APPENDIX 3.3

Air Quality Documentation

Westbrook Amendment to the Sierra Vista Specific Plan Air Quality and Climate Change Analysis

Westbrook Amendment to the Sierra Vista Specific Plan

Air Quality and Climate Change Analysis

PREPARED FOR:
City of Roseville Planning & Redevelopment
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Westbrook Amendment to the Sierra Vista Specific Plan

Air Quality and Climate Change Analysis

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1 AIR QUALITY

This section includes a discussion of existing air quality conditions, a summary of applicable regulations, and an analysis of potential short and long-term air quality impacts caused by the proposed Sierra Vista Specific Plan (SVSP) Westbrook Amendment (project). The method of analysis is consistent with the recommendations of the Placer County Air Pollution Control District (PCAPCD) and guidance from the California Air Resources Board (ARB). In addition, mitigation measures are recommended as necessary to reduce significant air quality impacts.

1.1 ENVIRONMENTAL SETTING

Air quality in this area is determined by such natural factors as topography, climate, and meteorology, in addition to the presence of existing air pollution sources. These factors are discussed below.

TOPOGRAPHY, METEOROLOGY, AND CLIMATE

The project site is located in the Sacramento Valley Air Basin (SVAB), which is a relatively flat area bordered by the north Coast Ranges to the west and the northern Sierra Nevada to the east. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin Delta (Delta) from the San Francisco Bay Area.

The Mediterranean climate of the SVAB is characterized by hot, dry summers and cool, rainy winters. During the summer, daily temperatures range from 50 degrees Fahrenheit (°F) to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature. Most precipitation in the area results from air masses that move in from the Pacific Ocean, usually from the west or northwest, during the winter months. More than half the total annual precipitation falls during the winter rainy season (November through February); the average winter temperature is a moderate 49°F. Also characteristic of SVAB winters are periods of dense and persistent low-level fog, which are most prevalent between storms. The prevailing winds are moderate in speed and vary from moisture-laden breezes from the south to dry land flows from the north.

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

May through October is ozone season in the SVAB. This period is characterized by poor air movement in the mornings with the arrival of the Delta sea breeze from the southwest in the afternoons. In addition, longer daylight hours provide a plentiful amount of sunlight to fuel photochemical reactions between reactive organic gases (ROG) and oxides of nitrogen (NO_X), which result in ozone formation. Typically, the Delta breeze transports air pollutants northward out of the SVAB; however, a phenomenon known as the Schultz Eddy prevents this from occurring during approximately half of the time from July to September. The Schultz Eddy phenomenon causes the wind to shift southward and blow air pollutants back into the SVAB. This phenomenon exacerbates

the concentration of air pollutant emissions in the area and contributes to the area violating the ambient-air quality standards.

The local meteorology of the project site and surrounding area is represented by measurements recorded at the weather station nearest to the project site, which is the Sacramento International Airport station. The normal annual precipitation is approximately 17 inches. January temperatures range from a normal minimum of 38°F to a normal maximum of 53°F. July temperatures range from a normal minimum of 58°F to a normal maximum of 93°F (WRCC 2011a). The predominant wind direction and speed is from the south at 8 miles per hour (WRCC 2011a, 2011b).

EXISTING AIR QUALITY

CRITERIA AIR POLLUTANTS

Concentrations of emissions of "criteria air pollutants" are used to indicate the quality of the ambient air because these are the most prevalent air pollutants known to be deleterious to human health. A brief description of criteria air pollutants is provided below. Emission source types and health effects are summarized in Table 1-1. Monitoring data applicable to the project site is provided in Table 1-2.

Ozone

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

Emissions of the ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. During the last 20 years the maximum amount of ROG and NO_X over an 8-hour period decreased by 17%. However, the ozone problem in the SVAB still ranks among the most severe in the state (ARB 2009a).

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local sources of NO_X emissions (EPA 2011).

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and exhaust from mobile and stationary sources, construction operations, smoke from fires, natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (ARB 2009a). Fine particulate matter ($PM_{2.5}$) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM_{10} emissions in the SVAB are dominated by emissions from area sources, primarily fugitive dust from

vehicle travel on unpaved and paved roads, farming operations, construction and demolition, and particles from residential fuel combustion. Direct emissions of PM_{10} have increased slightly over the last 20 years, and are projected to continue. $PM_{2.5}$ emissions have remained relatively steady over the last 20 years and are projected to increase slightly through 2020. Emissions of $PM_{2.5}$ in the SVAB are dominated by the same sources as emissions of PM_{10} (ARB 2009a).

Table 1-1 Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Ozone	Secondary pollutant resulting from reaction of ROG and NO_X in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NO_X results from the combustion of fuels	increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide (CO)	Incomplete combustion of fuels; motor vehicle exhaust	headache, dizziness, fatigue, nausea, vomiting, death	permanent heart and brain damage
Nitrogen dioxide (NO_2)	combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, death	chronic bronchitis, decreased lung function
Sulfur dioxide (SO_2)	coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	Insufficient evidence linking SO_2 exposure to chronic health impacts
Respirable particulate matter (PM_{10}), Fine particulate matter ($PM_{2.5}$)	fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in the atmosphere by condensation and/or transformation of SO_2 and ROG	breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	alterations to the immune system, carcinogenesis
Lead	metal processing	reproductive/ developmental effects (fetuses and children)	numerous effects including neurological, endocrine, and cardiovascular effects

Notes: NO_X = oxides of nitrogen; ROG = reactive organic gases.
[1] "Acute" refers to effects of short-term exposures to criteria air pollutants, usually at relatively high concentrations.
[2] "Chronic" refers to effects of long-term exposures to criteria air pollutants, usually at relatively low, ambient concentrations.
Source: EPA 2011.

MONITORING STATION DATA AND ATTAINMENT AREA DESIGNATIONS

Criteria air pollutant concentrations are measured at several monitoring stations in the SVAB. The Auburn-Dewitt-C Avenue and the Roseville-N Sunrise Blvd. stations are the closest stations to the project site with recent data for ozone, PM_{10}, and $PM_{2.5}$. In general, the ambient air quality measurements from these stations are representative of the ambient air quality near the project site. Table 1-2 summarizes the air quality data from the last 3 years.

Table 1-2 Summary of Annual Data on Ambient Air Quality (2008-2010)[1]

	2008	2009	2010
OZONE			
Maximum concentration (1-hr/8-hr avg, ppm)	0.124/0.112	0.108/0.099	0.107/0.090
Number of days state standard exceeded (1-hr/8-hr)	14/36	5/27	5/19
Number of days national standard exceeded (8-hr)	21	14	10
FINE PARTICULATE MATTER ($PM_{2.5}$)			
Maximum concentration ($\mu g/m^3$)	60.0	22.6	27.3
Number of days national standard exceeded (measured[2])	6.5	0	0
RESPIRABLE PARTICULATE MATTER (PM_{10})			
Maximum concentration ($\mu g/m^3$)	73.9	33.6	35.1
Number of days state standard exceeded (measured/calculated[2])	1/6.0	0/0	0/0
Number of days national standard exceeded (measured/calculated[2])	0/0	0/0	0/0

Notes: $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million

[1] Measurements from the Auburn-Dewitt-C Avenue and Roseville-N Sunrise Blvd stations.

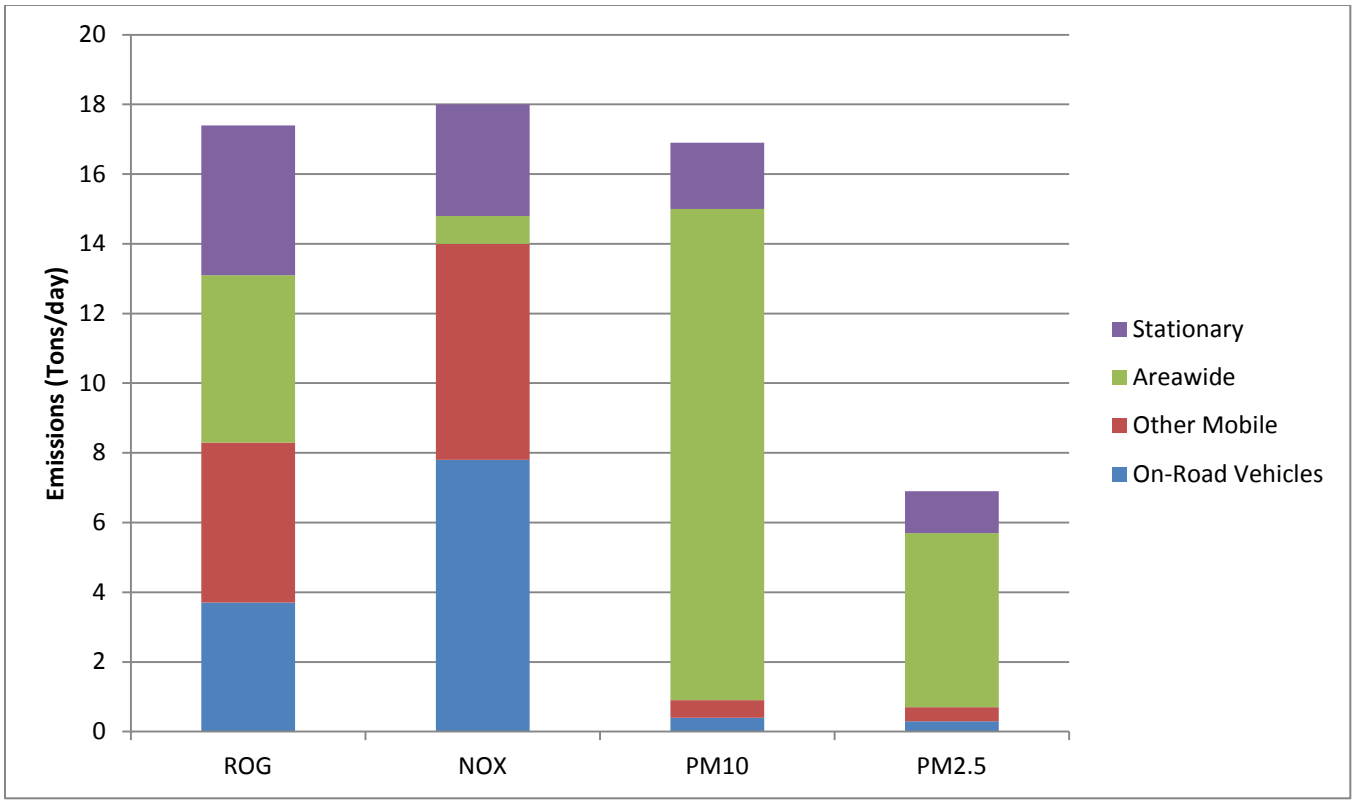
[2] Measured days are those days that an actual measurement was greater than the level of the State daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

Source: ARB 2011a.

Both ARB and the U.S. Environmental Protection Agency (EPA) use this type of monitoring data to designate areas according to their attainment to the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS), respectively. CAAQS and NAAQS are discussed in greater detail in the regulatory setting below and in Table 1-3. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." An area is designated "unclassified" if it cannot be classified as meeting or not meeting the standards on the basis of available information. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. Attainment designations for the year 2010 for the project area are shown in Table 1-3 in the regulatory setting below.

EMISSIONS INVENTORY

Exhibit 1 summarizes emissions of criteria air pollutants for the western portion of Placer County for various source categories. Western Placer County is the portion of the county that extends from just east of the City of Auburn to the western boundary of Placer County, encompassing the entire City of Roseville including the project site. Based on this data, on-road mobile sources are the largest contributor of NO_X emissions (43% of the total NO_X inventory) and also a major contributor of ROG emissions (21% of the total ROG inventory). Areawide sources account for approximately 83% and 72% of the western Placer County's PM_{10} and $PM_{2.5}$ emissions respectively (ARB 2009b).



Source: ARB 2009b.

Exhibit 1-1 Western Placer County 2010 Emissions Inventory of Select Criteria Air Pollutants and Precursors

TOXIC AIR CONTAMINANTS

A toxic air contaminant (TAC), or in federal parlance, hazardous air pollutants (HAPs) is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. Concentrations of TACs are also used to indicate the quality of ambient air. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to the *California Almanac of Emissions and Air Quality* (ARB 2009a), the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate diesel exhaust (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a

complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control system is being used. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

Diesel PM poses the greatest health risk among these 10 TACs mentioned. Based on receptor modeling techniques, ARB estimated its health risk to be 360 excess cancer cases per million people in the SVAB in the year 2000. Since 1990, the health risk associated with diesel PM has been reduced by 52%. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (ARB 2009a).

Sources of TACs in the vicinity of the project site include the City of Roseville Dry Creek Waste Water Treatment Plant located at 1800 Booth Boulevard, which is approximately 2.5 miles southeast of the project site (ARB 2011b). Major highways and roadways are also considered sources of TAC emissions, associated with the presence of diesel PM emissions from vehicle exhaust. The closest main arterials to the project site include Pleasant Grove Boulevard, Fiddyment Road, and Baseline Road. Existing Average Daily Traffic on these roads are 10,900 on Pleasant Grove where it intersects with Fiddyment Road, 9,700 on Baseline Road where it intersects with Watt Avenue, and 20,500 on Fiddyment Road where it intersects with Pleasant Grove Boulevard (City of Roseville 2010).

ODORS

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

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant

concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Existing potential sources of odor in the vicinity of the proposed project include industrial land uses such as the Western Regional Landfill located approximately 4 miles to the northeast and the City of Roseville Dry Creek Waste Water Treatment Plant located at which is approximately 2.5 miles to the southeast. Odors may also be emitted from activities associated with agriculture production on the surrounding land to the west of the City of Roseville.

SENSITIVE LAND USES

Sensitive land uses are generally considered to include those uses where exposure to pollutants could result in health-related risks to individuals. Residential dwellings and places where people recreate or conjugate for extended periods of time such as parks or schools are of primary concern because of the potential for increased and prolonged exposure of individuals to pollutants.

The project site is located in western Placer County, adjacent and to the west of the City of Roseville. Existing land uses in the project vicinity consist of agriculture production and open space. The nearest residences are located on the east side of Fiddyment Road, the eastern boundary of the project site. Coyote Ridge Elementary School, Wishing Well Preschool, and Woodcreek High School are located approximately 0.2, 1, and 1.5 miles, from the eastern boundary of the project site, respectively.

The proposed project would include sensitive land uses such as parks and open space, residential neighborhoods, and an elementary school. The proposed sensitive land uses include approximately 85 acres of park and open space, one elementary school, and 2,029 residential units.

1.2 REGULATORY SETTING

As stated previously, the project site is located in the SVAB. Air quality within the SVAB is regulated by multiple agencies, including the EPA, ARB, and PCAPCD. Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent.

Concentrations of several air pollutants—ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead—indicate the quality of ambient air and are therefore are the premise of air quality regulations. Acceptable levels of exposure to criteria air pollutants have been determined and ambient standards have been established for them (Table 1-3).

Air quality regulations also focus on TACs. In general, for those TACs that are carcinogenic, it is assumed that all concentrations present some level of increased cancer risk. In other words, there is no threshold level below which adverse health impacts would not be expected to occur. EPA and ARB regulate HAPs and TACs, respectively, that are generated by stationary sources through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT). These statutes and regulations, in conjunction with additional rules set forth by PCAPCD, establish the regulatory framework for TACs.

Applicable regulations associated with criteria air pollutants, TACs, and odors are described below.

1.2.1 FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

CRITERIA AIR POLLUTANTS

At the federal level, EPA implements national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), enacted in 1970. The most recent major amendments were passed by Congress in 1990.

Pursuant to the CAA, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead (ARB 2010a). The NAAQS are summarized in Table 1-3. The primary standards protect public health and the secondary standards protect public welfare. The CAA also requires each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states to revise their SIPs to incorporate additional control measures to reduce air pollution in those areas designated as nonattainment with the NAAQS. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA reviews all state SIPs to determine whether they conform to the mandates of the CAA and its amendments and whether implementing them will achieve air quality goals. If EPA determines a SIP to be inadequate, a Federal Implementation Plan that imposes additional control measures may be prepared for the nonattainment area. If the state fails to submit an approvable SIP or to implement the plan within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the nonattainment area.

Table 1-3 Ambient Air Quality Standards and Designations for Placer County

Pollutant	Averaging Time	California		National Standards [1]	
		Standards [2,3]	Attainment Status [4]	Primary [3]	Attainment Status [6]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	N	–	N
	8-hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)	
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	U	35 ppm (40 mg/m^3)	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	A	0.053 ppm (100 µg/m^3)	U/A
	1-hour	0.18 ppm (339 µg/m^3)		–	
Sulfur Dioxide (SO_2)	24-hour	0.04 ppm (105 µg/m^3)	A	–	U
	3-hour	–		0.5 ppm (1300 µg/m^3)[5]	
	1-hour	0.25 ppm (655 µg/m^3)		–	

Table 1-3 Ambient Air Quality Standards and Designations for Placer County

Pollutant	Averaging Time	California		National Standards [1]	
		Standards [2,3]	Attainment Status [4]	Primary [3]	Attainment Status [6]
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N	–	U
	24-hour	50 µg/m^3		150 µg/m^3	
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	U	15.0 µg/m^3	U/A
	24-hour	–		35 µg/m^3	
Lead [7]	30-day Average	1.5 µg/m^3	A	–	–
	Calendar Quarter	–	-	1.5 µg/m^3	A
	Rolling 3-Month Avg	–		0.15 µg/m^3	
Sulfates	24-hour	25 µg/m^3	A	No National Standards	
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	U		
Vinyl Chloride [7]	24-hour	0.01 ppm (26 µg/m^3)	-		
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer—visibility of 10 mi or more	U		

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

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

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

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

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

[5] Secondary Standard

[6] Nonattainment (N): any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.
Attainment (A): any area that meets the national primary or secondary ambient air quality standard for the pollutant.
Unclassifiable (U): any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.
Maintenance (M): any area previously designated nonattainment pursuant to the CAAA of 1990 and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan under Section 175A of the CAA, as amended.

[7] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Sources: ARB 2010a; ARB 2010b.

HAZARDOUS AIR POLLUTANTS

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

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

1.2.2 STATE PLANS, POLICIES, REGULATIONS, AND LAWS

CRITERIA AIR POLLUTANTS

ARB coordinates and oversees the state and local programs for controlling air pollution in California and implements the California Clean Air Act (CCAA), adopted in 1988. The CCAA requires ARB to establish California ambient air quality standards (CAAQS) (Table 1-3) (ARB 2010a). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

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

ARB also oversees local air district compliance with federal and state laws, approving local air quality plans, submitting SIPs to EPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

TOXIC AIR CONTAMINANTS

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588 [Statutes of 1987]). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. This process includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. ARB has

identified more than 21 TACs to date and has adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate BACT to minimize emissions; for example, the ATCM limits truck idling to 5 minutes (Title 13, Section 2485 of the California Code of Regulations).

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted diesel exhaust control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new rule for public-transit bus fleets and emissions standards for new urban buses. These new rules and standards include all of the following elements:

- more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines;
- zero-emission bus demonstration and purchase requirements applicable to transit agencies; and
- reporting requirements, under which transit agencies must demonstrate compliance with the public-transit bus fleet rule.

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

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

1.2.3 REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

PLACER COUNTY AIR POLLUTION CONTROL DISTRICT

PCAPCD attains and maintains air quality conditions in Placer County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of PCAPCD includes preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, and issuing permits for stationary sources of air pollution. PCAPCD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA, CAAA, and CCAA.

Rules

All projects are subject to adopted PCACPD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the proposed project may include but are not limited to the following:

- **Rule 202—Visible Emissions.** A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than 3 minutes in any one hour which is as dark or darker in shade as that designated as number 1 on the Ringelmann Chart, as published by the United States Bureau of Mines.
- **Rule 205-Nuisance**. A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause to have a natural tendency to cause injury or damage to business or property. The provisions of Rule 205 do not apply to odors emanating from agriculture operations necessary for the growing of crops or raising of fowl or animals.
- **Rule 207-**For the Sacramento Valley Air Basin and the Mountain Counties Air Basin portions of the Placer County Air Pollution Control District a person shall not release or discharge into the atmosphere from any source or single processing unit, exclusive of sources emitting combustion contaminants only, particulate matter emissions in excess of: 0.1 grains per cubic foot of gas at PCAPCD standard conditions.
- **Rule 217—Cutback and Emulsified Asphalt Paving Materials.** A person shall not manufacture for sale nor use for paving, road construction, or road maintenance any: rapid cure cutback asphalt; slow cure cutback asphalt containing organic compounds which evaporate at 500°F or lower as determined by current American Society for Testing and Materials (ASTM) Method D402; medium cure cutback asphalt except as provided in Section 1.2.; or emulsified asphalt containing organic compounds which evaporate at 500°F or lower as determined by current ASTM Method D244, in excess of 3% by volume.
- **Rule 218—Application of Architectural Coatings.** No person shall: (i) manufacture, blend, or repackage for sale within PCAPCD; (ii) supply, sell, or offer for sale within PCAPCD; or (iii) solicit for application or apply within PCAPCD, any architectural coating with a volatile organic carbon (VOC) content in excess of the corresponding specified manufacturer's maximum recommendation. "Manufacturer's maximum recommendation" means the maximum recommendation for thinning that is indicated on the label or lid of the coating container.
- **Rule 225- Wood Burning Appliances** No person shall sell or supply new wood burning appliances unless it is a U.S. EPA phase II Certified wood burning appliance, pellet-fueled wood burning heater, masonry heater, or determined to meet the U.S. EPA standard for particulate matter emissions standards.

- **Rule 228—Fugitive Dust.**
  - Visible Emissions Not Allowed Beyond the Boundary Line: A person shall not cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area (including disturbance as a result of the raising and/or keeping of animals or by vehicle use), such that the presence of such dust remains visible in the atmosphere beyond the boundary line of the emission source.
  - Visible Emissions from Active Operations: In addition to the requirements of Rule 202, Visible Emissions, a person shall not cause or allow fugitive dust generated by active operations, an open storage pile, or a disturbed surface area, such that the fugitive dust is of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke as dark or darker in shade as that designated as number 2 on the Ringelmann Chart, as published by the United States Bureau of Mines.
  - Concentration Limit: A person shall not cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter ($\mu g/m^3$) (24-hour average) when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other EPA-approved equivalent method for PM_{10} monitoring.
  - Track-Out onto Paved Public Roadways: Visible roadway dust as a result of active operations, spillage from transport trucks, and the track-out of bulk material onto public paved roadways shall be minimized and removed.
    - The track-out of bulk material onto public paved roadways as a result of operations, or erosion, shall be minimized by the use of track-out and erosion control, minimization, and preventative measures, and removed within 1 hour from adjacent streets any time track-out extends for a cumulative distance of greater than 50 feet onto any paved public road during active operations.
    - All visible roadway dust tracked-out upon public paved roadways as a result of active operations shall be removed at the conclusion of each work day when active operations cease, or every 24 hours for continuous operations. Wet sweeping or a High Efficiency Particulate Air (HEPA) filter equipped vacuum device shall be used for roadway dust removal.
    - Any material tracked-out, or carried by erosion, and clean-up water, shall be prevented from entering waterways or storm water inlets as required to comply with water quality control requirements.
  - Minimum Dust Control Requirements: The following dust mitigation measures are to be initiated at the start and maintained throughout the duration of the construction or grading activity, including any construction or grading for road construction or maintenance.
    - Unpaved areas subject to vehicle traffic must be stabilized by being kept wet, treated with a chemical dust suppressant, or covered.
    - The speed of any vehicles and equipment traveling across unpaved areas must be no more than 15 miles per hour unless the road surface and surrounding area is sufficiently stabilized to prevent vehicles and equipment traveling more than 15 miles per hour from emitting dust exceeding Ringelmann 2 or visible emissions from crossing the project boundary line.
    - Storage piles and disturbed areas not subject to vehicular traffic must be stabilized by being kept wet, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile.
    - Prior to any ground disturbance, including grading, excavating, and land clearing, sufficient water must be applied to the area to be disturbed to prevent emitting dust exceeding Ringelmann 2 and to minimize visible emissions from crossing the boundary line.

- Construction vehicles leaving the site shall be cleaned to prevent dust, silt, mud, and dirt, from being released or tracked off-site.
- When wind speeds are high enough to result in dust emissions crossing the boundary line, despite the application of dust mitigation measures, grading and earthmoving operations shall be suspended.
- No trucks are allowed to transport excavated material off-site unless the trucks are maintained such that no spillage can occur from holes or other openings in cargo compartments, and loads are either covered with tarps; or wetted and loaded such that the material does not touch the front, back, or sides of the cargo compartment at any point less than 6 inches from the top and that no point of the load extends above the top of the cargo compartment.

- Wind-Driven Fugitive Dust Control: A person shall take action(s), such as surface stabilization, establishment of a vegetative cover, or paving, to minimize wind-driven dust from inactive disturbed surface areas.

- **Rule 501—General Permit Requirements.** Any person operating an article, machine, equipment, or other contrivance, the use of which may cause, eliminate, reduce, or control the issuance of air contaminants, shall first obtain a written permit from the Air Pollution Control Officer (APCO). Stationary sources subject to the requirements of Rule 507, Federal Operating Permit Program, must also obtain a Title V permit pursuant to the requirements and procedures of that rule.

- **Rule 502—New Source Review and Rule 507—Federal Operating Permit.** All stationary sources that possess the potential to emit TACs or certain levels of criteria air pollutants or precursors are required to attain applicable permits and are subject to particular emissions controls based on the types and amounts of pollutant emissions.

Air Quality Plans

PCAPCD, in coordination with the air quality management districts and air pollution control districts of El Dorado, Sacramento, Solano, Sutter, and Yolo Counties, prepared and submitted the *1991 Air Quality Attainment Plan* (AQAP). The plan complies with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and, to a lesser extent, CO and PM_{10}. The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the attainment plan must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections.

The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the *1994 Ozone Attainment Plan* (OAP). The OAP stresses attainment of ozone standards and focuses on strategies for reducing emissions of ozone precursors (i.e., ROG and NO_x). It promotes active public involvement, enforcement of compliance with PCAPCD rules and regulations, education for professionals in the public and private sectors, development and promotion of transportation and land use programs designed to reduce vehicle miles travelled (VMT) within the region, and implementation of stationary- and mobile-source control measures. Additional triennial reports were also prepared in 1997, 2000, 2003, and 2009 in compliance with the CCAA; these reports act as incremental updates to the AQAP.

City of Roseville General Plan

The following goals, objectives, and policies are included in the City of Roseville General Plan Air Quality and Climate Change Element (City of Roseville 2010).

Goals

- **Air Quality Goal 1.** Improve Roseville's air quality by: a) Achieving and maintaining ambient air quality standards established by EPA and the ARB; and b) Minimizing public exposure to toxic or hazardous air pollutants and any pollutants that create a public nuisance though irritation to the senses (such as unpleasant odors).
- **Air Quality Goal 2.** Integrate air quality planning with the land use and transportation planning process.
- **Air Quality Goal 3.** Encourage the coordination and integration of all forms of public transport while reducing motor vehicle emissions through a decrease in the average daily trips and vehicle miles traveled and by increasing the commute vehicle occupancy rate by 50% to 1.5 or more persons per vehicle.
- **Air Quality Goal 4.** Increase the capacity of the transportation system, including the roadway system and alternate modes of transportation.
- **Air Quality Goal 5.** Provide adequate pedestrian and bikeway facilities for present and future transportation needs.
- **Air Quality Goal 6.** Promote a well-designed and efficient light rail and transit system.
- **Air Quality Goal 7.** While recognizing that the automobile is the primary form of transportation, the City of Roseville should make a commitment to shift from the automobile to other modes of transportation.

Policies

- **Air Quality Policy 1.** Cooperate with other agencies to develop a consistent and effective approach to air pollution planning.
- **Air Quality Policy 2.** Work with PCAPCD to monitor all air pollutants of concern on a continuous basis.
- **Air Quality Policy 3.** Develop consistent and accurate procedures for evaluating the air quality impacts of new projects.
- **Air Quality Policy 4.** As part of the development review process, develop mitigation measures to minimize stationary and area source emissions.
- **Air Quality Policy 5.** Develop transportation systems that minimize vehicle delay and air pollution.
- **Air Quality Policy 6.** Develop consistent and accurate procedures for mitigating transportation emissions from new and existing projects.
- **Air Quality Policy 7.** Encourage alternative modes of transportation including pedestrian, bicycle, and transit.
- **Air Quality Policy 8.** Separate air pollution-sensitive land uses from sources of air pollution.
- **Air Quality Policy 9.** Encourage land use policies that maintain and improve air quality.
- **Air Quality Policy 10.** Conserve energy and reduce air emissions by encouraging energy efficient building designs and transportation systems.

CITY OF ROSEVILLE DEVELOPMENT STANDARDS

The City maintains policies and guidelines regarding grading, erosion control, inspection, and permitting. Section 16.20.040 of the Roseville Municipal Code regulates stockpiling and grading, and addresses condition under which permits and grading plans are required. Section 16.20.070 identifies grading plan performance standards.

A grading plan shall comply with the following criteria:

A. Fill or cut slopes with a height exceeding five feet shall not exceed a slope of 4:1.

B. When grading around native oak trees:

1. Cut or fill slopes exceeding two feet in height shall not be permitted within a distance of 1.5 times the radius of the tree's protected zone.

2. The grade shall not be raised or lowered around more than 50 percent of the protected zone; and

3. The grading shall not change the drainage pattern within a distance of 1.5 times the radius of the tree's protected zone.

Section 16.20.020 requires that all grading be performed in accordance with either City of Roseville Improvement Standards or Chapter 16 of the Zoning Ordinance, whichever, is more restrictive. The Public Works Department requires that a grading permit be obtained prior to grading activities. At that time the Applicant must submit, for review and approval, Improvement and/or Grading Plans along with a site-specific Stormwater Pollution Prevention Plan (SWPPP). Slopes or banks along creek channels must be designed with proper slope protection to prevent soil erosion and channel-bank undercutting. The City has also adopted standards that would apply to project s within public right-of-way or easements.

1.3 IMPACT ANALYSIS

This section describes the project's construction-related (short-term) and operation-related (long-term) effects on air quality. The discussion includes the criteria for determining the level of significance of the effects and a description of the methods and assumptions used to conduct the analysis.

1.3.1 METHODS OF ANALYSIS

Short-term construction-generated emissions of criteria air pollutants and ozone precursors were assessed in accordance with methods recommended by PCAPCD. Where quantification of mass emissions is required, estimates were modeled using the URBEMIS 2007 Version 9.2.4 computer program (URBEMIS) (Rimpo and Associates 2008), which is approved by PCAPCD. URBEMIS was used to determine whether short-term construction-related emissions of criteria air pollutants associated with development of the proposed land uses on the project site would exceed applicable thresholds and where mitigation would be required. Modeling was based on project-specific data, when available. However, when project-specific information (e.g., amount of land to be disturbed/graded per day, types of equipment to be used, number of construction employees) was not available, reasonable assumptions and default settings were used to estimate criteria air pollutant and precursor emissions. A detailed list of modeling assumptions is provided in Appendix A.

Long-term (i.e., operational) regional emissions of criteria air pollutants and precursors, including mobile- and area-source emissions, were also quantified using the URBEMIS. URBEMIS allows land use selections that include project location specifics and trip generation rates. URBEMIS accounts for area-source emissions from the use of natural gas, landscape maintenance equipment, and consumer products and from mobile-source emissions associated with vehicle trip generation. Project-generated emissions were modeled based on general information provided in the project description and trip generation from the transportation analysis prepared for this project (Fehr and Peers 2011). Trip rates presented in the traffic analysis account for internal trips and therefore no adjustments for pass-by trips were made in the URBEMIS model.

The potential for vehicle trips generated by the proposed project to contribute to exceedances of the NAAQS and CAAQS at congested intersections in the project area is evaluated using the screening methodology recommended by the Sacramento Metropolitan Air Quality Management District (SMAQMD). SMAQMD's methodology is used in the absence of guidance from PCAPCD. Applying SMAQMD's screening methodology to the proposed project is appropriate because the meteorology conditions, ambient CO levels, and vehicle fleet mix of the Roseville area are similar to those of Sacramento County.

Construction-related emissions of TACs were evaluated based on the mass of $PM_{2.5}$ exhaust emitted by heavy-duty construction equipment, which is considered a surrogate for diesel PM, the duration of equipment use at any single location, the proximity of nearby sensitive receptors.

The potential for stationary sources that emit TACs to be developed on the project site to impact existing and future planned nearby sensitive receptors was also analyzed qualitatively. The analysis discusses those PCAPCD rules that regulate the influence of health risk exposure from stationary TAC sources.

The potential for sensitive receptors and sources of TACs to be located in close proximity to each other was evaluated using guidance from an ARB publication, *Air Quality and Land Use Handbook: A Community Health Perspective* (ARB 2005). The handbook provides guidance concerning land use compatibility with sources of TAC emissions. The handbook offers recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities. The handbook is advisory and not regulatory, but it offers the recommendations identified below that are pertinent to the project.

- Avoid siting residential land uses or schools within 1,000 feet of a major service and maintenance rail yard.
- Avoid siting new commercial trucking facilities that accommodate more than 100 trucks per day, or 40 trucks equipped with transportation refrigeration units (TRUs), within 1,000 feet of sensitive receptors (e.g., residences, schools, or parks).
- Avoid siting new sensitive land uses within 300 feet of a large gasoline station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gasoline-dispensing facilities.
- Avoid siting new sensitive land uses within 300 feet of any dry-cleaning operation using perchloroethylene (perc). For operations with two or more machines, provide 500 feet. For operations with three or more machines, consult the local air district (i.e., PCAPCD). Do not site new sensitive land uses in the same building with dry-cleaning operations that use perc.
- Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads carrying 100,000 vehicles per day, or rural roads carrying 50,000 vehicles per day.
- Obtain facility-specific information where there are questions about siting a sensitive land use close to an industrial facility, including the amount of pollutant emitted and its toxicity, distance to nearby receptors, and types of emissions controls in place.

It is important to note, however, that ARB's Handbook are considered screening level guidance and do not contain recommended thresholds of significance. However, the City has decided to use these screening levels as the threshold of significance for evaluating roadside TAC exposure in this analysis. The City believes that the decision to use ARB's recommended screening criteria as a threshold of significance is appropriate, in part, due to expected future changes in the inventory of mobile-source TAC emissions in the SVAB. In 2000, the total SVAB-wide average risk from inhalation of TACs of 520 chances in one million, as determined by ARB, accounts

for emissions of 10 select TACs that pose the greatest risk in California based primarily on ambient air quality data from all sources (e.g., stationary, area, on-road mobile, other mobile, and natural). According to ARB's emissions inventory for 2000, approximately 23% of the total acetaldehyde emissions for that year, 43% of benzene, 39% of 1,3-butadiene, 31% of formaldehyde, and 28% of diesel PM emitted in the SVAB were associated with on-road mobile sources (ARB 2009a). Based on these percentages and the individual health risks as determined by ARB in 2000 for each TAC, approximately 27.5% (143 chances in one million) of the total SVAB estimated inhalation risk of 520 chances in one million was associated with on-road mobile sources, 70% of the risk being attributable to diesel PM alone. According to ARB, implementation of the risk reduction plan to reduce diesel PM is estimated to drop concentrations and associated health risk by 75% and 85% in 2010 and 2020, respectively, from the estimated 2000 level (ARB 2009a).

Nonetheless, the City does not intend for its use of the screening criteria in ARB's handbook as thresholds of significance to establish a precedent for the CEQA or NEPA analyses performed for other projects in the region, in part, because ARB is expected to continue to develop guidance and rules regarding mobile-source TAC emissions as future studies of roadside concentrations of TACs become available.

The potential for construction and operation the proposed project to result in excessive exposure of receptors with odorous emissions is analyzed qualitatively, with consideration to the types of odor sources in the project area and the types of land uses proposed on the project site.

1.3.2 THRESHOLDS OF SIGNIFICANCE

Per Appendix G of the CEQA Guidelines, air quality impacts are considered significant if implementation of the proposed project would do any of the following:

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

As stated in Appendix G, the significance criteria established by the applicable air quality management district may be relied on to make the above determinations. Thus, in accordance with PCAPCD-recommended thresholds for evaluating project-related air quality impacts, implementation of the proposed project would be considered significant if operation of the proposed land uses for the project site would:

- Generate short-term construction-related criteria air pollutant or precursor emissions that exceed the PCAPCD-recommended threshold of 82 pounds per day (lb/day) for NO_x, or 82 lb/day for ROG, or 82 lb/day for PM_{10};
- Generate long-term regional criteria air pollutant or precursor emissions that exceed the PCAPCD recommended threshold of 82 lb/day for NO_x, or 82 lb/day for ROG, or 82 lb/day for PM_{10};
- Contribute to localized concentrations of air pollutants at nearby receptors that would exceed applicable ambient air quality standards;

- Expose sensitive receptors to TAC emissions that exceed an incremental increase of 10 in 1 million for the carcinogenic risk (i.e., the risk of contracting cancer) and/or a noncarcinogenic Hazard Index of 1.0 at the Maximally Exposed Individual (MEI). This threshold of significance applies to projects that would introduce new stationary or area sources of TAC emissions in close proximity to existing or future planned sensitive receptors. PCAPCD does not have a recommended threshold of significance for evaluating projects that would locate sensitive receptors near existing sources of TAC emissions such as a freeway, high-volume roadway, or rail yard. For the purposes of this analysis, the City will use applicable screening criteria recommended by ARB as thresholds of significance to evaluate instances in which the proposed project would locate a sensitive receptor in close proximity to a freeway, high-volume roadway, or a TAC-emitting land use such as a gasoline station or a dry-cleaning operation that uses perchloroethylene;
- Generate localized concentrations of CO that exceed the PCAPCD recommended threshold of 550 lb/day and that exceed the 1-hour CAAQS of 20 (ppm) or the 8-hour CAAQS of 9 ppm;
- Expose sensitive receptors to excessive nuisance odors, as defined under PCAPCD Rule 205 (as mentioned in the Regulatory Setting above).

1.3.3 IMPACTS AND MITIGATION MEASURES

IMPACT 1-1 **Generation of Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors.** Construction activities associated with the project would generate intermittent emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$.Because of the relatively large size of the project, construction-generated emissions of ROG and PM_{10} would exceed PCAPCD-recommended thresholds and could contribute to emissions concentrations that exceed the NAAQS and CAAQS. Thus, project-generated, construction-related emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, and/or conflict with air quality planning efforts.

Construction emissions are considered short term and temporary in duration, but have the potential to represent a significant impact with respect to air quality. PM_{10} and $PM_{2.}5$ are among the pollutants of greatest concern with respect to construction activities. Particulate emissions from construction activities can lead to adverse health effects and nuisance concerns, such as reduced visibility and soiling of exposed surfaces. Particulate emissions can result from a variety of construction activities, including excavation, grading, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction emissions of PM_{10} can vary greatly depending on the level of activity, the specific operations taking place, the number and types of equipment operated, local soil conditions, weather conditions, and the amount of earth disturbance (e.g., site grading, excavation, cut-and-fill).

Emissions of ozone precursors, ROG and NO_X, are primarily generated from mobile sources and vary as a function of vehicle trips associated with delivery of construction materials, any importing and exporting of soil or other earthen materials, vendor trips, and worker commute trips; and the types and number of heavy-duty, off-road equipment used and the intensity and frequency of their operation. A large portion of construction-related ROG emissions also results from the application of asphalt and architectural coatings. Thus, ROG emissions would vary based on the amount of coatings and paving applied each day.

Project-generated emissions of criteria air pollutants (e.g., PM_{10} and $PM_{2.5}$) and precursors (i.e., ROG and NO_X) were modeled based on general information provided in the project description and default PCAPCD-recommended settings and parameters attributable to the proposed land use types and site location. Construction of the land uses proposed on the approximately 400-acre project site could begin as early as 2014 and full buildout of the project area would occur over a 20- to 30-year period. Based on discussions with City staff it was conservatively assumed that up to 20% of the proposed land uses could be built in any one-year period (Pease, pers. comm. 2011). Based on the seasonal nature of construction it was further assumed that construction of most individual land uses would occur during the spring, summer and Fall months.

Table 1-4 summarizes the modeled worst-case daily emissions of criteria air pollutants and precursors associated with construction of the proposed project. Refer to Appendix A for a detailed summary of the modeling assumptions, inputs, and outputs.

Table 1-4 Summary of Modeled Maximum Daily Criteria Air Pollutant and Precursor Emissions from Construction Activities

Construction Activity	Emissions (lb/day)				
	ROG	NO_X	CO	PM_{10}	$PM_{2.5}$
Unmitigated	156	35	64	133	29
Mitigated	156[1]	30	64[1]	34	9
PCAPCD Thresholds of Significance	82	82	550	82	NA

Notes:
lb/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter with aerodynamic diameter less than 10 microns; $PM_{2.5}$ = particulate matter with aerodynamic diameter less than 2.5 microns; PCAPCD = Placer County Air Pollution Control District; yr= year.
[1] Mitigation that addressed exhaust emissions of PM_{10} and NO_X from off-road equipment would also reduce exhaust emissions of ROG equipment by approximately 5%, or 0.1 lb/day, which is not reflected in the table due to rounding; however, nearly all ROG emissions associated with construction activities are evaporative emissions of ROG from the application of architectural coatings and from asphalt paving. This mitigation would also result in a reduction in CO; however, the reduction achieved by this measure cannot be quantified.
Detailed assumptions and modeling output files are included in Appendix A.
Source: Modeling Conducted by Ascent Environmental 2011.

As shown in Table 1-4, the maximum daily level of construction-generated ROG and PM_{10} emissions would exceed the applicable PCAPCD thresholds and could contribute to emission concentrations that exceed the NAAQS and CAAQS. Thus, project-generated, construction-related emissions of criteria air pollutants and precursors could violate or contribute substantially to the nonattainment status in the region for ozone, expose sensitive receptors to substantial pollutant concentrations, and/or conflict with air quality planning efforts. As a result, this would be a **significant impact**.

While the projected levels of construction-generated emissions of NO_x would not be anticipated to exceed threshold of 82 lb/day, as shown in Table 1-4, they would likely occur at the same time construction of other phases of the SVSP is taking place. According to the SVSP the mitigated levels of NO_x emissions associated with construction of would range from 35.0-79.9 lb/day depending on year and area being developed. As a result, combined, or cumulative, levels of construction-related NO_x emissions would exceed the 82 lb/day threshold and be a significant impact. Therefore, NO_x emissions generated by construction of the project site would be **cumulatively considerable** in addition to emissions of ROG and PM_{10}.

Mitigation Measure 1-1

To reduce short-term construction emissions, applicant(s) or their contractors shall submit to PCAPCD a Construction Emission / Dust Control Plan at least 30 days prior to grading, excavation, or other ground

disturbance activity. The plan must explain how all construction activities will comply with the minimum requirements in sections 300 and 400 of PCAPCD Rule 228, Fugitive Dust Emissions; Rule 202, Visible Emissions; Rule 218, Architectural Coatings. The applicant(s) shall provide to the City a copy of the plan and evidence that the plan was submitted to PCAPCD. The applicant(s) shall not break ground prior to receiving PCAPCD approval of the Construction Emission/Dust Control Plan and delivering that approval to the City. However, if PCAPCD does not respond within 20 days, the plan shall be considered approved by PCAPCD.

The plan shall include all measures necessary to comply with PCAPCD Rules 202 and 228, any other PCAPCD rules applicable at the time, as well as the dust control measures and exhaust control measures provided below. The measures listed below are identical to the measures required by Mitigation Measure 4.4-1 of the SVSP EIR, unless otherwise noted.

Fugitive PM Dust Control Measures

- *In order to control dust, operational watering trucks shall be on site during times when ground disturbance activity is performed, including excavation, grading, and travel on unpaved surfaces. (This measure was not required by the SVSP EIR.)*

- *Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways shall be covered. (The first sentence of this measure was required by the SVSP EIR; however, the second sentence was not.)*

- *Suspend excavation, grading, and/or demolition activity using off-road equipment when wind speeds exceed 15 mph. (The SVSP EIR included a measure that requires grading activity to be suspended during high winds but not during excavation or demolition activity.)*

- *Sweep streets as necessary if silt is carried off-site to adjacent public thoroughfares or occurs as a result of hauling.*

- *Dispose of surplus excavated material in accordance with local ordinances and use sound engineering practices.*

- *Schedule activities to minimize the amounts of exposed excavated soil during and after the end of work periods, to the extent feasible.*

- *Phase grading into smaller areas to prevent the susceptibility of larger areas to erosion or wind disturbance over extended periods of time, to the extent feasible.*

- *Pave, apply gravel, or apply soil binders to any on-site haul roads, employee parking areas, and equipment staging areas. Soil binders shall be non-toxic in accordance with State and local regulations. (A measure in the SVSP EIR required that soil binders be spread on unpaved roads and parking areas but did not include the alternatives of applying gravel or paving.)*

- *Apply approved chemical soil stabilizers or vegetated mats, according to manufacturers' specifications, to all-inactive construction areas (previously graded areas which remain inactive for 96 hours or longer).*

- *Reestablish ground cover on exposed, disturbed surfaces (e.g., graded areas) on site through seeding and watering as soon as possible.*

- *Clean earth moving construction equipment with water or sweep clean, a minimum of once per day consistent with National Pollutant Discharge Elimination System Best Management Practices and the Roseville Grading Ordinance. Construction vehicles leaving the site shall be cleaned, as needed, to prevent dust, silt, mud, and dirt from being released or tracked offsite.*

Exhaust Emission Control Measures

- *The Construction Emission/Dust Control Plan shall include a comprehensive inventory (i.e., make, model, year, emission rating) of all heavy-duty off-road equipment (50 horsepower (HP) or greater) that will be used an aggregate of 40 or more hours for the construction project. The project representative shall provide PCAPCD with the anticipated construction timeline including start date, name, and phone number of the project manager and on-site foreman. The plan shall demonstrate that the heavy-duty (i.e., 50 horsepower, or greater) off-road vehicles to be used in the construction project, including owned, leased and subcontractor vehicles, would achieve a project wide fleet-average 20% NO_x reduction and 45% particulate reduction compared to the most recent statewide fleet average. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available. Contractors can use the Construction Mitigation Calculator worksheet model developed by the Sacramento Metropolitan Air Quality Management District web site to determine if their off-road equipment fleet meets the requirements listed in this measure (SMAQMD 2010b).*

- *All construction equipment shall be maintained in good operating condition. The prime contractor shall ensure that all construction equipment is being properly serviced and maintained as per the manufacturer's specifications. Maintenance records shall be available at the construction site for verification.*

- *An applicant representative who is certified by ARB to perform Visible Emissions Evaluations (VEE), shall routinely (i.e., once per week) evaluate project-related off-road equipment emissions for compliance with PCAPCD Rule 202.*

- *Idling of all on-road and off-road diesel equipment on the site shall be limited to a maximum of 5 minutes. The applicant(s) shall provide clear signage that posts this requirement for workers at the entrances to the site.*

- *Staging areas for off-road equipment and areas where on-road delivery trucks load and unload materials shall be located as far as possible from nearby sensitive receptors (i.e., residential units, schools, and hospitals). (This measure was not included in the SVSP EIR for construction activity.)*

- *To the extent feasible, construction contractors shall use electric construction power for construction operations, in lieu of diesel-powered generators to provide adequate power to any construction equipment, as feasible . (In order to provide clarity, this measure is included instead of the measure in the SVSP EIR that requires construction contractors to utilize existing power sources [e.g., power poles]).During construction, no open burning of removed vegetation shall be allowed unless permitted by the PCAPCD. All removed vegetative material shall be either chipped on site or taken to an appropriate recycling site, biomass power plant, or if a site is not available, a licensed disposal site. (This measure was not included in the SVSP EIR.)*

Significance after Mitigation

The dust control measures in Mitigation Measure 1-1 would reduce short-term construction-related emissions of fugitive PM_{10} dust by approximately 75% (SMAQMD 2010a). The exhaust control measures in Mitigation Measure 1-1 would reduce exhaust emissions of NO_x, PM_{10}, and ROG from off-road construction equipment by 20%, 45%, and 5%, respectively. As a result, the mitigated maximum daily emissions of PM_{10} would be less than PCAPCD's threshold of 82 lb/day, as shown in Table 1-4. Maximum daily emission of NO_x would also be reduced and because exhaust emissions from off-road construction equipment would be substantially lower than the statewide fleet, thee emissions would not be cumulatively considerable. Maximum daily emissions of ROG, however, would not be reduced to a level below the PCAPCD's threshold of 82 lb/day. Therefore, this impact would be **significant and unavoidable.**

IMPACT 1-2 **Generation of Long-Term Operational (Regional) Emissions of Criteria Air Pollutants and Precursors.** Operational area- and mobile-source emissions from project implementation would exceed the PCAPCD-recommended threshold of 82 lb/day for ROG, NO_X, and PM_{10}, and would result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS for ozone and PM_{10}.

Operation of the land uses proposed on the project site would result in long-term regional emissions of ROG, NO_X, and PM_{10} associated with area sources, such as natural gas emissions, landscaping, applications of architectural coatings, in addition to operational vehicle-exhaust emissions. Full buildout of the project site could occur as soon as 2025.

Modeled operational emissions for the proposed project are presented in Table 1-5. Refer to Appendix A for a detailed summary of the URBEMIS modeling assumptions, inputs, and outputs. Mobile-source emissions were modeled using trip generation rates provided in the traffic study prepared for the project (Fehr and Peers 2011). The trip generation rates are project-specific because they take into account those land use planning measures identified in the SVSP that aim to reduce vehicle trips to the extent that these reductions can be quantified.

Table 1-5 Summary of Modeled Long-Term Operational Emissions of Criteria Air Pollutant and Precursors

Operations (2025 Buildout)	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Mobile-Source Emissions	134	110	460	87
Area-Source Emissions	140	29	0.2	0.2
Total Operational	273	129	460.2	87.2
PCAPCD Thresholds of Significance	82	82	82	NA

Notes:
lb/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter with aerodynamic diameter less than 10 microns; $PM_{2.5}$ = particulate matter with aerodynamic diameter less than 2.5 microns; PCAPCD = Placer County Air Pollution Control District; yr= year.
Values may not sum to match total due to rounding.
Detailed assumptions and modeling output files are included in Appendix A.
Source: Modeling Conducted by Ascent Environmental 2011.

As shown in Table 1-5, operation of the proposed project under full buildout would result in an increase in unmitigated long-term regional emissions of approximately 273 lb/day of ROG, 129 lb/day of NO_X, and 460 lb/day of PM_{10}, and 87 lb/day of $PM_{2.5}$. Operational related emissions would exceed the PCAPCD-recommended threshold of 82 lb/day for ROG, NO_X, and PM_{10}, and would result in or substantially contribute to emissions

concentrations that exceed the NAAQS or CAAQS. In addition, because development of the project site is not included in an existing approved general plan, and operational emissions of criteria air pollutants and precursors associated with land use development on the site are not accounted for in applicable air quality plans, implementation of the proposed project could conflict with air quality planning efforts. As a result, this would be a **significant impact**.

Mitigation Measure 1-2

These measures shall be implemented through project design, conditions of approval, or through the City's inspection processes. This process is intended to ensure that best available and practical approaches are used to reduce operational emissions in the applications and design review for specific tentative map and permits. The following is a listing of measures that shall be implemented by the project applicant(s) for the purpose of reducing vehicle and operational emissions. Funding of each measure shall be provided by project applicant(s).

- *Provide tree plantings that meet or exceed the requirements of the City's Community Design Guidelines to provide shading of buildings and parking lots.*
- *Landscape with native drought-resistant plants (ground covers, shrubs and trees) with particular consideration of plantings that are not reliant on gas-powered landscape maintenance equipment.*
- *Require all flat roofs on non-residential structures to have a white or silver cap sheet to reduce energy demand.*
- *Provide electric vehicle charging stations in preferential locations of parking lots for non-residential land uses (e.g., close to building entrances, in shaded locations). Also provide signage prohibiting parking for non-electric vehicles within these designated spaces.*
- *Provide vanpool parking only spaces and preferential parking for carpools to accommodate carpools and vanpools in parking lots of employment land uses (e.g., office buildings, business-professional uses)*
- *All truck loading docks shall be equipped with one 110/208 volt power outlet for every two-dock doors. Signs shall be posted stating "Diesel trucks are prohibited from idling more than five minutes and trucks requiring auxiliary power shall connect to the 110/208-volt outlets to run auxiliary equipment".*
- *Design streets to maximize pedestrian access to transit stops.*
- *Require site design to maximize access to transit lines, to accommodate bus travel, and to provide lighted shelters at transit access points.*
- *Include photovoltaic systems in project design and/or participate in Roseville Electric incentive programs for energy-efficient development.*
- *Electrical outlets shall be installed on the exterior walls of both the front and back of all detached single-family and duplex residences to enable the use of electric landscape maintenance equipment.*
- *Gas line outlets shall be installed in the rear of single family and duplex homes (i.e., in the backyards) and in the common outdoor activity areas of multi-family residential land uses for use of outdoor cooking appliances, such as gas burning barbeques.*

- *Install low-NO_X hot water heaters (beyond District Rule 246 requirements) or tankless water heaters in all residential land uses.*

- *Provide notice to original purchasers of single-family and duplex residential units of incentive and rebate programs available through Roseville Electric or other providers that encourage the purchase of electric landscape maintenance equipment.*

- *Prior to approval of Tentative Maps provide notice to homebuyers through CC&Rs or other mechanisms to inform them that only gas fireplaces would be permitted. Where propane or natural gas service is not available, only EPA Phase II certified wood-burning devices shall be allowed in single family residences. The emission potential from each residence shall not exceed 7.5 grams per hour. Wood-burning or Pellet appliances shall not be permitted in multi-family residential buildings.*

Significance after Mitigation

While implementation of Mitigation Measure 1-2 would reduce operational-related emissions of criteria air pollutants and precursors, the reductions achieved by these measures cannot be estimated because detailed specifications about the emissions-generating activities engaged in by the residents, workers, and customers at those land uses are not known at this time. For instance, providing gas line outlets in the rear of single family and duplex homes would enable residents to use natural gas-powered outdoor cooking grills instead of higher-emitting charcoal grills. While it is certain that natural gas-powered grills have lower emissions that charcoal grills, the exact reduction amount is dependent on multiple factors including frequency and duration of use. The sizes of the reductions achieved by many of the measures listed under Mitigation Measure 1-2 would be a function of operational behaviors. Nonetheless, it is anticipated that the reduction in overall operational emissions achieved by these measures would be nominal.

Previously adopted project-specific mitigation that was identified in the SVSP EIR would apply to the project site. The project has been designed to incorporate measures to reduce reliance on the automobile. Dedicated right of way on Santucci Boulevard would be set aside for bus rapid transit. A transit center and park-and-ride lot would be part of the commercial center at Pleasant Grove and Santucci Boulevards (parcel WB-41). An integrated paseo system would provide off-street bicycle and pedestrian access throughout the project area connecting other portions of the SVSP area to the south with the Class I bicycle trails and paseo system in the West Plan to the north. These design measures would reduce mobile-source emissions and the extent that these reductions can be quantified is reflected in the trip generation rates developed by the traffic study for the proposed project (Fehr & Peers 2011). Thus, there is no other feasible mitigation available to reduce emissions generated by vehicle trips generated by the proposed project. Therefore, operational emissions of criteria air pollutants and precursors would be **significant and unavoidable.**

IMPACT 1-3	*Generation of Local Mobile-Source CO Emissions.* Project-generated local mobile-source CO emissions would not result in or substantially contribute to concentrations that exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm.

The primary mobile-source pollutant of localized concern is CO. Local mobile-source CO emissions near roadway intersections are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. However, under certain specific meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels at nearby sensitive land uses, such as residential units, hospitals, schools, and childcare facilities. Thus, high local CO concentrations are considered to have a direct influence on the receptors they

affect. Modeling of CO concentrations is typically recommended for areas located near signalized roadway intersections that are projected to operate at an unacceptable level of service (LOS) (i.e., LOS E or F) during peak traffic hours (Garza, Graney, and Sperling 1997).

Intersections controlled by stop signs do not experience high enough traffic volumes and associated congestion to be the site of violations of the AAQS; therefore, CO modeling is not recommended for unsignalized intersections (Garza, Graney, and Sperling 1997). Because the intersections controlled by stop signs would accommodate fewer vehicles than signalized intersections, it is reasonable to conclude that congestion at the intersections controlled by stop signs would not result in CO concentrations that exceed the AAQS.

The SMAQMD recommends screening criteria in its *Guide to Air Quality Assessment in Sacramento County* that provide lead agencies with a conservative indication of whether project-generated vehicle trips would result in the generation of CO emissions that exceed or contribute to an exceedance of the CAAQS for CO (SMAQMD 2010a). While the PCAPCD, the local agency in charge of air quality considerations in western Placer County, has not established specific guidelines for addressing impacts from CO concentrations, CEQA still requires an evaluation of impacts from CO concentration. SMAQMD's screening criteria was developed to help lead agencies analyze potential CO impacts and identify whether site-specific CO dispersion modeling is necessary. As explained above, applying SMAQMD's screening methodology to the proposed project is appropriate because the meteorology conditions, ambient CO levels, and vehicle fleet mix of the Roseville area are similar to those of Sacramento County. SMADQMD's recommended screening criteria are divided into the following two tiers:

First Tier Screening. The project would result in a less-than-significant impact to air quality for local CO if:

- Traffic generated by the project would not result in deterioration of intersection LOS to LOS E or F; or
- The project would not contribute additional traffic to an intersection that already operates at LOS of E or F.

Second Tier Screening. If all of the following criteria are met, the project would result in a less-than-significant impact to air quality for local CO.

- The project would not result in an affected intersection experiencing more than 31,600 vehicles per hour;
- The project would not contribute traffic to a tunnel, parking garage, bridge underpass, urban street canyon, or below-grade roadway; or other locations where horizontal or vertical mixing of air would be substantially limited; and
- The mix of vehicle types at the intersection is not anticipated to be substantially different from the County average (as identified by the EMFAC or URBEMIS models).

The traffic analysis prepared for the proposed project included an LOS analysis for all intersections within the study area that could potentially be adversely affected by the proposed project (Fehr & Peers 2011). The analysis evaluated existing traffic conditions plus proposed project conditions, and cumulative traffic conditions (i.e., project buildout in 2025) plus project conditions. Results of the analysis determined that the proposed project conditions would result in the deterioration of some intersections to LOS E or F. These results are summarized below in Table 1-6.

Table 1-6 Level of Service at Intersections-Existing Plus Project Conditions

Intersection	Jurisdiction	Existing LOS		Existing + Project LOS	
		(AM)	(PM)	(AM)	(PM)
Existing-Plus-Project Conditions					
Locust Road/Baseline Road	Placer County	C	E	C	F
Walerga/PFE Road	Placer County	D	C	E	D
Pleasant Grove Road South/ Riego Road	Sutter County	C	D	C	E
Cumulative-Plus-Project Conditions (2025)					
Blue Oaks Boulevard/New Meadow Drive	Roseville	D	C	E	C
Blue Oaks Boulevard/Diamond Creek Boulevard	Roseville	C	E	C	F
Galleria Boulevard/Roseville Parkway	Roseville	C	E	C	F
Pleasant Grove Boulevard/Fiddyment Road	Roseville	C	E	C	F

Source: Fehr and Peers 2011.

Based on the traffic analysis prepared for the proposed project (Table 1-6), some signalized intersections in the vicinity of the project site are predicted to operate at an unacceptable LOS under build out conditions (Fehr and Peers 2011). However, because none of the intersections would be anticipated to accommodate volumes of traffic that would exceed 31,600 vehicles in any single hour (Fehr and Peers 2011), all affected roadways would be at-grade, and the mix of vehicles traveling on these roadways is not anticipated to be substantially different in western Placer County, the project would not result in CO concentrations that would exceed or contribute to an exceedance of the CAAQS or NAAQS. Furthermore, due to stricter vehicle emissions standards in newer cars, new technology, and increased fuel economy, future CO emissions from on-road vehicles under future build out conditions (year 2025) would be substantially lower than those under existing conditions. Thus, even though the proposed project would reduce the LOS at various intersections due to increased traffic congestion, project-generated local mobile-source CO emissions would not result in or substantially contribute to concentrations that exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. As a result, this impact would be **less than significant**.

Mitigation Measure

No Mitigation is required.

IMPACT 1-4 *Exposure of Sensitive Receptors to Short- and Long-Term Emissions of Toxic Air Contaminants.* Project implementation would result in exposure of sensitive receptors to short-term emissions of TACs from diesel-powered equipment used during construction. Project implementation would also have the potential to result in the development of stationary sources of TACs or land uses that harbor high-TAC emitting activities and would expose nearby sensitive receptors to high levels of health risk.

The exposure of sensitive receptors to emissions of TACs from on-site sources during construction and operation of the proposed project are discussed separately below.

Short-Term Construction-Related Emissions of Toxic Air Contaminants

Construction-related activities would result in temporary, short-term project-generated emissions of diesel PM from the exhaust of off-road heavy-duty diesel equipment used for site preparation (e.g., demolition, grading, excavation, grading, and clearing); paving; application of architectural coatings; and other miscellaneous activities. According to ARB, the potential cancer risk from the inhalation of diesel PM outweighs the potential for non-cancer health impacts (ARB 2003). Based on the URBEMIS modeling performed for the analysis of mass emissions of criteria air pollutants and precursors under Impact 1-1, off-road diesel-powered equipment operated during project construction would generate up to 1.3 lb/day of diesel PM exhaust emissions at the project site during peak days of construction activity. Refer to Appendix A for a detailed assumptions and calculations.

The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. It is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the exposed individual. Thus, the risks estimated for an exposed individual are higher if a fixed exposure occurs over a longer period. According to the Office of Environmental Health Hazard Assessment (OEHHA), HRAs, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the duration of exposure (OEHHA 2001). The use of mobilized equipment for project construction activities would be temporary, and would dissipate with increasing distance from the source. Moreover, all construction equipment would not operate at the same time or location and, therefore, not necessarily expose the same nearby receptors to increased levels of diesel PM. Nonetheless, some sensitive receptors could be exposed to increased levels of diesel PM. While no sensitive receptors are currently located in close proximity to the project site, some residential land uses and schools may be developed and inhabited on adjacent properties before construction of the land uses proposed on the project site is completed. Also, new residential units and an elementary school could be constructed and become operational on the project site while construction of remaining land uses continues on the property. For these reasons, sensitive receptors could be exposed to diesel PM generated by project-related construction activities, which are anticipated to occur over a 20- to 30-year period. Even with the dispersive properties of diesel PM (Zhu et al. 2002), construction activities could expose sensitive receptors to levels that exceed applicable standards because of the potentially close proximity of on-site heavy-duty equipment to future planned residents and other sensitive receptors. Therefore, this would be a **significant impact**.

Long-Term Operation-Related Emissions of Toxic Air Contaminants

While the proposed project proposes specific land use types on the project site, the particular types of facilities that would be developed on commercial land uses is not known at this time. Development of some of the land uses proposed on the project site would likely include sources of TACs that would be required to obtain permits to operate under PCAPCD Rule 501, General Permit Requirements and Rule 507, Federal Operating Permit. These sources could include, but are not be limited to, a diesel-engine generator for emergency power generation; central heating boilers; kitchen equipment at restaurants; and dry cleaning equipment. Such stationary sources of TACs would be subject to PCAPCD requirements for toxics. Before granting a permit for these sources, PCAPCD would perform or refer to a formal health risk assessment to ensure the operation of such sources would not result in the exposure of sensitive receptors to levels of TAC emissions that would result in an incremental increase of 10 in 1 million for the carcinogenic risk and/or a noncarcinogenic Hazard Index of 1.0 at any receptor.

Implementation of the proposed project would result in the siting of residents and an elementary school on the project site, both of which are considered sensitive land uses. As explained above, the potential for sensitive

receptors and sources of TACs to be located in close proximity to each other was evaluated using guidance from an ARB publication, *Air Quality and Land Use Handbook: A Community Health Perspective* (ARB 2005). More specifically, the handbook recommends the following guidance that may be pertinent to the land uses proposed on the project site:

- Avoid siting residential land uses or schools within 1,000 feet of a major service and maintenance rail yard.
- Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads carrying 100,000 vehicles per day, or rural roads carrying 50,000 vehicles per day.
- Avoid siting new commercial trucking facilities that accommodate more than 100 trucks per day, or 40 trucks equipped with transportation refrigeration units (TRUs), within 1,000 feet of sensitive receptors (e.g., residences, schools, or parks).
- Avoid siting new sensitive land uses within 300 feet of a large gasoline station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gasoline-dispensing facilities.
- Avoid siting new sensitive land uses within 300 feet of any dry-cleaning operation using perchloroethylene (perc). For operations with two or more machines, provide 500 feet. For operations with three or more machines, consult the local air district (i.e., PCAPCD). Do not site new sensitive land uses in the same building with dry-cleaning operations that use perc.
- Obtain facility-specific information where there are questions about siting a sensitive land use close to an industrial facility, including the amount of pollutant emitted and its toxicity, distance to nearby receptors, and types of emissions controls in place.

The project site is not located near any rail lines, rail facilities, freeways or major roadways. The property is more than 2.5 miles northwest of the Roseville Rail Yard, more than 3 miles northwest of Interstate 80, approximately 4 miles from State Route 65, and more than 5 miles east of State Route 99/10. According to the traffic report, none of the arterial roadways in the traffic study area are projected to have traffic volumes greater than 50,000 average daily trips, including the volumes on Baseline Road, Fiddyment Road, and Pleasant Grove Boulevard (Fehr & Peers 2011). Furthermore, the City zoning code would not allow truck distribution centers, high-volume gasoline stations, large production dry cleaning facilities, or any other industrial facilities to be operated anywhere inside the SVSP boundaries. For these reasons, the proposed project would not have the potential to result in the incompatible locating of sensitive receptors and TAC-emitting land uses that do not comply with ARB's recommended setback distances. As a result, this would be a **less-than-significant impact**.

Mitigation Measure 1-4

In order to reduce exposure to construction-generated emissions of diesel PM, project applicant(s) shall require all their construction contractors to implement the Exhaust Emission Control Measures listed under Mitigation Measure 1-1.

Significance after Mitigation

Implementation of the Exhaust Emission Control Measures for on-site construction activity, as required by Mitigation measure 1-4, would reduce short-term construction-related emissions of PM_{10} exhaust by 45%. Reductions in exhaust emissions of $PM_{2.5}$, which is diesel PM, would be similar. Thus, maximum daily emissions of diesel PM would be reduced to approximately 0.7 lb/day during peak construction periods. On-site emissions of diesel PM would also be reduced by the limiting of equipment idling; use of electric power sources, where feasible; proper maintenance of construction equipment; and routine VEE monitoring to ensure equipment

operates properly. The requirement to stage equipment as far from sensitive receptors as possible would also reduce diesel PM exposure to those receptors. Because these measures would substantially reduce the dose of diesel PM exposure to nearby sensitive receptors, this impact would be reduced to a **less-than-significant** level.

IMPACT 1-5 *Exposure of Sensitive Receptors to Excessive Odors.* Neither the short-term construction nor the long-term operation of the proposed project would result in the exposure of sensitive receptors to excessive or unusual odorous emissions.

The exposure of sensitive receptors (e.g., existing and proposed residential units, schools, and parks) to odorous emissions from project-related construction activity and operations of facilities developed on the property are discussed under separate headings below.

Short-Term Construction-Related Odorous Emissions

Some project-related construction could result in temporary generation of objectionable odors associated with diesel exhaust, asphalt paving, and the application of architectural coatings, may be considered offensive to some individuals. Exposure to odorous emissions from these types of activities may occur when some on-site land uses undergo construction after some of the other proposed land uses are already constructed and become operational (e.g., after residents are built and then become inhabited). However, because odors would be temporary and would generally disperse rapidly with distance from the source, these construction-related activities would not result in the frequent exposure of on-site receptors, or any off-site receptors, to objectionable odorous emissions. As a result, this impact would be **less than significant.**

Long-Term Operation-Related Odorous Emissions

No common sources of nuisance odors, such as wastewater treatment facilities, waste-disposal facilities, or dairies are proposed on the project site. However, truck deliveries to commercial uses could expose individuals to diesel exhaust that some may find to be objectionable and sewer lift stations could intermittently and temporarily emit objectionable odors. Additionally, commercial uses could provide development of convenience uses that may include sources of odorous emissions (e.g., fast-food restaurants, gasoline stations, dry-cleaning facilities) that would be perceived as offensive to some individuals. The operation of such sources could expose a substantial number of proposed on-site receptors to objectionable odorous emissions. However, these sources are typical of an urban environment and not considered a nuisance or a major source of odorous emissions because they do not elicit complaints from the public. No unusual odor-producing uses are proposed on the project site or in the surrounding vicinity; no major odor sources are located or planned near the project site; and the project site and surrounding properties are not currently used for grazing or other odor-producing agricultural activities. Therefore, this impact would be **less than significant**.

Mitigation Measure

No mitigation is required.

2 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

2.1 ENVIRONMENTAL SETTING

Emissions of greenhouse gases (GHGs) have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. The proper context for addressing this issue in a CEQA analysis is as a discussion of cumulative impacts, because although the emissions of one single project would not result in global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change. In turn, global climate change has the potential to result in rising sea levels, which can inundate low-lying areas; to affect rainfall and snowfall, leading to changes in water supply; to affect habitat, leading to adverse effects on biological resources; and to result in other effects.

Although the impact of GHGs is cumulative, it is different from typical cumulative impact analyses. GHG emissions are generated by anthropogenic (i.e., human-made) and biogenic sources throughout the world, and to that end are an ultimate cumulative impact. The cumulative impact analyses for other resource areas focus on a more local scale—the project combined with other projects within the viewshed, the forest resource area, or the regional air basin—depending on resource issue. Therefore, this issue is presented at some depth, and focuses on the project's contribution to this global issue.

This section presents the current state of climate change science and an overview of GHG emissions sources in California; a summary of applicable regulations; and a description of project-generated GHG emissions and their contribution to global climate change. The analysis estimates and analyzes the GHG emissions associated with project-related construction activities and operation of the proposed project and also identifies the potential effects of global climate change on the project based on available scientific data.

ATTRIBUTING CLIMATE CHANGE—THE PHYSICAL SCIENTIFIC BASIS

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on Earth. Without the greenhouse effect, Earth would not be able to support life as we know it.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe.

Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 54% is sequestered through ocean uptake, uptake by northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46% of human-caused CO_2 emissions remains stored in the atmosphere (Seinfeld and Pandis 1998).

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and toxic air contaminants. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; suffice it to say, the quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climate. From the standpoint of CEQA, GHG impacts related to global climate change are inherently cumulative.

ATTRIBUTING CLIMATE CHANGE—GREENHOUSE GAS EMISSION SOURCES

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial and agricultural emissions sectors (ARB 2008). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (ARB 2010c). Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) is largely associated with agricultural practices and landfills. N_2O is also largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution, respectively, two of the most common processes of CO_2 sequestration.

According to different ranking systems, California is the 12th to 16th largest emitter of CO_2 in the world (CEC 2006a). California produced 484 million metric tons (MMT) of CO_2 equivalent (CO_2e) in 2004 at its peak over the inventory period, and produced 478 MMT in 2008 (ARB 2010c). CO_2e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, as described in Appendix C, "Calculation References," of the General Reporting Protocol of the California Climate Action Registry (CCAR) (2009), 1 ton of CH_4 has the same contribution to the greenhouse effect as approximately 21 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2. Expressing emissions in CO_2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2008, accounting for 37% of total GHG emissions in the state (ARB 2010c). This sector was followed by the electric power sector (including both in-state and out-of-state sources) (24%) and the industrial sector (19%) (ARB 2010c).

2.2 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

EPA is the federal agency responsible for implementing the Clean Air Act (CAA). The U.S. Supreme Court ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate

emissions of GHGs. In response to the mounting issue of climate change, EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions.

MANDATORY GREENHOUSE GAS REPORTING RULE

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons (MT) or more of CO_2 per year. This publicly available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

NATIONAL PROGRAM TO CUT GREENHOUSE GAS EMISSIONS AND IMPROVE FUEL ECONOMY FOR CARS AND TRUCKS

On September 15, 2009, EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) proposed a new national program that would reduce GHG emissions and improve fuel economy for all new cars and trucks sold in the United States. EPA proposed the first-ever national GHG emissions standards under the CAA, and NHTSA proposed Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act. This proposed national program would allow automobile manufacturers to build a single light-duty national fleet that satisfies all requirements under both federal programs and the standards of California and other states.

ENDANGERMENT AND CAUSE OR CONTRIBUTE FINDINGS

On December 7, 2009, EPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding). The Endangerment Finding is based on Section 202(a) of the CAA, which states that the Administrator (of EPA) should regulate and develop standards for "emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." The rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and therefore the threat of climate change.

The Administrator found that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CAA. The evidence supporting this finding consists of human activity resulting in "high atmospheric levels" of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wild fires, droughts, sea level rise, and higher intensity storms) are a threat to the public health and welfare. Therefore, GHGs were found to endanger the public health and welfare of current and future generations.

The Administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. EPA's final findings respond to the

2007 U.S. Supreme Court decision that GHGs fit within the CAA definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements but rather allow EPA to finalize the GHG standards proposed earlier in 2009 for new light-duty vehicles as part of the joint rulemaking with the U.S. Department of Transportation.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the CCAA, which was adopted in 1988.

Various statewide and local initiatives to reduce the state's contribution to GHG emissions have raised awareness that, even though the various contributors to and consequences of global climate change are not yet fully understood, global climate change is under way, and there is a real potential for severe adverse environmental, social, and economic effects in the long term. Because every nation emits GHGs and therefore makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can help to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions.

ASSEMBLY BILL 1493

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 required that ARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

To meet the requirements of AB 1493, in 2004 ARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California's existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1) required automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons), beginning with the 2009 model year. Implementation of AB 1493 lapsed because of delays in receiving proper approvals from EPA to implement this law under the CAA. California received the necessary approvals June 30, 2009; however, the state has agreed to allow the federal government to implement similar legislation (see "National Program to Cut Greenhouse Gas Emissions and Improve Fuel Economy for Cars and Trucks," above).

EXECUTIVE ORDER S-3-05

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, exacerbate California's air quality problems, and potentially cause a rise in sea level. To combat those concerns, the executive order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050.

ASSEMBLY BILL 32, THE CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006

In September 2006, Governor Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources.

CLIMATE CHANGE SCOPING PLAN

In December 2008, ARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to achieve reduction of approximately 118 million metric tons (MMT) of CO_2e, or approximately 22% from the state's projected 2020 emission level of 545 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 47 MMT CO_2e, or almost 10%, from 2008 emissions). ARB's original 2020 projection was 596 MMT CO_2e, but this revised 2020 projection takes into account the economic downturn that occurred in 2008 (ARB 2011c). In August 2011, the Scoping Plan was re-approved by ARB, and includes the Final Supplement to the Scoping Plan Functional Equivalent Document (FED), which further-examined various alternatives to Scoping Plan measures. The Scoping Plan also includes ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. ARB estimates the largest reductions in GHG emissions to be achieved by implementing the following measures and standards (ARB 2011c):

- improved emissions standards for light-duty vehicles (estimated reductions of 26.1 MMT CO_2e),
- the Low-Carbon Fuel Standard (15.0 MMT CO_2e),
- energy efficiency measures in buildings and appliances (11.9 MMT CO_2e), and
- a renewable portfolio and electricity standards for electricity production (23.4 MMT CO_2e).

ARB has not yet determined what amount of GHG reductions it recommends from local government operations; however, the Scoping Plan does state that land use planning and urban growth decisions will play an important role in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. (Meanwhile, ARB is also developing an additional protocol for community emissions.) ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The Scoping Plan states that the ultimate GHG reduction assignment to local government operations is to be determined (ARB 2008). With regard to land use planning, the Scoping Plan expects approximately 3.0 MMT CO_2e will be achieved associated with implementation of SB 375, which is discussed further below (ARB 2011c).

EXECUTIVE ORDER S-1-07

Executive Order S-1-07, which was signed by Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, at over 40% of statewide emissions. It establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10% by 2020. This order also directed ARB to determine whether this Low Carbon Fuel Standard could be adopted as a discrete early action measure after meeting the mandates in AB 32. ARB adopted the Low Carbon Fuel Standard on April 23, 2009.

SENATE BILL 1368

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the California Public Utilities Commission (CPUC) to establish a GHG performance standard for baseload generation from investor-owned utilities by February 1, 2007. The California Energy Commission (CEC) was required by SB 1368 to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards could not exceed the GHG emission rate from a baseload combined-cycle natural gas–fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.

SENATE BILLS 1078 AND 107 AND EXECUTIVE ORDER S-14-08

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20% of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Energy Standard to 33% renewable power by 2020.

SENATE BILL 97

As directed by SB 97, the Natural Resources Agency adopted amendments to the State CEQA Guidelines for GHG emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The amendments became effective on March 18, 2010.

SENATE BILL 375

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG emission reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012.

CITY OF ROSEVILLE COMMUNITY-WIDE SUSTAINABILITY ACTION PLAN

The City of Roseville has prepared a Draft Community-wide Sustainability Action Plan (SAP) (City of Roseville 2011). The SAP includes a city-wide emissions inventory and outlines a road-map to reduce GHGs. The GHG inventory conducted for baseline year 2008 identified communitywide emissions of approximately 1,202,383 MT CO_2e. Mobile sources, commercial and industrial energy use, and residential energy use (i.e., electricity and natural gas consumption) accounted for 44%, 24%, and 22% of the total inventory. Under a forecasted business-as-usual scenario, communitywide GHG emissions are projected to increase to 1,385,942 MT CO_2e in the year 2020 to accommodate buildout under the Roseville General Plan's. Adoption of the SAP is anticipated to be considered by the City Council in 2012.

2.3 IMPACT ANALYSIS

This section describes the project's construction-related (short-term) and operation-related (long-term) emissions of GHGs. The discussion includes the criteria for determining the level of significance of the effects and a description of the methods and assumptions used to conduct the analysis.

2.3.1 METHODS OF ANALYSIS

At the time of writing this analysis, ARB, PCAPCD, and the City have not formally adopted a recommended methodology for evaluating GHG emissions associated with new land use development. Though PCAPCD has not developed a threshold of significance for determining whether project-related GHG emissions are considered significant, it does recommend that lead agencies estimate GHG emissions associated with temporary and short-term, project-related construction activities, as well as the long-term, operational emissions associated with a project, including mobile- and area-source GHG emissions and direct, off-site emissions associated with the project's consumption of electricity and water.

Thus, short-term construction-related and long-term operational area- and mobile-source emissions of GHGs were estimated using URBEMIS; a model widely-used in regional air quality analysis. These emissions were modeled based on general information provided in the project description and using trip generation rates from the transportation analysis prepared for this project (Fehr & Peers 2011). The total level of GHGs associated with project construction was amortized over the projected life of the buildings and facilities that would be developed on the project site (i.e., 30 years).

Indirect emissions associated with operational electricity consumption were estimated using a methodology recommended in the California Climate Action Registry's (CCAR) General Reporting Protocol, version 3.1 (CCAR 2009).This estimate was based on the projected annual electricity demand provided in the utilities report prepared for the project (Capitol Utility Specialists 2011) and the composite emission factor for Roseville Electric utility. Indirect energy-related emissions associated with water consumption were also estimated using projected water consumption data from the utilities report and associated energy consumption rates published by the California Energy Commission (CEC 2006b).

It is important to note that all CO_2 emissions from project operation may not necessarily be considered "new" emissions, given that a project itself does not create "new" emitters (people) of GHGs, at least not in the traditional sense. In other words, the GHG emissions from a residential project are not necessarily all new GHG emissions in the local area, state, or world; to a large degree, a new residential development, accommodates household relocations. In this sense, residential development projects can be seen as reacting to increased demand from the growing population and economy, and are not in themselves creators of economic or population growth. Emissions of GHGs are, however, influenced by the location and design of projects, to the extent that they can influence travel to and from the land uses that are developed, and to the degree the development and facilities are designed to maximize energy efficiency and GHG efficiency.

The methodology used to analyze the project's contribution to global climate change includes a calculation of GHG emissions and a discussion about the context in which they can be evaluated. The primary purpose of calculating the project's GHG emissions is for informational and comparison purposes, as ARB, PCAPCD, and the City have not adopted a quantifiable threshold for evaluating whether project-generated GHG's would be considered a significant impact. However, CEQA requires that the GHG emissions associated with a proposed project be analyzed.

2.3.2 THRESHOLDS OF SIGNIFICANCE

Per Appendix G of the CEQA Guidelines, GHG or climate change impacts are considered significant if implementation of the proposed project would do any of the following:

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

An individual project cannot generate enough GHG emissions to significantly influence global climate change. A project participates in this potential impact to the extent that its incremental contribution, combined with the cumulative contributions of all other sources of GHGs, when taken together, cause global climate change impacts.

For the purposes of this analysis GHG emissions from the proposed project are quantified and then discussed. The discussion focuses on whether the associated emissions would substantially help or hinder the state's ability to attain the goals identified in AB 32 (i.e., reduction of statewide GHG emissions to 1990 levels by 2020). The analysis recognizes that the impact that GHG emissions have on global climate change does not depend on whether they are generated by stationary, mobile, or area sources, or whether they are generated in one region or another. As stated above, the mandate of AB 32 demonstrates California's commitment to reducing GHG emissions and the state's associated contribution to climate change, without intending to limit population or economic growth within the state. Thus, to achieve the goals of AB 32, which are tied to mass GHG emission levels of a specific benchmark year (i.e., 1990), California would have to achieve a lower rate of emissions per unit of population (per person) and/or per level of economic activity (e.g., per job) than its current rate. Furthermore, to accommodate future population and economic growth, the state would have to achieve an even lower rate of emissions per unit than it achieved in 1990. (The goal—to achieve 1990 quantities of GHG emissions by 2020—will need to be accomplished despite 30 years of population and economic growth beyond 1990.) For this reason, land use developments need to be GHG "efficient" to attain AB 32 goals while accommodating population and job growth. Thus, this analysis focuses on the annual operational GHG emissions per service population (SP), or annual GHG/SP, where SP is the number of residents accommodated by residential land uses developed on the project site plus the number of jobs supported by the non-residential land uses on the project site. The benchmark for this metric is estimated to be approximately 4.6 MT CO_2e/SP/year (BAAQMD 2010). Though this benchmark was developed by another air district, it can be applied to land use developments throughout California because it was estimated based on future expected growth in the state's population and economy and the mass emissions reduction target mandated by AB 32 for the year 2020 (BAAQMD 2010). Development of the benchmark assumed that only certain sectors of the statewide GHG emissions inventory are related to land use planning and development design decisions. For instance, GHG emissions produced by the forestry sector are not accounted for in this metric because the proposed project would not result in the removal or addition of forests or state forestland. Additionally, analysis using an efficiency-based metric in this analysis is consistent with the discussion in ARB's Scoping Plan of the importance of GHG efficiency in land use planning that must be achieved to attain the mandated reductions in mass annual GHG emission levels (ARB 2008). However, although the Scoping Plan discusses efficiency in terms of (imperial) tons per person, it does not explicitly discuss ways to account for projected growth in the state's population or projected growth in the state's economy. Moreover, the metric of mass GHG emissions per capita would not be useful for understanding the efficiency of nonresidential land uses (e.g., commercial, industrial, educational).

Because the CO_2e /SP/year metric accounts for future population growth, future economic growth, and mass emission targets, future land use development projects that would not be more GHG efficient than "business as usual" would conflict with the spirit of AB 32 policy.

Nonetheless, one of the primary challenges to establishing a reasonable threshold and determining impacts (and mitigation) relates to enactment of AB 32 and other GHG emission-reduction legislations. As previously described, much of this legislation requires ARB and others to establish standards that relate to energy efficiency, carbon levels in fuels, smokestack emissions, and regional transportation planning (i.e., SB 375). While some of these standards have been established, others are in the development process and may be a few to several years away from implementation. The project, however, would also be in development for multiple decades (i.e., approximately 20 to 30 years), and during its lifetime would be subject to these as-yet undeveloped thresholds. There is a lag time between enactment of these legislative fixes and the regulations that will implement them. As a consequence, local governmental agencies are left to struggle with trying to discern the extent to which their decisions can and will influence GHG emissions, versus what GHG reductions will be achieved by still-to-be-developed regulations. For instance, a local lead agency can base a threshold on generation of emissions below some business-as-usual target, but it is difficult to ascertain whether these regulations will largely result in substantial reductions that hit the target, or whether local agencies will need to impose additional measures. This challenge is discussed in more detail in the "Impacts and Mitigation Measures" section below.

2.3.3 IMPACTS AND MITIGATION MEASURES

IMPACT 2-1	**Generation of GHG Emissions.** Construction and operation of the land uses proposed on the project site would generate GHG emissions, which would contribute considerably to cumulative GHG emissions.

Heavy-duty off-road equipment, materials transport, and worker commutes during construction of the land uses proposed on the project site would result in exhaust emissions of GHGs. GHG emissions generated by construction would be primarily in the form of CO_2. Although emissions of other GHGs, such as CH_4 and N_2O, are important with respect to global climate change, the emission levels of these other GHGs from on- and off-road vehicles used during construction are relatively small compared with CO_2 emissions, even when factoring in the relatively larger global warming potential of CH_4 and N_2O.

Construction-generated GHG emissions were modeled based on the types and quantities of various land uses proposed under the Westbrook Amendment and default PCAPCD-recommended settings and parameters attributable to the proposed land use types and site location. In short, modeling was conducted using the same assumptions for estimating construction-generated emissions of criteria air pollutants and precursors, which are listed in the discussion under Impact 1-1.

Construction of the land uses proposed on the approximately 400-acre project site could begin as early as 2014 and full buildout of the project area would occur over a 20- to 30-year period. Given that exhaust emission rates of the construction equipment fleet in the state are expected to decrease over time due to ARB-lead efforts, annual construction emissions were estimated using the earliest calendar when construction would begin (2014) in order to generate conservative estimates. It is anticipated, however, that in later years, advancements in engine technology, retrofits, and turnover in the equipment fleet would result in increased fuel efficiency, potentially more alternatively fueled equipment, and lower levels of GHG emissions. Also, the URBEMIS model does not account for reductions in CO_2 emission rates that would affect future construction activity due to the

regulatory environment that is expected to evolve under AB 32. For instance, ARB's Scoping Plan identifies the need to expand efficiency strategies and low carbon fuels for heavy-duty and off-road vehicles (ARB 2008). According to the estimates provided by URBEMIS, a total of 3,507 MT of CO_2 would be generated from construction of all the land uses proposed on the project site, as shown in Table 2-1. Conservatively assuming a 30-year operational life of the buildings and facilities that would be constructed, the amortized level of construction-generated emissions would be approximately 129 MT CO_2/year.

GHG emissions would also be generated throughout the operational life of the proposed project. Operational emissions would be generated by area-, mobile-, and stationary-sources. Area-source emissions would be associated with activities such as combustion of natural gas for space and water heating, maintenance of landscaping and grounds, waste disposal, and other sources. Mobile-source emissions of GHGs would include project-generated vehicle trips for residents, employees, and visitors. In addition, increases in stationary-source emissions could occur at off-site utility providers from electricity generation that would supply power to the proposed land uses. Thus, the GHGs associated with the consumption of electricity by the proposed land uses are considered an indirect source. On-site consumption of water would also result in indirect GHG emissions because of the electricity consumption associated with the off-site conveyance, distribution, and treatment of that water. GHGs associated with consumption of non-recycled and recycled water by the proposed project were estimated based on the Potable Water Master Plan (HydroScience Engineers 2011a) and Recycled Water Mast Plan prepared for the project site (HydroScience Engineers 2011b).

GHG emissions generated by operation of the proposed land uses would be primarily in the form of CO_2. Although emissions of other GHGs, such as CH_4 and N_2O, are important with respect to global climate change, the emissions levels of these GHGs from the sources considered for this project are relatively small compared with CO_2 emissions, even when factoring in the relatively larger global warming potential of CH_4 and N_2O.

At the time of writing this analysis, emission factors and calculation methods for GHGs from development projects have not been formally adopted for use by the ARB, PCAPCD, or the City. However, PCAPCD does recommend that direct and indirect emissions of GHGs from a project be quantified and disclosed, including area- and mobile-source emissions, and indirect emissions from in-state energy production and water consumption. This approach is considered to be reasonable; no other "more reasonable" approaches have been recommended. Therefore, it is appropriate to estimate the levels of GHGs generated from these sources using the methodologies described above.

The proposed project would also result in the loss of some trees and grasslands, which are a form of carbon storage and they sequester carbon from the atmosphere; however, the project would include vegetative landscaping, counterbalancing this loss. It would not be possible, at this scale, to determine if more or less vegetation would be on the site after development than before, so the loss in vegetation is not quantified for this analysis.

Operational GHG emissions were estimated for full buildout of the project site, in the year 2025, and are presented in Table 2-1. The annual operational emissions level of the proposed project was estimated using the best available methodologies and emission factors available at the time of writing this analysis. However, for many operational GHG emission sources GHG emission rates for future years are not yet developed, in part, because regulations continue to evolve under the mandate of AB 32. The URBEMIS model, as well as other GHG estimation protocols, does not yet account for the impact reductions of the future regulatory environment and future technological improvements that will result in GHG efficiencies. Thus, this analysis uses the emissions estimates modeled for full buildout as a proxy for evaluating GHG emissions associated with development of the project site.

As shown in Table 2-1, estimated GHG emissions associated with operation of the land uses proposed on the project site would total approximately 52,861 MT CO_2e per year. At full buildout, an estimated 5,154 residents would be living on the project site and the non-residential land uses would support an estimated 1,139 jobs. When estimated CO_2e emissions are normalized with respect to service population (i.e., residents plus jobs), the GHG efficiency of operations would be 8.4 MT CO_2e/SP/year under full buildout. For sake of reference, the Bay Area Air Quality Management District has established an efficiency-based significance threshold of 4.6 MT CO2e/SP/year, which is based on the projected GHG inventory for the entire state and the projected population and employment levels in the state (BAAQMD 2010).

In many respects, however, the GHG efficiency of 8.4 MT CO_2e /SP/year estimated for the proposed project is representative of the project's GHG efficiency under a business-as-usual scenario and could possibly be higher than what would likely occur. First, the level of mobile-source emissions, which was estimated to be more than 80% of the total operational emissions is based on the VMT estimated by the traffic study, which is conservative. The total VMT estimated by the traffic study includes all trips associated with the proposed project, including trips that originate or terminate outside the project site. Many of these trips that would occur with or without the project, but to be conservative, the traffic study attributes all of them to the project's land uses. Thus, some portion of the estimated mobile-source emissions is associated with trips that would merely replace trips that would otherwise take place elsewhere in the Sacramento region.

Table 2-1 Summary of Modeled Project-Related GHG Emissions

Construction-Related GHG Emissions	
Total Construction Emissions	3,507 MT CO_2
Amortization Period	30 years
Amortized Construction Emissions	129 MT CO_2/year
Operational GHG Emissions under Full Buildout (2025)	
Buildout (2025)	**CO_2 MT/year**
Transportation (mobile sources)	43,015[1]
Area Sources	7,917
Electricity Consumption	1,262
Water Conveyance, Treatment, Distribution, and Wastewater Treatment	550
Amortized Construction Emissions	88
Total Operational Emissions	**52,861**
Service Population (residents + jobs)	**6,293 SP**
GHG Efficiency	**8.4 MT CO_2e/SP/year**
GHG Efficiency Threshold	**4.6 MT CO_2e/SP/year**

Notes: CO_2 = carbon dioxide; GHG = greenhouse gas; MT = metric tons; MT/yr = metric tons per year; SP = Service Population, which is the number of residents supported by the projected plus the number of jobs supported by the project. Values may not sum to match total due to rounding.
[1] The estimate of transportation-related GHG emissions is based on the trip generation rates identified in the traffic study prepared for the project (Fehr and Peers 2011), which take into account those features that would reduce vehicle trips. These include providing opportunities for Bus Rapid Transit lanes on Santucci Boulevard, a transit center and park-and-ride lot as part of the commercial center at Pleasant Grove and Santucci Boulevards, a system of open space and paseos that provide off-street pedestrian and bicycle connections throughout the community.
See Appendix A for detailed modeling results.
Source: Modeling Conducted by Ascent Environmental 2011.

Furthermore, the VMT estimate accounts for only some (not all) of the trip reduction features that would be part of the project design. The proposed project includes some "smart growth" concepts, such as a mix of uses configured for convenient bike and pedestrian access, an extensive network of bike and pedestrian connections and integration of transit infrastructure. The transportation model used in the traffic analysis functions at a regional scale, so all the nuances of the land use planning under the proposed project are not necessarily reflected in the estimate of net VMT. In addition, the emissions rates used to estimate mobile-source GHG emissions do not account for GHG reductions that would result from the Low Carbon Fuel Standard, which was adopted as a discrete early-action measure of AB 32, or the CAA waiver that California received from EPA allowing the state to adopt more stringent fuel efficiency standards for passenger vehicles and light trucks (AB 1493, which is discussed in the "Regulatory Setting" section above).

The project site is located within the area identified in the Sacramento Area Council of Governments (SACOG) Preferred Blueprint Scenario, which is intended to reduce overall VMT and GHG emissions in the region, and it is anticipated that development within the City would be consistent with this policy. The project would be subject to the City's *Smart Choices, Strategies to Implement the Blueprint* project adopted by the City Council in March 2005.

With regard to another segment of operational GHG emissions shown in Table 2-1, indirect GHG emissions related to the consumption of fossil fuel-based electricity, these estimated emissions do not account for reductions that will result from future regulatory changes under AB 32. The estimate of these emissions is not discounted to reflect the alternative-energy mandate of SB 107, which requires electric utilities to provide at least 20% of its electricity supply from renewable sources by 2010 and 30% by 2020; this mandate would be fully implemented before full buildout of the proposed project. Because Roseville Electric is still procuring enough renewable energy to meet this goal, the estimated rate of GHG emissions from electricity is expected to decrease between now and 2020. In addition, SB 1368 requires more stringent emissions performance standards for new power plants, both in-state and out-of-state, that will supply electricity to California consumers. Thus, implementation of SB 1368 would also reduce GHG emissions associated with electricity consumption.

Further reductions are also expected from other regulatory measures that would be developed under the mandate of AB 32, as identified and recommended in ARB's Scoping Plan (ARB 2011c). In general, the Scoping Plan focuses on achieving the state's GHG reduction goals with regulations that improve the efficiency of motor vehicles and the production (and consumption) of electricity. Thus, even with the implementation of no project-specific mitigation, the rate of GHG emissions from development on the project site are projected to decrease in subsequent years as the regulatory environment progresses under AB 32.

Additionally, new technology improvements may become available or the feasibility of existing technologies may improve. Nonetheless, a complete picture of the future regulatory environment is unknown at this time. GHG reduction measures promulgated under the AB 32 mandate may not be sufficient to cause future development to achieve ARB's recommended 30% reduction from business-as-usual emissions levels projected for 2020 (as discussed in the Scoping Plan) or any other mass emission-based or service efficiency-based GHG goal.

Also worth consideration is that, for the moment, the total annual GHG emissions level associated with operation of the proposed project alternatives would exceed 25,000 MT CO_2/year throughout its operational life, which is the mandatory reporting level for stationary sources as part of implementation of AB 32. In comparison to this reporting level, the amount of operational GHG emissions of the proposed project would be considered substantial.

Because the total GHG emissions associated with project operations would be considered substantial, and due to the uncertainty about whether the future regulations developed through implementation of AB 32 would improve the GHG efficiency of the project such that it would achieve GHG-efficiency of 4.6 MT CO_2e/SP/year, the proposed project would result in a cumulatively **considerable contribution to a significant cumulative impact** related to its long-term operational GHGs.

Mitigation Measure 2-1a

In order to reduce construction-related emissions to reduce GHGs, project applicant(s) shall require all their construction contractors to implement the Exhaust Emission Control Measures listed under Mitigation Measure 1-1.

Mitigation Measure 2-1B

Mitigation Measure 1-2 shall be implemented through project design, conditions of approval or through the City's inspection processes in order to reduce operational emissions of GHGs.

Mitigation Measure 2-1C

Applicants shall consider the following measures to reduce GHG emissions associated with electricity and water consumption. These measures were not required in the SVSP EIR. Some of these measures, however, are related to some of the optional GHG reduction methods listed under Mitigation Measure 4.5-2 of the SVSP EIR, as noted below, and provide additional clarity and measureable performance standards. These measures are based on an increased collective understanding of the feasibility and effectiveness of various GHG reduction measures. Since the program-level analysis of GHGs was developed in the SVSP EIR, local municipalities and developers have identified new feasible and cost-effective project-level measures that result in GHG reductions, in part, due to the formulation of community-wide GHG reduction plans (a.k.a., climate action plans) by many cities and counties in the state.

- *Limit the amount of turf area requiring irrigation at all residential land uses; parks; landscape corridors and paseos; and along rights of way such that irrigation demand is reduced by a minimum of 28%, 18%, 43%; and 45%, respectively. These limits apply to the total volume of water used for irrigation, regardless of whether any irrigation water is recycled water. The baseline for these reductions should be based on the values listed in Table 1 of the Westbrook Water Conservation Plan (HydroScience Engineers 2011c). This plan also provides details about the feasibility of implementing this measure at these land use types. In addition, the amount of turf area requiring irrigation at all commercial land uses such that irrigation demand is reduced from baseline levels by a minimum of 28%. (These performance standards accomplish multiple measures listed under Mitigation Measure 4.5-2 of the SVSP EIR, including use of water-efficient landscapes with native, drought-resistant species in all public area and commercial landscaping; the use of water-efficient turf in parks and other turf-dependant spaces; and designing buildings and lots to be water-efficient.)*

- *Install smart irrigation control systems for all turf and landscaping areas that require irrigation. Smart irrigation control systems avoid overwatering by restricting the frequency and application rate of irrigation. Smart irrigation control systems can account for variations in whether and soil moisture conditions. Details about the feasibility of implementing this measure are provided in the Westbrook Water Conservation Plan (HydroScience Engineers 2011c). (This measure is consistent with the option listed under Mitigation Measure 4.5-2 of the SVSP suggesting the installation of water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.)*

- *Install the infrastructure to use reclaimed water for landscape irrigation at non-single family residential and uses. The measure is considered feasible according to the Westbrook Recycled Water Master Plan (HydroScience Engineers 2011b). (This measure is consistent with the item under Mitigation measure 4.5-2 of the SVSP that calls for the installation of infrastructure to use reclaimed water for landscape irrigation).*

- *Install recirculating hot water systems for indoor potable water use in all residential land uses. Details about the feasibility of implementing this measure are provided in the Westbrook Water Conservation Plan (HydroScience Engineers 2011c).*

Mitigation Measure 2-1D

The City shall ensure that each increment of new development within the project site requiring a discretionary approval (e.g., proposed tentative map, conditional use permit), is subject to a project-specific environmental review by City staff and will require operation of each phase of development to achieve the AB 32-based efficiency goal of 4.6 MT CO_2e/SP/year.

The City shall require feasible reduction measures that, in combination with existing and future regulatory measures developed under AB 32, will reduce GHG emissions associated with the operation of future project development phases and supporting roadway and infrastructure improvements that are part of the proposed project by an amount sufficient to achieve the AB 32-based goal of 4.6 MT CO_2e/SP/year.. The feasibility of potential GHG reduction measures shall be evaluated by the City at the time each phase of development is proposed in order to allow for ongoing innovations in GHG reduction technologies, as well as incentives and/or requirements created in the regulatory environment.

Prior to City approval of any tentative map of for new development of individual lots within the project area, the project applicant(s) shall submit to the City a list of feasible energy-efficient design standards to be considered in the project-specific environmental review. These energy conservation measures, which will be incorporated into the design, construction, and operational aspects of each increment of development, would result in a reduction in overall project energy consumption and GHGs. The project-specific environmental review shall further identify potentially feasible GHG reduction measures to reflect the current state of the regulatory environment, which will continuously evolve under the mandate of AB 32. The City will review and ensure inclusion of the design features in the proposed project before the applicant(s) can receive the City's discretionary approval for the applicable increment of development. In determining what measures should appropriately be imposed by the City under the circumstances, the City shall consider the following factors:

- *the extent to which rates of GHG emissions generated by motor vehicles traveling to, from, and within the project site are projected to decrease over time as a result of regulations, policies, and/or plans that have already been adopted or may be adopted in the future by ARB pursuant to AB 32, or by EPA;*

- *the extent to which mobile-source GHG emissions, which at the time of writing this analysis comprise a substantial portion of the state's GHG inventory, can also be reduced through design measures that result in trip reductions and reductions in trip length;*

- *the extent to which GHG emissions emitted by the mix of power generation supplying electricity to Roseville Electric, the electrical utility that will serve the project site, are projected to decrease pursuant to the Renewables Portfolio Standard required by SB 1078 and SB 107, and the subsequent Renewable Energy Standard by 2020, as well as any future regulations, policies, and/or plans adopted by the federal and State governments that reduce GHG emissions from power generation;*

- *the extent to which any stationary sources of GHG emissions that would be operated on a proposed land use are already subject to regulations, policies, and/or plans that reduce GHG emissions, particularly any future regulations that will be developed as part of ARB's implementation of AB 32, mandatory reporting requirements, or cap-and-trade requirements, or other pertinent regulations on stationary sources that have the indirect effect of reducing GHG emissions;*

- *the extent to which the feasibility of existing GHG reduction technologies may change in the future, and to which innovation in GHG reduction technologies will continue effecting cost-benefit analyses that determine economic feasibility; and*

- *whether the total costs of proposed mitigation for GHG emissions, together with other mitigation measures required for the proposed development, are so great that a reasonably prudent property owner would not proceed with the project in the face of such costs.*

In considering how much, and what kind of, measures are necessary in light of these factors, the City shall consider and implement, as appropriate, the following non-exclusive and non-exhaustive list of measures. GHG emission reduction strategies and their respective feasibility are likely to evolve over time. These measures are derived from multiple sources including the Mitigation Measure Summary in Appendix B of the California Air Pollution Control Officer's Association (CAPCOA) white paper, CEQA & Climate Change *(CAPCOA 2008); CAPCOA's* Model Policies for Greenhouse Gases in General Plans *(CAPCOA 2009); CPCOA's* Quantifying Greenhouse Gas Reduction Measures *(CAPCOA 2010); and the California Attorney General's Office publication,* The California Environmental Quality Act: Addressing Global Warming Impacts at the Local Agency Level *(California Attorney General's Office 2010). The measures listed below are identical to the GHG reduction options listed under Mitigation Measure 4.5-2 of the SVSP EIR, unless otherwise noted.*

Energy Efficiency

- *Include additional clean alternative energy features to promote energy self-sufficiency (e.g., photovoltaic cells, solar thermal electricity systems, small wind turbines).*

- *Site buildings to take advantage of shade and prevailing winds and design landscaping and sun screens to reduce energy use.*

- *Install efficient lighting in all buildings (including residential). Also install lighting control systems, where practical. Design buildings to use daylight as an integral part of lighting systems.*

- *Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes.*

Water Conservation and Efficiency

- *Install water-efficient fixtures and appliances in buildings to reduce indoor water use.*

- *Prohibit businesses from using pressure washers for cleaning driveways, parking lots, sidewalks, and street surfaces. These restrictions should be included in the Covenants, Conditions, and Restrictions of the community.*

- *Provide education about water conservation and available programs and incentives.*

- *To reduce stormwater runoff, which typically bogs down wastewater treatment systems and increases their energy consumption, construct driveways to single family detached residences and parking lots and driveways of multifamily residential uses with pervious surfaces. Possible designs include*

Hollywood drives (two concrete strips with vegetation or aggregate in between) and/or the use of porous concrete, porous asphalt, turf blocks, or pervious pavers.

- *Comply with any applicable water conservation ordinances.*

Solid Waste Measures

- *Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).*
- *Provide interior and exterior storage areas for recyclables and green waste at all buildings.*
- *Provide adequate recycling containers in public areas, including parks, school grounds, golf courses, and pedestrian zones in areas of mixed-use development.*
- *Provide education and publicity about reducing waste and available recycling services.*

Transportation and Motor Vehicles

- *Promote ride-sharing programs and employment centers (e.g., by designating a certain percentage of parking spaces for ride-sharing vehicles, designating adequate passenger loading and unloading zones and waiting areas for ride-share vehicles, and providing a Web site or message board for coordinating ride-sharing).*
- *Provide the necessary facilities and infrastructure in all land use types to encourage the use of low- or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).*
- *Require commercial and retail land uses to provide prioritized parking for electric vehicles, hybrid vehicles, and alternative fuel vehicles.*
- *At industrial and commercial land uses, all forklifts, "yard trucks," or vehicles that are predominately used on-site at non-residential land uses shall be electric-powered or powered by biofuels (such as biodiesel [B100]) that are produced from waste products, or shall use other technologies that do not rely on direct fossil fuel consumption.*
- *Implement roundabouts instead at intersections instead of stop signs.*
- *Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes.*

Significance After Mitigation

The exhaust emission control measures required by Mitigation Measure 1-1 will help minimize the combustion of fossil fuels by heavy-duty construction equipment and associated GHG emissions.

The energy efficiency measures required by Mitigation Measure 1-2 will reduce energy demand by buildings developed on the project site and GHG emissions associated with energy consumption.

By acknowledging that the regulatory environment will continue to progress and that new GHG-efficient technologies will continue to be innovated over time, Mitigation Measure 2-1d requires the implementation of project-specific mitigation measures that are appropriate and feasible during each phase or increment of project development. Although Mitigation Measure 2-1d would require the implementation of all feasible GHG

reduction measures known at the time of each development proposal that is subject to discretionary action by the City, whether this measure would result in operational GHG efficiency of 4.6 MT CO_2e/SP/year is unknown at this time. As the preceding discussion suggests, much of the difficulty in achieving a GHG efficiency of 4.6 MT CO_2e/SP/year through measures imposed by the City reflects the reality that the vast majority of GHG emissions associated with development of the project site would be attributable to the combustion of fossil fuels, either in motor vehicles or in electricity-generating power plants. The state, it is clear, must make significant strides in changing the make-up of transportation fuels and power plant fuels if it is to achieve compliance with AB 32. Based on the most recent update to the Scoping Plan (ARB 2011c), however, it is reasonable to expect that the state should be able to make such strides through regulations and policies adopted pursuant to AB 32. Given the long period of time needed for build-out of the project, these regulations and policies should be effective in reducing GHG emissions from vehicles and power plants during the period of time in which the City approves the vast majority of project development entitlements needed for development pursuant to, and consistent with, the proposed project. As these regulations and policies gradually become effective, the task of achieving GHG efficiency of 4.6 MT CO_2e/SP/year should become comparatively easier. However, the precise level of reductions is difficult to calculate for all phases of development, and therefore would be speculative at this time. As a precaution, this analysis concludes that the proposed project's incremental contribution to long-term operational GHG emissions is cumulatively considerable and **significant and unavoidable**.

IMPACT 2-2	**Impacts of Climate Change on the Westbrook Amendment Land Uses.** Climate change is expected to result in a variety of effects to the project site including changes to water supply, increased risk of flooding, and increased frequency and intensity of wildfire. Negative effects on residents, resources, and structures could result.

As discussed previously in this section, human-induced increases in GHG concentrations in the atmosphere have led to increased global average temperatures (global warming) through the intensification of the greenhouse effect, and associated changes in local, regional, and global average climatic conditions.

Although there is a strong scientific consensus that global climate change is occurring and is influenced by human activity, there is less certainty as to the timing, severity, and potential consequences of the climate phenomena. Scientists have identified several ways in which global climate change could alter the physical environment in California (IPCC 2007, CEC 2006c, DWR 2006). These include:

- increased average temperatures;
- modifications to the timing, amount, and form (rain vs. snow) of precipitation;
- changes in the timing and amount of runoff;
- reduced water supply;
- deterioration of water quality; and,
- elevated sea level.

These changes may translate into a variety of issues and concerns that may affect the proposed land uses on the project site, including but not limited to:

- decreased water supply, reliability, and quality;
- increased frequency and intensity of wildfire as a result of changing precipitation patterns and temperatures;
- increased risk of flooding and landslide associated with changes to precipitation patterns;

- Increased air pollution and related effects on human health; and
- Increased energy demand associated with increased temperatures.

Although climate change is an issue of global scale and the impacts described above are likely to occur whether or not the proposed project is adopted, implementation of the proposed project would influence the degree to which climate change affects the residents and workers in the proposed land uses, ecosystems, and the economy. Development associated with buildout of the project site could subject an increased number of persons and structures to potential hazards, such as water supply issues. Because the project site is located sufficiently far above sea level, it is not anticipated that the property would be affected by sea level rise. Because the land surrounding the project site is largely agricultural and not heavily vegetated, increased exposure to wildfire is also not anticipated.

Although development of the project site may increase exposure to such risks and hardships, development of under the Westbrook Amendment includes a variety of measures that would assist the City in avoiding, adapting to, and being resilient in the face of climate change-associated impacts. These measures are shown below:

- **Emergency Water Supply.** An on-site injection/extraction 2.6 million gallon per day well will be built as part of the proposed land use plan to help provide the City with an emergency water supply during dry years or during fire flows, and allow for the eventual use of an Aquifer Storage and Recovery (ASR) project.
- **Recycled Water.** The project site will receive recycled water from the Pleasant Grove Wastewater Treatment Plant which will be used to irrigate landscaping at parks, schools, commercial, business professional, and multi-family projects, as well as publicly landscaped areas such as roadway landscaped corridors and medians.
- **Smart/centrally controlled irrigation controls.** Irrigation controls will restrict irrigation to only the times and water application rates that are necessary to maintain landscaping. They account for changes in the demand in water which varies with weather patterns. They will be required for residential, small commercial and quasi-public parcels subject to turf reduction measures, and centrally controlled irrigation controllers for larger commercial and publicly maintained parcels.
- **Recirculating Hot water systems.** These systems use a recirculating pump on a home's hot water line system, reducing the time necessary to receive hot water at any hot water faucet. This type of system will be included on all residential units to generate additional plan-wide water conservation.
- **Turf Reduction.** In front yards of residential areas and in public spaces such as parks and street landscape corridors turf limits will be imposed. These areas will have low water plant species that use between 65-75% less water than the average lawn.

The inclusion of the features of the proposed project described above would reduce the extent and severity of climate change-associated impacts on project site by providing methods for adapting to these changes. Therefore, this impact is considered **less than significant**.

Mitigation Measure

No Mitigation is required.

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Appendix A

Emissions Calculations and Modeling

Westbrook Proposed Land Use [1]	URBEMIS Equavalent Land Use	Acres	Square Ft	D.U.	FAR Assumptions[2]	
LDR (Low Density Residential)	Single Family Housing	145.7	6,346,692	705		
MDR (Medium Density Residential)	Single Family Housing	83.6	3,641,616	635		
HDR (High Density Residential)	Condo/townhouse general	27.6	1,202,256	689		
CC (Commercial)	Strip Mall	37	1,611,720		402,930	Square feet
CMU (Commercial Mix Use-Retail/Office 50/50)[3]	Strip Mall/General Office	6.3	274,428		109,771	Square feet
Public(School)	Elementary School	10	435,600			
Public (Well site)	General Light Industry	0.3	13,068			
Park	City Park	15.5	675,180			

Notes:
1. Land use acreage and dwelling units from Proposed Westbrook Amendment Land Use Plan (City of Roseville 2011)
2. FAR assumptions were based on assumptions in Sierra Vista Specific Plan EIR (2009) Retail 25% CMU 40% FAR
3. For CC and CMU FAR were calculated based on total acreage, then CMU square footage was divided equally into retail and office

URBEMIS Land Use Totals	Acres	Square Ft
Single Family Residential	229.3	11,190,564
Condo/Apartments	27.6	1,202,256
Retail (CC+ 50% of CMU)	40.15	1,748,934
Office	3.15	54,886
Elementary School	10	435,600
Parks (3)	15.5	675,180
Light Industry (well)	0.3	13,068
Total	326	

URBEMIS INPUTS		
Land Use	Quantity	Units
Single Family Residential	1,340	Dwelling Units
Condo/Apartments	689	Dwelling Units
Retail (402,930 sf retail +50% of 109771 sf CMU Office)	457,816	Square feet
Office (50% of CMU)[2]	54,886	Square feet
Elementary School	10	Acres
Parks (3)	16	Acres
Light Industry (well)	13,068	Square feet

	value	units
Total Housing	2,029	dwelling units
average housing size	2.54	residents/household
Residential Population	5,154	residents
Total Retail/Office area	512,701	sq ft
employment ratio	450	sq ft/job
employment	1,139	jobs

URBEMIS Output Calculations	ROG lbs/day	NOX lbs/day	CO lbs/day	PM10 lbs/day	PM 2.5 lbs/day	CO2 Short ton/yr	CO2 MT Ton/yr
2014 Total (100% Construction)	780	177	318	663	145	3654	3314
2014 (20% Construction)	156	35.4	63.6	132.6	29		663

Notes:Assumed 20% of construction in 2014

Mitigation Calculation	PM 10 Dust	PM 10 Exhaust	Pm 2.5 Dust	PM 2.5 Exhaust	ROG	Nox	CO	
total emissions	654	9	137	8.29	704	172	317	
20% of emissions	130.8	1.8	27.4	1.658	140.8	34.4	63.4	
Mitigation (75% reduction)	32.7		6.85					
	34.5		8.508		140.8	34.4	63.4	

Other Assumptions:
Soil Hauling, 20 cubic yards/acre

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Summary Report for Annual Emissions (Tons/Year)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Construction.urb924

Project Name: Westbrook Construction

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2014 TOTALS (tons/year unmitigated)	51.45	11.71	20.98	0.03	43.16	0.60	43.76	9.03	0.55	9.58	3,866.74
2014 TOTALS (tons/year mitigated)	46.49	11.38	20.98	0.03	9.89	0.46	10.35	2.08	0.42	2.50	3,866.74
Percent Reduction	9.63	2.81	0.00	0.00	77.09	22.88	76.35	76.93	23.14	73.86	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	41.21	6.84	96.86	0.27	14.16	13.63	8,790.87

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	41.21	6.84	96.86	0.27	14.16	13.63	8,790.87

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Unmitigated Emissions (Tons/Year)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Construction.urb924

Project Name: Westbrook Construction

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

2014	51.45	11.71	20.98	0.03	43.16	0.60	43.76	9.03	0.55	9.58	3,866.74
Asphalt 04/01/2014-10/01/2014	0.29	1.24	0.79	0.00	0.00	0.10	0.10	0.00	0.09	0.09	150.73
Paving Off-Gas	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.17	1.03	0.66	0.00	0.00	0.09	0.09	0.00	0.08	0.08	93.64
Paving On Road Diesel	0.02	0.21	0.07	0.00	0.00	0.01	0.01	0.00	0.01	0.01	48.64
Paving Worker Trips	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.45
Building 04/01/2014-10/01/2014	0.74	3.61	15.78	0.03	0.12	0.19	0.31	0.04	0.17	0.21	2,801.32
Building Off Road Diesel	0.19	1.16	0.86	0.00	0.00	0.07	0.07	0.00	0.07	0.07	149.11
Building Vendor Trips	0.15	1.77	1.48	0.01	0.02	0.07	0.09	0.01	0.06	0.07	568.50
Building Worker Trips	0.40	0.68	13.43	0.02	0.10	0.05	0.15	0.04	0.04	0.07	2,083.70
Coating 04/01/2014-10/01/2014	49.56	0.02	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	59.22
Architectural Coating	49.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	59.22
Fine Grading 04/01/2014-10/01/2014	0.86	6.83	4.03	0.00	43.03	0.32	43.35	8.99	0.29	9.28	855.47
Fine Grading Dust	0.00	0.00	0.00	0.00	43.03	0.00	43.03	8.99	0.00	8.99	0.00
Fine Grading Off Road Diesel	0.85	6.77	3.85	0.00	0.00	0.31	0.31	0.00	0.29	0.29	816.99
Fine Grading On Road Diesel	0.00	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.12
Fine Grading Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.35

Phase Assumptions

Phase: Fine Grading 4/1/2014 - 10/1/2014 - Default Fine Site Grading Description

Total Acres Disturbed: 326.05

Maximum Daily Acreage Disturbed: 32.6

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 49.39

Off-Road Equipment:

4 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

2 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
3 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 4/1/2014 - 10/1/2014 - Default Paving Description
Acres to be Paved: 81.51
Off-Road Equipment:
1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day
2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day
2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 4/1/2014 - 10/1/2014 - Default Building Construction Description
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day
3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day
1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 4/1/2014 - 10/1/2014 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Summary Report for Summer Emissions (Pounds/Day)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Construction.urb924

Project Name: Westbrook Construction

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2014 TOTALS (lbs/day unmitigated)	779.48	177.35	317.89	0.41	653.96	9.11	663.07	136.86	8.29	145.15	58,586.98
2014 TOTALS (lbs/day mitigated)	704.41	172.36	317.89	0.41	149.80	7.02	156.82	31.57	6.37	37.94	58,586.98

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	140.02	28.90	83.58	0.00	0.24	0.24	35,514.93

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	140.02	28.90	83.58	0.00	0.24	0.24	35,514.93

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Unmitigated Emissions (Pounds/Day)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Construction.urb924

Project Name: Westbrook Construction

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

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Time Slice 4/1/2014-10/1/2014 Active Days: 132	779.48	177.35	317.89	0.41	653.96	9.11	663.07	136.86	8.29	145.15	58,586.98
Asphalt 04/01/2014-10/01/2014	4.41	18.78	11.99	0.01	0.03	1.46	1.49	0.01	1.34	1.35	2,283.84
Paving Off-Gas	1.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.54	15.61	10.07	0.00	0.00	1.34	1.34	0.00	1.24	1.24	1,418.81
Paving On Road Diesel	0.23	3.13	1.10	0.01	0.03	0.11	0.14	0.01	0.10	0.11	736.99
Paving Worker Trips	0.02	0.04	0.83	0.00	0.01	0.00	0.01	0.00	0.00	0.00	128.03
Building 04/01/2014-10/01/2014	11.22	54.74	239.02	0.39	1.86	2.85	4.71	0.66	2.54	3.20	42,444.19
Building Off Road Diesel	2.93	17.65	13.06	0.00	0.00	1.11	1.11	0.00	1.02	1.02	2,259.28
Building Vendor Trips	2.24	26.78	22.46	0.08	0.32	1.03	1.34	0.11	0.94	1.05	8,613.67
Building Worker Trips	6.05	10.32	203.49	0.31	1.54	0.72	2.26	0.56	0.58	1.13	31,571.23
Coating 04/01/2014-10/01/2014	750.86	0.29	5.78	0.01	0.04	0.02	0.06	0.02	0.02	0.03	897.34
Architectural Coating	750.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.17	0.29	5.78	0.01	0.04	0.02	0.06	0.02	0.02	0.03	897.34
Fine Grading 04/01/2014-10/01/2014	12.99	103.54	61.09	0.01	652.03	4.77	656.80	136.17	4.39	140.56	12,961.62
Fine Grading Dust	0.00	0.00	0.00	0.00	652.00	0.00	652.00	136.16	0.00	136.16	0.00
Fine Grading Off Road Diesel	12.85	102.57	58.32	0.00	0.00	4.73	4.73	0.00	4.36	4.36	12,378.67
Fine Grading On Road Diesel	0.06	0.84	0.30	0.00	0.01	0.03	0.04	0.00	0.03	0.03	198.86
Fine Grading Worker Trips	0.07	0.13	2.48	0.00	0.02	0.01	0.03	0.01	0.01	0.01	384.09

Phase Assumptions

Phase: Fine Grading 4/1/2014 - 10/1/2014 - Default Fine Site Grading Description

Total Acres Disturbed: 326.05

Maximum Daily Acreage Disturbed: 32.6

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 49.39

Off-Road Equipment:

4 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

2 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
3 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 4/1/2014 - 10/1/2014 - Default Paving Description
Acres to be Paved: 81.51
Off-Road Equipment:
1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day
2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day
2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 4/1/2014 - 10/1/2014 - Default Building Construction Description
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day
3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day
1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 4/1/2014 - 10/1/2014 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Area Source Unmitigated Emissions (Pounds/Day)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Operational.urb924

Project Name: Westbrook Operations

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	2.12	27.82	14.26	0.00	0.05	0.05	35,067.73
Hearth - No Summer Emissions							
Landscape	11.55	0.80	69.09	0.00	0.19	0.19	112.90
Consumer Products	99.26						
Architectural Coatings	26.83						
TOTALS (lbs/day, unmitigated)	139.76	28.62	83.35	0.00	0.24	0.24	35,180.63

Area Source Changes to Defaults

10/17/2011 3:25:16 PM

Urbemis 2007 Version 9.2.4

Detail Report for Annual Area Source Unmitigated Emissions (Tons/Year)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Operational.urb924

Project Name: Westbrook Operations

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.39	5.08	2.60	0.00	0.01	0.01	6,399.86
Hearth	16.72	1.64	88.00	0.27	14.13	13.60	2,319.84
Landscape	1.04	0.07	6.22	0.00	0.02	0.02	10.16
Consumer Products	18.12						
Architectural Coatings	4.90						
TOTALS (tons/year, unmitigated)	41.17	6.79	96.82	0.27	14.16	13.63	8,729.86

Area Source Changes to Defaults

10/17/2011 3:25:02 PM

Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Operational.urb924

Project Name: Westbrook Operations

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	41.17	6.79	96.82	0.27	14.16	13.63	8,729.86

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	24.84	23.26	237.27	0.46	83.96	15.94	47,425.18

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	66.01	30.05	334.09	0.73	98.12	29.57	56,155.04

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Operational.urb924

Project Name: Westbrook Operations

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	9.63	8.92	92.64	0.18	32.30	6.14	18,331.90
Condo/townhouse general	3.69	3.31	34.40	0.07	12.00	2.28	6,807.58
Elementary school	0.96	0.51	5.13	0.01	1.83	0.35	1,030.08
City park	0.03	0.02	0.22	0.00	0.08	0.02	44.76
Strip mall	10.33	10.32	103.03	0.20	37.10	7.03	20,841.97
General office building	0.17	0.16	1.65	0.00	0.58	0.11	330.02
General light industry	0.03	0.02	0.20	0.00	0.07	0.01	38.87
TOTALS (tons/year, unmitigated)	24.84	23.26	237.27	0.46	83.96	15.94	47,425.18

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2025 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	229.00	9.00	dwelling units	1,340.00	12,060.00	103,109.38
Condo/townhouse general	27.60	6.50	dwelling units	689.00	4,478.50	38,289.83
Elementary school		1.00	students	750.00	750.00	5,835.00
City park		2.20	acres	15.50	34.10	254.30
Strip mall		35.00	1000 sq ft	457.89	16,026.15	118,481.33
General office building		17.70	1000 sq ft	13.00	230.10	1,864.39
General light industry		2.00	1000 sq ft	13.00	26.00	219.05
					33,604.85	268,053.28

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	40.3	0.0	100.0	0.0
Light Truck < 3750 lbs	13.9	0.0	97.8	2.2
Light Truck 3751-5750 lbs	22.4	0.0	100.0	0.0
Med Truck 5751-8500 lbs	11.0	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.6	0.0	76.9	23.1
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
Heavy-Heavy Truck 33,001-60,000 lbs	1.0	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	5.5	34.5	65.5	0.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.3	0.0	84.6	15.4

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Elementary school				20.0	10.0	70.0
City park				5.0	2.5	92.5
Strip mall				2.0	1.0	97.0
General office building				35.0	17.5	47.5
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

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Urbemis 2007 Version 9.2.4

Summary Report for Summer Emissions (Pounds/Day)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Operational.urb924

Project Name: Westbrook Operations

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	139.76	28.62	83.35	0.00	0.24	0.24	35,180.63

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	133.67	110.21	1,263.61	2.65	460.03	87.30	271,831.02

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	273.43	138.83	1,346.96	2.65	460.27	87.54	307,011.65

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Operational Unmitigated Emissions (Pounds/Day)

File Name: P:\Projects\2011\11010069.01 - Roseville, City of - Westbrook AQ & CCA\4_Deliverables in progress\Deliverable_1\01_ Prepared by authors\Air\Appendix Items\Westbrook Operational.urb924

Project Name: Westbrook Operations

Project Location: Placer County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	52.04	42.24	495.37	1.03	177.00	33.62	105,052.01
Condo/townhouse general	20.31	15.68	183.96	0.38	65.73	12.49	39,011.23
Elementary school	6.38	2.40	27.28	0.06	10.01	1.90	5,904.78
City park	0.19	0.10	1.17	0.00	0.44	0.08	256.62
Strip mall	53.71	48.93	545.97	1.16	203.27	38.53	119,492.07
General office building	0.88	0.77	8.81	0.02	3.20	0.61	1,891.54
General light industry	0.16	0.09	1.05	0.00	0.38	0.07	222.77
TOTALS (lbs/day, unmitigated)	133.67	110.21	1,263.61	2.65	460.03	87.30	271,831.02

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2025 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	229.00	9.00	dwelling units	1,340.00	12,060.00	103,109.38
Condo/townhouse general	27.60	6.50	dwelling units	689.00	4,478.50	38,289.83
Elementary school		1.00	students	750.00	750.00	5,835.00
City park		2.20	acres	15.50	34.10	254.30
Strip mall		35.00	1000 sq ft	457.89	16,026.15	118,481.33
General office building		17.70	1000 sq ft	13.00	230.10	1,864.39
General light industry		2.00	1000 sq ft	13.00	26.00	219.05
					33,604.85	268,053.28

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	40.3	0.0	100.0	0.0
Light Truck < 3750 lbs	13.9	0.0	97.8	2.2
Light Truck 3751-5750 lbs	22.4	0.0	100.0	0.0
Med Truck 5751-8500 lbs	11.0	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.6	0.0	76.9	23.1
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
Heavy-Heavy Truck 33,001-60,000 lbs	1.0	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	5.5	34.5	65.5	0.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.3	0.0	84.6	15.4

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Elementary school				20.0	10.0	70.0
City park				5.0	2.5	92.5
Strip mall				2.0	1.0	97.0
General office building				35.0	17.5	47.5
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

Project Name GHG Emissions Estimates

- sq ft

Construction - URBEMIS GHG Emissions Modeling Results

Total (all construction)	3,867	tons	3,507	MT
amortization period	30	years		
amortized construction emiss.	129	tons/year	117	MT

Operation - URBEMIS GHG Emissions Modeling Results

Area-Source Emissions	tons/yr	**MT/yr**
URBEMIS output	8,730	7,918

Mobile-Source Emissions	tons/yr	**MT/yr**
URBEMIS output	47,425	43,015

Indirect GHG Emissions Modeling Results

Indirect Emissions from Electricity Consumption 1, 2

MWh/yr	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
3,504	Roseville Electric	793.8	1	NA	21	NA	310	**1,262**

Indirect Emissions from Potable Water Use (includes conveyance, treatment, distribution, and wastewater treatment) 1,3

	Water Demand (AFY)	KWh/million gallons*	Mg/year	Total KWh/yr	MWh/yr	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
wo/conservation	976	5,411	273	1,478,718	1,479	CAMX	724.12	1	0.0302	21	0.0081	310	**488**
w/conservation	867	5,411	243	1,313,574	1,314	CAMX	724.12	1	0.0302	21	0.0081	310	**433**

Indirect Emissions from Recycled Water Use (includes treatment, distribution, and wastewater treatment) 1,3

	Water Demand (AFY)	KWh/million gallons*	Mg/year	Total KWh/yr	MWh/yr	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
wo/conservation	186	3,294	52	171,552	172	Roseville Electric	793.8	1	NA	21	NA	310	**62**
w/conservation	117	3,294	33	107,911	108	Roseville Electric	793.8	1	NA	21	NA	310	**39**

*Indoor use in Northern California

Water demand values were estimated in the *Potable Water.Master Plan* (September 2011) and *Recycled Water Master Plan* (Ausgust 2011) prepared by HydroScience Engineers, Inc.

	AFY	Total CO2e (Metric Tons/year)
Potable and Recycled Water Consumption Subtotal, without/Conservation	1,162	**550**
Potable and Recycled Water Consumption Subtotal, with/Conservation	984	**472**
Difference	178	**77**

Total Operational GHG Emissions (MT/yr) 52,861 GHG/SP 8.4 MT/SP/yr

residents: 5,154 jobs: 1,139 Serv Pop: 6,293 employees+population

Sources:

1 California Climate Action Registry [CCAR] General Reporting Protocol v 3.1 January 2009. Appendix C. http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

2 California Energy Commission [CEC] 2009. California Commercial End Use Survey. http://capabilities.itron.com/CeusWeb/Chart.aspx[6/8/2010 2:19:09 PM]

3 California Energy Commission [CEC] 2006 (December). Refining Estimates of Water-Related Energy Use in California. CEC-500-2006-118

Conversion Factors:

1 ton	0.907 MT	2204.62 lb
1 AF	0.28 mg	
1 yr	365 days	
1 MW	8765.81277 MWh/yr	

GHG Emissions Assocated with Electricity Consumption

	value	units	Source/Notes
average electricity demand	0.4	MVA	Utilities Study by Capitol Utility Specialists, Table 3
power conversion rate	1.00	MW/MVA	http://en.wikipedia.org/wiki/Volt-ampere
average electricity demand	0.4	MW	conversion calculation
time conversion rate	24	hr/day	clock
time conversion rate	365	days/year	Earth
Avg. annual consumption of electricity	3,504	MW-hr/year	calculation
CO_2 emission rate for electricity consumption	793.8	lb/MW-hr	2007 Utility-Specific Emisssion Factor for Roseville Electric from CCAR
CO_2 emissions from electricity consumption	2,781,475	lb/year	calculation
mass conversion rate	2,204.62	lb/MT	onlineconversion.com/weight_common.htm
GHG emissions from electricity consumption*	**1,262**	**MT/year**	calculation

*Emission factors for Roseville Electric for CH4 and N2O were not available. However, the emissions of CH4 and N2O are expected to be nominal.

Table 5: Reduced Landscape Turf Water Savings – Residential

Land Use Designation	Annual Front Yard Demand[1,2] (AFY)	Annual Front Yard Turf Demand (AFY)	Reduced Turf Annual Front Yard Demand (AFY)	Water Savings for Reduced Turf (AFY)	Water System Savings	Percent Reduction in Water Demand
Low Density Residential	97	95	70	27	Potable	28%
Medium Density Residential	62	61	45	17	Potable	28%
High Density Residential	18	18	13	5	Recycled	28%
Total	177	174	128	49		28%

Notes:

1. From Table 3.
2. Demands for High Density Residential parcels represent full irrigation demand since there is no distinction between front yard and back yard

Source: HydroScience Engineers, Inc. 2011c (May 5). *Westbrook, a Portion of the Sierra Vista Specific Plan – Water Conservation Plan.* A technical memorandum by Jacky Bowen and Curtis Lam.

Table 6: Reduced Landscape Turf Water Savings – Non-Residential

Land Use Designation	Annual Irrigation Demand[2] (AFY)	Base Turf Area[1]	New Turf Area[1]	Low Water Use Area[1]	Reduced Irrigation Demand (AFY)	Water Savings for Reduced Turf (AFY)	Water System Savings	Percent Reduction in Water Demand
Parks	44	0.8	0.6	0.2	36	8	Recycled	18%
Landscape corridor	53	0.8	0.3	0.5	30	23	Recycled	43%
Paseo[3]	0	0.8	0.3	0.5	0	0	Recycled	
Right of way	38	0.8	0.3	0.5	21	17	Recycled	45%
Total	135				87	48		

Notes:

1. Original demand includes the turf reduction water conservation measures that were previously described.

Air Quality Emissions Calculations Comparison of Alternatives

Westbrook Development - Comparison of Alternatives, Unmitigated Construction Emissions

Alternative	Res Acreage	% of proposed	Res Units	% of proposed	NonRes Acreage	% of proposed
Proposed	245.3	100.0%	2029	100.0%	53.8	100.0%
Red Foot/Inc Der	153.4	62.5%	1890	93.1%	51.8	96.3%
Red Foot/Same D	157.9	64.4%	1405	69.2%	51.8	96.3%
Central Preserve	173.1	70.6%	1495	73.7%	51.3	95.4%
One Acre Fill	140.3	57.2%	1340	66.0%	34.8	64.7%
Half Acre Fill	129.3	52.7%	1256	61.9%	31.1	57.8%
Offsite	169	68.9%	1350	66.5%	76.1	141.4%
No Action	176.6	72.0%	1505	74.2%	41.4	77.0%

Alternative	ROG	NOx	CO	SOx	PM10	PM2.5
Proposed	156	35	64		133	29
Red Foot/Inc Der	150.2	33.7	61.6	0.0	128.1	27.9
Red Foot/Same D	150.2	33.7	61.6	0.0	128.1	27.9
Central Preserve	148.8	33.4	61.0	0.0	126.8	27.7
One Acre Fill	100.9	22.6	41.4	0.0	86.0	18.8
Half Acre Fill	90.2	20.2	37.0	0.0	76.9	16.8
Offsite	220.7	49.5	90.5	0.0	188.1	41.0
No Action	120.0	26.9	49.2	0.0	102.3	22.3

Westbrook Development - Comparison of Alternatives, Mitigated Construction Emissions

Alternative	Res Acreage	% of proposed	Res Units	% of proposed	NonRes Acreage	% of proposed
Proposed	245.3	100.0%	2029	100.0%	53.8	100.0%
Red Foot/Inc Der	153.4	62.5%	1890	93.1%	51.8	96.3%
Red Foot/Same D	157.9	64.4%	1405	69.2%	51.8	96.3%
Central Preserve	173.1	70.6%	1495	73.7%	51.3	95.4%
One Acre Fill	140.3	57.2%	1340	66.0%	34.8	64.7%
Half Acre Fill	129.3	52.7%	1256	61.9%	31.1	57.8%
Offsite	169	68.9%	1350	66.5%	76.1	141.4%
No Action	176.6	72.0%	1505	74.2%	41.4	77.0%

Alternative	ROG	NOx	CO	SOx	PM10	PM2.5
Proposed	156	30	64		34	9
Red Foot/Inc Der	150.2	28.9	61.6	0.0	32.7	8.7
Red Foot/Same D	150.2	28.9	61.6	0.0	32.7	8.7
Central Preserve	148.8	28.6	61.0	0.0	32.4	8.6
One Acre Fill	100.9	19.4	41.4	0.0	22.0	5.8
Half Acre Fill	90.2	17.3	37.0	0.0	19.7	5.2
Offsite	220.7	42.4	90.5	0.0	48.1	12.7
No Action	120.0	23.1	49.2	0.0	26.2	6.9

Greenhouse Gas Emissions Calculations Comparison of Alternatives

Westbrook Development - Comparison of Alternatives Greenhouse Gas Emissions from Construction

Alternative	Res Acreage	% of proposed	Res Units	% of proposed	NonRes Acreage	% of proposed
Proposed	245.3	100.0%	2029	100.0%	53.8	100.0%
Red Foot/Inc Den	153.4	62.5%	1890	93.1%	51.8	96.3%
Red Foot/Same Den	157.9	64.4%	1405	69.2%	51.8	96.3%
Central Preserve	173.1	70.6%	1495	73.7%	51.3	95.4%
One Acre Fill	140.3	57.2%	1340	66.0%	34.8	64.7%
Half Acre Fill	129.3	52.7%	1256	61.9%	31.1	57.8%
Offsite	169	68.9%	1350	66.5%	76.1	141.4%
No Action	176.6	72.0%	1505	74.2%	41.4	77.0%

Operational Emissions Calculated by Proportion of Proposed Res Units

Alternative	Amortized Construction Emissions	Total Construction Emissions
Proposed	129.00	3,507.00
Red Foot/Inc Den	120.16	3,266.75
Red Foot/Same Den	89.33	2,428.45
Central Preserve	95.05	2,584.01
One Acre Fill	85.19	2,316.11
Half Acre Fill	79.85	2,170.92
Offsite	85.83	2,333.39
No Action	95.69	2,601.30

Operational Emissions Calculated by Proportion of Proposed Comm Acreage

Alternative	Amortized Construction Emissions	Total Construction Emissions
Proposed	129.00	3,507.00
Red Foot/Inc Den	124.20	3,376.63
Red Foot/Same Den	124.20	3,376.63
Central Preserve	123.01	3,344.04
One Acre Fill	83.44	2,268.47
Half Acre Fill	74.57	2,027.28
Offsite	182.47	4,960.64
No Action	99.27	2,698.70

Average of Values Above

Alternative	Amortized Construction Emissions	Total Construction Emissions
Proposed	129.00	3,507.00
Red Foot/Inc Den	122.18	3,321.69
Red Foot/Same Den	106.77	2,902.54
Central Preserve	109.03	2,964.02
One Acre Fill	84.32	2,292.29
Half Acre Fill	77.21	2,099.10
Offsite	134.15	3,647.02
No Action	97.48	2,650.00

Westbrook Development - Comparison of Alternatives Greenhouse Gas Emissions from 2025 Buildout

Alternative	Res Acreage	% of proposed	Res Units	% of proposed	Comm Acreage	% of proposed
Proposed	245.3	100.0%	2029	100.0%	53.8	100.0%
Red Foot/Inc Den	153.4	62.5%	1890	93.1%	51.8	96.3%
Red Foot/Same Den	157.9	64.4%	1405	69.2%	51.8	96.3%
Central Preserve	173.1	70.6%	1495	73.7%	51.3	95.4%
One Acre Fill	140.3	57.2%	1340	66.0%	34.8	64.7%
Half Acre Fill	129.3	52.7%	1256	61.9%	31.1	57.8%
Offsite	169	68.9%	1350	66.5%	76.1	141.4%
No Action	176.6	72.0%	1505	74.2%	41.4	77.0%

Operational Emissions Calculated by Proportion of Proposed Res Units

Alternative	Source	Mobile Sources	Area Sources	Electricity	Water Conveyance, Treatment, Distribution, and Wastewater Treatement	Amortized Construction Emissions	Total
Proposed	Area	43,015.00	4,917.00	1,262.00	550.00	88.00	49,832.00
Red Foot/Inc Den	Area	40,068.19	4,580.15	1,175.54	512.32	81.97	46,418.18
Red Foot/Same Den	Area	29,786.14	3,404.82	873.88	380.85	60.94	34,506.63
Central Preserve	Area	31,694.15	3,622.93	929.86	405.25	64.84	36,717.02
One Acre Fill	Area	28,408.13	3,247.30	833.45	363.23	58.12	32,910.24
Half Acre Fill	Area	26,627.32	3,043.74	781.21	340.46	54.47	30,847.21
Offsite	Area	28,620.13	3,271.54	839.67	365.94	58.55	33,155.84
No Action	Area	31,906.15	3,647.16	936.08	407.96	65.27	36,962.62

Operational Emissions Calculated by Proportion of Proposed Comm Acreage

Alternative	Source	Mobile Sources	Area Sources	Electricity	Water Conveyance, Treatment, Distribution, and Wastewater Treatement	Amortized Construction Emissions	Total
Proposed	Area	43,015.00	4,917.00	1,262.00	550.00	88.00	49,832.00
Red Foot/Inc Den	Area	41,415.93	4,734.21	1,215.09	529.55	84.73	47,979.51
Red Foot/Same Den	Area	41,415.93	4,734.21	1,215.09	529.55	84.73	47,979.51
Central Preserve	Area	41,016.16	4,688.51	1,203.36	524.44	83.91	47,516.39
One Acre Fill	Area	27,823.83	3,180.51	816.31	355.76	56.92	32,233.34
Half Acre Fill	Area	24,865.55	2,842.36	729.52	317.94	50.87	28,806.23
Offsite	Area	60,844.64	6,955.09	1,785.10	777.97	124.48	70,487.27
No Action	Area	33,100.76	3,783.71	971.13	423.23	67.72	38,346.56

Average of Values Above

Alternative	Source	Mobile Sources	Area Sources	Electricity	Water Conveyance, Treatment, Distribution, and Wastewater Treatement	Amortized Construction Emissions	Total
Proposed	Area	43,015	4,917	1,262	550	88	49,832
Red Foot/Inc Den	Area	40,742	4,657	1,195	521	83	47,199
Red Foot/Same Den	Area	35,601	4,070	1,044	455	73	41,243
Central Preserve	Area	36,355	4,156	1,067	465	74	42,117
One Acre Fill	Area	28,116	3,214	825	359	58	32,572
Half Acre Fill	Area	25,746	2,943	755	329	53	29,827
Offsite	Area	44,732	5,113	1,312	572	92	51,822
No Action	Area	32,503	3,715	954	416	66	37,655