concentration of GHGs in the atmosphere, and are reported to have led to a trend of unnatural warming of the earth's natural climate, known as global warming or global climate change. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred because it implies that there are other consequences to the global climate in addition to rising temperatures. Other than water vapor, the primary GHGs contributing to global climate change include the following gases:

- Carbon dioxide (CO_2), primarily a byproduct of fuel combustion;
- Nitrous oxide (N_2O), a byproduct of fuel combustion; also associated with agricultural operations such as the fertilization of crops;
- Methane (CH_4), commonly created by off-gassing from agricultural practices (e.g. livestock), wastewater treatment and landfill operations;
- Chlorofluorocarbons (CFCs) were used as refrigerants, propellants and cleaning solvents, but their production has been mostly prohibited by international treaty;
- Hydrofluorocarbons (HFCs) are now widely used as a substitute for chlorofluorocarbons in refrigeration and cooling; and
- Perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6) emissions are commonly created by industries such as aluminum production and semiconductor manufacturing.

These gases vary considerably in terms of Global Warming Potential (GWP), a term developed to compare the propensity of each GHG to trap heat in the atmosphere relative to another GHG. GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and the length of time of gas remains in the atmosphere. The GWP of each GHG is measured relative to CO_2. Accordingly, GHG emissions are typically measured and reported in terms of equivalent CO_2 (CO_2e).

An expanding body of scientific research supports the theory that global climate change is currently affecting changes in weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally-occurring resources within California are adversely affected by the global climate change trend. Increased precipitation and sea level rise increases coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal species could also occur. Potential effects of global climate change that could adversely affect human health include more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes and drought; and increased levels of air pollution.

Greenhouse Gas Emissions Regulatory Framework

This section summarizes key federal, State, and City statutes, regulations, and policies that would apply to the Plan Area. At each level, agencies are considering strategies to control emissions of gases that contribute to global climate change.

Federal Regulations

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC). While the United States signed the Kyoto Protocol, which would have required reductions in GHGs, Congress never ratified the protocol. The federal government chose voluntary and incentive-based programs to reduce emissions and has established programs to promote climate technology and science.

On April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate CO_2 emissions under the federal CAA, and on December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six greenhouse gases (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to global climate change.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that reduce greenhouse gas emissions and improve fuel economy. A second phase for model years 2017 through 2025 was established in 2012.

On May 13, 2010, the EPA issued a final rule to address greenhouse gas emissions from stationary sources under the CAA permitting programs. This final rule sets thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

At this time, there are no federal regulations or policies directly pertaining to assessing GHG emissions from the General Plan Update under CEQA.

State Regulations

The State of California is concerned about GHG emissions and their effect on global climate change. The State recognizes that "there appears to be a close relationship between the concentration of GHGs in the atmosphere and global temperatures" and that "the evidence for climate change is overwhelming." The effects of climate change on California, in terms of how it would affect the ecosystem and economy, remain uncertain. The State has many areas of concern regarding climate change with respect to global warming. According to the 2006 Climate Action Team Report, the following climate change effects and conditions can be expected in California over the course of the next century:

- A diminishing Sierra snowpack declining by 70 to 90 percent, effecting the state's water supply;
- Increasing temperatures from 8 to 10.4 degrees °F under the higher emission scenarios, leading to a 25 to 35 percent increase in the number of days ozone pollution standards are exceeded in most urban areas;
- Coastal erosion along the length of California and seawater intrusion into the Sacramento River Delta from a 4- to 33-inch rise in sea level. This would exacerbate flooding in already vulnerable regions;
- Increased vulnerability of forests due to pest infestation and increased temperatures;
- Increased challenges for the State's important agricultural industry from water shortages, increasing temperatures, and saltwater intrusion into the Delta; and
- Increased electricity demand, particularly in the hot summer months.

Assembly Bill 1575 (1975). In 1975, the Legislature created the California Energy Commission (CEC). The CEC regulates electricity production that is one of the major sources of GHGs.

Title 24, Part 6 of the California Code of Regulations (1978). The Energy Efficiency Standards for Residential and Nonresidential Buildings were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

Assembly Bill 1493 (2002). Assembly Bill (AB) 1493 required CARB to develop and adopt regulations that reduce GHG emitted by passenger vehicles and light duty trucks.

State of California Executive Order S-3-05 (2005). The Governor's Executive Order established aggressive emissions reductions goals: by 2010, GHG emissions must be reduced to 2000 levels; by 2020, GHG emissions must be reduced to 1990 levels; and by 2050, GHG emissions must be reduced to 80 percent below 1990 levels.

In June 2005, the Governor of California signed Executive Order S-3-05, which identified Cal/EPA as the lead coordinating State agency for establishing climate change emission reduction targets in California. A "Climate Action Team," a multi-agency group of State agencies, was set up to implement Executive Order S-3-05. Under this order, the State plans to reduce GHG emissions to 80 percent below 1990 levels by 2050. GHG emission reduction strategies and measures to reduce global warming were identified by the California Climate Action Team in 2006.

Assembly Bill 32 (AB 32), California Global Warming Solutions Act (2006). AB 32, the Global Warming Solutions Act of 2006, codifies the State's GHG emissions target by directing CARB to reduce the State's global warming emissions to 1990 levels by 2020. AB 32 was signed and passed into law by Governor Schwarzenegger on September 27, 2006. Since that time, the CARB, CEC, California Public Utilities Commission (CPUC), and Building Standards Commission have all been developing regulations that will help meet the goals of AB 32 and Executive Order S-3-05.

A Scoping Plan for AB 32 was adopted by CARB in December 2008. It contains the State's main strategies to reduce GHGs from business-as-usual emissions projected in 2020 back down to 1990 levels. Business-as-usual (BAU) is the projected emissions in 2020, including increases in emissions caused by growth, without any GHG reduction measures. The Scoping Plan has a range of GHG reduction actions, including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system.

As directed by AB 32, CARB has also approved a statewide GHG emissions limit. On December 6, 2007, CARB staff resolved an amount of 427 million metric tons of equivalent carbon dioxide ($MMTCO_2e$) as the total statewide GHG 1990 emissions level and 2020 emissions limit. The limit is a cumulative statewide limit, not a sector- or facility-specific limit. CARB updated the future 2020 BAU annual emissions forecast, in light of the economic downturn, to 545 MMT of CO2e. Two GHG emissions reduction measures currently enacted that were not previously included in the 2008 Scoping Plan baseline inventory were included, further reducing the baseline inventory to 507 MMT of CO2e. Thus, an estimated reduction of 80 MMT of CO2e is necessary to reduce statewide emissions to meet the AB 32 target by 2020. In May of 2015, Governor Jerry Brown issued an emissions reduction target of 40 percent below 1990 levels by 2030.

SB 32 was passed in 2016, which codified a 2030 GHG emissions reduction target of 40 percent below 1990 levels. CARB published a second update to the Scoping Plan[6] to reflect the 2030 target set by Executive Order B-30-15 and codified by SB 32. The mid-term 2030 target is considered critical by CARB on the path to obtaining an even deeper GHG emissions target of 80 percent below 1990 levels by 2050, as directed in Executive Order S-3-05. The Scoping Plan outlines the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure, providing a blueprint to continue driving down GHG emissions and obtain the statewide goals.

Senate Bill 375, California's Regional Transportation and Land Use Planning Efforts (2008). California enacted legislation (SB 375) to expand the efforts of AB 32 by controlling indirect GHG emissions caused by urban sprawl. SB 375 would develop emissions-reduction goals in which regions can apply in planning activities. SB 375 provides incentives for local governments and developers to implement new conscientiously planned growth patterns. This includes incentives for creating attractive, walkable, and sustainable communities and revitalizing existing communities. The legislation also allows developers to bypass certain environmental reviews under CEQA if they build projects consistent with the new sustainable community strategies. Development of more alternative transportation options that would reduce vehicle trips and miles traveled, along with traffic congestion, would be encouraged. SB 375 enhances CARB's ability to reach the AB 32 goals by directing the agency in developing regional GHG emission reduction targets to be achieved from the transportation sector for 2020 and 2035. CARB has established GHG emission reduction targets for passenger vehicle emissions of five percent below 2005 baseline emissions by 2020 and 10 percent below 2005 baseline emissions by 2035. StanCOG baseline GHG emissions were approximately 15.9 pounds per capita per day (StanCOG 2014 RTP/SCS PEIR, page 4.9-12). In 2005, daily vehicle miles traveled in Modesto was an estimated 6,835,210 miles.

Executive Order S-13-08 (2008). This Executive Order directed California agencies to assess and reduce the vulnerability of future construction projects to impacts associated with sea-level rise.

PROJECT IMPACTS AND MITIGATION MEASURES

Significance Criteria

[6] CARB, 2017. *California's 2017 Climate Change Scoping Plan*. November.

Thresholds of significance for air quality impacts have been established for this assessment based on the CEQA Environmental Checklist found in Appendix G of the State CEQA Guidelines.

Appendix G of the State CEQA Guidelines provide guidance for the determination of significance for a proposed project. A proposed project would result in a significant impact on air quality if it would:

1) Conflict with or obstruct implementation of an applicable air quality plan;
2) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
3) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
4) Expose sensitive receptors to substantial pollutant concentrations;
5) Create objectionable odors affecting a substantial number of people;
6) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
7) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Thresholds of Significance Suggested by the San Joaquin Valley Air Pollution Control District

The State CEQA Guidelines further state that the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make the determinations from Appendix G of the State CEQA Guidelines. The SJVAPCD has specified significance thresholds within its Guide for Assessing and Mitigating Air Quality Impacts (San Joaquin Valley Air Pollution Control District 2015) to determine air quality impacts for projects located within the SJVAB.

The SJVAPCD has determined that compliance with its Regulation VIII Fugitive PM10 Prohibitions, including implementation of all feasible control measures specified in *its Guide for Assessing and Mitigating Air Quality Impacts*, is sufficient mitigation to minimize adverse air quality effects from construction-related PM10 emissions to less-than-significant levels (San Joaquin Valley Air Pollution Control District 2002). Since the publication of the SJVAPCD's guidance manual, the SJVAPCD has revised various rules comprising Regulation VIII. Guidance from SJVAPCD staff indicates that implementation of a dust control plan would satisfy all of the requirements of SJVAPCD Regulation VIII.

As discussed above, the SJVAPCD Guidance for Assessing and Mitigating Air Quality Impacts[7] includes project-level thresholds and land use screening sizes for criteria air pollutants. However,

[7] SJVAPCD, 2015. *Guidance for Assessing and Mitigating Air Quality Impacts*. March 19.

these are not appropriate for use at the plan level, but would be used to assess the impact of individual proposed projects under buildout of the Plan. Individual projects would need to comply with the SJVAPCD's Regulation VIII regarding particulate matter emissions from construction activities. Compliance with SJVAPCD Regulation VIII and the local zoning code will reduce particulate emission impacts to levels that are considered less than significant by the SJVAPCD.

In June of 2005, SJVAPCD revised their *Air Quality Guidelines for General Plans*. In it they outline goals and policies that general plans should City's should adopt as part of implementation of their general plan.

The SJVAPCD GAMAQI considers exposure of sensitive receptors to air pollutant levels that result in an unacceptable cancer risk or hazard, to be significant. For cancer risk, which is a concern with diesel particulate matter and other mobile-source TACs, the SJVAPCD considers an increased risk of contracting cancer that is 20 in one million chances or greater, to be significant risk for a single source. Non-cancer risk would be considered significant if the computed Hazard Index (HI) is greater than 1.0.[8]

Impact: Conflict with or obstruct implementation of an applicable air quality plan?

The SJVAPCD is the regional agency responsible for overseeing compliance with State and federal laws, regulations, and programs within the Valley. The SJVAPCD has developed CEQA guidelines to assist lead agencies in evaluating the significance of air quality impacts from the implementation of General Plans. Land use planning affects vehicle travel, which in turn affects region-wide emissions of air pollutants and GHG.

The proposed General Plan land use diagram and circulation element are consistent with StanCOG's 2014 Sustainable Communities Strategy, which reflects Modesto's General Plan. The number of daily vehicle miles traveled is lower with the proposed General Plan than it is with the existing General Plan (No Project), which is the scenario reflected in the 2014 Sustainable Communities Strategy. The Sustainable Communities Strategy was approved by CARB, who is responsible for determining consistency with California plans and regulations to reduce air pollutants and GHG emissions.

In June of 2005, SJVAPCD revised their *Air Quality Guidelines for General Plans*. In it they outline goals and policies that general plans should City's should adopt as part of implementation of their general plan. Table 5 below lists these recommended goals and policies and indicates whether or not the proposed General Plan Update would be consistent.

TABLE 5 Consistency with the SJVAPCD Air Quality Guidelines for General Plans Goals and Policies

[8] The Hazard Index is the ratio of the computed receptor exposure level to the level known to cause acute or chronic adverse health impacts.

SJVAPCD Goals and Policies	Consistency
AIR QUALITY ELEMENTS	
Communication, Cooperation, and Coordination	
Goal 1: Effective communication and coordination in developing and operating community and regional air quality air programs	

Policy 1: The City of Modesto shall determine project air quality impacts using analysis methods and significance threshold recommended by the District.	Consistent See Chapter VII, H.2.(o)
Policy 2: The City of Modesto shall ensure that air quality impacts identified during CEQA review are consistently and fairly mitigated.	See Chapter VII, H.2.(p)
Policy3: The City of Modesto shall ensure all air quality mitigation measures are feasible, implementable, and cost effective.	See Chapter VII, H.2.(q)
Policy 4: The City of Modesto shall identify the cumulative transportation and air quality impacts of all general plan amendments approved during the previous year.	See Chapter VII, H.2.(r)
Policy 5: The City of Modesto shall reduce the air quality impacts of development projects that may be insignificant by themselves, but cumulatively are significant.	See Chapter VII, H.2.(s)
Policy 6: The City of Modesto shall encourage innovative mitigation measures to reduce air quality impacts by coordinating with the District, project applicants, and other interested parties.	See Chapter VII, H.2.(t)
Policy 7: The City of Modesto shall work with neighboring jurisdictions and affected agencies to address cross jurisdictional and regional transportation and air quality issues.	See Chapter VII, H.2.(e)
Policy 8: The City of Modesto shall consult with the District during CEQA review for discretionary projects with the potential for causing adverse air quality impacts.	See Chapter VII, H.2.(h)
Policy 9: The City of Modesto shall coordinate with other jurisdictions and other regional agencies in the San Joaquin Valley to establish parallel air quality programs and implementation measures (trip reduction ordinances, indirect source programs, etc.).	See Chapter VII, H.2.(f)

Policy 10: The City of Modesto shall work to reach an equitable tax sharing arrangement with the city/county to avoid the fiscalization of land use decisions.	The City has indicated that this is already practiced
Policy 11: The City of Modesto shall support investment in cost-effective multi-use modeling and geographic information system technology	See Chapter VII, H.2.(i)
Policy 12: The City of Modesto shall consider air quality when planning the land uses and transportation systems to accommodate the expected growth in this community.	See Chapter VII, H.2.(v)
Policy 13: All City submittals of transportation improvement projects to be included in regional transportation plans (RTP, RTIP, CMP, etc.) shall be consistent with the air quality goals and policies of the General Plan.	See Chapter VII, H.2.(w)
Policy 14: The City of Modesto shall consult with transit providers to determine project impacts on long range transit plans and ensure that impacts are mitigated.	See Chapter VII, H.2.(x)
Policy 15: The City of Modesto shall work with the Housing Authority, transit providers, and developers to encourage the construction of low income housing developments that use transit-oriented and pedestrian-oriented design principles.	See Chapter VII, H.2.(w)
Policy 16: The City of Modesto shall work with Caltrans and the Regional Transportation Planning Agency to minimize the air quality, mobility, and social impacts of large scale transportation projects on existing neighborhoods.	See Chapter VII, H.2.(z)
Policy 17: The City of Modesto shall work to improve the public's understanding of the land use, transportation, and air quality link.	See Chapter VII, H.2.(z)
Policy 18: The City of Modesto shall encourage local public and private groups that provide air quality education programs.	See Chapter VII, H.2.(k)

SJVAPCD Goals and Policies	Consistency

Policy 19: City Departments shall take the lead in implementing innovative employer-based trip reduction programs for their employees.	See Chapter VII, H.2.(aa)
Policy 20: City fleet vehicle operators shall replace or convert conventional fuel vehicles with clean fuel vehicles as rapidly as feasible.	See Chapter VII, H.2.(bb)
Policy 21: The City of Modesto shall support the use of teleconferencing in lieu of employee travel to conferences and meetings when feasible.	See Chapter VII, H.2.(cc)
Policy 22: The City of Modesto shall encourage departments to set up telecommuting programs as part of their trip reduction strategies.	See Chapter VII, H.2.(ff)

SJVAPCD Goals and Policies	Consistency
Congestion Management / Transportation Control Measures	
Goal 2: Reduce traffic congestion and vehicle trips through more efficient infrastructure and support for trip reduction programs.	
Policy 23: The City of Modesto shall consider measures to increase the capacity of the existing road network prior to constructing more capacity (additional lanes, new freeways, etc.).	Consistent See Constrained Streets (Chapter V, V.A.7) and exhibit
Policy 24: The City of Modesto shall work with employers and developers to provide employees and residents with attractive, affordable transportation alternatives.	See Chapter VII- H.2. (dd)
Policy 25: The City of Modesto shall work to establish public/private partnerships to develop satellite and neighborhood work centers for telecommuting.	See Chapter VII- H.2.(ff)
Policy 26: The City of Modesto shall encourage the development of state of the art communication infrastructure linked to the rest of the world.	See Chapter VII H.2. (gg)
Toxic and Hazardous Emissions	
Goal 3: Minimize exposure of the public to toxic air pollutant emissions and noxious odors from industrial, manufacturing, and processing facilities.	
Policy 27: The City of Modesto shall require residential development projects and projects categorized as sensitive receptors to be located an adequate distance from existing and potential sources toxic emissions such as freeways, major arterials, industrial sites, and hazardous material locations.	Consistent See Chapter VII- H.2. (a)
Policy 28: The City of Modesto shall require new air pollution point sources such as, but not limited to, industrial, manufacturing, and processing facilities to be located an adequate distance from residential areas and other sensitive receptors.	See Chapter VII, H.2.(l)

SJVAPCD Goals and Policies	Consistency
Fugitive Dust/PM 10	
Goal 4: Reduce particulate emissions from sources under the jurisdiction of the city/county	
Policy 29: The City of Modesto shall work with the District to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible.	Consistent See Chapter VII, H.2.(hh)
Policy 30: The City of Modesto shall require all access roads, driveways, and parking areas serving new commercial and industrial development to be constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use.	See Chapter VII, H.2.(ii)
Policy 31: The City of Modesto shall reduce PM10 emissions from City/County maintained roads to the maximum extent feasible.	See Chapter VII, H.2.(jj)
Energy	
Goal 5: Reduce emissions related to energy consumption and area sources	
Policy 32: The City of Modesto shall work with the local energy providers and developers on voluntary incentive based programs to encourage the use of energy efficient designs and equipment.	Consistent See Chapter VII- I.1.(p)
Policy 33: The City of Modesto shall cooperate with the local building industry, utilities and the District to promote enhanced energy conservation standards for new construction.	See Chapter VII- I.1.(q)
Policy 34: The City of Modesto shall encourage new residential, commercial, and industrial development to reduce air quality impacts from area sources and from energy consumption.	See Chapter VII- I.1.(r)

SJVAPCD Goals and Policies	**Consistency**
LAND USE ELEMENTS	
Land Use, Transportation and Air Quality	
Goal 6: Reduce motor vehicle trips and vehicle miles traveled and increase average vehicle ridership	
	Consistent
Policy 35: The City of Modesto shall consider air quality and mobility when reviewing any proposed change to the land use pattern of this community.	Chapter V, V.A
Policy 36: The City of Modesto shall encourage projects proposing pedestrian or transit-oriented designs (TOD) at suitable locations.	Chapter V, V.A.(2)
Policy 37: The City of Modesto shall work to preserve and enhance existing neighborhoods and commercial districts having transit and pedestrian oriented designs	Chapter V, F.A.2; Chapter III, C.2
Policy 38: The City of Modesto shall plan areas within ¼ mile of locations identified as transit hubs and commercial centers for higher density development.	Chapter III, B.7
Policy 39: The City of Modesto shall encourage higher housing densities in areas served by the full range of urban services.	Chapter III, B.7
Policy 40: The City of Modesto shall encourage mixed- use developments that provide series such as day care centers, restaurants, banks, and stores near employment centers.	Chapter III, B.2
Policy 41: The City of Modesto shall promote the downtown (or village centers) as primary pedestrian-oriented, commercial and financial center(s) in the city/community.	Chapter III, B.5, B.6
Policy 42: The City of Modesto shall plan adequate neighborhood commercial shopping areas to serve new residential development.	Chapter III, B.3

Policy 43: The City of Modesto shall encourage subdivision designs that provide neighborhood parks in proximity to activity centers such as schools, libraries and community centers.	Consistent Chapter III, B.10
Policy 44: The City of Modesto shall work closely with school districts to help them choose school site locations that allow students to safely walk or bicycle from their homes.	Chapter III, C.1.(f)
Policy 45: The City of Modesto shall plan park and ride lots at suitable locations serving long distance and local commuters.	Chapter V, F.6
Policy 46: The City of Modesto shall plan for multi-modal transfer sites that incorporate auto parking areas, bike parking, transit, pedestrian and bicycle paths, and park and ride pick-up points.	Chapter V, F.10
Policy 47: The City of Modesto shall encourage the development of pedestrian-oriented shopping areas within walking distance of high-density residential neighborhoods.	Chapter III, C.1
Policy 48: The City of Modesto shall protect pedestrian oriented commercial areas from development that is incompatible in design, scale or use.	Chapter III, C.2
Policy 49: The City of Modesto shall discourage new regional auto-oriented commercial uses (such as volume discount stores, auto dealerships and large scale car repair) within areas designated as mixed-use, transit-oriented or pedestrian-oriented.	Chapter III, G.1
Policy 50: The City of Modesto shall encourage regional shopping malls/centers at sites capable of support by a full range of transportation options.	Chapter III, B.8
Policy 52: The City/ of Modesto shall encourage infill of vacant parcels.	Chapter III, C.III.B.1

	Consistent
Policy 53: The City/ of Modesto shall encourage infill and redevelopment projects within an urban area that will improve the effectiveness of the transit system and will not adversely affect existing development.	Chapter III, C.III.B.1
Policy 54: The City/ of Modesto shall adopt a reasonable urban limit line/urban growth boundary and commit to providing public services only within the urban area.	Chapter III, C.III.B.2
Policy 55: The City/ of Modesto shall expand public services incrementally to serve contiguous development and will discourage the formation of small sewer and water systems serving fringe urban development.	Chapter III, C.III.B.2
Policy 56: The City/ of Modesto shall encourage project sites designed to increase the convenience, safety and comfort of people using transit, walking or cycling.	Chapter III, C.III.C
Policy 57: The City/ of Modesto shall require an air quality/transportation design analysis for projects exceeding District CEQA significance thresholds.	Chapter VII, H.2.g
Policy 58: The City/ of Modesto shall review all subdivision street and lot designs, commercial site plans, and multifamily site plans to identify design changes that can improve access by transit, bicycle, and walking.	Chapter III, C.III.C.1
Policy 59: The City/ of Modesto shall require all development projects proposed within 2,000 feet of an existing or planned light rail transit, commuter rail, express bus, or transit corridor stop, to incorporate site design measures that enhance the efficiency of the transit system.	Chapter III, C.III.C.1

SJVAPCD Goals and Policies	**Consistency**
CIRCULATION ELEMENTS	
Policy 60: The City of Modesto shall plan for a multi-modal transportation system that meets the mobility needs of the community and improves air quality.	Consistent Chapter V, V.A
Policy 61: The City of Modesto shall vigorously pursue and use state and federal funds earmarked for bicycle and transit improvements.	Chapter V, V.G.3
Policy 62: The City of Modesto shall encourage the consolidation of transit services within the metropolitan area to maximize the efficiency of transit services while minimizing costs.	Chapter V, V.f..(1)
Policy 63: The City of Modesto shall ensure to the extent feasible that pedestrian, bicycle, and automobile connections are maintained in existing neighborhoods affected by transportation and other development projects.	Chapter III, C.III.B.2
Policy 64: The City of Modesto shall require transit improvements at sites deemed appropriate and necessary by the Transportation Department and the transit provider and consistent with long-range transit plans.	Chapter V, V.F
Policy 65: The City of Modesto shall work with Caltrans and transit providers to identify park and ride sites with convenient access to public transit.	Chapter V, V.F.6
Policy 66: The City of Modesto shall design all arterial and collector streets planned as transit routes to allow the efficient operation of public transit.	Chapter V, V.F
Policy 67: The City of Modesto shall ensure that a comprehensive system of bikeways and pedestrian paths is planned and constructed in accordance with an adopted City/County plan.	Chapter V, V.A.2

SJVAPCD Goals and Policies	Consistency
	Consistent
Policy 68: The City of Modesto shall ensure that regional and commuter bikeways are extended to serve new development consistent with the adopted bikeway plan.	Chapter V, V.A.2
Policy 69: The City of Modesto shall ensure that upgrades to existing roads (widening, curb and gutter, etc.) include bicycle and pedestrian improvements in their plans and implementation where appropriate.	See Chapter V, V.E.(3)
Policy 70: The City of Modesto shall require new major activity centers, office and commercial development to provide secure bicycle storage and parking facilities.	Chapter III, C.III.G.1
Policy 71: The City of Modesto shall preserve abandoned railroad right of ways with no potential for use as light rail lines for use as bikeways and pedestrian paths when feasible.	Chapter V, V.G
Policy 72: The City of Modesto shall identify potential light rail corridors during major general plan updates and take action to protect the right of way from incompatible development.	Chapter V, V.G
Policy 73: The City of Modesto shall preserve specific existing railroad right of ways that have the potential to be used as light rail lines.	Chapter V, V.G
Policy 74: The City of Modesto shall support the use of suitable freeway and expressway right of ways for light rail.	Chapter V, V.G
Policy 75: The City of Modesto shall plan the area around new commuter and mainline rail stations to provide convenient and safe pedestrian and bicycle access, and connections to the transit system.	Chapter V, V.G

As indicated in Table 5, the plan would include features, policies, and implementing measures that are generally consistent with the SJVAPCD goals and policies and the proposed General Plan land use diagram and circulation element are consistent with StanCOG's 2014 Sustainable Communities Strategy, which reflects Modesto's General Plan.

Impact: **Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?**

Implementation of the General Plan Update would result in short-term emissions from construction activities associated with subsequent development, including site grading, asphalt paving, building construction, and architectural coating. Emissions commonly associated with construction activities include fugitive dust from soil disturbance, fuel combustion from mobile heavy-duty diesel- and gasoline-powered equipment, portable auxiliary equipment, and worker commute trips. During construction, fugitive dust, the dominant source of PM_{10} and $PM_{2.5}$ emissions, is generated when wheels or blades disturb surface materials. Uncontrolled dust from construction can become a nuisance and potential health hazard to those living and working nearby. The potential health risk impact from construction is addressed in Impact 4.

Demolition and renovation of buildings can also generate PM_{10} and $PM_{2.5}$ emissions. Off-road construction equipment is often diesel-powered and can be a substantial source of NO_X emissions, in addition to PM_{10} and $PM_{2.5}$ emissions. Worker commute trips and architectural coatings are dominant sources of ROG emissions. The SJVAPCD GAMAQI does not identify plan-level thresholds that apply to construction. The SJVAPCD's GAMAQI emphasizes implementation of effective and comprehensive control measures rather than requiring a detailed quantification of construction emissions. SJVAPCD adopted a set of PM_{10} fugitive dust rules collectively called Regulation VIII. This regulation essentially prohibits the emissions of visible dust (limited to 20 percent opacity) and requires that disturbed areas or soils be stabilized. Compliance with Regulation VIII during the construction phases of the various projects under the General Plan Update would be required. Prior to construction of each project, the applicant would be required to submit a dust control plan that meets the regulation requirements. These plans are reviewed by SJVAPCD and construction cannot begin until District approval is obtained. Anyone who prepares or implements a Dust Control Plan must attend a training course conducted by the District. Construction sites are subject to SJVAPCD inspections under this regulation.

The SJVAPCD Indirect Source Review Rule (Rule 9510) applies to construction of projects that would exceed certain sizes. Rule 9510 ensures that projects contribute their share of emission reductions in order to achieve the basin-wide reduction targets established in the Air District's ozone and particulate matter attainment plans. Rule 9510 would require that projects reduce construction exhaust emissions by 20 percent for NO_x and 45 percent for PM_{10}. SJVAPCD encourages reductions through on-site mitigation measures. (Note: The use of the term “mitigation” under Rule 9510 does not necessarily refer to mitigation of impacts under CEQA. If a project would not exceed the CEQA significance thresholds, no mitigation under CEQA would be required). A combination of on-site and off-site (fee based) measures can be implemented to meet the overall emission reduction requirements.

Without application of appropriate control measures to reduce construction dust and exhaust, construction period impacts at the project level would be considered a potentially significant impact. Implementation of proposed General Plan amendment Policies VII.H.2.jj through VII.H.2.aaa, as applicable, would reduce this impact to less-than-significant.

However, the City cannot ensure such reductions can be made as part of future individual development projects and maintained throughout the life of such projects. In addition, the growth of vehicle travel and new stationary sources that would be allowed under the updated General Plan would lead to emissions that could be cumulatively considerable. No mitigation measures are feasible to reduce cumulatively considerable air pollutants to a less-than-significant level. Therefore, this impact would be significant and unavoidable.

Mitigation MeasureAQ-1: Implement Regulation VIII to Control Fugitive Dust Emissions during Construction.

- Effective dust suppression (e.g., watering) for land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill and demolition activities.
- Effective stabilization of all disturbed areas of a construction site, including storage piles, not used for seven or more days.
- Control of fugitive dust from on-site unpaved roads and off-site unpaved access roads.
- Removal of accumulations of mud or dirt at the end of the workday or once every 24 hours from public paved roads, shoulders and access ways adjacent to the site.
- Cease outdoor construction activities that disturb soils during periods with high winds.
- Record keeping for each day dust control measures are implemented.
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Landscape or replant vegetation in disturbed areas as quickly as possible.
- Prevent the tracking of dirt on public roadways. Limit access to the construction sites, so tracking of mud or dirt on to public roadways can be prevented. If necessary, use wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.
- Suspend grading activity when winds (instantaneous gusts) exceed 25 mph or dust clouds cannot be prevented from extending beyond the site.

As discussed above, Rule 9510 would not be considered mitigation under CEQA, however it would require that the projects reduce construction exhaust emissions by 20 percent for NO_x and 45 percent for PM_{10}

Additionally, implementation of the General Plan Update would result in long-term area and mobile source emissions from operation and use of subsequent development. Implementation of the General Plan Update could include stationary sources of pollutants that would be required to obtain permits to operate in compliance with SJVAPCD rules. These sources include, but are not limited to, gasoline stations, dry cleaners, internal combustion engines, and surface coating operations. The permit process ensures that these sources would be equipped with the required emission controls and that, individually, these sources would result in a less than significant impact.

As discussed above, the SJVAPCD GAMAQI does not have thresholds related to direct and indirect regional criteria pollutant emissions resulting from plan implementation. Under Rule 9510, projects would be required to reduce operational NO_x emissions by 33 percent and operational PM_{10} emissions by 50 percent over 10 years.

However, the City cannot ensure such reductions can be made as part of future individual development projects and maintained throughout the life of such projects. In addition, the growth of vehicle travel and new stationary sources that would be allowed under the updated General Plan would lead to emissions that could be cumulatively considerable. No mitigation measures are feasible to reduce cumulatively considerable air pollutants to a less-than-significant level. Therefore, this impact would be significant and unavoidable.

Impact: Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Project traffic would increase concentrations of carbon monoxide along roadways providing access to the project. Carbon monoxide is a localized air pollutant, where highest concentrations are found very near sources. The major source of carbon monoxide is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volume and congestion. Emissions and ambient concentrations of CO have decreased greatly in recent years. These improvements are due largely to the introduction of cleaner burning motor vehicles and reformulated motor vehicle fuels. No exceedances of the State or federal CO standards have been recorded at any of San Joaquin Valley's monitoring stations in the past 15 years. The San Joaquin Valley Air Basin has attained the State and National CO standards. No monitoring of CO concentrations has been conducted in Stanislaus County for the past three years at the various air monitoring stations operated by CARB.[9]

[9] CARB, 2016. iADAM: Air Quality Data Statistics. Available online: http://www.arb.ca.gov/adam/. Accessed: July 13, 2016.

Other local pollutants, such as lead (Pb) and sulfur dioxide (SO_2) would not be substantially emitted by the project, and air quality standards for them are being met throughout the San Joaquin Valley Air Basin. Since it is evident that the project would not result in impacts involving these or other local pollutants, these pollutants are not evaluated in this report.

Impact: Expose sensitive receptors to substantial pollutant concentrations?

Subsequent land use activities associated with implementation of the General Plan Update could potentially include short-term construction sources of TACs and long-term operational sources of TACs, including stationary and mobile sources.

Temporary Construction Sources

Implementation of the General Plan Update would result in the potential construction of a variety of projects. This construction would result in short-term emissions of diesel particulate matter (DPM), a TAC. Construction would result in the generation of DPM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities. The amount to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. Cancer risk and $PM_{2.5}$ exposure would have to be analyzed through project-level analysis to identify the potential for significant impacts and measures to reduce those impacts to less than significant. Health risks associated with temporary construction would, therefore, be considered potentially significant. Implementation of Mitigation Measure AQ-2 would reduce this impact.

Mitigation MeasureAQ-2 **Require Project-Level Construction Health Risk Assessment.** A construction health risk assessment will be required on a project-by-project basis if, at the direction of SJVAPCD after applicant and Air District consultation, the specific project is considered to have a potentially significant project-level health risk impact; through refined modeling using 2015 OEHHA guidance (or the latest accepted methodology), to identify impacts and, if necessary, include measures to reduce diesel particulate exposure. Reduction in health risk can be accomplished through, though is not limited to, the following measures:

- Construction equipment selection;

- Use of alternative fuels, engine retrofits, and added exhaust devices;
- Modify construction schedule; and
- Implementation of SJVAPCD measures for control of fugitive dust.

Long-Term Operational Sources

The SJVAPCD GAMAQI considers exposure of sensitive receptors to air pollutant levels that result in an unacceptable cancer risk or hazard, to be significant. For cancer risk, which is a concern with diesel particulate matter and other mobile-source TACs, the SJVAPCD considers an increased risk of contracting cancer that is 20 in one million chances or greater, to be significant risk for a single source. Non-cancer risk would be considered significant if the computed Hazard Index (HI) is greater than 1.0.[10]

The General Plan Update would permit and facilitate the development of new sensitive receptors, such as new homes, in locations near arterial and collector roadways, highways, rail lines, and stationary sources of TAC emissions. Sensitive receptors within the Planning Area would be exposed to levels of TACs and or $PM_{2.5}$ that could cause an unacceptable cancer risk or hazard.

Stationary Sources

The Planning Area has numerous permitted stationary sources. These sources are located throughout the City, but mostly in industrial and commercial areas. The impact of these sources can only be addressed on a project-by-project basis, since impacts are generally localized. New residences and sensitive receptors could be located near stationary sources of TACs located throughout the City, such as gasoline dispensing stations, emergency back-up diesel generators, and dry cleaners. Without proper setbacks or mitigation measures, these sources could result in TAC levels that would be significant for new sensitive receptors.

Gasoline Stations

CARB recommends a setback of 300 feet for large gasoline dispensing facilities (3.6 million gallons of throughput a year) and 50 feet for small facilities.

Dry Cleaning Facilities

[10] The Hazard Index is the ratio of the computed receptor exposure level to the level known to cause acute or chronic adverse health impacts.

Perchlorethylene (Perc) is the solvent used commonly in past dry cleaning operations. Perc is a TAC because it has the potential to cause cancer. In 2005, CARB recommended setbacks of 300 feet between dry cleaning facilities that emit Perc and sensitive land uses. Since then, CARB has enacted new rules to substantially reduce Perc emissions and phase out the use of TACs in dry cleaning by 2023. Most dry cleaning facilities would need to be analyzed on a project-by-project basis, starting by determining if the facility in question uses Perc in their cleaning process.

Emergency Back-Up Generators

Electricity generators that are powered by diesel engines are common. They are typically located at facilities where uninterrupted electricity is necessary. Common facilities include fire and police stations, hospital or medical treatment facilities, pump stations, schools, offices, and data centers. Diesel engines powering these generators are regulated by SJVAPCD and CARB. CARB has established strict emissions limits and operating restrictions for engines larger than 50 horsepower. As a result, all new engines have very localized impacts and would not be permitted if they would cause significant cancer risks or hazards.

Other Sources

CARB recommends a setback of 1,000 feet for both distribution centers and chrome platers.

Highway and Roadway Traffic

The CARB Air Quality and Land Use Handbook recommends avoiding siting new sensitive receptors within 500 feet of a freeway, urban roads with 100,000 vehicles/day or rural roads with 50,000 vehicles/day. However, this is not always feasible. Project-level analysis would be required for proposed receptor setbacks of lesser distances, including possible refined dispersion modeling of TACs.

Railroad Operations

Potential health effects from railroad traffic along the Union Pacific Railroad (UPRR) and Burlington Northern Santa Fe Railway (BNSF) rail lines in Modesto were evaluated. The BNSF rail line is located along the eastern edge of Modesto and the UPRR rail line parallels Highway 99 along the western side of the city. The BNSF rail line is used by trains for passenger and freight service, while the UP rail line is used only for freight service. Passenger rail service on the BNSF line consists of the Amtrak San Joaquin passenger line with 14 trains per day. In addition, based on data from the U.S. Department of Transportation there are about 46 freight trains that use the

BNSF rail line and 18 to 20 freight trains on the UP line on a daily basis.[11] All passenger and freight trains using these rail lines use diesel powered locomotives and emit diesel exhaust from the engines.

The rail analysis is meant to show screening levels of increased cancer risks to new residents who would be locating in areas designated as residential, village residential, or mixed use along the rail lines. Since DPM emissions from locomotives will be decreasing over time due to on-going implementation of U.S. EPA locomotive emission standards, cancer risks were evaluated for two exposure scenarios. The first one is where exposure would begin in about 2020 and the second where exposure would begin in about 2025.

The volume of train activity, operating characteristics, and rail line orientation has a considerable effect on the level of exposure to DPM and cancer risk. For this analysis, approximately 3,000 foot segments of the rail line in the vicinity of potential future residences were evaluated. To account for differences in rail line locations and operating characteristics, two cases were evaluated.

- Case 1 is for trains traveling on the BNSF rail line on a segment of the rail line adjacent to areas of potential future residential development in the eastern side of the General Plan area. Passenger and freight trains running along this section of rail line were assumed to be traveling at an average speed of 40 mph.

- Case 2 is for freight trains traveling on the UPRR rail line on a segment of the rail line adjacent to areas of potential future residential development in the western side of the General Plan area. Freight trains running along this section of rail line were assumed to be traveling at an average speed of 40 mph.

The locations of the BNSF and UPRR rail line segments evaluated are shown in Figure 1.

Rail Line Emissions Modeling

DPM emissions from trains on the rail line were calculated using EPA emission factors for locomotives (EPA, 2009) and CARB adjustment factors to account for fuels used in California (CARB, 2006). Since the exposure duration used in calculating cancer risks is 70 years, emissions for the period from 2020 through 2089 were calculated evaluating exposures starting in 2020 and for 2025 through 2094 for exposures starting in 2025. Average DPM emissions were calculated based on EPA emission factors for the periods 2020-2024, 2025-2030, 2030-2089 and 2030-2094.

Amtrak's passenger trains in this area generally use locomotives with 3,200 horsepower (hp) diesel engines. In estimating diesel locomotive emissions, all passenger train locomotives were assumed to have 3,200 hp engines. Each passenger train was assumed to use one locomotive and would be traveling at an average speed of 40 mph. UPRR freight trains in California range in size from about

[11] U.S. Department of Transportation, Federal Railroad Administration, U.S. DOT Crossing inventory Form for DOT Crossing Inventory number 028744N (2nd Street, Empire) and 752855A (Woodland Avenue in Modesto).

1,500 hp to 4,000 hp, with a fleet average horsepower of about 2,200 hp.[12] For this evaluation, it was assumed that the UPRR freight train locomotives use 2,300 hp engines. BNSF freight trains in California range in size from about 1,200 hp to 4,400 hp, with a fleet average horsepower of about 3,440 hp.[13] For this evaluation, it was assumed that the BNSF freight train locomotives use 3,600 hp engines. Emissions from the freight trains were calculated assuming they would use three locomotives and would be traveling at about 40 mph.

Rail Line Dispersion Modeling

Modeling of locomotive emissions was conducted using the EPA's AERMOD dispersion model and five years (2010-2014) of hourly meteorological data from the Modesto Airport prepared for use with the AERMOD model by the San Joaquin Valley Air Pollution Control District (SJVAPCD). Locomotive emissions over the rail segments evaluated were modeled as a line sources (a series of adjacent volume sources) along about 3,000 feet of track. A volume source release height of 5 meters with a plume height of 6 meters was used in the modeling.

Concentrations were calculated at receptors that were placed on both sides of the rail line segments, perpendicular to the rail line, at a distance of 50 feet then at every 100 feet out to 1,000 feet from the track centerline, spaced every 164 feet (50 meters) along the rail line segments. Receptor heights were set at 1.5 meters (or about 5 feet).

Rail Line Cancer Risk Impacts

Using the modeled long-term average DPM concentrations at each receptor location, the increased cancer risks were computed using the most recent methods recommended by SJVAPCD.[14] The factors used to compute cancer risk are highly dependent on modeled concentrations, exposure period or duration, and the type of receptor. The exposure level is determined by the modeled concentration; however, it has to be averaged over a representative exposure period. The averaging period is dependent on many factors, but mostly the type of sensitive receptor being evaluated. This assessment conservatively assumed long-term 70 year residential exposures for two cases, one with the exposure period starting in 2020 and the other with the exposures starting in 2025. The SJVAPCD has developed exposure assumptions for typical types of sensitive receptors. *Attachment 1* includes a description of how the cancer risk impacts are computed.

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[12] Based on *2009 UPRR California Intrastate Locomotives*, Available at: http://www.arb.ca.gov/railyard/rrsubmittal/0410upinventory.pdf

[13] Based on *2009 UPRR California Intrastate Locomotives*, Available at: http://www.arb.ca.gov/railyard/rrsubmittal/0410bnsfinventory.pdf

[14] SJVAPCD. 2015. *Final Staff Report, Update to District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document*. May 28, 2015

It should be noted that the procedure to calculate maximum cancer risk assumes that exposure starts at infancy (3rd trimester of pregnancy to age 2) and continues through childhood (ages 2 to 16) and adulthood (ages 16 to 70) and that infants will be present at all receptor locations at the beginning of the exposure period.

The maximum cancer risks from both the BNSF and UPRR rail lines occurred 50 feet from the railroad track centerline and decrease with distance from the rail lines. Figures 2 and 3 show the sections of rail line segments evaluated and receptor locations relative to the rail lines, and list the computed maximum increased cancer risks for trains traveling on the BNSF rail line and UPRR rail line, respectively. Maximum increased cancer risks to new residents locating near the rail lines are show for new residential exposure starting in 2020 and 2025.

As indicated in Figure 2, trains on the BNSF rail line would have a significant cancer risk (above 20 in one million excess cancer risk) within approximately 800 feet from the rail line for exposures starting in 2020 and within about 500 feet for exposures starting in 2025. For the UP rail line shown in Figure 3, trains would have a significant cancer risk within about 200 feet east of the rail line and 300 feet west of the rail line for exposures starting in 2020. For exposures starting in 2025, trains would have a significant caner risk within about 100 feet east of the rail line and 200 feet west of the rail line. Potentially significant setback distances for acute and chronic Hazard Index would be further than those identified above for excess cancer risk.

Details of the locomotive emission calculations, rail line modeling, and cancer risk calculations are included in *Attachment 2*.

Summary

The General Plan Update would allow growth of new residential land uses that would be sensitive receptors and new non-residential land uses that are a potential for new emissions sources. Typically, these sources would be evaluated through the SJVAPCD permit process or the CEQA process to identify and mitigate any significant exposures. However, some sources that would not undergo such a review, such as truck loading docks or truck parking areas, may have the potential to cause significant increases in TAC exposure. This impact would be potentially significant. Implementation of Mitigation Measure AQ-3 would reduce this impact.

Mitigation MeasureAQ-3 The following measures shall be utilized in site planning and building designs to reduce TAC and $PM_{2.5}$ exposure to sensitive receptors:

- Future development under the General Plan Update that includes sensitive receptors (such as schools, hospitals, daycare centers, or retirement homes) located within the setback distances from highways, railroads, local roadways, and stationary sources below shall require site-specific analysis to determine the level of TAC and $PM_{2.5}$ exposure. This analysis shall be conducted following methodology and procedures recommended by SJVAPCD and OEHHA. If the site-specific analysis reveals significant exposures, such as cancer risk greater than 20 in one million or acute or chronic hazards with a Hazard Index greater than 1.0, additional measures shall be required, as described below, to reduce the risk to below the threshold.

Setback screening distances:

a) Gasoline dispensing facilities: 300 feet for large facilities (3.6 million gallons of throughput a year or more) and 50 feet for smaller facilities;

b) Dry cleaning facilities: 300 feet for facilities that emit Perchlorethylene;

c) Distribution centers: 1,000 feet;

d) Chrome platers: 1,000 feet;

e) Freeways, urban roads with 100,000 vehicles/day or rural roads with 50,000 vehicles/day or more: 500 feet;

f) BNSF rail line: 800 feet from 2020-2024, and 500 feet for 2025 and later;

g) UP rail line: 200 feet east of the rail line and 300 feet west of the rail line from 2020-2024, and 100 feet east of the rail line and 200 feet west of the rail line for 2025 and later.

- Future non-residential developments containing potentially significant TAC sources would be evaluated in consultation with SJVAPCD to ensure that they do not cause a significant health risk in terms of excess cancer risk greater than 20 in one million, or acute or chronic hazards with a Hazard Index greater than 1.0. This analysis shall be conducted following methodology and procedures recommended by SJVAPCD and OEHHA. If the site-specific analysis reveals significant exposures, additional measures shall be required as described below to reduce the risk to below the threshold.

- If the analysis shows the cancer risk exposure is significant, then the project sponsor shall submit performance specifications and design details to demonstrate that lifetime residential exposures would be reduced to a level of less-than-significant under the applicable threshold subject to approval by the City. The specifications or design standards may include the following or other comparable measures:

  i. Install air filtration systems rated MERV-13 or higher and a maintenance plan for the air filtration system shall be implemented.

  ii. Plant trees and/or vegetation shall be planted between sensitive receptors and pollution sources, if feasible. Trees that are best suited to trapping particulate matter shall be planted, including the following: Pine (Pinus nigra var. maritime), Cypress

(X Cupressocyparis leylandii), Hybrid popular (Populus deltoids X trichocarpa), and Redwoods (Sequoia sempervirens).

iii. Design sites to locate sensitive receptors as far as possible from any freeways, roadways, diesel generators, distribution centers, and rail lines.

iv. Locate operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible. If near a distribution center, residents shall not be located immediately adjacent to a loading dock or where trucks concentrate to deliver goods.

FIGURE 1 Representative UPRR and BNSF Rail Line Segments Used for Modeling

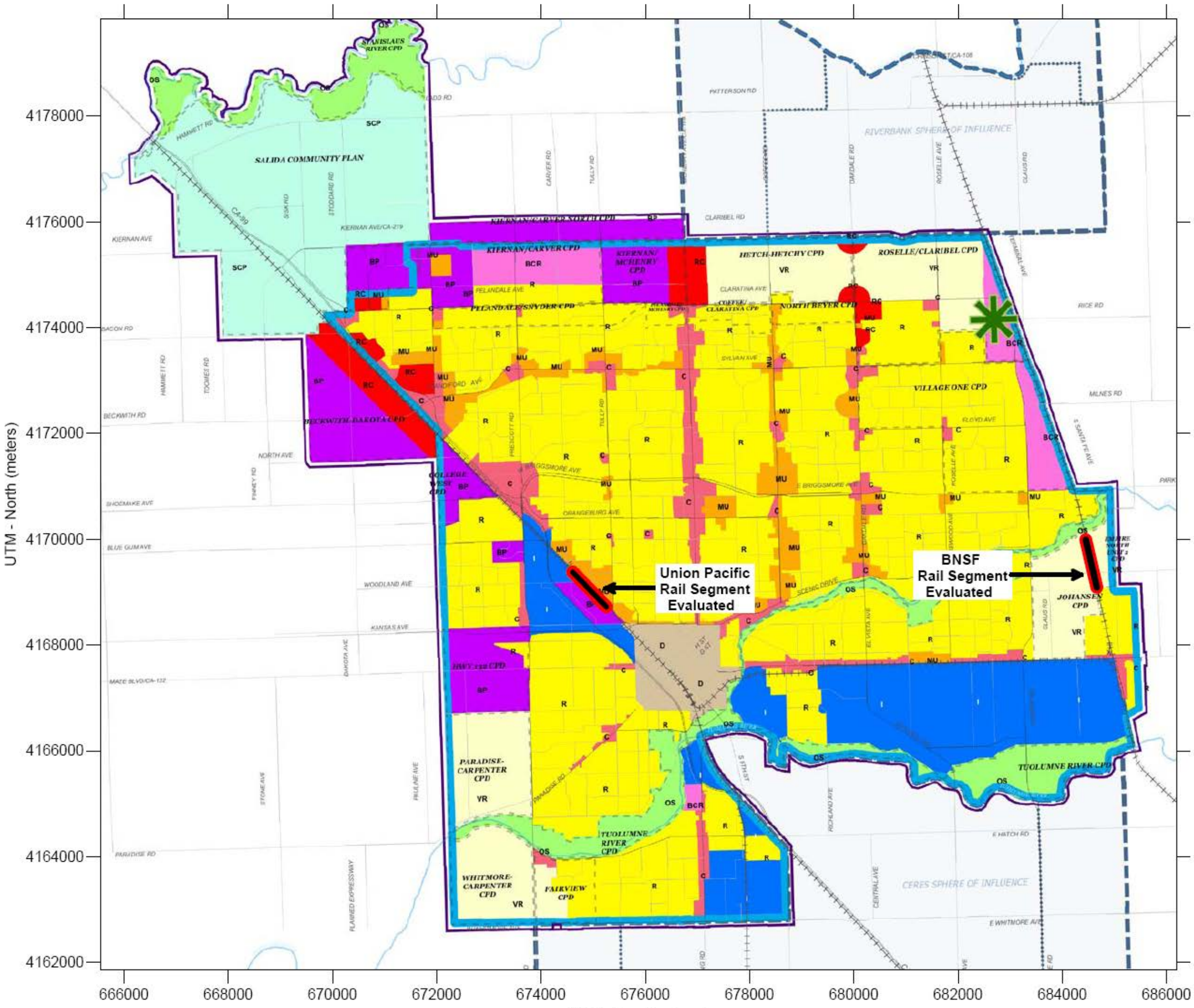
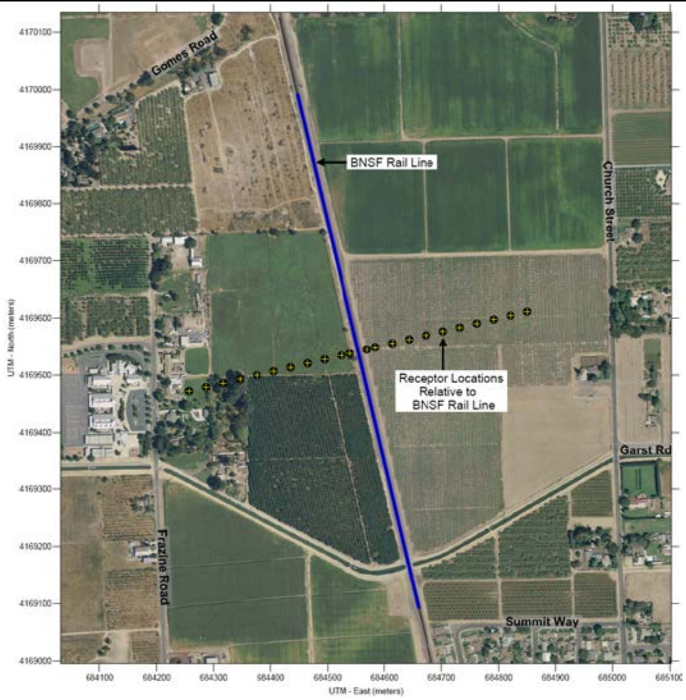


FIGURE 2 BNSF Rail Line - Modesto



Health Risks from Trains Traveling on BNSF Rail Line
Exposure Starting in 2020

Receptors East of BNSF Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	125.0	100.0	65.2	46.6	36.0	28.8
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	23.8	20.1	17.2	14.9	13.1	

Receptors West of BNSF Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	110.8	91.0	62.7	46.3	36.5	29.7
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	24.8	21.1	18.4	16.1	14.3	

Health Risks from Trains Traveling on BNSF Rail Line
Exposure Starting in 2025

Receptors East of BNSF Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	75.9	60.8	39.6	28.3	21.9	17.5
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	14.5	12.2	10.5	9.1	7.9	

Receptors West of BNSF Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	67.3	55.3	38.1	28.1	22.2	18.0
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	15.0	12.8	11.2	9.8	8.7	

FIGURE 3 UPRR Rail Line - Modesto

Health Risks from Trains Traveling on UPRR Rail Line
Exposure Starting in 2020

Receptors East of UPRR Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	47.8	32.5	19.0	12.7	9.3	7.1
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	5.7	4.6	3.9	3.3	2.8	

Receptors West of UPRR Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	59.4	43.6	26.7	18.4	13.7	10.5
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	8.3	6.8	5.6	4.7	4.0	

Health Risks from Trains Traveling on UPRR Rail Line
Exposure Starting in 2025

Receptors East of UPRR Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	27.4	18.3	10.9	7.3	5.3	4.1
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	3.3	2.7	2.2	1.9	1.6	

Receptors West of UPRR Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	34.1	25.0	15.3	10.5	7.8	6.0
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	4.8	3.9	3.2	2.7	2.3	

Impact: Create objectionable odors affecting a substantial number of people?

Subsequent land use activities associated with implementation of the General Plan Update could allow for the development of uses that have the potential to produce odorous emissions either during the construction or operation of future development. Additionally, subsequent land use activities may allow for the construction of sensitive land uses (i.e., residential development, schools, parks, offices, etc.) near existing or future sources of odorous emissions.

Future construction activities could result in odorous emissions from diesel exhaust associated with construction equipment. However, because of the temporary nature of these emissions and the highly diffusive properties of diesel exhaust, exposure of sensitive receptors to these emissions would be limited.

Significant sources of offending odors are typically identified based on complaint histories received and compiled by SJVAPCD. It is difficult to identify sources of odors without requesting information by specific facility from SJVAPCD. Typical large sources of odors that result in complaints are wastewater treatment facilities, landfills including composting operations, asphalt batch plants, fiberglass manufacturing, feed lots/dairy, food processing facilities, and chemical and rendering plants. Other sources, such as restaurants, paint or body shops, and coffee roasters typically result in localized sources of odors. SJVAPCD odor impacts to be significant when there is more than one confirmed complaint per year averaged over a three-year period; or three unconfirmed complaints per year averaged over a three-year period. Table 6 contains the screening distances for potentially significant odor impacts.

TABLE 6 Screening Distances for Potentially Significant Odor Impacts

Type of Facility	Distance
Wastewater Treatment Facility	2 miles
Sanitary Landfill	1 mile
Transfer Station	1 mile
Composting Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	1 mile
Chemical Manufacturing	1 mile
Fiberglass Manufacturing	1 mile
Painting/Coating Operations (e.g., auto body shops)	1 mile
Food Processing Facility	1 mile
Feed Lot/Dairy	1 mile
Rendering Plant	1 mile

The Plan Area includes potential odor sources throughout that could affect new sensitive receptors. Most of these major existing sources are already buffered. However, it is possible that odors may be present. Responses to odors are subjective, and vary by individual and type of use. Sensitive land uses that include outdoor uses, such as residences and possibly daycare facilities, are likely to be affected most by existing odors. The General Plan Update does not have policies or implementing measures that address potential conflicts in land uses that could result in odor complaints. As a result, the impact would be considered potentially significant. Implementation of Mitigation Measure AQ-4 would reduce this impact.

Mitigation Measure AQ-4 The following Policy and Action Measures shall be added to the General Plan Update:

- New Policy AQ-4.1: *Avoid Odor Conflicts*. Coordinate land use planning to prevent new odor complaints.
- New Action AQ-4.1A: *Identify Potential for Odor Complaints*. Consult with SJVAPCD, as necessary, to identify the potential for odor complaints from various existing and planned or proposed land uses in the Plan Area.
- New Action AQ-4.1B: *Odor Sources.* Prohibit new sources of odors that have the potential to result in frequent odor complaints unless it can be shown that potential odor complaints can be mitigated.
- New Action AQ-4.1C: *Limit Sensitive Receptors Near Odor Sources.* Prohibit sensitive receptors from locating near odor sources where frequent odor complaints would occur, unless it can be shown that potential odor complaints can be mitigated.

Impact: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

SJVAPCD's *Guidance for Valley Land-Use Agencies in Addressing GHG Emissions Impacts for New Projects Under CEQA* establishes a requirement that land use development projects demonstrate a 29 percent reduction in GHG emissions from Business-As-Usual (BAU). However, this would apply at the project level and SJVAPCD does not have a recommended threshold of significance for general plans. Further, this method of demonstrating 29 percent reduction from BAU was called into question in the Newhall case (Center for Biological Diversity v. California Department of Fish and Wildlife, Los Angeles Super. Ct. No. BS131347). In the second update to the Scoping Plan,[15] CARB recommends that local governments aim to achieve community-wide emissions of no more than 6 MT CO_2e per capita by 2030 and no more than 2 MT CO_2e per capita by 2050. A simple interpolation between the two goals results in a 2040 substantial progress goal of no more than 4 MT CO_2e per capita.

GHG emissions were computed for the full build-out traffic scenario and for the alternative scenario, with operational emissions in 2040 using the California Emissions Estimator Model Version 2016.3.2 (CalEEMod). General Plan land use types and size, and trip generation rate were

[15] CARB, 2017. *California's 2017 Climate Change Scoping Plan*. November.

input to CalEEMod. CalEEMod predicts emissions of GHG in the form of equivalent carbon dioxide emissions or CO_2e.

Operational Period Emissions

The CalEEMod model and EMFAC2017 model along with the project vehicle miles traveled (VMT) estimates were used to predict GHG emissions associated with operation of fully developed sites under the General Plan Update. CARB's EMFAC2017 model is sensitive to the year selected, since vehicle emissions have and continue to be reduced due to more stringent exhaust controls, newer vehicle fleet, fuel efficiency standards, and low carbon fuels. Adjustments to the modeling are described below. CalEEMod and EMFAC2017 output worksheets are provided in *Attachment 3*.

Year of Analysis

Emissions associated with vehicle travel depend on the year of analysis. The earlier the year, the higher the emission rates, as the models assume reduced emission rates as newer vehicles with lower emission rates replace older, more polluting vehicles through attrition of the overall vehicle fleet. The earliest year the full build-out could be possibly constructed and fully operated would be 2040.

Land Use Descriptions

The following land uses types and sizes were input to CalEEMod for the Existing run (which was run using historical energy consumption data): "Single Family Housing" (62,490 dwelling units), "Apartments Mid Rise" (23,180 dwelling units), "Strip Mall"/ retail (14,211,500 square feet), "General Office Building" (13,985,455 square feet), "General Heavy Industry" (4,667,500 square feet), "Government (Civic Center)" (1,860,000 square feet), "High School"/education (4,287,500 square feet), "Hotel" (2,545,500 square feet),[16] and "Health Club" (2,745,455 square feet).

For the net General Plan buildout (which was added to the Existing run to represent the proposed General Plan buildout), the following land uses were input to CalEEMod: "Single Family Housing" (34,473 dwelling units), "Apartments Mid Rise" (13,120 dwelling units), "Strip Mall"/ retail (9,884,718 square feet), "General Office Building" (19,925,399 square feet), "General Heavy Industry" (18,212,041 square feet), "Government (Civic Center)" (696,043 square feet), "High School"/education (3,163,002 square feet), "Hotel" (6,223,845 square feet),[17] and "Health Club" (9,155,416 square feet).

[16] 1,753 hotel rooms were entered which corresponded closest to the estimated 2,545,500 sf.
[17] 4,287 hotel rooms were entered which corresponded closest to the estimated net 6,223,845 sf.

For the Project Alternative (which was added to the Existing run to represent the Alternative), the following land uses types and sizes were input to CalEEMod: “Single Family Housing” (16,632 dwelling units), “Apartments Mid Rise” (22,094 dwelling units), “Strip Mall”/ retail (16,486,500 square feet), “General Office Building” (17,300,606 square feet), “General Heavy Industry” (12,933,000 square feet), “Government (Civic Center)” (435,000 square feet), “High School”/education (1,471,500 square feet), “Hotel” (7,473,500 square feet),[18] and “Health Club” (8,120,909 square feet).

Trip Generation Rates and Travel Distances

Mobile emissions were calculated using daily vehicle miles traveled (VMT) provided in the traffic study. For each project scenario (Boundary Method, OD Shared Accounting Method, and OD Full Accounting Method), the daily VMT was provided. These data were applied to the average GHG emission factor using the CARB EMFAC2017 emissions factor model.

Electricity Generation

For the Existing run, historical data from 2005 were conservatively used for energy consumption. For the net General Plan buildout and Project Alternative runs, default rates for energy consumption were assumed in the model, which represent energy consumption rates for the 2016 Title 24 California building standards.

Per Capita Rate

The number of 2040 Plan Area residents is anticipated to be 390,300. Under the Project Alternative, the number of 2040 Plan Area residents is anticipated to be 357,800.

GHG Operational Emissions

Tables 7, 8 and 9 present the results of the CalEEMod and EMFAC analysis in terms of annual metric tons of equivalent CO_2e emissions (MT of CO_2e/yr) and per capita values for the Boundary Method, OD Shared Accounting Method, and OD Full Accounting Method, respectively. The CalEEMod modeling data are provided in *Attachment 3*.

As shown in Tables 7, 8 and 9, 2040 full build-out operation of the General Plan Update would have per capita emissions of 5.3 – 6.3 MT of CO_2e/yr depending on the VMT accounting method. As discussed above, SJVAPCD does not have a GHG significance threshold at the plan level. Both 2040 project and the alternative would exceed CARB’s recommended 2050 goal of 2 MT of CO_2e/yr/capita and the interpolated 2040 substantial progress goal of 4 MT CO_2e per capita.

[18] 5,147 hotel rooms were entered which corresponded closest to the estimated net 7,473,500 sf.

Therefore, it cannot be concluded that 2040 General Plan GHG emissions would be in line with EO S-3-05 and EO B-30-15 goals, as these represent substantial reductions beyond AB32 goals. There are no additional feasible and reasonable measures beyond those outlined in Table 5 to reduce Plan Area VMT. The Plan currently includes many measures to ensure energy-efficiency in the City.

TABLE 7 2040 Project GHG Emissions (Metric Tons CO_2e), Boundary Method

Source Category	Existing (Base Year)	2040 Project	2040 Alternative
Area	149,772	182,291	200,151
Energy Consumption	533,369	1,013,501	934,587
Mobile	403,173	724,206	714,117
Solid Waste Generation	71,162	149,430	136,652
Water Usage	45,737	95,327	88,017
Total	1,203,213	2,164,755	2,073,524
Service Population Emissions[1]		5.5	5.8

Notes: [1]Based on a Plan Area population of 390,300 for the Project and 357,800 for the Project Alternative.

TABLE 8 2040 Project GHG Emissions (Metric Tons CO_2e), OD Shared Accounting Method

Source Category	Existing (Base Year)	2040 Project	2040 Alternative
Area	149,772	182,291	200,151
Energy Consumption	533,369	1,013,501	934,587
Mobile	278,574	612,215	612,154
Solid Waste Generation	71,162	149,430	136,652
Water Usage	45,737	95,327	88,017
Total	1,078,614	2,052,764	1,971,561
Service Population Emissions[1]		5.3	5.5

Notes: [1]Based on a Plan Area population of 390,300 for the Project and 357,800 for the Project Alternative.

TABLE 9 2040 Project GHG Emissions (Metric Tons CO_2e), OD Full Accounting Method

Source Category	Existing (Base Year)	2040 Project	2040 Alternative
Area	149,772	182,291	200,151
Energy Consumption	533,369	1,013,501	934,587
Mobile	422,073	1,000,588	1,004,201
Solid Waste Generation	71,162	149,430	136,652
Water Usage	45,737	95,327	88,017
Total	1,222,113	2,441,137	2,363,608
Service Population Emissions[1]		6.3	6.6

Notes: [1]Based on a Plan Area population of 390,300 for the Project and 357,800 for the Project Alternative.

Impact: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, codifies the State of California's GHG emissions target by directing CARB to reduce the State's global warming emissions to 1990 levels by 2020. AB 32 was signed and passed into law by Governor Schwarzenegger on September 27, 2006. Since that time, CARB, California Energy Commission (CEC), the California Public Utilities Commission (CPUC), and the Building Standards Commission have all been developing regulations that will help meet the goals of AB 32 and Executive Order S-3-05.

A Scoping Plan for AB 32 was adopted by CARB in December 2008. It contains the State of California's main strategies to reduce GHGs from business-as-usual (BAU) emissions projected in 2020 back down to 1990 levels. BAU is the projected emissions in 2020, including increases in emissions caused by growth, without any GHG reduction measures. The Scoping Plan has a range of GHG reduction actions, including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. It required CARB and other state agencies to develop and adopt regulations and other initiatives reducing GHGs by 2012.

As directed by AB 32, CARB has also approved a statewide GHG emissions limit. On December 6, 2007, CARB staff resolved an amount of 427 million metric tons (MMT) of CO_2e as the total statewide GHG 1990 emissions level and 2020 emissions limit. The limit is a cumulative statewide limit, not a sector- or facility-specific limit. CARB updated the future 2020 BAU annual emissions forecast, in light of the economic downturn, to 545 MMT of CO_2e. Two GHG emissions reduction measures currently enacted that were not previously included in the 2008 Scoping Plan baseline inventory were included, further reducing the baseline inventory to 507 MMT of CO_2e. Thus, an estimated reduction of 80 MMT of CO_2e is necessary to reduce statewide emissions to meet the AB 32 target by 2020.

SB 32 was passed in 2016, which codified a 2030 GHG emissions reduction target of 40 percent below 1990 levels. CARB is currently working on a second update to the Scoping Plan to reflect the 2030 target set by Executive Order B-30-15 and codified by SB 32. The 2017 Scoping Plan Update was published in November 2017 as directed by SB 32 companion legislation AB 197. The mid-term 2030 target is considered critical by CARB on the path to obtaining an even deeper GHG emissions target of 80 percent below 1990 levels by 2050, as directed in Executive Order S-3-05. The Scoping Plan outlines the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure, providing a blueprint to continue driving down GHG emissions and obtain the statewide goals.

The proposed project would be constructed in conformance with CALGreen and the Title 24 Building Code, which requires high-efficiency water fixtures and water-efficient irrigation systems. However, as discussed above project GHG emissions would exceed the 2050 goal of 2 MT of CO_2e per capita per year and the interpolated 2040 substantial progress goal of 4 MT CO_2e per capita based on the 2017 CARB Scoping Plan Update.

Cumulative Impacts

General Plan emissions of criteria air pollutants or their precursors would not make a considerable contribution to cumulative air quality impacts. Air pollution, by nature, is mostly a cumulative impact. The significance thresholds applicable to construction and operational aspects of a project represent the levels at which a project's individual emissions of criteria pollutants and precursors would result in a cumulatively considerable contribution to the region's air quality conditions as determined by the SJVAPCD. Proposed projects as part of the General Plan buildout would subject to the project-level review using the screening criteria and significance thresholds published by SJVAPCD, and would be required to mitigate any significant impacts through compliance with Indirect Source Review Rule (ISR or Rule 9510) to reduce ozone precursor (i.e., ROG and NO_x) and PM_{10} emissions from new land use development projects.

Per CEQA Guidelines Section 15064(h)(3), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program. The proposed General Plan land use diagram and circulation element are consistent with StanCOG's 2014 Sustainable Communities Strategy, which reflects Modesto's General Plan. The number of daily vehicle miles traveled is lower with the proposed General Plan than it is with the existing General Plan (No Project), which is the scenario reflected in the 2014 Sustainable Communities Strategy. The Sustainable Communities Strategy was approved by CARB, who is responsible for determining consistency with California plans and regulations to reduce air pollutants and GHG emissions. In addition, as discussed above, the General Plan is generally consistent with the recommended goals and policies contained in the SJVAPCD *Air Quality Guidelines for General Plans*.

Pursuant to CEQA Guidelines Section 15064(h)(3), a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project would comply with the requirements in a previously approved plan or mitigation program (including plans or regulations for the reduction of GHGs) that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located. SJVAPCD considers GHG impacts to be exclusively cumulative impacts. This approach recognizes that GHG emissions worldwide are cumulatively significant. Therefore, this GHG analysis considers cumulative impacts as part of the analysis. Accordingly, no additional cumulative impacts have been identified, and no mitigation measures would be required.

Attachment 1: Health Risk Assessment Methodology

Cancer Risk Calculation Methodology

A health risk assessment for exposure to TACs requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risk at each sensitive receptor location. The State of California Office of Environmental Health Hazard Assessment (OEHHA) and CARB develop recommended methods for conducting health risk assessments. The most recent OEHHA risk assessment guidelines were published in February of 2015.[19] These guidelines incorporate substantial changes designed to provide for enhanced protection of children, as required by state law, compared to previous published risk assessment guidelines. The SJVAPCD has recently revised Risk Management Policy to incorporate OEHHA's new guidelines.[20]

This health risk assessment used the recent 2015 OEHHA risk assessment guidelines and SJVAPCD recommended procedures for applying the OEHHA guidelines.[21]

Cancer Risks

Potential increased cancer risk from inhalation of TACs are calculated based on the average annual TAC concentration, inhalation dose, the TAC cancer potency factor, and an age sensitivity factor to reflect the greater sensitivity of infants and children to cancer causing TACs. The inhalation dose depends on a person's breathing rate, exposure time and frequency of exposure, and the exposure duration over a 70-year lifetime period. These parameters vary depending on the age, or age range, of the persons being exposed and whether the exposure is considered to occur at a residential location, at a workplace, or at a school.

The current OEHHA guidance used by SJVAPCD recommends that cancer risk be calculated by age groups to account for different breathing rates and sensitivity to TACs. Specifically, for a 70-year residential exposure period they recommend evaluating risks for the third trimester of pregnancy to age zero, ages zero to less than two (infant exposure), ages two to less than 16 (child exposure), and ages 16 to 70 (adult exposure). Age sensitivity factors (ASFs) associated with the different types of exposure are an ASF of 10 for the third trimester and infant exposures, an ASF of 3 for a child exposure, and an ASF of 1 for an adult exposure. Also associated with each exposure type are different breathing rates, expressed as liters per kilogram of body weight per day (L/kg-day). As recommended by the SJVAPCD, 95th percentile breathing rates are used for all age groups.

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[19] OEHHA 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February 2015.

[20] SJVAPCD. 2015. *APR – 1906 Framework for Performing Health Risk Assessments*. June30, 2015.

[21] SJVAPCD. 2015. *Final Draft Staff Report, Update to District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document*. May 28, 2015

Functionally, cancer risk is calculated using the following parameters and formulas:

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 10^6

Where:

CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

ASF = Age sensitivity factor for specified age group

ED = Exposure duration (years)

AT = Averaging time for lifetime cancer risk (years)

FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where:

C_{air} = concentration in air ($\mu g/m^3$)

DBR = daily breathing rate (L/kg body weight-day)

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

10^{-6} = Conversion factor

The health risk parameters used in this evaluation are summarized in the table below.

Health Risk Parameters used for Cancer Risk Calculations

Parameter	***Exposure Type →*** / ***Age Range →***	**Infant**		**Child**	**Adult**
		3rd Trimester	**0<2**	**2 < 16**	**16 - 70**
DPM Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$		1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day)*		361	1,090	745	290
Inhalation Absorption Factor		1	1	1	1
Averaging Time ((years)		70	70	70	70
Exposure Duration (years)		0.25	2	14	54
Exposure Frequency (days/year)		350	350	350	350
Age Sensitivity Factor		10	10	3	1
Fraction of Time at Home		1.0	1.0	1.0	1.0

* 95th percentile breathing rates for all age groups

Non-Cancer Hazards

Potential non-cancer health hazards from TAC exposure are expressed in terms of a hazard index, which is the ratio of the TAC concentration to a reference exposure level (REL). Non-cancer health effects can be acute due to short term TAC exposure (one hour) or chronic due to longer term TAC exposure (annual average). OEHHA has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The total HI is calculated as the sum of the HIs for each TAC evaluated and the total HI is compared to the SJVAPCD significance thresholds to determine whether a significant non-cancer health impact from a project would occur.

Typically, for projects involving construction or for residential projects locating near roadways with substantial TAC emissions, the primary TAC of concern with non-cancer health effects is DPM. For DPM, the chronic inhalation REL is 5 $\mu g/m^3$.

Attachment 2: BNSF and UPRR Rail Line Emissions, Modeling, and Health Risk Calculation Information

Modesto General Plan - BNSF Rail Line Locomotive DPM Emissions
DPM Modeling - Rail Line Information and DPMEmission Rates
BNSF Freight Trains and Amtrak Passenger Trains (San Joaquin Line) - Diesel-Powered Locomotives

Year	Description	No. Lines	Link Width (ft)	Link Width (m)	Link Length (ft)	Link Length (miles)	Link Length (m)	Release Height (m)	Average No. Trains per Day	Train Travel Speed (mph)	DPM Emission Rates: Average Daily Emission Rate (g/mi/day)	DPM Emission Rates: Average Daily Emission Rate (g/day)	DPM Emission Rates: Link Emission Rate (g/s)	DPM Emission Rates: Link Emission Rate (lb/hr)
2020	Passenger								14	40	36.8	21.1	2.44E-04	1.93E-03
	Freight Trains								32	40	369.2	211.4	2.45E-03	1.94E-02
	Total	**1**	**15**	**4.6**	**3,024**	**0.57**	**922**	**5.0**	**46**	**-**	**405.9**	**232.5**	**2.69E-03**	**2.14E-02**
2020-2024	Passenger								14	40	19.6	11.2	1.30E-04	1.03E-03
	Freight Trains								32	40	221.5	126.8	1.47E-03	1.17E-02
	Total	**1**	**15**	**4.6**	**3,024**	**0.57**	**922**	**5.0**	**46**	**-**	**241.1**	**138.1**	**1.60E-03**	**1.27E-02**
2030+	Passenger								14	40	6.0	3.5	4.00E-05	3.18E-04
	Freight Trains								32	40	73.3	42.0	4.86E-04	3.86E-03
	Total	**1**	**15**	**4.6**	**3,024**	**0.57**	**922**	**5.0**	**46**	**-**	**79.4**	**45.5**	**5.26E-04**	**4.18E-03**

Notes: Emission based on Emission Factors for Locomotives, USEPA 2009 (EPA-420-F-09-025)
Average emissions calculated for year 2020, 2020-2024, and 2030+. Emissions for 2030+ assumed to be representative of period from 2030-2089
Fuel correction factors from Offroad Modeling Change Technical memo, Changes to the Locomotive Inventory, CARB July 2006.
Passenger trains assumed to operate for 24 hours per day
Freight trains assumed to operate for 24 hours per day

Amtrak San Joaquin - Passenger Trains	
Arrive/Depart Station	*Diesel*
Passenger trains - weekday =	14
Passenger trains - weekend =	14
Passenger trains - Sat only =	0
Total Trains =	28
Annual average daily trains =	14
Locomotive horsepower =	3200
Locomotives per train =	1
Locomotive engine load =	0.5

Freight trains per day =		
Freight trains per day =	32	7 days/week
Locomotive horsepower =	3600	(note: average hp for BNSF locomotive in CA in 2009 was 3,440 hp)
Locomotives per train =	3	
Total horsepower =	10800	
Locomotive engine load =	0.5	

Locomotive Emission Factors (g/hp-hr)

Train Type	2020	2015	2030+
Passenger	0.101	0.054	0.017
Freight	0.111	0.066	0.022

PM2.5 to PM ratio = 0.92

	CARB Fuel Adj Factor 2010	2011+
Passenger	0.717	0.709
Freight	0.851	0.840

Modesto General Plan - UPRR Rail Line Locomotive DPM Emissions
DPM Modeling - Rail Line Information and DPMEmission Rates
UPRR Freight Trains - Diesel-Powered Locomotives

											DPM Emission Rates			
Year	Description	No. Lines	Link Width (ft)	Link Width (m)	Link Length (ft)	Link Length (miles)	Link Length (m)	Release Height (m)	Average No. Trains per Day	Train Travel Speed (mph)	Average Daily Emission Rate (g/mi/day)	Average Daily Emission Rate (g/day)	Link Emission Rate (g/s)	Link Emission Rate (lb/hr)
2020	Passenger									0	0.0	0.0	0.00E+00	0.00E+00
	Freight Trains								20	40	147.4	96.9	1.12E-03	8.91E-03
	Total	**1**	**15**	**4.6**	**3,472**	**0.66**	**1,058**	**5.0**	**20**	**-**	**147.4**	**96.9**	**1.12E-03**	**8.91E-03**
2020-2024	Passenger									0	0.0	0.0	0.00E+00	0.00E+00
	Freight Trains								20	40	88.4	53.0	6.14E-04	4.87E-03
	Total	**1**	**15**	**4.6**	**3,165**	**0.60**	**965**	**5.0**	**20**	**-**	**88.4**	**53.0**	**6.14E-04**	**4.87E-03**
2030+	Passenger									0	0.0	0.0	0.00E+00	0.00E+00
	Freight Trains								20	40	29.3	17.6	2.03E-04	1.61E-03
	Total	**1**	**15**	**4.6**	**3,165**	**0.60**	**965**	**5.0**	**20**	**-**	**29.3**	**17.6**	**2.03E-04**	**1.61E-03**

Notes: Emission based on Emission Factors for Locomotives, USEPA 2009 (EPA-420-F-09-025)
Average emissions calculated for year 2020, 2020-2024, and 2030+. Emissions for 2030+ assumed to be representative of period from 2030-2089
Fuel correction factors from Offroad Modeling Change Technical memo, Changes to the Locomotive Inventory, CARB July 2006.
Passenger trains assumed to operate for 24 hours per day
Freight trains assumed to operate for 24 hours per day

ACE Passenger Trains	
Arrive/Depart Station	*Diesel*
Passenger trains - weekday =	0
Passenger trains - weekend =	0
Passenger trains - Sat only =	0
Total Trains =	0
Annual average daily trains =	0
Locomotive horsepower =	3200
Locomotives per train =	1
Locomotive engine load =	1

Freight trains per day =		
Freight trains per day =	20	7 days/week
Locomotive horsepower =	2300	(note: average hp for UPRR locomotive in CA in 2009 was 2,200 hp)
Locomotives per train =	3	
Total horsepower =	6900	
Locomotive engine load =	0.5	

Locomotive Emission Factors (g/hp-hr)

Train Type	2020	2025	2030+
Passenger	0.101	0.054	0.017
Freight	0.111	0.066	0.022

PM2.5 to PM ratio = 0.92

	CARB Fuel Adj Factor	
	2010	2011+
Passenger	0.717	0.709
Freight	0.851	0.840

Modesto - Cancer Risk Modeling Summary
BNSF Rail Line Risks
Exposure Starting in 2020

Receptors East of BNSF Rail Line

Distance from Rail Line Centerline	50 ft	100 ft	200 ft	300 ft	400 ft	500 ft
Lifetime Cancer Risk (chances in one million)	125.0	100.0	65.2	46.6	36.0	28.8
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	23.8	20.1	17.2	14.9	13.1	

Receptors West of BNSF Rail Line

Distance from Rail Line Centerline	50 ft	100 ft	200 ft	300 ft	400 ft	500 ft
Lifetime Cancer Risk (chances in one million)	110.8	91.0	62.7	46.3	36.5	29.7
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	24.8	21.1	18.4	16.1	14.3	

Modesto General Plan - BNSF Railroad DPM Modeling Information
AERMOD Risk Modeling Parameters and Maximum Concentrations
On-Site Residential Receptors (1.5 meter receptor heights)
70-Year Residential Exposure (Exposure Starting in 2020)

Receptor Information

Number of Receptors	172
Receptor Height =	1.5 meters
Receptor distances =	50 ft then every 100 ft out to 1000 ft from the rail line

Meteorological Conditions

SJVAPCD Modesto Airport Met Data	2010-2014
Land Use Classification	Rural
Wind speed =	variable
Wind direction =	variable

MEI Maximum Concentrations

Emission Period	DPM Concentration ($\mu g/m^3$)
2020-2024	0.19871
2025-2029	0.11820
2030-2089	0.03886

Modesto General Plan - BNSF Railroad Maximum Cancer Risk
Residential Receptors (1.5 meter receptor heights)
70-Year Residential Exposure (Exposure Starting in 2020)

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air $(\mu g/m^3)$
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Cancer Potency Factors (mg/kg-day)$^{-1}$

TAC	CPF
DPM	1.10E+00

	Infant/Child			Adult
Age -->	**3rd Trimester**	**0 - <2**	**2 - <16**	**16 - 70**
Parameter				
ASF	10	10	3	1
DBR* =	361	1090	745	290
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	54
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	1.00

* 95th percentile breathing rates

Rail Traffic Cancer Risk by Year - Maximum Impact Receptor Location

				Maximum - Exposure Information		
Exposure Year	**Year**	**Exposure Duration (years)**	**Age**	**Age Sensitivity Factor**	**Annual DPM Conc. (ug/m3)**	**DPM Cancer Risk (per million)**
0	2020	0.25	-0.25 - 0*	10	0.1987	2.70
1	2020	1	1	10	0.1987	32.64
2	2021	1	2	10	0.1987	32.64
3	2022	1	3	3	0.1987	6.69
4	2023	1	4	3	0.1987	6.69
5	2024	1	5	3	0.1987	6.69
6	2025	1	6	3	0.1182	3.98
7	2026	1	7	3	0.1182	3.98
8	2027	1	8	3	0.1182	3.98
9	2028	1	9	3	0.1182	3.98
10	2029	1	10	3	0.1182	3.98
11	2030	1	11	3	0.0389	1.31
12	2031	1	12	3	0.0389	1.31
13	2032	1	13	3	0.0389	1.31
14	2033	1	14	3	0.0389	1.31
15	2034	1	15	3	0.0389	1.31
16	2035	1	16	3	0.0389	1.31
17	2036	1	17	1	0.0389	0.17
18	2037	1	18	1	0.0389	0.17
19	2038	1	19	1	0.0389	0.17
20	2039	1	20	1	0.0389	0.17
.•	.•	.•	.•	.•	.•	.•
.•	.•	.•	.•	.•	.•	.•
.•	.•	.•	.•	.•	.•	.•
65	2084	1	65	1	0.0389	0.17
66	2085	1	66	1	0.0389	0.17
67	2086	1	67	1	0.0389	0.17
68	2087	1	68	1	0.0389	0.17
69	2088	1	69	1	0.0389	0.17
70	2089	1	70	1	0.0389	0.17
Total Increased Cancer Risk						**125.0**

* Third trimester of pregnancy

** Maximum occurs 50 feet east from centerline of rail line

Modesto - Cancer Risk Modeling Summary

UPRR Rail Line Risks

Exposure Starting in 2020

Receptors East of UPRR Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	47.8	32.5	19.0	12.7	9.3	7.1
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	5.7	4.6	3.9	3.3	2.8	

Receptors West of UPRR Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	59.4	43.6	26.7	18.4	13.7	10.5
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	8.3	6.8	5.6	4.7	4.0	

Modesto General Plan - UPRR Railroad DPM Modeling Information

AERMOD Risk Modeling Parameters and Maximum Concentrations

On-Site Residential Receptors (1.5 meter receptor heights)

70-Year Residential Exposure (Exposure Starting in 2020)

Receptor Information

Number of Receptors	352
Receptor Height =	1.5 meters
Receptor distances =	50 ft then every 100 ft out to 1000 ft from the rail line

Meteorological Conditions

SJVAPCD Modesto Airport Met Data	2010-2014
Land Use Classification	Rural
Wind speed =	variable
Wind direction =	variable

MEI Maximum Concentrations

Emission Period	DPM Concentration ($\mu g/m^3$)
2020-2024	0.11120
2025-2029	0.06097
2030-2089	0.02016

Modesto General Plan - UPRR Railroad Maximum Cancer Risk
Residential Receptors (1.5 meter receptor heights)
70-Year Residential Exposure (Exposure Starting in 2020)

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air $(\mu g/m^3)$
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00

	Infant/Child			Adult
Age -->	3rd Trimester	0 - <2	2 - <16	16 - 70
Parameter				
ASF	10	10	3	1
DBR* =	361	1090	745	290
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	54
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	1.00

* 95th percentile breathing rates

Rail Traffic Cancer Risk by Year - Maximum Impact Receptor Location**

				Maximum - Exposure Information		
Exposure Year	Year	Exposure Duration (years)	Age	Age Sensitivity Factor	Annual DPM Conc. (ug/m3)	DPM Cancer Risk (per million)
0	2020	0.25	-0.25 - 0*	10	0.1112	1.51
1	2020	1	1	10	0.1112	18.26
2	2021	1	2	10	0.1112	18.26
3	2022	1	3	3	0.1112	3.75
4	2023	1	4	3	0.1112	3.75
5	2024	1	5	3	0.1112	3.75
6	2025	1	6	3	0.0610	2.05
7	2026	1	7	3	0.0610	2.05
8	2027	1	8	3	0.0610	2.05
9	2028	1	9	3	0.0610	2.05
10	2029	1	10	3	0.0610	2.05
11	2030	1	11	3	0.0202	0.68
12	2031	1	12	3	0.0202	0.68
13	2032	1	13	3	0.0202	0.68
14	2033	1	14	3	0.0202	0.68
15	2034	1	15	3	0.0202	0.68
16	2035	1	16	3	0.0202	0.68
17	2036	1	17	1	0.0202	0.09
18	2037	1	18	1	0.0202	0.09
19	2038	1	19	1	0.0202	0.09
20	2039	1	20	1	0.0202	0.09
.•	.•	.•	.•	.•	.•	.•
.•	.•	.•	.•	.•	.•	.•
.•	.•	.•	.•	.•	.•	.•
65	2084	1	65	1	0.0202	0.09
66	2085	1	66	1	0.0202	0.09
67	2086	1	67	1	0.0202	0.09
68	2087	1	68	1	0.0202	0.09
69	2088	1	69	1	0.0202	0.09
70	2089	1	70	1	0.0202	0.09
Total Increased Cancer Risk						**68.4**

* Third trimester of pregnancy
** Maximum occurs 50 feet west from centerline of rail line

Modesto - Cancer Risk Modeling Summary

BNSF Rail Line Risks

Exposure Starting in 2025

Receptors East of BNSF Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	75.9	60.8	39.6	28.3	21.9	17.5
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	14.5	12.2	10.5	9.1	7.9	

Receptors West of BNSF Rail Line

Distance from Rail Line Centerline	**50 ft**	**100 ft**	**200 ft**	**300 ft**	**400 ft**	**500 ft**
Lifetime Cancer Risk (chances in one million)	67.3	55.3	38.1	28.1	22.2	18.0
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	15.0	12.8	11.2	9.8	8.7	

Modesto General Plan - BNSF Railroad DPM Modeling Information
AERMOD Risk Modeling Parameters and Maximum Concentrations
On-Site Residential Receptors (1.5 meter receptor heights)
70-Year Residential Exposure (Exposure Starting in 2025)

Receptor Information

Number of Receptors	352
Receptor Height =	1.5 meters
Receptor distances =	50 ft then every 100 ft out to 1000 ft from the rail line

Meteorological Conditions

SJVAPCD Modesto Airport Met Data	2010-2014
Land Use Classification	Rural
Wind speed =	variable
Wind direction =	variable

MEI Maximum Concentrations

Emission Period	DPM Concentration ($\mu g/m^3$)
2025-2029	0.11820
2030-2094	0.03886

Modesto General Plan - BNSF Railroad Maximum Cancer Risk
Residential Receptors (1.5 meter receptor heights)
70-Year Residential Exposure (Exposure Starting in 2025)

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00

	Infant/Child			Adult
Age -->	3rd Trimester	0 - <2	2 - <16	16 - 70
Parameter				
ASF	10	10	3	1
DBR* =	361	1090	745	290
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	54
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	1.00

* 95th percentile breathing rates

Rail Traffic Cancer Risk by Year - Maximum Impact Receptor Location

				Maximum - Exposure Information		
Exposure Year	Year	Exposure Duration (years)	Age	Age Sensitivity Factor	Annual DPM Conc. (ug/m3)	DPM Cancer Risk (per million)
0	2025	0.25	-0.25 - 0*	10	0.1182	1.61
1	2025	1	1	10	0.1182	19.41
2	2026	1	2	10	0.1182	19.41
3	2027	1	3	3	0.1182	3.98
4	2028	1	4	3	0.1182	3.98
5	2029	1	5	3	0.1182	3.98
6	2030	1	6	3	0.0389	1.31
7	2031	1	7	3	0.0389	1.31
8	2032	1	8	3	0.0389	1.31
9	2033	1	9	3	0.0389	1.31
10	2034	1	10	3	0.0389	1.31
11	2035	1	11	3	0.0389	1.31
12	2036	1	12	3	0.0389	1.31
13	2037	1	13	3	0.0389	1.31
14	2038	1	14	3	0.0389	1.31
15	2039	1	15	3	0.0389	1.31
16	2040	1	16	3	0.0389	1.31
17	2041	1	17	1	0.0389	0.17
18	2042	1	18	1	0.0389	0.17
19	2043	1	19	1	0.0389	0.17
20	2044	1	20	1	0.0389	0.17
.•	.•	.•	.•	.•	.•	.•
.•	.•	.•	.•	.•	.•	.•
.•	.•	.•	.•	.•	.•	.•
65	2089	1	65	1	0.0389	0.17
66	2090	1	66	1	0.0389	0.17
67	2091	1	67	1	0.0389	0.17
68	2092	1	68	1	0.0389	0.17
69	2093	1	69	1	0.0389	0.17
70	2094	1	70	1	0.0389	0.17
Total Increased Cancer Risk						**75.9**

* Third trimester of pregnancy

** Maximum occurs 50 feet east from centerline of rail line

Modesto - Cancer Risk Modeling Summary
UPRR Rail Line Risks
Exposure Starting in 2025

Receptors East of UPRR Rail Line

Distance from Rail Line Centerline	50 ft	100 ft	200 ft	300 ft	400 ft	500 ft
Lifetime Cancer Risk (chances in one million)	27.4	18.3	10.9	7.3	5.3	4.1
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	3.3	2.7	2.2	1.9	1.6	

Receptors West of UPRR Rail Line

Distance from Rail Line Centerline	50 ft	100 ft	200 ft	300 ft	400 ft	500 ft
Lifetime Cancer Risk (chances in one million)	34.1	25.0	15.3	10.5	7.8	6.0
Distance from Rail Line Centerline	**600 ft**	**700 ft**	**800 ft**	**900 ft**	**1,000 ft**	
Lifetime Cancer Risk (chances in one million)	4.8	3.9	3.2	2.7	2.3	

Modesto General Plan - UPRR Railroad DPM Modeling Information
AERMOD Risk Modeling Parameters and Maximum Concentrations
On-Site Residential Receptors (1.5 meter receptor heights)
70-Year Residential Exposure (Exposure Starting in 2025)

Receptor Information

Number of Receptors	352
Receptor Height =	1.5 meters
Receptor distances =	50 ft then every 100 ft out to 1000 ft from the rail line

Meteorological Conditions

SJVAPCD Modesto Airport Hourly Data	2010-2014
Land Use Classification	Urban
Wind speed =	variable
Wind direction =	variable

MEI Maximum Concentrations

Emission Period	DPM Concentration ($\mu g/m^3$)
2025-2029	0.05296
2030-2094	0.01751

Modesto General Plan - UPRR Railroad Maximum Cancer Risk
Residential Receptors (1.5 meter receptor heights)
70-Year Residential Exposure (Exposure Starting in 2025)

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air $(\mu g/m^3)$
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00

	Infant/Child			Adult
Age --> Parameter	3rd Trimester	0 - <2	2 - <16	16 - 70
ASF	10	10	3	1
DBR* =	361	1090	745	290
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	54
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	1.00

* 95th percentile breathing rates

Rail Traffic Cancer Risk by Year - Maximum Impact Receptor Location**

				Maximum - Exposure Information		
Exposure Year	**Year**	**Exposure Duration (years)**	**Age**	**Age Sensitivity Factor**	**Annual DPM Conc. (ug/m3)**	**DPM Cancer Risk (per million)**
0	2020	0.25	-0.25 - 0*	10	0.0530	0.72
1	2020	1	1	10	0.0530	8.70
2	2021	1	2	10	0.0530	8.70
3	2022	1	3	3	0.0530	1.78
4	2023	1	4	3	0.0530	1.78
5	2024	1	5	3	0.0530	1.78
6	2025	1	6	3	0.0175	0.59
7	2026	1	7	3	0.0175	0.59
8	2027	1	8	3	0.0175	0.59
9	2028	1	9	3	0.0175	0.59
10	2029	1	10	3	0.0175	0.59
11	2030	1	11	3	0.0175	0.59
12	2031	1	12	3	0.0175	0.59
13	2032	1	13	3	0.0175	0.59
14	2033	1	14	3	0.0175	0.59
15	2034	1	15	3	0.0175	0.59
16	2035	1	16	3	0.0175	0.59
17	2036	1	17	1	0.0175	0.08
18	2037	1	18	1	0.0175	0.08
19	2038	1	19	1	0.0175	0.08
20	2039	1	20	1	0.0175	0.08
.•	.•	.•	.•	.•	.•	.•
.•	.•	.•	.•	.•	.•	.•
.•	.•	.•	.•	.•	.•	.•
65	2084	1	65	1	0.0175	0.08
66	2085	1	66	1	0.0175	0.08
67	2086	1	67	1	0.0175	0.08
68	2087	1	68	1	0.0175	0.08
69	2088	1	69	1	0.0175	0.08
70	2089	1	70	1	0.0175	0.08
Total Increased Cancer Risk						**34.1**

* Third trimester of pregnancy

** Maximum occurs 50 feet west from centerline of rail line

Attachment 3: CalEEMod Input and Output Worksheets and EMFAC Worksheets

Modesto GP Update - Existing

Stanislaus County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	13,985.45	1000sqft	0.00	13,985,455.00	0
Government (Civic Center)	1,860.00	1000sqft	0.00	1,860,000.00	0
High School	4,287.50	1000sqft	0.00	4,287,500.00	0
General Heavy Industry	4,667.50	1000sqft	0.00	4,667,500.00	0
Health Club	2,745.45	1000sqft	0.00	2,745,455.00	0
Hotel	1,753.00	Room	0.00	2,545,356.00	0
Apartments Low Rise	23,180.00	Dwelling Unit	0.00	23,180,000.00	66295
Single Family Housing	62,490.00	Dwelling Unit	9,999.00	112,482,000.00	178721
Strip Mall	14,211.50	1000sqft	0.00	14,211,500.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	46
Climate Zone	3			**Operational Year**	2040
Utility Company	Modesto Irrigation District				
CO2 Intensity (lb/MWhr)	833.46	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - from traffic report land use table. Acreage set to 9,999 (which is the CalEEMod maximum)

Construction Phase - Phases set to zero - Contruction emission computations not appropriate at the plan level

Off-road Equipment -

Vehicle Trips - traffic report

Grading -

Energy Use - historical data for Existing

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10,000.00	0.00
tblConstructionPhase	NumDays	11,000.00	0.00
tblConstructionPhase	NumDays	6,000.00	0.00
tblConstructionPhase	NumDays	15,500.00	0.00
tblConstructionPhase	NumDays	155,000.00	0.00
tblConstructionPhase	NumDays	11,000.00	0.00
tblConstructionPhase	PhaseEndDate	5/24/2056	1/24/2018
tblConstructionPhase	PhaseEndDate	4/5/2817	2/5/2775
tblConstructionPhase	PhaseEndDate	5/24/2079	5/24/2056
tblConstructionPhase	PhaseEndDate	10/22/2138	5/24/2079
tblConstructionPhase	PhaseEndDate	12/7/2732	10/22/2138
tblConstructionPhase	PhaseEndDate	2/5/2775	12/7/2732
tblEnergyUse	LightingElect	3.35	2.70
tblEnergyUse	LightingElect	3.58	2.92
tblEnergyUse	LightingElect	3.58	2.92
tblEnergyUse	LightingElect	3.35	2.70
tblEnergyUse	LightingElect	3.69	2.99
tblEnergyUse	LightingElect	1.93	1.51
tblEnergyUse	LightingElect	4.53	3.71
tblEnergyUse	NT24E	2,630.88	3,172.76
tblEnergyUse	NT24E	5,093.98	6,155.97
tblEnergyUse	NT24NG	2,498.00	3,723.00
tblEnergyUse	NT24NG	6,005.20	3,723.00

tblEnergyUse	Refrigerator	712.50	643.00
tblEnergyUse	Refrigerator	1,251.38	827.00
tblEnergyUse	T24E	499.01	694.40
tblEnergyUse	T24E	2.52	1.96
tblEnergyUse	T24E	3.45	2.62
tblEnergyUse	T24E	3.45	2.62
tblEnergyUse	T24E	2.52	1.96
tblEnergyUse	T24E	2.81	2.14
tblEnergyUse	T24E	5.38	4.13
tblEnergyUse	T24E	1,243.06	995.93
tblEnergyUse	T24E	2.77	2.14
tblEnergyUse	T24NG	13,167.83	10,413.46
tblEnergyUse	T24NG	19.93	17.03
tblEnergyUse	T24NG	15.38	12.77
tblEnergyUse	T24NG	15.38	12.77
tblEnergyUse	T24NG	19.93	17.03
tblEnergyUse	T24NG	27.22	23.19
tblEnergyUse	T24NG	19.81	17.99
tblEnergyUse	T24NG	28,148.14	22,422.24
tblEnergyUse	T24NG	10.42	8.62
tblLandUse	LandUseSquareFeet	13,985,500.00	13,985,455.00
tblLandUse	LandUseSquareFeet	2,745,450.00	2,745,455.00
tblLandUse	LotAcreage	321.06	0.00
tblLandUse	LotAcreage	42.70	0.00
tblLandUse	LotAcreage	98.43	0.00
tblLandUse	LotAcreage	107.15	0.00
tblLandUse	LotAcreage	63.03	0.00
tblLandUse	LotAcreage	58.43	0.00
tblLandUse	LotAcreage	1,448.75	0.00
tblLandUse	LotAcreage	20,288.96	9,999.00

tblLandUse	LotAcreage	326.25	0.00
tblVehicleTrips	ST_TR	7.16	5.73
tblVehicleTrips	ST_TR	1.50	4.85
tblVehicleTrips	ST_TR	2.46	2.98
tblVehicleTrips	ST_TR	20.87	27.13
tblVehicleTrips	ST_TR	4.37	4.54
tblVehicleTrips	ST_TR	9.91	9.02
tblVehicleTrips	ST_TR	42.04	40.36
tblVehicleTrips	SU_TR	6.07	4.86
tblVehicleTrips	SU_TR	1.50	4.85
tblVehicleTrips	SU_TR	1.05	1.27
tblVehicleTrips	SU_TR	26.73	34.75
tblVehicleTrips	SU_TR	1.79	1.86
tblVehicleTrips	SU_TR	8.62	7.84
tblVehicleTrips	SU_TR	20.43	19.61
tblVehicleTrips	WD_TR	6.59	5.26
tblVehicleTrips	WD_TR	1.50	4.85
tblVehicleTrips	WD_TR	11.03	13.36
tblVehicleTrips	WD_TR	27.92	13.36
tblVehicleTrips	WD_TR	32.93	42.70
tblVehicleTrips	WD_TR	12.89	13.36
tblVehicleTrips	WD_TR	9.52	8.71
tblVehicleTrips	WD_TR	44.32	42.70
tblWoodstoves	NumberCatalytic	9,999.00	20,289.00
tblWoodstoves	NumberNoncatalytic	9,999.00	20,289.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2,727.0168	116.8501	5,979.5505	14.9870		834.7197	834.7197		834.7197	834.7197	101,281.2490	38,152.7288	139,433.9778	385.1423	2.3797	149,771.6793
Energy	14.2716	123.9725	66.6761	0.7785		9.8604	9.8604		9.8604	9.8604	0.0000	531,353.6479	531,353.6479	16.2810	5.3978	533,369.2131
Mobile	205.6685	3,050.5936	2,077.3600	16.6709	1,350.6601	6.1009	1,356.7610	362.5134	5.7145	368.2279	0.0000	1,554,846.6220	1,554,846.6220	91.1845	0.0000	1,557,126.2354
Waste						0.0000	0.0000		0.0000	0.0000	28,723.8789	0.0000	28,723.8789	1,697.5326	0.0000	71,162.1943
Water						0.0000	0.0000		0.0000	0.0000	3,463.8399	30,782.6366	34,246.4765	356.8406	8.6221	45,736.8762
Total	**2,946.9569**	**3,291.4162**	**8,123.5866**	**32.4363**	**1,350.6601**	**850.6809**	**2,201.3410**	**362.5134**	**850.2946**	**1,212.8080**	**133,468.9678**	**2,155,135.6353**	**2,288,604.6032**	**2,546.9811**	**16.3996**	**2,357,166.1983**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2,727.0168	116.8501	5,979.5505	14.9870		834.7197	834.7197		834.7197	834.7197	101,281.2490	38,152.7288	139,433.9778	385.1423	2.3797	149,771.6793
Energy	14.2716	123.9725	66.6761	0.7785		9.8604	9.8604		9.8604	9.8604	0.0000	531,353.6479	531,353.6479	16.2810	5.3978	533,369.2131
Mobile	205.6685	3,050.5936	2,077.3600	16.6709	1,350.6601	6.1009	1,356.7610	362.5134	5.7145	368.2279	0.0000	1,554,846.6220	1,554,846.6220	91.1845	0.0000	1,557,126.2354
Waste						0.0000	0.0000		0.0000	0.0000	28,723.8789	0.0000	28,723.8789	1,697.5326	0.0000	71,162.1943
Water						0.0000	0.0000		0.0000	0.0000	3,463.8399	30,782.6366	34,246.4765	356.8406	8.6221	45,736.8762
Total	**2,946.9569**	**3,291.4162**	**8,123.5866**	**32.4363**	**1,350.6601**	**850.6809**	**2,201.3410**	**362.5134**	**850.2946**	**1,212.8080**	**133,468.9678**	**2,155,135.6353**	**2,288,604.6032**	**2,546.9811**	**16.3996**	**2,357,166.1983**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	205.6685	3,050.5936	2,077.3600	16.6709	1,350.6601	6.1009	1,356.7610	362.5134	5.7145	368.2279	0.0000	1,554,846.6220	1,554,846.6220	91.1845	0.0000	1,557,126.2354
Unmitigated	205.6685	3,050.5936	2,077.3600	16.6709	1,350.6601	6.1009	1,356.7610	362.5134	5.7145	368.2279	0.0000	1,554,846.6220	1,554,846.6220	91.1845	0.0000	1,557,126.2354

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	121,926.80	132,821.40	112654.80	358,042,174	358,042,174
General Heavy Industry	22,637.38	22,637.38	22637.38	66,090,068	66,090,068
General Office Building	186,845.61	41,676.64	17761.52	339,230,951	339,230,951
Government (Civic Center)	24,849.60	0.00	0.00	33,931,011	33,931,011
Health Club	117,230.72	74,484.06	95404.39	186,598,352	186,598,352
High School	57,281.00	19,465.25	7974.75	117,385,265	117,385,265
Hotel	14,322.01	14,357.07	10430.35	26,164,074	26,164,074
Single Family Housing	544,287.90	563,659.80	489921.60	1,580,634,509	1,580,634,509
Strip Mall	606,831.05	573,576.14	278687.52	855,030,503	855,030,503
Total	1,696,212.06	1,442,677.73	1,035,472.30	3,563,106,907	3,563,106,907

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	7.30	7.50	48.40	13.90	37.70	86	11	3
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Government (Civic Center)	9.50	7.30	7.30	75.00	20.00	5.00	50	34	16
Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
High School	9.50	7.30	7.30	77.80	17.20	5.00	75	19	6
Hotel	9.50	7.30	7.30	19.40	61.60	19.00	58	38	4
Single Family Housing	10.80	7.30	7.50	48.40	13.90	37.70	86	11	3
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
General Heavy Industry	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
General Office Building	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Government (Civic Center)	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Health Club	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
High School	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Hotel	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Single Family Housing	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Strip Mall	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427

5.0 Energy Detail

Historical Energy Use: Y

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	390,114.1290	390,114.1290	13.5739	2.8084	391,290.3784
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	390,114.1290	390,114.1290	13.5739	2.8084	391,290.3784
NaturalGas Mitigated	14.2716	123.9725	66.6761	0.7785		9.8604	9.8604		9.8604	9.8604	0.0000	141,239.5189	141,239.5189	2.7071	2.5894	142,078.8348
NaturalGas Unmitigated	14.2716	123.9725	66.6761	0.7785		9.8604	9.8604		9.8604	9.8604	0.0000	141,239.5189	141,239.5189	2.7071	2.5894	142,078.8348

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	3.27683e+008	1.7669	15.0991	6.4252	0.0964		1.2208	1.2208		1.2208	1.2208	0.0000	17,486.4204	17,486.4204	0.3352	0.3206	17,590.3335
General Heavy Industry	9.74107e+007	0.5253	4.7750	4.0110	0.0287		0.3629	0.3629		0.3629	0.3629	0.0000	5,198.2073	5,198.2073	0.0996	0.0953	5,229.0976
General Office Building	1.8251e+008	0.9841	8.9466	7.5151	0.0537		0.6799	0.6799		0.6799	0.6799	0.0000	9,739.4387	9,739.4387	0.1867	0.1786	9,797.3153
Government (Civic Center)	2.4273e+007	0.1309	1.1899	0.9995	7.1400e-003		0.0904	0.0904		0.0904	0.0904	0.0000	1,295.2997	1,295.2997	0.0248	0.0238	1,302.9970
Health Club	5.72976e+007	0.3090	2.8087	2.3593	0.0169		0.2135	0.2135		0.2135	0.2135	0.0000	3,057.6206	3,057.6206	0.0586	0.0561	3,075.7905
High School	1.07659e+008	0.5805	5.2774	4.4330	0.0317		0.4011	0.4011		0.4011	0.4011	0.0000	5,745.1009	5,745.1009	0.1101	0.1053	5,779.2412
Hotel	6.40157e+007	0.3452	3.1380	2.6359	0.0188		0.2385	0.2385		0.2385	0.2385	0.0000	3,416.1217	3,416.1217	0.0655	0.0626	3,436.4220
Single Family Housing	1.63382e+009	8.8098	75.2837	32.0356	0.4805		6.0868	6.0868		6.0868	6.0868	0.0000	87,186.6463	87,186.6463	1.6711	1.5984	87,704.7529
Strip Mall	1.52063e+008	0.8200	7.4541	6.2614	0.0447		0.5665	0.5665		0.5665	0.5665	0.0000	8,114.6634	8,114.6634	0.1555	0.1488	8,162.8848

Total		14.2716	123.9725	66.6761	0.7784		9.8604	9.8604		9.8604	9.8604	0.0000	141,239.5189	141,239.5189	2.7071	2.5894	142,078.8348

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	3.27683e+008	1.7669	15.0991	6.4252	0.0964		1.2208	1.2208		1.2208	1.2208	0.0000	17,486.4204	17,486.4204	0.3352	0.3206	17,590.3335
General Heavy Industry	9.74107e+007	0.5253	4.7750	4.0110	0.0287		0.3629	0.3629		0.3629	0.3629	0.0000	5,198.2073	5,198.2073	0.0996	0.0953	5,229.0976
General Office Building	1.8251e+008	0.9841	8.9466	7.5151	0.0537		0.6799	0.6799		0.6799	0.6799	0.0000	9,739.4387	9,739.4387	0.1867	0.1786	9,797.3153
Government (Civic Center)	2.4273e+007	0.1309	1.1899	0.9995	7.1400e-003		0.0904	0.0904		0.0904	0.0904	0.0000	1,295.2997	1,295.2997	0.0248	0.0238	1,302.9970
Health Club	5.72976e+007	0.3090	2.8087	2.3593	0.0169		0.2135	0.2135		0.2135	0.2135	0.0000	3,057.6206	3,057.6206	0.0586	0.0561	3,075.7905
High School	1.07659e+008	0.5805	5.2774	4.4330	0.0317		0.4011	0.4011		0.4011	0.4011	0.0000	5,745.1009	5,745.1009	0.1101	0.1053	5,779.2412
Hotel	6.40157e+007	0.3452	3.1380	2.6359	0.0188		0.2385	0.2385		0.2385	0.2385	0.0000	3,416.1217	3,416.1217	0.0655	0.0626	3,436.4220
Single Family Housing	1.63382e+009	8.8098	75.2837	32.0356	0.4805		6.0868	6.0868		6.0868	6.0868	0.0000	87,186.6463	87,186.6463	1.6711	1.5984	87,704.7529
Strip Mall	1.52063e+008	0.8200	7.4541	6.2614	0.0447		0.5665	0.5665		0.5665	0.5665	0.0000	8,114.6634	8,114.6634	0.1555	0.1488	8,162.8848
Total		**14.2716**	**123.9725**	**66.6761**	**0.7784**		**9.8604**	**9.8604**		**9.8604**	**9.8604**	**0.0000**	**141,239.5189**	**141,239.5189**	**2.7071**	**2.5894**	**142,078.8348**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			

Apartments Low Rise	1.08425e+008	40,990.1575	1.4262	0.2951	41,113.7486
General Heavy Industry	4.11674e+007	15,563.3618	0.5415	0.1120	15,610.2876
General Office Building	1.27547e+008	48,219.4154	1.6778	0.3471	48,364.8038
Government (Civic Center)	1.69632e+007	6,412.9564	0.2231	0.0462	6,432.2923
Health Club	2.42149e+007	9,154.4745	0.3185	0.0659	9,182.0765
High School	3.00983e+007	11,378.6764	0.3959	0.0819	11,412.9847
Hotel	2.02101e+007	7,640.4605	0.2659	0.0550	7,663.4976
Single Family Housing	5.47459e+008	206,967.3402	7.2014	1.4899	207,591.3761
Strip Mall	1.15824e+008	43,787.2863	1.5236	0.3152	43,919.3111
Total		**390,114.1290**	**13.5739**	**2.8084**	**391,290.3784**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	1.08425e+008	40,990.1575	1.4262	0.2951	41,113.7486
General Heavy Industry	4.11674e+007	15,563.3618	0.5415	0.1120	15,610.2876
General Office Building	1.27547e+008	48,219.4154	1.6778	0.3471	48,364.8038
Government (Civic Center)	1.69632e+007	6,412.9564	0.2231	0.0462	6,432.2923
Health Club	2.42149e+007	9,154.4745	0.3185	0.0659	9,182.0765
High School	3.00983e+007	11,378.6764	0.3959	0.0819	11,412.9847
Hotel	2.02101e+007	7,640.4605	0.2659	0.0550	7,663.4976

Single Family Housing	5.47459e+008	206,967.3402	7.2014	1.4899	207,591.3761
Strip Mall	1.15824e+008	43,787.2863	1.5236	0.3152	43,919.3111
Total		**390,114.1290**	**13.5739**	**2.8084**	**391,290.3784**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2,727.0168	116.8501	5,979.5505	14.9870		834.7197	834.7197		834.7197	834.7197	101,281.2490	38,152.7288	139,433.9778	385.1423	2.3797	149,771.6793
Unmitigated	2,727.0168	116.8501	5,979.5505	14.9870		834.7197	834.7197		834.7197	834.7197	101,281.2490	38,152.7288	139,433.9778	385.1423	2.3797	149,771.6793

6.2 Area by SubCategory

<u>Unmitigated</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	158.1322					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	702.8524					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Hearth	1,847.0539	109.5365	5,345.838 1	14.9534		831.1907	831.1907		831.1907	831.1907	101,281.2 490	37,112.87 76	138,394.12 65	384.1513	2.3797	148,707.0 522
Landscaping	18.9783	7.3137	633.7124	0.0336		3.5290	3.5290		3.5290	3.5290	0.0000	1,039.851 3	1,039.8513	0.9910	0.0000	1,064.627 1
Total	**2,727.0168**	**116.8501**	**5,979.550 5**	**14.9870**		**834.7197**	**834.7197**		**834.7197**	**834.7197**	**101,281.2 490**	**38,152.72 88**	**139,433.97 78**	**385.1423**	**2.3797**	**149,771.6 793**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	158.1322					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	702.8524					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1,847.0539	109.5365	5,345.838 1	14.9534		831.1907	831.1907		831.1907	831.1907	101,281.2 490	37,112.87 76	138,394.12 65	384.1513	2.3797	148,707.0 522
Landscaping	18.9783	7.3137	633.7124	0.0336		3.5290	3.5290		3.5290	3.5290	0.0000	1,039.851 3	1,039.8513	0.9910	0.0000	1,064.627 1
Total	**2,727.0168**	**116.8501**	**5,979.550 5**	**14.9870**		**834.7197**	**834.7197**		**834.7197**	**834.7197**	**101,281.2 490**	**38,152.72 88**	**139,433.97 78**	**385.1423**	**2.3797**	**149,771.6 793**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	34,246.476 5	356.8406	8.6221	45,736.876 2

Unmitigated	34,246.476 5	356.8406	8.6221	45,736.876 2

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	1510.27 / 952.127	4,828.4343	49.3635	1.1933	6,418.130 4
General Heavy Industry	1079.36 / 0	2,550.4057	35.2478	0.8464	3,683.814 3
General Office Building	2485.7 / 1523.49	7,889.2712	81.2435	1.9636	10,505.51 65
Government (Civic Center)	369.507 / 226.472	1,172.7668	12.0771	0.2919	1,561.680 5
Health Club	162.375 / 99.5199	515.3555	5.3071	0.1283	686.2581
High School	142.365 / 366.081	820.7832	4.6660	0.1151	971.7376
Hotel	44.4679 / 4.94088	111.6105	1.4524	0.0349	158.3249
Single Family Housing	4071.48 / 2566.8	13,016.775 8	133.0770	3.2170	17,302.37 15
Strip Mall	1052.68 / 645.192	3,341.0736	34.4063	0.8316	4,449.042 5
Total		**34,246.476 5**	**356.8407**	**8.6221**	**45,736.87 62**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
Apartments Low Rise	1510.27 / 952.127	4,828.4343	49.3635	1.1933	6,418.1304
General Heavy Industry	1079.36 / 0	2,550.4057	35.2478	0.8464	3,683.8143
General Office Building	2485.7 / 1523.49	7,889.2712	81.2435	1.9636	10,505.5165
Government (Civic Center)	369.507 / 226.472	1,172.7668	12.0771	0.2919	1,561.6805
Health Club	162.375 / 99.5199	515.3555	5.3071	0.1283	686.2581
High School	142.365 / 366.081	820.7832	4.6660	0.1151	971.7376
Hotel	44.4679 / 4.94088	111.6105	1.4524	0.0349	158.3249
Single Family Housing	4071.48 / 2566.8	13,016.7758	133.0770	3.2170	17,302.3715
Strip Mall	1052.68 / 645.192	3,341.0736	34.4063	0.8316	4,449.0425
Total		**34,246.4765**	**356.8407**	**8.6221**	**45,736.8762**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	28,723.8789	1,697.5326	0.0000	71,162.1943
Unmitigated	28,723.8789	1,697.5326	0.0000	71,162.1943

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	10662.8	2,164.4520	127.9155	0.0000	5,362.3383
General Heavy Industry	5787.7	1,174.8508	69.4317	0.0000	2,910.6431
General Office Building	13006.5	2,640.2060	156.0317	0.0000	6,540.9987
Government (Civic Center)	10602	2,152.1102	127.1861	0.0000	5,331.7619
Health Club	15649.1	3,176.6178	187.7327	0.0000	7,869.9360
High School	5573.75	1,131.4209	66.8651	0.0000	2,803.0473
Hotel	959.77	194.8246	11.5138	0.0000	482.6698
Single Family Housing	64339.6	13,060.3492	771.8445	0.0000	32,356.4624
Strip Mall	14922.1	3,029.0474	179.0116	0.0000	7,504.3367
Total		**28,723.8790**	**1,697.5326**	**0.0000**	**71,162.1943**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	10662.8	2,164.4520	127.9155	0.0000	5,362.3383

General Heavy Industry	5787.7	1,174.8508	69.4317	0.0000	2,910.6431
General Office Building	13006.5	2,640.2060	156.0317	0.0000	6,540.9987
Government (Civic Center)	10602	2,152.1102	127.1861	0.0000	5,331.7619
Health Club	15649.1	3,176.6178	187.7327	0.0000	7,869.9360
High School	5573.75	1,131.4209	66.8651	0.0000	2,803.0473
Hotel	959.77	194.8246	11.5138	0.0000	482.6698
Single Family Housing	64339.6	13,060.3492	771.8445	0.0000	32,356.4624
Strip Mall	14922.1	3,029.0474	179.0116	0.0000	7,504.3367
Total		**28,723.8790**	**1,697.5326**	**0.0000**	**71,162.1943**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Modesto Gp Update - GP Buildout Net

Stanislaus County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	34,473.00	Dwelling Unit	9,999.00	62,051,400.00	98593
Apartments Low Rise	13,120.00	Dwelling Unit	0.00	13,120,000.00	37523
Strip Mall	9,884.72	1000sqft	0.00	9,884,718.00	0
General Office Building	19,925.40	1000sqft	0.00	19,925,399.00	0
General Heavy Industry	18,212.04	1000sqft	0.00	18,212,041.00	0
Government (Civic Center)	696.04	1000sqft	0.00	696,043.00	0
High School	3,163.00	1000sqft	0.00	3,163,002.00	0
Hotel	4,287.00	Room	0.00	6,224,724.00	0
Health Club	9,155.42	1000sqft	0.00	9,155,416.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	46
Climate Zone	3			**Operational Year**	2040
Utility Company	Modesto Irrigation District				
CO2 Intensity (lb/MWhr)	833.46	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - from traffic report land use table. Acreage set to 9,999 (which is the CalEEMod maximum)

Construction Phase - Phases set to zero - Contruction emission computations not appropriate at the plan level

Grading -

Vehicle Trips - traffic report

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	11,000.00	0.00
tblConstructionPhase	NumDays	155,000.00	0.00
tblConstructionPhase	NumDays	10,000.00	0.00
tblConstructionPhase	NumDays	15,500.00	0.00
tblConstructionPhase	NumDays	11,000.00	0.00
tblConstructionPhase	NumDays	6,000.00	0.00
tblConstructionPhase	PhaseEndDate	4/12/2817	2/12/2775
tblConstructionPhase	PhaseEndDate	12/14/2732	10/29/2138
tblConstructionPhase	PhaseEndDate	5/31/2056	1/31/2018
tblConstructionPhase	PhaseEndDate	10/29/2138	5/31/2079
tblConstructionPhase	PhaseEndDate	2/12/2775	12/14/2732
tblConstructionPhase	PhaseEndDate	5/31/2079	5/31/2056
tblLandUse	LandUseSquareFeet	9,884,720.00	9,884,718.00
tblLandUse	LandUseSquareFeet	19,925,400.00	19,925,399.00
tblLandUse	LandUseSquareFeet	18,212,000.00	18,212,041.00
tblLandUse	LandUseSquareFeet	3,163,000.00	3,163,002.00
tblLandUse	LandUseSquareFeet	9,155,420.00	9,155,416.00
tblLandUse	LotAcreage	11,192.53	9,999.00
tblLandUse	LotAcreage	820.00	0.00
tblLandUse	LotAcreage	226.92	0.00
tblLandUse	LotAcreage	457.42	0.00
tblLandUse	LotAcreage	418.09	0.00
tblLandUse	LotAcreage	15.98	0.00
tblLandUse	LotAcreage	72.61	0.00
tblLandUse	LotAcreage	142.90	0.00

tblLandUse	LotAcreage	210.18	0.00
tblVehicleTrips	ST_TR	7.16	5.73
tblVehicleTrips	ST_TR	1.50	4.85
tblVehicleTrips	ST_TR	2.46	2.98
tblVehicleTrips	ST_TR	20.87	27.13
tblVehicleTrips	ST_TR	4.37	4.54
tblVehicleTrips	ST_TR	9.91	9.02
tblVehicleTrips	ST_TR	42.04	40.36
tblVehicleTrips	SU_TR	6.07	4.86
tblVehicleTrips	SU_TR	1.50	4.85
tblVehicleTrips	SU_TR	1.05	1.27
tblVehicleTrips	SU_TR	26.73	34.75
tblVehicleTrips	SU_TR	1.79	1.86
tblVehicleTrips	SU_TR	8.62	7.84
tblVehicleTrips	SU_TR	20.43	19.61
tblVehicleTrips	WD_TR	6.59	5.26
tblVehicleTrips	WD_TR	1.50	4.85
tblVehicleTrips	WD_TR	11.03	13.36
tblVehicleTrips	WD_TR	27.92	13.36
tblVehicleTrips	WD_TR	32.93	42.70
tblVehicleTrips	WD_TR	12.89	13.36
tblVehicleTrips	WD_TR	9.52	8.71
tblVehicleTrips	WD_TR	44.32	42.70
tblWoodstoves	NumberCatalytic	9,999.00	0.00
tblWoodstoves	NumberNoncatalytic	9,999.00	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1,495.5370	31.0577	1,252.6924	1.5459		125.6777	125.6777		125.6777	125.6777	10,900.3788	21,196.0525	32,096.4313	0.9476	1.3398	32,519.3788
Energy	12.2337	108.0186	69.9803	0.6673		8.4523	8.4523		8.4523	8.4523	0.0000	478,335.2018	478,335.2018	14.7514	4.7916	480,131.8685
Mobile	189.9929	2,843.6600	1,885.1040	15.0928	1,211.5239	5.5063	1,217.0302	325.1696	5.1572	330.3268	0.0000	1,407,862.9543	1,407,862.9543	85.2130	0.0000	1,409,993.2788
Waste						0.0000	0.0000		0.0000	0.0000	31,592.1920	0.0000	31,592.1920	1,867.0451	0.0000	78,268.3185
Water						0.0000	0.0000		0.0000	0.0000	3,959.1797	32,505.6550	36,464.8347	407.7767	9.8358	49,590.3192
Total	**1,697.7636**	**2,982.7362**	**3,207.7767**	**17.3060**	**1,211.5239**	**139.6363**	**1,351.1602**	**325.1696**	**139.2872**	**464.4569**	**46,451.7505**	**1,939,899.8636**	**1,986,351.6141**	**2,375.7338**	**15.9671**	**2,050,503.1638**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1,495.5370	31.0577	1,252.6924	1.5459		125.6777	125.6777		125.6777	125.6777	10,900.3788	21,196.0525	32,096.4313	0.9476	1.3398	32,519.3788
Energy	12.2337	108.0186	69.9803	0.6673		8.4523	8.4523		8.4523	8.4523	0.0000	478,335.2018	478,335.2018	14.7514	4.7916	480,131.8685
Mobile	189.9929	2,843.6600	1,885.1040	15.0928	1,211.5239	5.5063	1,217.0302	325.1696	5.1572	330.3268	0.0000	1,407,862.9543	1,407,862.9543	85.2130	0.0000	1,409,993.2788
Waste						0.0000	0.0000		0.0000	0.0000	31,592.1920	0.0000	31,592.1920	1,867.0451	0.0000	78,268.3185
Water						0.0000	0.0000		0.0000	0.0000	3,959.1797	32,505.6550	36,464.8347	407.7767	9.8358	49,590.3192
Total	**1,697.7636**	**2,982.7362**	**3,207.7767**	**17.3060**	**1,211.5239**	**139.6363**	**1,351.1602**	**325.1696**	**139.2872**	**464.4569**	**46,451.7505**	**1,939,899.8636**	**1,986,351.6141**	**2,375.7338**	**15.9671**	**2,050,503.1638**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	189.9929	2,843.6600	1,885.1040	15.0928	1,211.5239	5.5063	1,217.0302	325.1696	5.1572	330.3268	0.0000	1,407,862.9543	1,407,862.9543	85.2130	0.0000	1,409,993.2788
Unmitigated	189.9929	2,843.6600	1,885.1040	15.0928	1,211.5239	5.5063	1,217.0302	325.1696	5.1572	330.3268	0.0000	1,407,862.9543	1,407,862.9543	85.2130	0.0000	1,409,993.2788

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	69,011.20	75,177.60	63763.20	202,653,724	202,653,724
General Heavy Industry	88,328.40	88,328.40	88328.40	257,875,744	257,875,744
General Office Building	266,203.33	59,377.69	25305.26	483,310,301	483,310,301
Government (Civic Center)	9,299.13	0.00	0.00	12,697,550	12,697,550
Health Club	390,936.26	248,386.44	318150.71	622,260,662	622,260,662
High School	42,257.71	14,360.03	5883.18	86,598,210	86,598,210
Hotel	35,024.79	35,110.53	25507.65	63,984,818	63,984,818
Single Family Housing	300,259.83	310,946.46	270268.32	871,966,929	871,966,929
Strip Mall	422,077.46	398,947.22	193839.32	594,711,002	594,711,002
Total	1,623,398.11	1,230,634.36	991,046.04	3,196,058,941	3,196,058,941

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	7.30	7.50	48.40	13.90	37.70	86	11	3
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Government (Civic Center)	9.50	7.30	7.30	75.00	20.00	5.00	50	34	16
Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
High School	9.50	7.30	7.30	77.80	17.20	5.00	75	19	6
Hotel	9.50	7.30	7.30	19.40	61.60	19.00	58	38	4
Single Family Housing	10.80	7.30	7.50	48.40	13.90	37.70	86	11	3
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
General Heavy Industry	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
General Office Building	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Government (Civic Center)	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Health Club	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
High School	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Hotel	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Single Family Housing	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Strip Mall	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	357,264.1872	357,264.1872	12.4309	2.5719	358,341.3893
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	357,264.1872	357,264.1872	12.4309	2.5719	358,341.3893
NaturalGas Mitigated	12.2337	108.0186	69.9803	0.6673		8.4523	8.4523		8.4523	8.4523	0.0000	121,071.0147	121,071.0147	2.3205	2.2196	121,790.4792
NaturalGas Unmitigated	12.2337	108.0186	69.9803	0.6673		8.4523	8.4523		8.4523	8.4523	0.0000	121,071.0147	121,071.0147	2.3205	2.2196	121,790.4792

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	1.8547e+008	1.0001	8.5462	3.6367	0.0546		0.6910	0.6910		0.6910	0.6910	0.0000	9,897.4045	9,897.4045	0.1897	0.1815	9,956.2198
General Heavy Industry	3.80085e+008	2.0495	18.6316	15.6506	0.1118		1.4160	1.4160		1.4160	1.4160	0.0000	20,282.7988	20,282.7988	0.3888	0.3719	20,403.3294
General Office Building	2.60026e+008	1.4021	12.7464	10.7070	0.0765		0.9687	0.9687		0.9687	0.9687	0.0000	13,876.0020	13,876.0020	0.2660	0.2544	13,958.4601
Government (Civic Center)	9.08336e+006	0.0490	0.4453	0.3740	2.6700e-003		0.0338	0.0338		0.0338	0.0338	0.0000	484.7227	484.7227	9.2900e-003	8.8900e-003	487.6032
Health Club	1.91074e+008	1.0303	9.3664	7.8677	0.0562		0.7118	0.7118		0.7118	0.7118	0.0000	10,196.4113	10,196.4113	0.1954	0.1869	10,257.0035
High School	7.9423e+007	0.4283	3.8933	3.2704	0.0234		0.2959	0.2959		0.2959	0.2959	0.0000	4,238.3127	4,238.3127	0.0812	0.0777	4,263.4989
Hotel	1.56552e+008	0.8442	7.6741	6.4463	0.0460		0.5832	0.5832		0.5832	0.5832	0.0000	8,354.2007	8,354.2007	0.1601	0.1532	8,403.8455
Single Family Housing	9.01305e+008	4.8600	41.5307	17.6726	0.2651		3.3578	3.3578		3.3578	3.3578	0.0000	48,097.0596	48,097.0596	0.9219	0.8818	48,382.8764
Strip Mall	1.05766e+008	0.5703	5.1846	4.3551	0.0311		0.3940	0.3940		0.3940	0.3940	0.0000	5,644.1023	5,644.1023	0.1082	0.1035	5,677.6424

Total		**12.2337**	**108.0185**	**69.9803**	**0.6673**		**8.4523**	**8.4523**		**8.4523**	**8.4523**	**0.0000**	**121,071.0147**	**121,071.0147**	**2.3205**	**2.2196**	**121,790.4792**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	1.8547e+008	1.0001	8.5462	3.6367	0.0546		0.6910	0.6910		0.6910	0.6910	0.0000	9,897.4045	9,897.4045	0.1897	0.1815	9,956.2198
General Heavy Industry	3.80085e+008	2.0495	18.6316	15.6506	0.1118		1.4160	1.4160		1.4160	1.4160	0.0000	20,282.7988	20,282.7988	0.3888	0.3719	20,403.3294
General Office Building	2.60026e+008	1.4021	12.7464	10.7070	0.0765		0.9687	0.9687		0.9687	0.9687	0.0000	13,876.0020	13,876.0020	0.2660	0.2544	13,958.4601
Government (Civic Center)	9.08336e+006	0.0490	0.4453	0.3740	2.6700e-003		0.0338	0.0338		0.0338	0.0338	0.0000	484.7227	484.7227	9.2900e-003	8.8900e-003	487.6032
Health Club	1.91074e+008	1.0303	9.3664	7.8677	0.0562		0.7118	0.7118		0.7118	0.7118	0.0000	10,196.4113	10,196.4113	0.1954	0.1869	10,257.0035
High School	7.9423e+007	0.4283	3.8933	3.2704	0.0234		0.2959	0.2959		0.2959	0.2959	0.0000	4,238.3127	4,238.3127	0.0812	0.0777	4,263.4989
Hotel	1.56552e+008	0.8442	7.6741	6.4463	0.0460		0.5832	0.5832		0.5832	0.5832	0.0000	8,354.2007	8,354.2007	0.1601	0.1532	8,403.8455
Single Family Housing	9.01305e+008	4.8600	41.5307	17.6726	0.2651		3.3578	3.3578		3.3578	3.3578	0.0000	48,097.0596	48,097.0596	0.9219	0.8818	48,382.8764
Strip Mall	1.05766e+008	0.5703	5.1846	4.3551	0.0311		0.3940	0.3940		0.3940	0.3940	0.0000	5,644.1023	5,644.1023	0.1082	0.1035	5,677.6424
Total		**12.2337**	**108.0185**	**69.9803**	**0.6673**		**8.4523**	**8.4523**		**8.4523**	**8.4523**	**0.0000**	**121,071.0147**	**121,071.0147**	**2.3205**	**2.2196**	**121,790.4792**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			

Apartments Low Rise	6.13691e+007	23,200.6413	0.8073	0.1670	23,270.5946
General Heavy Industry	1.6063e+008	60,726.4239	2.1130	0.4372	60,909.5227
General Office Building	1.8172e+008	68,699.3088	2.3904	0.4946	68,906.4469
Government (Civic Center)	6.34791e+006	2,399.8352	0.0835	0.0173	2,407.0710
Health Club	8.07508e+007	30,527.9168	1.0622	0.2198	30,619.9628
High School	2.22043e+007	8,394.3502	0.2921	0.0604	8,419.6603
Hotel	4.94243e+007	18,684.9141	0.6501	0.1345	18,741.2517
Single Family Housing	3.02009e+008	114,174.8299	3.9727	0.8219	114,519.0832
Strip Mall	8.05605e+007	30,455.9671	1.0597	0.2193	30,547.7962
Total		**357,264.1872**	**12.4309**	**2.5719**	**358,341.3893**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	6.13691e+007	23,200.6413	0.8073	0.1670	23,270.5946
General Heavy Industry	1.6063e+008	60,726.4239	2.1130	0.4372	60,909.5227
General Office Building	1.8172e+008	68,699.3088	2.3904	0.4946	68,906.4469
Government (Civic Center)	6.34791e+006	2,399.8352	0.0835	0.0173	2,407.0710
Health Club	8.07508e+007	30,527.9168	1.0622	0.2198	30,619.9628
High School	2.22043e+007	8,394.3502	0.2921	0.0604	8,419.6603
Hotel	4.94243e+007	18,684.9141	0.6501	0.1345	18,741.2517

Single Family Housing	3.02009e+008	114,174.8299	3.9727	0.8219	114,519.0832
Strip Mall	8.05605e+007	30,455.9671	1.0597	0.2193	30,547.7962
Total		**357,264.1872**	**12.4309**	**2.5719**	**358,341.3893**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1,495.5370	31.0577	1,252.6924	1.5459		125.6777	125.6777		125.6777	125.6777	10,900.3788	21,196.0525	32,096.4313	0.9476	1.3398	32,519.3788
Unmitigated	1,495.5370	31.0577	1,252.6924	1.5459		125.6777	125.6777		125.6777	125.6777	10,900.3788	21,196.0525	32,096.4313	0.9476	1.3398	32,519.3788

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	117.3184					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	556.2711					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hearth	811.3701	26.9913	900.2649	1.5272		123.7159	123.7159		123.7159	123.7159	10,900.3788	20,617.6396	31,518.0184	0.3952	1.3398	31,927.1546
Landscaping	10.5776	4.0664	352.4275	0.0187		1.9618	1.9618		1.9618	1.9618	0.0000	578.4129	578.4129	0.5525	0.0000	592.2242
Total	**1,495.5370**	**31.0577**	**1,252.6924**	**1.5460**		**125.6777**	**125.6777**		**125.6777**	**125.6777**	**10,900.3788**	**21,196.0525**	**32,096.4313**	**0.9476**	**1.3398**	**32,519.3788**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	117.3184					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	556.2711					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	811.3701	26.9913	900.2649	1.5272		123.7159	123.7159		123.7159	123.7159	10,900.3788	20,617.6396	31,518.0184	0.3952	1.3398	31,927.1546
Landscaping	10.5776	4.0664	352.4275	0.0187		1.9618	1.9618		1.9618	1.9618	0.0000	578.4129	578.4129	0.5525	0.0000	592.2242
Total	**1,495.5370**	**31.0577**	**1,252.6924**	**1.5460**		**125.6777**	**125.6777**		**125.6777**	**125.6777**	**10,900.3788**	**21,196.0525**	**32,096.4313**	**0.9476**	**1.3398**	**32,519.3788**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	36,464.8347	407.7767	9.8358	49,590.3192

Unmitigated	36,464.8347	407.7767	9.8358	49,590.3192

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	854.821 / 538.909	2,732.9188	27.9400	0.6754	3,632.6951
General Heavy Industry	4211.52 / 0	9,951.3634	137.5324	3.3024	14,373.7816
General Office Building	3541.42 / 2170.55	11,239.9903	115.7491	2.7976	14,967.4032
Government (Civic Center)	138.275 / 84.7492	438.8670	4.5194	0.1092	584.4044
Health Club	541.48 / 331.875	1,718.5876	17.6980	0.4278	2,288.5067
High School	105.026 / 270.068	605.5131	3.4422	0.0849	716.8760
Hotel	108.747 / 12.083	272.9459	3.5518	0.0854	387.1870
Single Family Housing	2246.05 / 1415.99	7,180.7859	73.4128	1.7747	9,544.9616
Strip Mall	732.186 / 448.759	2,323.8628	23.9311	0.5784	3,094.5037
Total		**36,464.8347**	**407.7767**	**9.8358**	**49,590.3192**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
Apartments Low Rise	854.821 / 538.909	2,732.9188	27.9400	0.6754	3,632.6951
General Heavy Industry	4211.52 / 0	9,951.3634	137.5324	3.3024	14,373.7816
General Office Building	3541.42 / 2170.55	11,239.9903	115.7491	2.7976	14,967.4032
Government (Civic Center)	138.275 / 84.7492	438.8670	4.5194	0.1092	584.4044
Health Club	541.48 / 331.875	1,718.5876	17.6980	0.4278	2,288.5067
High School	105.026 / 270.068	605.5131	3.4422	0.0849	716.8760
Hotel	108.747 / 12.083	272.9459	3.5518	0.0854	387.1870
Single Family Housing	2246.05 / 1415.99	7,180.7859	73.4128	1.7747	9,544.9616
Strip Mall	732.186 / 448.759	2,323.8628	23.9311	0.5784	3,094.5037
Total		**36,464.8347**	**407.7767**	**9.8358**	**49,590.3192**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	31,592.1920	1,867.0451	0.0000	78,268.3185
Unmitigated	31,592.1920	1,867.0451	0.0000	78,268.3185

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	6035.2	1,225.0911	72.4008	0.0000	3,035.1112
General Heavy Industry	22582.9	4,584.1206	270.9138	0.0000	11,356.9647
General Office Building	18530.6	3,761.5484	222.3011	0.0000	9,319.0769
Government (Civic Center)	3967.43	805.3524	47.5950	0.0000	1,995.2266
Health Club	52185.9	10,593.2641	626.0440	0.0000	26,244.3633
High School	4111.9	834.6785	49.3281	0.0000	2,067.8808
Hotel	2347.13	476.4462	28.1572	0.0000	1,180.3752
Single Family Housing	35493.5	7,204.8557	425.7948	0.0000	17,849.7250
Strip Mall	10379	2,106.8351	124.5104	0.0000	5,219.5948
Total		**31,592.1920**	**1,867.0451**	**0.0000**	**78,268.3185**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	6035.2	1,225.0911	72.4008	0.0000	3,035.1112

General Heavy Industry	22582.9	4,584.1206	270.9138	0.0000	11,356.96 47
General Office Building	18530.6	3,761.5484	222.3011	0.0000	9,319.076 9
Government (Civic Center)	3967.43	805.3524	47.5950	0.0000	1,995.226 6
Health Club	52185.9	10,593.264 1	626.0440	0.0000	26,244.36 33
High School	4111.9	834.6785	49.3281	0.0000	2,067.880 8
Hotel	2347.13	476.4462	28.1572	0.0000	1,180.375 2
Single Family Housing	35493.5	7,204.8557	425.7948	0.0000	17,849.72 50
Strip Mall	10379	2,106.8351	124.5104	0.0000	5,219.594 8
Total		**31,592.192 0**	**1,867.045 1**	**0.0000**	**78,268.31 85**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Modesto GP Update - Alternative Net

Stanislaus County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	16,632.00	Dwelling Unit	9,999.00	29,937,600.00	47568
Apartments Low Rise	22,094.00	Dwelling Unit	0.00	22,094,000.00	63189
Strip Mall	16,486.50	1000sqft	0.00	16,486,500.00	0
General Office Building	17,300.61	1000sqft	0.00	17,300,606.00	0
General Heavy Industry	12,933.00	1000sqft	0.00	12,933,000.00	0
Government (Civic Center)	435.00	1000sqft	0.00	435,000.00	0
High School	1,471.50	1000sqft	0.00	1,471,500.00	0
Hotel	5,147.00	Room	0.00	7,473,444.00	0
Health Club	8,120.91	1000sqft	0.00	8,120,909.00	0

1.2 Other Project Characteristics

Urbanization Urban | **Wind Speed (m/s)** 2.2 | **Precipitation Freq (Days)** 46

Climate Zone 3 | **Operational Year** 2040

Utility Company Modesto Irrigation District

CO2 Intensity (lb/MWhr) 833.46 | **CH4 Intensity (lb/MWhr)** 0.029 | **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - from traffic report land use table. Acreage set to 9,999 (which is the CalEEMod maximum)

Construction Phase - Phases set to zero - Contruction emission computations not appropriate at the plan level

Grading -

Vehicle Trips - traffic report

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	11,000.00	0.00
tblConstructionPhase	NumDays	155,000.00	0.00
tblConstructionPhase	NumDays	10,000.00	0.00
tblConstructionPhase	NumDays	15,500.00	0.00
tblConstructionPhase	NumDays	11,000.00	0.00
tblConstructionPhase	NumDays	6,000.00	0.00
tblConstructionPhase	PhaseEndDate	4/12/2817	2/12/2775
tblConstructionPhase	PhaseEndDate	12/14/2732	10/29/2138
tblConstructionPhase	PhaseEndDate	5/31/2056	1/31/2018
tblConstructionPhase	PhaseEndDate	10/29/2138	5/31/2079
tblConstructionPhase	PhaseEndDate	2/12/2775	12/14/2732
tblConstructionPhase	PhaseEndDate	5/31/2079	5/31/2056
tblLandUse	LandUseSquareFeet	17,300,600.00	17,300,606.00
tblLandUse	LandUseSquareFeet	8,120,910.00	8,120,909.00
tblLandUse	LotAcreage	5,400.00	9,999.00
tblLandUse	LotAcreage	1,380.88	0.00
tblLandUse	LotAcreage	378.48	0.00
tblLandUse	LotAcreage	397.17	0.00
tblLandUse	LotAcreage	296.90	0.00
tblLandUse	LotAcreage	9.99	0.00
tblLandUse	LotAcreage	33.78	0.00
tblLandUse	LotAcreage	171.57	0.00
tblLandUse	LotAcreage	186.43	0.00
tblVehicleTrips	ST_TR	7.16	5.73
tblVehicleTrips	ST_TR	1.50	4.85

tblVehicleTrips	ST_TR	2.46	2.98
tblVehicleTrips	ST_TR	20.87	27.13
tblVehicleTrips	ST_TR	4.37	4.54
tblVehicleTrips	ST_TR	9.91	9.02
tblVehicleTrips	ST_TR	42.04	40.36
tblVehicleTrips	SU_TR	6.07	4.86
tblVehicleTrips	SU_TR	1.50	4.85
tblVehicleTrips	SU_TR	1.05	1.27
tblVehicleTrips	SU_TR	26.73	34.75
tblVehicleTrips	SU_TR	1.79	1.86
tblVehicleTrips	SU_TR	8.62	7.84
tblVehicleTrips	SU_TR	20.43	19.61
tblVehicleTrips	WD_TR	6.59	5.26
tblVehicleTrips	WD_TR	1.50	4.85
tblVehicleTrips	WD_TR	11.03	13.36
tblVehicleTrips	WD_TR	27.92	13.36
tblVehicleTrips	WD_TR	32.93	42.70
tblVehicleTrips	WD_TR	12.89	13.36
tblVehicleTrips	WD_TR	9.52	8.71
tblVehicleTrips	WD_TR	44.32	42.70

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Area	2,946.5724	44.9168	2,927.9412	4.2802		363.6886	363.6886		363.6886	363.6886	32,174.3956	17,247.1952	49,421.5909	0.7715	3.1465	50,378.5301
Energy	9.8101	86.9855	58.7982	0.5351		6.7779	6.7779		6.7779	6.7779	0.0000	399,728.6667	399,728.6667	12.3912	3.9586	401,218.1127
Mobile	189.4374	2,876.3552	1,825.1985	14.5557	1,149.9516	5.2824	1,155.2340	308.6438	4.9468	313.5906	0.0000	1,358,087.2143	1,358,087.2143	86.5325	0.0000	1,360,250.5274
Waste						0.0000	0.0000		0.0000	0.0000	26,434.4271	0.0000	26,434.4271	1,562.2299	0.0000	65,490.1742
Water						0.0000	0.0000		0.0000	0.0000	3,348.9777	27,827.8600	31,176.8377	344.9404	8.3223	42,280.3800
Total	**3,145.8200**	**3,008.2575**	**4,811.9379**	**19.3710**	**1,149.9516**	**375.7488**	**1,525.7004**	**308.6438**	**375.4133**	**684.0571**	**61,957.8004**	**1,802,890.9362**	**1,864,848.7366**	**2,006.8654**	**15.4274**	**1,919,617.7244**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2,946.5724	44.9168	2,927.9412	4.2802		363.6886	363.6886		363.6886	363.6886	32,174.3956	17,247.1952	49,421.5909	0.7715	3.1465	50,378.5301
Energy	9.8101	86.9855	58.7982	0.5351		6.7779	6.7779		6.7779	6.7779	0.0000	399,728.6667	399,728.6667	12.3912	3.9586	401,218.1127
Mobile	189.4374	2,876.3552	1,825.1985	14.5557	1,149.9516	5.2824	1,155.2340	308.6438	4.9468	313.5906	0.0000	1,358,087.2143	1,358,087.2143	86.5325	0.0000	1,360,250.5274
Waste						0.0000	0.0000		0.0000	0.0000	26,434.4271	0.0000	26,434.4271	1,562.2299	0.0000	65,490.1742
Water						0.0000	0.0000		0.0000	0.0000	3,348.9777	27,827.8600	31,176.8377	344.9404	8.3223	42,280.3800
Total	**3,145.8200**	**3,008.2575**	**4,811.9379**	**19.3710**	**1,149.9516**	**375.7488**	**1,525.7004**	**308.6438**	**375.4133**	**684.0571**	**61,957.8004**	**1,802,890.9362**	**1,864,848.7366**	**2,006.8654**	**15.4274**	**1,919,617.7244**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	189.4374	2,876.3552	1,825.1985	14.5557	1,149.9516	5.2824	1,155.2340	308.6438	4.9468	313.5906	0.0000	1,358,087.2143	1,358,087.2143	86.5325	0.0000	1,360,250.5274
Unmitigated	189.4374	2,876.3552	1,825.1985	14.5557	1,149.9516	5.2824	1,155.2340	308.6438	4.9468	313.5906	0.0000	1,358,087.2143	1,358,087.2143	86.5325	0.0000	1,360,250.5274

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	116,214.44	126,598.62	107376.84	341,267,636	341,267,636
General Heavy Industry	62,725.05	62,725.05	62725.05	183,126,482	183,126,482
General Office Building	231,136.10	51,555.81	21971.77	419,643,346	419,643,346
Government (Civic Center)	5,811.60	0.00	0.00	7,935,478	7,935,478
Health Club	346,762.81	220,320.26	282201.59	551,948,946	551,948,946
High School	19,659.24	6,680.61	2736.99	40,287,444	40,287,444
Hotel	42,050.99	42,153.93	30624.65	76,820,587	76,820,587
Single Family Housing	144,864.72	150,020.64	130394.88	420,693,121	420,693,121
Strip Mall	703,973.55	665,395.14	323300.27	991,905,175	991,905,175
Total	1,673,198.50	1,325,450.06	961,332.03	3,033,628,215	3,033,628,215

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	7.30	7.50	48.40	13.90	37.70	86	11	3
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4

Government (Civic Center)	9.50	7.30	7.30	75.00	20.00	5.00	50	34	16
Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
High School	9.50	7.30	7.30	77.80	17.20	5.00	75	19	6
Hotel	9.50	7.30	7.30	19.40	61.60	19.00	58	38	4
Single Family Housing	10.80	7.30	7.50	48.40	13.90	37.70	86	11	3
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
General Heavy Industry	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
General Office Building	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Government (Civic Center)	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Health Club	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
High School	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Hotel	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Single Family Housing	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427
Strip Mall	0.561935	0.028835	0.181775	0.088795	0.008394	0.003308	0.026073	0.093385	0.001808	0.000875	0.003797	0.000593	0.000427

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	302,642.0040	302,642.0040	10.5303	2.1787	303,554.5125
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	302,642.0040	302,642.0040	10.5303	2.1787	303,554.5125
NaturalGas Mitigated	9.8101	86.9855	58.7982	0.5351		6.7779	6.7779		6.7779	6.7779	0.0000	97,086.6627	97,086.6627	1.8608	1.7799	97,663.6002
NaturalGas Unmitigated	9.8101	86.9855	58.7982	0.5351		6.7779	6.7779		6.7779	6.7779	0.0000	97,086.6627	97,086.6627	1.8608	1.7799	97,663.6002

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	3.12331e+008	1.6841	14.3917	6.1241	0.0919		1.1636	1.1636		1.1636	1.1636	0.0000	16,667.1688	16,667.1688	0.3195	0.3056	16,766.2134
General Heavy Industry	2.69912e+008	1.4554	13.2310	11.1140	0.0794		1.0056	1.0056		1.0056	1.0056	0.0000	14,403.5167	14,403.5167	0.2761	0.2641	14,489.1096
General Office Building	2.25773e+008	1.2174	11.0673	9.2965	0.0664		0.8411	0.8411		0.8411	0.8411	0.0000	12,048.1022	12,048.1022	0.2309	0.2209	12,119.6980
Government (Civic Center)	5.67675e+006	0.0306	0.2783	0.2338	1.6700e-003		0.0212	0.0212		0.0212	0.0212	0.0000	302.9330	302.9330	5.8100e-003	5.5500e-003	304.7332
Health Club	1.69483e+008	0.9139	8.3080	6.9787	0.0499		0.6314	0.6314		0.6314	0.6314	0.0000	9,044.2781	9,044.2781	0.1734	0.1658	9,098.0237
High School	3.69494e+007	0.1992	1.8112	1.5214	0.0109		0.1377	0.1377		0.1377	0.1377	0.0000	1,971.7588	1,971.7588	0.0378	0.0362	1,983.4760
Hotel	1.87957e+008	1.0135	9.2136	7.7394	0.0553		0.7002	0.7002		0.7002	0.7002	0.0000	10,030.1075	10,030.1075	0.1922	0.1839	10,089.7114
Single Family Housing	4.34848e+008	2.3448	20.0371	8.5264	0.1279		1.6200	1.6200		1.6200	1.6200	0.0000	23,205.1256	23,205.1256	0.4448	0.4254	23,343.0221
Strip Mall	1.76406e+008	0.9512	8.6473	7.2638	0.0519		0.6572	0.6572		0.6572	0.6572	0.0000	9,413.6719	9,413.6719	0.1804	0.1726	9,469.6127
Total		**9.8102**	**86.9855**	**58.7982**	**0.5351**		**6.7779**	**6.7779**		**6.7779**	**6.7779**	**0.0000**	**97,086.6627**	**97,086.6627**	**1.8608**	**1.7799**	**97,663.6002**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	3.12331e+008	1.6841	14.3917	6.1241	0.0919		1.1636	1.1636		1.1636	1.1636	0.0000	16,667.1688	16,667.1688	0.3195	0.3056	16,766.2134
General Heavy Industry	2.69912e+008	1.4554	13.2310	11.1140	0.0794		1.0056	1.0056		1.0056	1.0056	0.0000	14,403.5167	14,403.5167	0.2761	0.2641	14,489.1096
General Office Building	2.25773e+008	1.2174	11.0673	9.2965	0.0664		0.8411	0.8411		0.8411	0.8411	0.0000	12,048.1022	12,048.1022	0.2309	0.2209	12,119.6980
Government (Civic Center)	5.67675e+006	0.0306	0.2783	0.2338	1.6700e-003		0.0212	0.0212		0.0212	0.0212	0.0000	302.9330	302.9330	5.8100e-003	5.5500e-003	304.7332
Health Club	1.69483e+008	0.9139	8.3080	6.9787	0.0499		0.6314	0.6314		0.6314	0.6314	0.0000	9,044.2781	9,044.2781	0.1734	0.1658	9,098.0237
High School	3.69494e+007	0.1992	1.8112	1.5214	0.0109		0.1377	0.1377		0.1377	0.1377	0.0000	1,971.7588	1,971.7588	0.0378	0.0362	1,983.4760
Hotel	1.87957e+008	1.0135	9.2136	7.7394	0.0553		0.7002	0.7002		0.7002	0.7002	0.0000	10,030.1075	10,030.1075	0.1922	0.1839	10,089.7114
Single Family Housing	4.34848e+008	2.3448	20.0371	8.5264	0.1279		1.6200	1.6200		1.6200	1.6200	0.0000	23,205.1256	23,205.1256	0.4448	0.4254	23,343.0221
Strip Mall	1.76406e+008	0.9512	8.6473	7.2638	0.0519		0.6572	0.6572		0.6572	0.6572	0.0000	9,413.6719	9,413.6719	0.1804	0.1726	9,469.6127
Total		**9.8102**	**86.9855**	**58.7982**	**0.5351**		**6.7779**	**6.7779**		**6.7779**	**6.7779**	**0.0000**	**97,086.6627**	**97,086.6627**	**1.8608**	**1.7799**	**97,663.6002**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	1.03345e+008	39,069.7386	1.3594	0.2813	39,187.5394
General Heavy Industry	1.14069e+008	43,123.9332	1.5005	0.3105	43,253.9580
General Office Building	1.57782e+008	59,649.4792	2.0755	0.4294	59,829.3309

Government (Civic Center)	3.9672e+006	1,499.8043	0.0522	0.0108	1,504.3264
Health Club	7.16264e+007	27,078.4456	0.9422	0.1949	27,160.0910
High School	1.03299e+007	3,905.2414	0.1359	0.0281	3,917.0162
Hotel	5.93391e+007	22,433.2290	0.7806	0.1615	22,500.8683
Single Family Housing	1.45709e+008	55,085.3065	1.9167	0.3966	55,251.3965
Strip Mall	1.34365e+008	50,796.8262	1.7675	0.3657	50,949.9858
Total		**302,642.0040**	**10.5304**	**2.1787**	**303,554.5125**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	1.03345e+008	39,069.7386	1.3594	0.2813	39,187.5394
General Heavy Industry	1.14069e+008	43,123.9332	1.5005	0.3105	43,253.9580
General Office Building	1.57782e+008	59,649.4792	2.0755	0.4294	59,829.3309
Government (Civic Center)	3.9672e+006	1,499.8043	0.0522	0.0108	1,504.3264
Health Club	7.16264e+007	27,078.4456	0.9422	0.1949	27,160.0910
High School	1.03299e+007	3,905.2414	0.1359	0.0281	3,917.0162
Hotel	5.93391e+007	22,433.2290	0.7806	0.1615	22,500.8683
Single Family Housing	1.45709e+008	55,085.3065	1.9167	0.3966	55,251.3965
Strip Mall	1.34365e+008	50,796.8262	1.7675	0.3657	50,949.9858

Total		302,642.0040	10.5304	2.1787	303,554.5125

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2,946.5724	44.9168	2,927.9412	4.2802		363.6886	363.6886		363.6886	363.6886	32,174.3956	17,247.1952	49,421.5909	0.7715	3.1465	50,378.5301
Unmitigated	2,946.5724	44.9168	2,927.9412	4.2802		363.6886	363.6886		363.6886	363.6886	32,174.3956	17,247.1952	49,421.5909	0.7715	3.1465	50,378.5301

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	93.4858					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	454.0244					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2,390.4481	41.6072	2,641.0943	4.2650		362.0920	362.0920		362.0920	362.0920	32,174.3956	16,776.3896	48,950.7852	0.3216	3.1465	49,896.4763
Landscaping	8.6142	3.3095	286.8469	0.0152		1.5966	1.5966		1.5966	1.5966	0.0000	470.8057	470.8057	0.4499	0.0000	482.0538

Total	2,946.5724	44.9168	2,927.9412	4.2802		363.6885	363.6885		363.6885	363.6885	32,174.3956	17,247.1952	49,421.5909	0.7715	3.1465	50,378.5301

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	93.4858					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	454.0244					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2,390.4481	41.6072	2,641.0943	4.2650		362.0920	362.0920		362.0920	362.0920	32,174.3956	16,776.3896	48,950.7852	0.3216	3.1465	49,896.4763
Landscaping	8.6142	3.3095	286.8469	0.0152		1.5966	1.5966		1.5966	1.5966	0.0000	470.8057	470.8057	0.4499	0.0000	482.0538
Total	**2,946.5724**	**44.9168**	**2,927.9412**	**4.2802**		**363.6885**	**363.6885**		**363.6885**	**363.6885**	**32,174.3956**	**17,247.1952**	**49,421.5909**	**0.7715**	**3.1465**	**50,378.5301**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	31,176.8377	344.9404	8.3223	42,280.3800
Unmitigated	31,176.8377	344.9404	8.3223	42,280.3800

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	1439.51 / 907.519	4,602.2187	47.0508	1.1374	6,117.4363
General Heavy Industry	2990.76 / 0	7,066.8231	97.6667	2.3451	10,207.3423
General Office Building	3074.9 / 1884.62	9,759.3311	100.5013	2.4291	12,995.7269
Government (Civic Center)	86.417 / 52.9652	274.2761	2.8245	0.0683	365.2317
Health Club	480.296 / 294.375	1,524.3970	15.6982	0.3794	2,029.9186
High School	48.8606 / 125.642	281.6985	1.6014	0.0395	333.5071
Hotel	130.563 / 14.507	327.7006	4.2644	0.1025	464.8592
Single Family Housing	1083.64 / 683.165	3,464.4746	35.4191	0.8562	4,605.1055
Strip Mall	1221.2 / 748.475	3,875.9180	39.9141	0.9647	5,161.2525
Total		**31,176.8376**	**344.9404**	**8.3223**	**42,280.3800**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	1439.51 / 907.519	4,602.2187	47.0508	1.1374	6,117.4363

General Heavy Industry	2990.76 / 0	7,066.8231	97.6667	2.3451	10,207.3423
General Office Building	3074.9 / 1884.62	9,759.3311	100.5013	2.4291	12,995.7269
Government (Civic Center)	86.417 / 52.9652	274.2761	2.8245	0.0683	365.2317
Health Club	480.296 / 294.375	1,524.3970	15.6982	0.3794	2,029.9186
High School	48.8606 / 125.642	281.6985	1.6014	0.0395	333.5071
Hotel	130.563 / 14.507	327.7006	4.2644	0.1025	464.8592
Single Family Housing	1083.64 / 683.165	3,464.4746	35.4191	0.8562	4,605.1055
Strip Mall	1221.2 / 748.475	3,875.9180	39.9141	0.9647	5,161.2525
Total		**31,176.8376**	**344.9404**	**8.3223**	**42,280.3800**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	26,434.4271	1,562.2299	0.0000	65,490.1742
Unmitigated	26,434.4271	1,562.2299	0.0000	65,490.1742

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	10163.2	2,063.0459	121.9225	0.0000	5,111.108 8
General Heavy Industry	16036.9	3,255.3498	192.3857	0.0000	8,064.991 4
General Office Building	16089.6	3,266.0353	193.0172	0.0000	8,091.464 2
Government (Civic Center)	2479.5	503.3161	29.7451	0.0000	1,246.944 3
Health Club	46289.2	9,396.2873	555.3047	0.0000	23,278.90 39
High School	1912.95	388.3116	22.9486	0.0000	962.0255
Hotel	2817.98	572.0245	33.8057	0.0000	1,417.166 4
Single Family Housing	17124.5	3,476.1147	205.4325	0.0000	8,611.927 0
Strip Mall	17310.8	3,513.9421	207.6680	0.0000	8,705.642 7
Total		**26,434.427 1**	**1,562.229 9**	**0.0000**	**65,490.17 42**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	10163.2	2,063.0459	121.9225	0.0000	5,111.108 8
General Heavy Industry	16036.9	3,255.3498	192.3857	0.0000	8,064.991 4
General Office Building	16089.6	3,266.0353	193.0172	0.0000	8,091.464 2

Government (Civic Center)	2479.5	503.3161	29.7451	0.0000	1,246.944 3
Health Club	46289.2	9,396.2873	555.3047	0.0000	23,278.90 39
High School	1912.95	388.3116	22.9486	0.0000	962.0255
Hotel	2817.98	572.0245	33.8057	0.0000	1,417.166 4
Single Family Housing	17124.5	3,476.1147	205.4325	0.0000	8,611.927 0
Strip Mall	17310.8	3,513.9421	207.6680	0.0000	8,705.642 7
Total		**26,434.427 1**	**1,562.229 9**	**0.0000**	**65,490.17 42**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

calendar_year	season_month	sub_area	vehicle_class	fuel	pollutant	emission	emission_annualized	CO2e [short tons/day]	CO2e_annualized [metric tons/year]
2040	Annual	Stanislaus (SJV)	LDA	Gas	CH4	0.043255913	15.00980167	1.081397815	340.4166731
2040	Annual	Stanislaus (SJV)	LDA	Gas	CO2	2465.462145	855515.3644	2465.462145	776110.7059
2040	Annual	Stanislaus (SJV)	LDA	Gas	Fuel	260.2374253	90302.38659		
2040	Annual	Stanislaus (SJV)	LDA	Gas	N2O	0.06954638	24.13259374	20.72482114	6524.032661
2040	Annual	Stanislaus (SJV)	LDA	Dsl	CH4	4.06E-05	0.014104817	0.001016197	0.319891955
2040	Annual	Stanislaus (SJV)	LDA	Dsl	CO2	23.6312594	8200.047011	23.6312594	7438.959648
2040	Annual	Stanislaus (SJV)	LDA	Dsl	Fuel	2.106089451	730.8130394		
2040	Annual	Stanislaus (SJV)	LDA	Dsl	N2O	0.003714505	1.288933198	1.106922458	348.4516572
2040	Annual	Stanislaus (SJV)	LDT1	Gas	CH4	0.004574225	1.587256061	0.114355624	35.99837223
2040	Annual	Stanislaus (SJV)	LDT1	Gas	CO2	254.481571	88305.10514	254.481571	80109.06681
2040	Annual	Stanislaus (SJV)	LDT1	Gas	Fuel	26.86134482	9320.886653		
2040	Annual	Stanislaus (SJV)	LDT1	Gas	N2O	0.006730663	2.335540044	2.00573756	631.3925347
2040	Annual	Stanislaus (SJV)	LDT2	Gas	CH4	0.017430278	6.04830635	0.435756942	137.1733199
2040	Annual	Stanislaus (SJV)	LDT2	Gas	CO2	787.238581	273171.7876	787.238581	247817.3482
2040	Annual	Stanislaus (SJV)	LDT2	Gas	Fuel	83.09555344	28834.15704		
2040	Annual	Stanislaus (SJV)	LDT2	Gas	N2O	0.020397857	7.078056439	6.078561438	1913.489776
2040	Annual	Stanislaus (SJV)	MDV	Gas	CH4	0.013031117	4.521797708	0.325777933	102.5526764
2040	Annual	Stanislaus (SJV)	MDV	Gas	CO2	614.3729725	213187.4215	614.3729725	193400.4309
2040	Annual	Stanislaus (SJV)	MDV	Gas	Fuel	64.84903484	22502.61509		
2040	Annual	Stanislaus (SJV)	MDV	Gas	N2O	0.014201923	4.928067382	4.23217314	1332.259305
2040	Annual	Stanislaus (SJV)	LHDT1	Gas	CH4	0.002051911	0.670974861	0.051297772	15.21745822
2040	Annual	Stanislaus (SJV)	LHDT1	Gas	CO2	164.7945466	53887.81673	164.7945466	48886.21902
2040	Annual	Stanislaus (SJV)	LHDT1	Gas	Fuel	17.39459216	5688.031637		
2040	Annual	Stanislaus (SJV)	LHDT1	Gas	N2O	0.003621148	1.184115544	1.079102239	320.1151342
2040	Annual	Stanislaus (SJV)	LHDT2	Gas	CH4	0.000295014	0.096469635	0.007375354	2.187895144
2040	Annual	Stanislaus (SJV)	LHDT2	Gas	CO2	27.58219505	9019.37778	27.58219505	8182.244232
2040	Annual	Stanislaus (SJV)	LHDT2	Gas	Fuel	2.911389022	952.0242102		
2040	Annual	Stanislaus (SJV)	LHDT2	Gas	N2O	0.000552353	0.180619408	0.164601173	48.82885489
2040	Annual	Stanislaus (SJV)	MHDT	Gas	CH4	0.00072076	0.235688557	0.018019003	5.345328079
2040	Annual	Stanislaus (SJV)	MHDT	Gas	CO2	45.95804503	15028.28072	45.95804503	13633.43085
2040	Annual	Stanislaus (SJV)	MHDT	Gas	Fuel	4.851018838	1586.28316		
2040	Annual	Stanislaus (SJV)	MHDT	Gas	N2O	0.000708164	0.231569557	0.211032807	62.60277558
2040	Annual	Stanislaus (SJV)	HHDT	Gas	CH4	2.07E-05	0.006774675	0.000517942	0.153647099
2040	Annual	Stanislaus (SJV)	HHDT	Gas	CO2	0.451898596	147.7708408	0.451898596	134.0554902
2040	Annual	Stanislaus (SJV)	HHDT	Gas	Fuel	0.047699344	15.59768549		
2040	Annual	Stanislaus (SJV)	HHDT	Gas	N2O	3.95E-05	0.012927908	0.011781396	3.494945215
2040	Annual	Stanislaus (SJV)	LDT1	Dsl	CH4	1.40E-07	4.85E-05	3.49E-06	0.001099824
2040	Annual	Stanislaus (SJV)	LDT1	Dsl	CO2	0.047106863	16.34608147	0.047106863	14.82891992
2040	Annual	Stanislaus (SJV)	LDT1	Dsl	Fuel	0.004198306	1.456812316		
2040	Annual	Stanislaus (SJV)	LDT1	Dsl	N2O	7.40E-06	0.002569376	0.002206554	0.694608112
2040	Annual	Stanislaus (SJV)	LDT2	Dsl	CH4	2.86E-05	0.009911797	0.000714106	0.224795833
2040	Annual	Stanislaus (SJV)	LDT2	Dsl	CO2	7.118823076	2470.231607	7.118823076	2240.957061
2040	Annual	Stanislaus (SJV)	LDT2	Dsl	Fuel	0.634451086	220.1545267		
2040	Annual	Stanislaus (SJV)	LDT2	Dsl	N2O	0.00111898	0.388286009	0.333455996	104.9696783
2040	Annual	Stanislaus (SJV)	MDV	Dsl	CH4	2.37E-05	0.008214314	0.000591809	0.186297561
2040	Annual	Stanislaus (SJV)	MDV	Dsl	CO2	20.88575509	7247.357017	20.88575509	6574.693575
2040	Annual	Stanislaus (SJV)	MDV	Dsl	Fuel	1.861401787	645.90642		
2040	Annual	Stanislaus (SJV)	MDV	Dsl	N2O	0.00328295	1.139183598	0.978319055	307.9681811
2040	Annual	Stanislaus (SJV)	LHDT1	Dsl	CH4	0.0012166	0.397828171	0.030414998	9.02259373

2040	Annual	Stanislaus (SJV)	LHDT1	Dsl	CO2	89.31617257	29206.38843	89.31617257	26495.59749
2040	Annual	Stanislaus (SJV)	LHDT1	Dsl	Fuel	7.960127967	2602.961845		
2040	Annual	Stanislaus (SJV)	LHDT1	Dsl	N2O	0.014039259	4.590837538	4.183699041	1241.092208
2040	Annual	Stanislaus (SJV)	LHDT2	Dsl	CH4	0.000485371	0.158716219	0.012134268	3.599624335
2040	Annual	Stanislaus (SJV)	LHDT2	Dsl	CO2	39.5806762	12942.88112	39.5806762	11741.58761
2040	Annual	Stanislaus (SJV)	LHDT2	Dsl	Fuel	3.52754981	1153.508788		
2040	Annual	Stanislaus (SJV)	LHDT2	Dsl	N2O	0.006221531	2.034440671	1.854016269	549.99299
2040	Annual	Stanislaus (SJV)	MHDT	Dsl	CH4	0.000247395	0.077187373	0.006184886	1.75058067
2040	Annual	Stanislaus (SJV)	MHDT	Dsl	CO2	380.5324639	118726.1287	380.5324639	107706.5631
2040	Annual	Stanislaus (SJV)	MHDT	Dsl	Fuel	33.91420637	10581.23239		
2040	Annual	Stanislaus (SJV)	MHDT	Dsl	N2O	0.059814404	18.66209408	17.82469242	5045.131602
2040	Annual	Stanislaus (SJV)	HHDT	Dsl	CH4	0.004051419	1.264042758	0.101285477	28.66801573
2040	Annual	Stanislaus (SJV)	HHDT	Dsl	CO2	1582.131565	493625.0484	1582.131565	447809.2395
2040	Annual	Stanislaus (SJV)	HHDT	Dsl	Fuel	141.0043597	43993.36021		
2040	Annual	Stanislaus (SJV)	HHDT	Dsl	N2O	0.24868905	77.59098347	74.10933678	20976.03415
2040	Annual	Stanislaus (SJV)	HHDT	NG	CH4	0.004216326	1.315493611	0.105408142	29.83490178
2040	Annual	Stanislaus (SJV)	HHDT	NG	CO2	3.199969317	998.3904269	3.199969317	905.7248194
2040	Annual	Stanislaus (SJV)	HHDT	NG	Fuel	0.369867647	115.3987059		
2040	Annual	Stanislaus (SJV)	HHDT	NG	N2O	0.000652335	0.20352842	0.194395734	55.02210298
2040	Annual	Stanislaus (SJV)	UBUS	Gas	CH4	2.98E-05	0.00973615	0.000744354	0.220812233
2040	Annual	Stanislaus (SJV)	UBUS	Gas	CO2	4.390681575	1435.752875	4.390681575	1302.493472
2040	Annual	Stanislaus (SJV)	UBUS	Gas	Fuel	0.463450502	151.5483141		
2040	Annual	Stanislaus (SJV)	UBUS	Gas	N2O	6.18E-05	0.020217948	0.018424919	5.465742943
2040	Annual	Stanislaus (SJV)	SBUS	Gas	CH4	0.000460113	0.150456836	0.011502816	3.412304614
2040	Annual	Stanislaus (SJV)	SBUS	Gas	CO2	5.788625288	1892.880469	5.788625288	1717.192769
2040	Annual	Stanislaus (SJV)	SBUS	Gas	Fuel	0.611007938	199.7995957		
2040	Annual	Stanislaus (SJV)	SBUS	Gas	N2O	0.000162419	0.053110951	0.048400806	14.35807457
2040	Annual	Stanislaus (SJV)	OBUS	Gas	CH4	0.000155006	0.050686898	0.003875145	1.149559846
2040	Annual	Stanislaus (SJV)	OBUS	Gas	CO2	9.630429029	3149.150293	9.630429029	2856.861908
2040	Annual	Stanislaus (SJV)	OBUS	Gas	Fuel	1.016522626	332.4028988		
2040	Annual	Stanislaus (SJV)	OBUS	Gas	N2O	0.000163209	0.053369183	0.048636136	14.42788519
2040	Annual	Stanislaus (SJV)	UBUS	Dsl	CH4	0.00015743	0.051479469	0.003935739	1.167535051
2040	Annual	Stanislaus (SJV)	UBUS	Dsl	CO2	3.286506605	1074.68766	3.286506605	974.9405248
2040	Annual	Stanislaus (SJV)	UBUS	Dsl	Fuel	0.292903428	95.77942103		
2040	Annual	Stanislaus (SJV)	UBUS	Dsl	N2O	0.000516593	0.168925934	0.153944735	45.66762795
2040	Annual	Stanislaus (SJV)	SBUS	Dsl	CH4	2.84E-05	0.009281257	0.000709576	0.210495435
2040	Annual	Stanislaus (SJV)	SBUS	Dsl	CO2	11.60949216	3796.303936	11.60949216	3443.949986
2040	Annual	Stanislaus (SJV)	SBUS	Dsl	Fuel	1.034673123	338.3381113		
2040	Annual	Stanislaus (SJV)	SBUS	Dsl	N2O	0.00182485	0.596726112	0.543805448	161.3196115
2040	Annual	Stanislaus (SJV)	OBUS	Dsl	CH4	1.78E-05	0.005209752	0.00044604	0.118155225
2040	Annual	Stanislaus (SJV)	OBUS	Dsl	CO2	16.41477503	4793.114308	16.41477503	4348.241403
2040	Annual	Stanislaus (SJV)	OBUS	Dsl	Fuel	1.462934494	427.1768724		
2040	Annual	Stanislaus (SJV)	OBUS	Dsl	N2O	0.002580174	0.753410821	0.768891865	203.6779327
2040	Annual	Stanislaus (SJV)	UBUS	NG	CH4	0.052245417	17.08425124	1.306135416	387.4644116
2040	Annual	Stanislaus (SJV)	UBUS	NG	CO2	17.45420619	5707.525424	17.45420619	5177.781452
2040	Annual	Stanislaus (SJV)	UBUS	NG	Fuel	2.017440024	659.7028879		
2040	Annual	Stanislaus (SJV)	UBUS	NG	N2O	0.003558154	1.163516395	1.060329926	314.546337
2040	Annual	Stanislaus (SJV)	MCY	Gas	CH4	0.032300204	11.20817074	0.807505097	254.1971094
2040	Annual	Stanislaus (SJV)	MCY	Gas	CO2	17.91276687	6215.730105	17.91276687	5638.817116
2040	Annual	Stanislaus (SJV)	MCY	Gas	Fuel	1.890749911	656.0902191		

2040	Annual	Stanislaus (SJV)	MCY	Gas	N2O	0.005405429	1.875683805	1.610817792	507.0744793
2040	Annual	Stanislaus (SJV)	MH	Gas	CH4	3.69E-05	0.012055002	0.000921636	0.273402915
2040	Annual	Stanislaus (SJV)	MH	Gas	CO2	12.27465708	4013.812865	12.27465708	3641.270824
2040	Annual	Stanislaus (SJV)	MH	Gas	Fuel	1.295629365	423.6708025		
2040	Annual	Stanislaus (SJV)	MH	Gas	N2O	0.00011259	0.036816985	0.03355187	9.953145323
2040	Annual	Stanislaus (SJV)	MH	Dsl	CH4	1.75E-05	0.005714777	0.00043691	0.129609
2040	Annual	Stanislaus (SJV)	MH	Dsl	CO2	3.540549013	1157.759527	3.540549013	1050.302077
2040	Annual	Stanislaus (SJV)	MH	Dsl	Fuel	0.315544457	103.1830376		
2040	Annual	Stanislaus (SJV)	MH	Dsl	N2O	0.000556525	0.181983675	0.16584445	49.19767232
									2,051,505.8 TOTAL

calendar_year	sub_area	vehicle_class	fuel	vmt (daily)	
2040	Stanislaus (SJV)	LDA	Gas	10890568.97	
2040	Stanislaus (SJV)	LDA	Dsl	135007.6906	
2040	Stanislaus (SJV)	LDA	Elec	694345.4598	
2040	Stanislaus (SJV)	LDT1	Gas	962283.252	
2040	Stanislaus (SJV)	LDT2	Gas	3000793.318	
2040	Stanislaus (SJV)	MDV	Gas	1914963.649	
2040	Stanislaus (SJV)	LHDT1	Gas	177137.1516	
2040	Stanislaus (SJV)	LHDT2	Gas	25646.20749	
2040	Stanislaus (SJV)	MHDT	Gas	28951.92043	
2040	Stanislaus (SJV)	HHDT	Gas	265.7958159	
2040	Stanislaus (SJV)	LDT1	Dsl	137.634482	
2040	Stanislaus (SJV)	LDT2	Dsl	30560.92976	
2040	Stanislaus (SJV)	MDV	Dsl	68663.42815	
2040	Stanislaus (SJV)	LHDT1	Dsl	175401.5762	
2040	Stanislaus (SJV)	LHDT2	Dsl	68729.12499	
2040	Stanislaus (SJV)	MHDT	Dsl	402009.2124	
2040	Stanislaus (SJV)	HHDT	Dsl	1300017.398	
2040	Stanislaus (SJV)	LDT1	Elec	37594.15471	
2040	Stanislaus (SJV)	LDT2	Elec	96092.84228	
2040	Stanislaus (SJV)	MDV	Elec	70188.96179	
2040	Stanislaus (SJV)	HHDT	NG	1106.847231	
2040	Stanislaus (SJV)	UBUS	Gas	2555.285449	
2040	Stanislaus (SJV)	SBUS	Gas	6191.177087	
2040	Stanislaus (SJV)	OBUS	Gas	6002.690794	
2040	Stanislaus (SJV)	UBUS	Dsl	2185.815926	
2040	Stanislaus (SJV)	SBUS	Dsl	9917.475642	
2040	Stanislaus (SJV)	OBUS	Dsl	14237.54027	
2040	Stanislaus (SJV)	UBUS	NG	8805.715586	
2040	Stanislaus (SJV)	MCY	Gas	68915.44119	
2040	Stanislaus (SJV)	MH	Gas	7703.390327	
2040	Stanislaus (SJV)	MH	Dsl	3656.29996	
					CO2e_annualized [metric tons/year] total for Stanislaus
				7,376,882,270.29	2,051,505.76
					CO2e MT/VMT
					0.000278099

CO2e MT/VMT

0.000278099

City of Modesto VMT, Boundary Method	Base Year	GP Buildout	Alternative
Daily VMT	3,971,900	7,134,600	7,035,200
Annual VMT	1,449,743,500	2,604,129,000	2,567,848,000
CO2e MT/yr	403,173	724,206	714,117

City of Modesto VMT, OD Shared Accounting Method	Base Year	GP Buildout	Alternative
Daily VMT	2,744,400	6,031,300	6,030,700
Annual VMT	1,001,706,000	2,201,424,500	2,201,205,500
CO2e MT/yr	278,574	612,215	612,154

City of Modesto VMT, OD Full Accounting Method	Base Year	GP Buildout	Alternative
Daily VMT	4,158,100	9,857,400	9,893,000
Annual VMT	1,517,706,500	3,597,951,000	3,610,945,000
CO2e MT/yr	422,073	1,000,588	1,004,201