

This section describes the air quality impacts of the proposed Sheldon/99 GPA and Rezone project. It examines the climatic influences that affect air quality of the Elk Grove area and also describes available data on measured contaminant levels. In addition, it outlines the regulatory and planning agencies and programs relevant to the project area.

4.7.1. EXISTING SETTING

AIR BASIN CHARACTERISTICS

The City of Elk Grove lies at the southern end of the Sacramento Valley, a broad, flat valley bounded by the coastal ranges to the west and the Sierra Nevada mountain range to the east. A sea level gap in the Coast Range (the Carquinez Strait) is located approximately 50 miles southwest and the intervening terrain is very flat. The prevailing wind direction is southwesterly, which is the wind direction when marine breezes flow through the Carquinez Strait. Marine breezes dominate during the spring and summer months and show strong daily variations. Highest average wind speeds occur in the afternoon and evening hours; lightest winds occur in the night and morning hours. During fall and winter, when the sea breeze diminishes, northerly winds occur more frequently, but southwesterly winds still predominate.

The project area is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD) and is located in the Sacramento Valley Air Basin. The Sacramento Valley Air Basin has been further divided into planning areas called the Northern Sacramento Valley Air Basin (NSVAB) and the Greater Sacramento Air Region, designated by the U.S. Environmental Protection Agency (EPA) as the Sacramento federal ozone non-attainment area. The non-attainment area consists of all of Sacramento and Yolo counties and parts of El Dorado, Solano, Placer, and Sutter counties.

The San Francisco Bay Area Air Basin lies to the west, and the San Joaquin Valley Air Basin is located to the south of the Planning Area. Considerable transport of pollutants occurs between these air basins, so that air quality in the project area is partially determined by the release of pollutants elsewhere. In turn, pollutants generated in the project area affect air quality in areas to the north and east.

AMBIENT AIR QUALITY STANDARDS

Both the EPA and the California Air Resources Board (ARB) have established ambient air quality standards for common pollutants. The national ambient air quality standards ("NAAQS" or "federal standards") and California ambient air quality standards ("CAAQS" or "state standards") for important pollutants are summarized in **Table 4.7-1**. These ambient air quality standards are levels of contaminants that represent levels to protect public health and welfare and avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California standards are more stringent. This is particularly true for ozone and particulate matter (PM₁₀ and PM_{2.5}).

A geographical area identified to have air quality as good as, or better than, the federal and/or California ambient air quality standard is referred to as being in attainment of these standards. An area may be an attainment area for one pollutant and a non-attainment area for others.

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**TABLE 4.7-1
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	Federal Primary Standard ²	State Standard ¹
Ozone	1-Hour	--	0.09 ppm
	8-Hour	0.075 ppm	0.07 ppm
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35 ppm	20.0 ppm
Nitrogen Dioxide	Annual Average	0.053 ppm	0.03 ppm
	1-Hour	--	0.18 ppm
Sulfur Dioxide	Annual Average	0.03 ppm	--
	24-Hour	0.14 ppm	0.04 ppm
	1-Hour	--	0.25 ppm
PM ₁₀	Annual Average	--	20 µg/m
	24-Hour	150 µg/m	50 µg/m
PM _{2.5}	Annual Average	15 µg/m	12 µg/m
	24-Hour	35 µg/m	-- ²
Lead ³	Calendar Quarter	1.5 ug/m	--
	30 Day Average	--	1.5 ug/m

Source: California Air Resources Board, Ambient Air Quality Standards, April 1, 2008. <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. Accessed May 15, 2008.

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

¹ California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, suspended particulate matter—PM₁₀, PM_{2.5}, and visibility reducing particles—are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

² National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) 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. For PM₁₀, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM_{2.5}, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

³ The ARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level 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.

AIR POLLUTANTS OF CONCERN AND HEALTH EFFECTS

The most problematic pollutants in project area are ozone, carbon monoxide, and particulate matter. Carbon monoxide in Sacramento County no longer exceeds the ambient air quality standards in Sacramento County, but has in the past. The health effects and major sources of these pollutants are described below. Toxic air contaminants are a separate class of pollutants and are discussed later in this section.

Ozone

Ground level ozone, commonly referred to as smog, is greatest on warm, windless, sunny days. Ozone is not emitted directly into the air from point sources (e.g., mobile or stationary); rather, they are formed through a complex series of chemical reactions between reactive organic gases (ROG) and nitrogen oxides (NOx). These reactions occur over time in the presence of sunlight.

Ozone is a public health concern because it is a respiratory irritant that increases susceptibility to respiratory infections and diseases and because it can harm lung tissue at high concentrations. In addition, ozone can cause substantial damage to leaf tissues of crops and natural vegetation and can damage many natural and manmade materials by acting as a chemical oxidizing agent. The principal sources of the ozone precursors (ROG and NO_x) are the combustion of fuels and the evaporation of solvents, paints, and fuels.

Sacramento County is classified as a serious ozone non-attainment area for the both the federal 8-hour ozone standard and for the state 1-hour and 8-hour standards (SMAQMD, 2008).

Particulate Matter (PM)

Particulate matter can be divided into several size fractions. Coarse particles are between 2.5 and 10 microns in diameter and arise primarily from natural processes, such as wind-blown dust or soil. Fine particles are less than 2.5 microns in diameter and are produced mostly from combustion or burning activities. Fuel burned in cars and trucks, power plants, factories, fireplaces, and wood stoves produce fine particles.

The level of fine particulate matter in the air is a public health concern because it can bypass the body's natural filtration system more easily than larger particles and can lodge deep in the lungs. The health effects vary depending on a variety of factors, including the type and size of particles. Research has demonstrated a correlation between high PM concentrations and increased mortality rates. Elevated PM concentrations can also aggravate chronic respiratory illnesses such as bronchitis and asthma.

The EPA revoked the annual PM₁₀ standard in 2006 because available evidence generally did not suggest a link between long-term exposure to the current levels of coarse particles and health problems. The existing daily PM₁₀ standard was retained due to the effects of short-term exposure to inhalable coarse particles.

Sacramento County is classified as a non-attainment area for state particulate matter standards (PM₁₀ and PM_{2.5}). The County is also classified as a moderate non-attainment area for federal PM₁₀ standards. However, air quality meets federal PM₁₀ standards. SMAQMD must request redesignation to attainment and submit a maintenance plan to be formally designated to attainment (SMAQMD, 2008).

Carbon Monoxide (CO)

Carbon monoxide (CO) is an odorless, colorless gas that is formed by the incomplete combustion of fuels. Motor vehicle emissions are the dominant source of CO in the Sacramento area. At high concentrations, CO reduces the oxygen-carrying capacity of the blood and can cause dizziness, headaches, unconsciousness, and even death. CO can also aggravate cardiovascular disease. Relatively low concentrations of CO can significantly affect the amount of oxygen in the bloodstream because carbon monoxide binds to hemoglobin 220–245 times more strongly than oxygen.

CO emissions and ambient concentrations have decreased significantly in recent years. These improvements are due largely to the introduction of cleaner burning motor vehicles and motor vehicle fuels. The Sacramento area has attained the state and national CO standard. The records from the area's monitoring stations show that the CO standard has not been exceeded since 1999. However, CO is still a pollutant that must be closely monitored due to its severe effect on human health.

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Toxic Air Contaminants (TACs)

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. Unlike criteria pollutants, no safe levels of exposure to TACs have been established. There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations, such as gasoline stations and dry cleaners, and motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage, and death.

Diesel exhaust is a TAC of growing concern in California. In 1998, ARB identified diesel engine particulate matter as a TAC. The exhaust from diesel engines contains hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources, such as trucks, buses, automobiles, trains, ships, and farm equipment, are by far the largest source of diesel emissions. Studies show that diesel particulate matter concentrations are much higher near heavily traveled highways and intersections.

It is important to understand that TACs are not considered criteria air pollutants and thus are not specifically addressed through the setting of ambient air quality standards. Instead, EPA and ARB regulate hazardous air pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology (MACT and BACT) to limit emissions. These in conjunction with additional rules set forth by SMAQMD establish the regulatory framework for TACs.

The inventory of stationary sources of TACs maintained by the ARB shows few major air pollutant sources in Elk Grove. Larger stationary sources of pollutants include the Sacramento Regional Wastewater Treatment Plant (SRWWTP) and associated cogeneration plant at the western boundary of the City and industrial facilities located at the extreme south end of the city limits near State Route 99 (SR 99). SR 99 and Interstate 5 (I-5) are also obvious sources of air pollutants in the city. The western boundary of the portion of the project site north of Sheldon Road is immediately adjacent to SR 99, and the western boundary of the portion of the project site south of Sheldon Road is approximately 1,003 feet from SR 99.

In 1998, after a 10-year scientific assessment process, ARB identified particulate matter from diesel-fueled engines as a TAC. The state has begun a program of identifying and reducing risks associated with particulate matter emissions from diesel-fueled vehicles. The plan consists of new regulatory standards for all new on road, off-road, and stationary diesel-fueled engines and vehicles, new retrofit requirements for existing on-road, off-road, and stationary diesel-fueled engines and vehicles, and new diesel fuel regulations to reduce the sulfur content of diesel fuel as required by advanced diesel emission control systems. Land uses where individuals could be exposed to high levels of diesel exhaust include:

- Warehouses;
- Schools with high volume of bus traffic;
- High volume highways; and
- High volume arterials and local roadways with high level of diesel traffic.

The only large-scale warehouse in the City of Elk Grove is the Apple computer facility, which is located north of Laguna Boulevard in the Laguna West area near I-5. The Elk Grove Unified School District currently has over 58 schools within its district boundaries. Many of the schools in the district have high volumes of bus traffic during daily morning and afternoon operations,

which contribute to diesel emissions in the area. High volume highways/freeways in the city include I-5 and SR 99, both of which have high volumes of daily truck traffic. Trucks are considered major sources of diesel-related emissions. Additionally, the city has several high volume arterials and local roadways (i.e., Bradshaw Road, Grant Line Road, and Laguna Boulevard) that have considerable amounts of diesel-powered vehicles and truck traffic.

AMBIENT AIR QUALITY

SMAQMD and ARB maintain several air quality monitoring sites in the Sacramento area, including one in the City of Elk Grove. The Elk Grove monitoring site measures two pollutants: ozone and nitrogen dioxide. The nearest monitoring site for carbon monoxide and PM_{2.5} is at T Street in downtown Sacramento. The nearest monitoring site for PM₁₀ is the Sacramento Branch Center Road site, located near Bradshaw Road south of U.S. 50. The nearest monitoring site for sulfur dioxide is the Sacramento-Del Paso Manor site. **Table 4.7-2** shows historical occurrences of pollutant levels exceeding the state/federal ambient air quality standards for the three-year period 2005–2007. The maximum concentration and number of days that each standard was exceeded is shown. All federal ambient air quality standards are met in the Elk Grove area, with the exception of ozone. Additionally, the state ambient standards of ozone and PM₁₀ are regularly exceeded.

**TABLE 4.7-2
ELK GROVE AREA AIR QUALITY**

Pollutant	Standard ³	2005		2006		2007	
		Highest	Days Over	Highest	Days Over	Highest	Days Over
Ozone							
Highest 1-hour average ¹	0.09 ppm	0.113 ppm	7	0.143 ppm	10	0.102 ppm	1
Highest 8-hour average ²	0.07 ppm	0.095 ppm	2	0.112 ppm	7	0.087 ppm	1
Carbon Monoxide							
Highest 8-hour average ¹	9.0 ppm	3.64 ppm	0	*	*	*	*
PM ₁₀							
Highest 24-hour average ¹	50 µg/m ³	64.0 µg/m ³	4	40.0 µg/m ³	0	*	*
PM _{2.5}							
Highest 24-hour average ²	65 µg/m ³	59.0 µg/m ³	0	54.0 µg/m ³	*	58.0 µg/m ³	0
Sulfur Dioxide							
Highest 1-hour average ¹	.025 ppm	.003 ppm	0	.002 ppm	0	.004 ppm	0
Nitrogen Dioxide							
Highest 1-hour average ¹	0.25 ppm	.051 ppm	0	.052 ppm	0	.051 ppm	0

Source: California Air Resource Board database. Accessed May 2008.

Note: (1) California standard; (2) National standard; (3) ppm = parts per million; µg/m³ = micrograms per cubic meter

*Data not available.

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ODORS

Typically odors are 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. In addition, people may have different reactions to the same odor. It is also important to 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. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

SENSITIVE RECEPTORS AND POLLUTION SOURCES

Sensitive receptors are facilities where sensitive receptor population groups (children, the elderly, the acutely ill, and the chronically ill) are likely to be located. Examples of these receptors are schools, retirement homes, convalescent homes, hospitals, and medical clinics. The majority of sensitive receptors in Elk Grove are schools and residences. Sensitive receptors in the vicinity of the project site include the surrounding residential neighborhoods to the east and southeast of the site.

CLIMATE CHANGE

Greenhouse Gases and Climate Change

To fully understand global climate change it is important to recognize the naturally occurring "greenhouse effect" and to define the greenhouse gases that contribute to this phenomenon. The temperature on Earth is regulated by this greenhouse effect, which is so named because the Earth's atmosphere acts like a greenhouse, warming the planet in much the same way that an ordinary greenhouse warms the air inside its glass walls. Like glass, the gases in the atmosphere let in light yet prevent heat from escaping.

Greenhouse gases (GHG) are naturally occurring gases such as water vapor, carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) that absorb heat radiated from the Earth's surface. Greenhouse gases – carbon dioxide, methane, nitrous oxide, and others – are transparent to certain wavelengths of the sun's radiant energy, allowing them to penetrate deep into the atmosphere or all the way to the Earth's surface (NASA, 2007). Clouds, ice caps, and particles in the air reflect about 30 percent of this radiation, but oceans and land masses absorb the rest (70 percent of the radiation received from the sun) before releasing it back toward space as infrared radiation. The greenhouse gases and clouds effectively prevent some of the infrared radiation from escaping; they trap the heat near Earth's surface where it warms the lower atmosphere. If this natural barrier of atmospheric gases were not present, the heat would escape into space, and Earth's average global temperatures could be as much as 61 degrees Fahrenheit cooler (NASA, 2007).

In addition to natural sources, human activities are exerting a major and growing influence on climate by changing the composition of the atmosphere and by modifying the land surface. Particularly, the increased consumption of fossil fuels (natural gas, coal, gasoline, etc.) has substantially increased atmospheric levels of greenhouse gases. Measured atmospheric levels of certain greenhouse gases such as carbon dioxide, methane, and nitrous oxide have risen substantially in recent decades (Miller, 2000). This increase in atmospheric levels of greenhouse gases unnaturally enhances the greenhouse effect by trapping more infrared radiation as it rebounds from the Earth's surface and thus trapping more heat near the Earth's surface.

According to the U.S. Environmental Protection Agency (EPA), the Earth's average surface temperature has increased by about 1.2 to 1.4°F since 1900. The warmest global average temperatures on record have all occurred within the past 15 years, with the warmest two years being 1998 and 2005. Eleven of the last 12 years rank among the hottest years on record (since 1850, when reliable worldwide temperature measurements began) (IPCC, 2007). Most of the warming in recent decades is likely the result of human activities. Other aspects of the climate are also changing such as rainfall patterns, snow and ice cover, and sea level.

Many complex mechanisms interact within Earth's energy budget to establish the global average temperature. For example, a change in ocean temperature would be expected to lead to changes in the circulation of ocean currents, which in turn would further alter ocean temperatures. There is uncertainty about how some factors could affect global climate change because they have the potential to both enhance and neutralize future climate warming. For instance, aerosols, including particulate matter, reflect sunlight back to space. As particulate matter attainment designations are met and fewer emissions of particulate matter occur, the cooling effect of anthropogenic aerosols would be reduced and the greenhouse effect would be further enhanced. Similarly, aerosols act as cloud condensation nuclei, aiding in cloud formation and increasing cloud lifetime. Clouds can efficiently reflect solar radiation back to space (see discussion of the cloud effect below). As particulate matter emissions are reduced, the indirect positive effect of aerosols on clouds would be reduced, potentially further amplifying the greenhouse effect.

As global temperature rises, the ability of the air to hold moisture increases, facilitating cloud formation. If an increase in cloud cover occurs at low or middle altitudes, resulting in clouds with greater liquid water content such as stratus or cumulus clouds, more radiation would be reflected back to space, resulting in a negative feedback mechanism, wherein the side effect of more cloud cover resulting from global warming acts to balance further warming. If clouds form at higher altitudes in the form of cirrus clouds, however, these clouds actually allow more solar radiation to pass through than they reflect, and ultimately they act as a GHG themselves. This results in a positive feedback mechanism in which the side effect of global warming acts to enhance the warming process. This feedback mechanism, known as the "cloud effect," contributes to uncertainties associated with projecting future global climate conditions.

Other mechanisms include permafrost and polar and sea ice. As global temperature continues to rise, CH₄ gas currently trapped in permafrost would be released into the atmosphere when areas of permafrost thaw. Thawing of permafrost attributable to global warming would be expected to accelerate and enhance global warming trends. Additionally, as the surface area of polar and sea ice continues to diminish, the Earth's albedo, or reflectivity, is also anticipated to decrease. More incoming solar radiation will likely be absorbed by the Earth rather than being reflected back to space, further enhancing the greenhouse effect. The scientific community is still studying these and other positive and negative feedback mechanisms to better understand their potential effects on global climate change.

Global Implications

Recognizing the problem of global climate change, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. It is open to all members of the United Nations and WMO. The role of the IPCC is to assess on a comprehensive, objective, open, and transparent basis the scientific, technical, and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation. According to climate models, the IPCC projects that the Earth's average surface temperature should rise 1.8–6.3 °F before the year 2100. If the atmospheric concentration of CO₂ doubles from its late 1700s level of 280 parts per million to 560 parts per million, the most likely rise in temperature would be about 3.6 °F. This may not seem like a significant increase, yet even at the lowest projected increase of 1.8 °F, the Earth would be warmer than it has been for 10,000 years (Miller, 2000).

As previously stated, 11 of the last 12 years rank among the hottest years on record. The IPCC Fourth Assessment Report's Working Group I Summary for Policymakers (Report) synthesizes current scientific understanding of global climate change and projects future climate change using the most comprehensive set of well-established global climate models. The Report incorporates findings of the current effects of global climate change. These findings include:

- The intensity of tropical cyclones (hurricanes) in the North Atlantic has increased over the past 30 years, which correlates with increases in tropical sea surface temperatures.
- Droughts have become longer and more intense and have affected larger areas since the 1970s, especially in the tropics and subtropics.
- Since 1900 the Northern Hemisphere has lost 7 percent of the maximum area covered by seasonally frozen ground.
- Mountain glaciers and snow cover have declined worldwide.
- Satellite data since 1978 show that the extent of Arctic sea ice during the summer has shrunk by more than 20 percent.
- Since 1961, the world's oceans have been absorbing more than 80 percent of the heat added to the climate, causing ocean water to expand and contributing to rising sea levels. Between 1993 and 2003, ocean expansion was the largest contributor to sea level rise.
- Melting glaciers and losses from the Greenland and Antarctic ice sheets have also contributed to recent sea level rise.

An enhanced greenhouse effect will generate new patterns of microclimate and will have significant impacts on the economy, environment, and transportation infrastructure and operations due to increased temperatures, intensity of storms, sea level rise, and changes in precipitation. Impacts may include flooding of tunnels, coastal highways, runways, and railways, buckling of highways and railroad tracks, submersion of dock facilities, and a shift in agriculture to areas that are now cooler. Such prospects will have strategic security as well as transportation implications.

Climate change affects public health and the environment. Increased smog and emissions, respiratory disease, reduction in the state's water supply, extensive coastal damage, and changes in vegetation and crop patterns have been identified as effects of climate change. The impacts of climate change are broad-ranging and interact with other market failures and economic dynamics, giving rise to many complex policy problems. If global greenhouse gas emissions continue rising on their current trajectory, the costs of climate change could eventually total 5–20 percent of the annual global gross domestic product (GDP) (Caltrans, page 4). The findings are the latest in a string of reports warning that the rate of carbon dioxide accumulating in the atmosphere is increasing at an alarming pace.

California Implications

Climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants and TACs, which are pollutants of regional and local concern. Worldwide, California is the 12th to 16th largest emitter of CO₂ and is responsible for approximately 2 percent of the world's CO₂ emissions (CEC, 2006a, 2006b). In 2004, California produced 492 million gross metric tons of carbon dioxide-equivalent (CEC, 2006a).

Increased global average temperature increases ocean temperatures, and the Pacific Ocean strongly influences the climate within California. If the temperature of the ocean warms, it is anticipated that the winter snow season would be shortened. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state. According to a California Energy Commission (CEC) report, the snowpack portion of the supply could potentially decline by 70 to 90 percent by the end of the 21st century (CEC, 2006c). This phenomenon could lead to significant challenges securing an adequate water supply for a growing state population.

Further, the increased ocean temperature could result in increased moisture flux into the state; however, since this would likely increasingly come in the form of rain rather than snow in the high elevations, increased precipitation could lead to increased potential and severity of flood events, placing more pressure on California's levee/flood control system. Sea level has risen approximately 7 inches during the last century and, according to the CEC report, it is predicted to rise an additional 22–35 inches by 2100, depending on the future GHG emissions levels (CEC, 2006c). If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion, and disruption of wetlands (CEC, 2006c). As the existing climate throughout California changes over time, mass migration of species, or worse, failure of species to migrate in time to adapt to the perturbations in climate, could also result.

According to the California Environmental Protection Agency, the climate changes for global warming could affect agriculture, the fishing industry, California's coastline, forests, and ecosystems, increase air pollution, and energy production (CalEPA, 2002).

Agriculture

Potential impacts, such as reduced water supply, more severe droughts, more winter floods, and drier growing seasons will affect California's agriculture. Many farms, especially in the fruit and nut business, require long-term investments, making fast adaptation difficult, and could thus experience serious losses if decisions continue to be made with no regard to expected climate changes.

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Fishing

Studies found that as a result of changes in ocean conditions, the distribution and abundance of major fish stocks will change substantially. Impacts to fisheries related to El Niño/Southern Oscillation illustrate how climate directly impacts marine fisheries on short-term scales. Higher sea surface temperatures in 1997–1998 during the El Niño had a great impact on market squid, California's largest fishery by volume. The California Regional Assessment reports that landings fell to less than 1,000 metric tons in that season, down from 110,000 tons in the 1996–1997 season. Other unusual events also occurred such as poor salmon returns, a series of plankton blooms, and seabird die-offs.

Coastline

With climate changes, recreational facilities and developed coastlines will also be more vulnerable to hurricanes, storm surges, and flooding. Increasing population growth in coastal areas is a reason for further concern, since these areas could be more vulnerable to climate change impacts. Impacts of expected sea level rise and increased storm surges are numerous. Beachfront homes and harbors as well as wetlands may flood. Sewage systems may be overwhelmed by storm runoff and high tides. Coastal airports are vulnerable to flooding (San Francisco, Oakland, and Santa Barbara). Jetties and seawalls may have to be raised and strengthened to protect harbors which are used for shipping, recreation, and tourism.

Forests

The California Regional Assessment notes an increase in the number and extent of areas burned by wildfires in recent years, and modeling results under changing climate conditions suggest that fires may be hotter, move faster, and be more difficult to contain under future climate conditions. The factors which contribute to the risk of catastrophic fires (fuel loads, high temperatures, dry conditions, and wind) are typically present already in summer and fall seasons in California, but can exist at other times of the year, especially in drought conditions. Public safety is an issue as more home and tourism developments on coastal hills and mountains and the foothills and higher elevations in the Sierra Nevada are highly susceptible to catastrophic wildfires.

Ecosystems

The current distribution, abundance, and vitality of species and habitats are strongly dependent on climatic (and microclimatic) conditions. Climate change is expected to result in warmer temperatures year-round, accompanied by substantially wetter winters. Rising sea level will significantly affect coastal wetlands because they are mostly within a few feet of sea level. As the sea rises, these wetlands will move inland. The overall acreage of wetlands will be reduced due to constraints by existing urban development and steeper slopes immediately inland of existing wetlands. Tidal rivers, estuaries, and relatively flat shoreline habitats will be more subject to damage by flooding and erosion. More severe storm surges from the ocean, due to higher sea levels, combined with higher river runoff could significantly increase flood levels by more than the rise in sea level alone. Erosion of beaches would decrease habitat for beach-dependent species, such as seals, shorebirds, and endangered species (for example, snowy plover and least tern). Aquatic habitats are also likely to be significantly affected by climatic changes. Most fish have limits to how hot or cold the water can be before they must either find more hospitable temperatures or die. As temperatures warm, many fish will have to retreat to cooler waters.

Changes in temperature and precipitation patterns would also shift California's current climate zones, and thus habitats associated with these zones, northward by approximately 100–400 miles, as well as upwards in elevation by 500–1500 feet. Global climate change would alter the composition, structure, and arrangement of the vegetation cover of the state (forest and wildland). Species distribution would move geographically as the climate changes, with forest stands, woodlands, and grassland species predicted to move northward and higher in elevation. The entire vegetative community may be affected if non-native invasive species occupy sites and replace native plants. Outbreaks of insects and diseases could compromise forest health and the capability of the forest stands to reproduce and to store carbon on a landscape basis. Forest fires are likely to become more frequent and severe if soils become drier. Changes in pest populations could further increase the stress on forests.

Air Quality

Projected climate changes will impact the quality of California's air, public health, and environment. Higher temperatures increase the formation of ground-level ozone and particulate matter, making it more difficult to meet the health-based air quality standards for these pollutants. Ground-level ozone has been shown to aggravate existing respiratory illnesses such as asthma, reduce lung function, and induce respiratory inflammation. Ambient ozone also reduces agricultural crop yields and impairs ecosystem health.

The particulate matter of most concern – PM₁₀ – has a diameter smaller than 10 micrometers and can easily pass into the lungs, contributing to the development of lung tissue damage. PM₁₀ has been implicated in exacerbation of cardiovascular disease, asthma, and other respiratory diseases and associated with increased mortality. Air pollution is also made worse by increases in natural hydrocarbon emissions and evaporative emissions of fuels and solvents which lead to higher levels of ozone and PM₁₀ during hot weather. Warmer temperatures that cause increased use of air conditioners can cause increased air pollutants from power plants and from vehicle operation. In addition, warming, drying, and increased winds could mean hotter, harder-to-control wildfires. These wildfires could result in increased levels of fine particulate matter that could also exceed state and federal standards and harm public health.

Electricity Generation

California's electricity generation is currently relatively efficient when it comes to emissions of greenhouse gases. The national average for the electricity generation share of total greenhouse gas emissions is approximately 40 percent, while California electricity accounts for only 16 percent of statewide emissions. This is in part due to California's significant amount of imported electricity, mild climate, and lack of energy-intensive industry. Over the past two decades, California has developed one of the largest and most diverse renewable electricity generation industries in the world. However, changes in climate of the magnitude predicted by the Intergovernmental Panel of Climate Change would substantially affect electricity generation throughout California and the entire Western States grid, particularly for hydroelectric facilities.

Less snowpack would result in lower levels of hydro-generation in the summer and fall seasons due to reduced runoff in those seasons. Additional hydropower may be available during the winter and the spring. However, on balance hydropower is more useful and valuable within the grid mix of generation sources when it is available throughout the peak summer and fall seasons. The natural gas distribution system may also be damaged because of landslides and fires. Flooding could also impact pipelines, wells, and related petroleum extraction equipment. Warmer weather would result in an increased demand for electricity for cooling appliances in homes and businesses.

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4.7.2 REGULATORY FRAMEWORK

Air quality in the Air Basin is addressed through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies primarily responsible for improving the air quality in Sacramento County, along with their individual responsibilities, are discussed below.

FEDERAL

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) is responsible for enforcing the Federal Clean Air Act and the 1990 amendments to it ("Federal CAA") and the national ambient air quality standards (federal standards) that the EPA establishes. These standards identify levels of air quality for six "criteria" pollutants, which are considered the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect public health and welfare. The six criteria pollutants include ozone, CO, nitrogen dioxide (NO₂, a form of NO_x), sulfur dioxide (SO₂, a form of SO_x), particulate matter 10 microns in size and smaller (PM₁₀), and lead. The EPA also has regulatory and enforcement jurisdiction over emission sources beyond state waters (outer continental shelf) and sources that are under the exclusive authority of the federal government, such as aircraft, locomotives, and interstate trucking.

Federal Hazardous Air Pollutant Program

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

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

STATE

California Air Resources Board

The California Air Resources Board (ARB), a department of the California Environmental Protection Agency (Cal EPA), oversees air quality planning and control throughout California. It

is primarily responsible for ensuring implementation of the 1989 amendments to the California Clean Air Act (CCAA), responding to the federal CAA requirements, and for regulating emissions from motor vehicles and consumer products within the state. ARB has established emission standards for vehicles sold in California and for various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions.

The amendments to the CCAA establish ambient air quality standards for the state (state standards) and a legal mandate to achieve these standards by the earliest practical date (SMAQMD, 2004). These standards apply to the same six criteria pollutants as the Federal CAA and also include sulfate, visibility, hydrogen sulfide, and vinyl chloride. They are more stringent than the federal standards and, in the case of PM₁₀ and SO₂, far more stringent.

Tanner Air Toxics Act

California regulates TACs primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and 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 (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate best available control technology to minimize emissions.

Air Toxics "Hot Spots" Information and Assessment Act

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) is a state law enacted in 1987. The law requires certain facilities to submit information regarding emissions of more than 550 TACs to their local air pollution control districts. The act addresses public concerns that emissions from individual facilities might cause local concentration of air toxics "hot spots" at a level where individuals may be exposed to an excess risk of adverse health effects. AB 2588 requires that existing facilities that emit toxic substances above a specified level prepare a toxic emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures. ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors and generators). In February 2000, ARB adopted a new public transit bus-fleet rule and emission standards for new urban buses. These rules and standards provide for (1) more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines; (2) zero-emission bus demonstration and purchase requirements applicable to transit agencies; and (3) reporting requirements under which transit agencies must demonstrate compliance with the urban transit bus fleet rule. On November 16, 2006, ARB adopted amendments to the AB 2588 Air Toxics "Hot Spots" Emission Inventory Criteria and Guidelines Regulation (Title 17, California Code of Regulations, Section 93300.5) that accommodate stationary diesel engines in the "Hot Spots" program. The amendments became effective on September 26, 2007.

AB 2588 was amended in 1993 by Senate Bill (SB) 1731, the Facility Toxic Air Contaminant Risk Reduction Audit and Plan. In accordance with SB 1731, local air districts are required to

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establish a program to reduce risks from existing facilities that are deemed to pose a significant health risk.

Assembly Bill 1493

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 requires the California Air Resources Board to develop and adopt the nation's first greenhouse gas emission standards for automobiles. The legislature declared in AB 1493 that global warming was a matter of increasing concern for public health and environment in the state. It cited several risks that California faces from climate change, including reduction in the state's water supply, increased air pollution creation by higher temperatures, harm to agriculture, an increase in wildfires, damage to the coastline, and economic losses caused by higher food, water energy, and insurance prices. Further, the legislature stated that technological solutions to reduce greenhouse gas emissions would stimulate the California economy and provide jobs.

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's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets and the Secretary of Cal EPA to submit biannual status reports. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

To comply with the Executive Order, the Secretary of Cal EPA created a Climate Act Team (CAT) made up of members from various state agencies and commissions. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses and local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32, the California Climate Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by the year 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. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Senate Bill 1368

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. Senate Bill 1368 (Stats. 2000, ch. 598) establishes sections 8340 and 8341 of the Public Utilities Code, requiring the California Energy Commission (CEC), in consultation with the California Public Utilities Commission (CPUC) and ARB, to establish a greenhouse gases emission performance standard and implementing regulations for all long-term baseload generation commitments made by local publicly owned electric utilities. The legislation directs the CEC to establish the performance standard as one not exceeding the rate of greenhouse gases emitted per megawatt-hour associated with natural gas-fired combined-cycle combustion turbine baseload generation. The law requires that the CEC's standard be consistent with that adopted by the CPUC. The implementing regulations are required to include a greenhouse gases emission performance standard and an output-based methodology for calculating and enforcing the emission performance standard (<http://www.energy.ca.gov/index.html>, 2008).

On October 30, 2006, CEC instituted a rulemaking proceeding for establishing a greenhouse gases emission performance standard and implementing regulations consistent with the requirements of Senate Bill 1368, and the Energy Commission adopted the proposed regulations on May 23, 2007. The rulemaking package was submitted to the Office of Administrative Law (OAL) on June 1, 2007. On June 29, 2007, OAL issued a decision disapproving the rulemaking action. The regulations were subsequently revised and approved by the CEC on August 29, 2007, and by the OAL on October 16, 2007 (<http://www.energy.ca.gov/index.html>, 2008).

LOCAL**Sacramento Metropolitan Air Quality Management District**

The Sacramento Metropolitan Air Quality Management District (SMAQMD) coordinates the work of government agencies, businesses, and private citizens to achieve and maintain healthy air quality for the Sacramento area. SMAQMD develops market-based programs to reduce emissions associated with mobile sources, processes permits, ensures compliance with permit conditions and with SMAQMD rules and regulations, and conducts long-term planning related to air quality.

SMAQMD sponsors a variety of community education programs. For example, the "Spare the Air" program focuses on reducing automobile trips, particularly when the Air Quality Index indicates that air quality is reaching unhealthy levels (SMAQMD, 2004). Surveys indicate that approximately 22 percent of drivers curtail driving by at least one trip during unhealthy periods. SMAQMD is also engaged in a variety of public outreach programs, including work with the American Lung Association, information brochures, radio and television announcements, and other efforts.

Sacramento Area Regional Ozone Attainment Plan.

Sacramento County, including the City of Elk Grove, is included in the Greater Sacramento ozone non-attainment area as delineated by the U.S. EPA. The Federal CAA set new deadlines for attaining the ozone standard. The Sacramento Area was classified as a "serious" non-attainment area and given a date of 1999 by which to achieve attainment. Because achieving attainment by this date was later found to be infeasible, the area was "bumped up" to "severe" classification and an attainment date of 2005 was designated. The Clean Air Act (CAA) also set specific planning requirements to ensure that the attainment goal would be met. In 1994, ARB, in cooperation with the air districts of the Sacramento non-attainment area, fulfilled one of these

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requirements by preparing the *1994 Sacramento Area Regional Ozone Attainment Plan*. The plan identified a detailed comprehensive strategy for reducing emissions to the level needed for attainment and showed how the area would make expeditious progress toward meeting this goal.

The federal 8-hour ozone regulations require that areas classified serious or above submit a reasonable further progress (RFP) demonstration plan that shows a minimum of 18 percent VOC (and/or NOx) emission reductions over the first 6 years following the 2002 baseline year and then an average of 3 percent reductions per year for each subsequent 3-year period out to the attainment year. In February 2006, the Sacramento region submitted an early 8-hour ozone RFP plan to EPA demonstrating an 18 percent reduction from 2002-2008 for the Sacramento non-attainment area with existing control strategies. In addition, the early RFP plan included an updated emission inventory and set new motor vehicle emission budgets for 2008, which EPA found to be adequate for transportation conformity purposes.

The draft *Sacramento Regional 8-Hour Ozone 2011 Reasonable Further Progress Plan* includes the information and analyses to fulfill CAA requirements for demonstrating RFP toward attaining the 8-hour ozone NAAQS for the Sacramento region through 2011. In addition, this plan establishes an updated emissions inventory and maintains existing motor vehicle emission budgets for transportation conformity purposes. The plan indicates that despite meeting the 2011 progress target, the Sacramento region cannot meet the 2013 attainment date for serious non-attainment areas. As mentioned above, Section 181(b)(3) of the CAA permits a state to request that EPA reclassify or “bump up” a non-attainment area to a higher classification and extend the time allowed for attainment. This bump-up process is appropriate for areas that must rely on longer term strategies to achieve the emission reductions needed for attainment. Therefore, the air districts in the Sacramento region submitted a letter to ARB in February 2008 to request a voluntary reclassification (bump-up) of the Sacramento federal non-attainment area from a serious to a severe 8-hour ozone non-attainment area with an extended attainment deadline of June 15, 2019 (SMAQMD, 2008).

SMAQMD Rules and Regulations

SMAQMD has adopted a number of rules and regulations for the purpose of attaining the goals set forth in the federal and state Clean Air Acts. These rules and regulations, known as *The Rules and Regulations of the Sacramento Metropolitan Air Quality Management District*, have been implemented to provide an orderly procedure for the review of new sources of air pollution and of the modification and operation of existing sources through the issuance of permits. While there are a number of exceptions, the rules and regulations pertain to “any person building, erecting, altering or replacing any article, machine, equipment or other contrivance, the use of which may cause, eliminate, reduce, or control the issuance of air contaminants.” The rules and regulations contain specific guidelines for admittance of air pollutants (i.e., dust, odors, asbestos, etc.) by any new and modified stationary air pollution sources.

Guide to Air Quality Assessment in Sacramento County

SMAQMD has developed a manual for calculating a project's air quality impacts. This document, known as the *Guide to Air Quality Assessment in Sacramento County* is intended to act as a guide during the Initial Study phase of a proposed land use development. Further environmental review is required if, following review in the Initial Study phase, significant air quality impacts are identified. The guide is intended for use by SMAQMD to review projects for which it acts as the lead agency. In other projects, SMAQMD will use it to provide comments as a responsible agency or a reviewing agency under CEQA. SMAQMD recommends that this

guide be used by lead agencies at local, state, and federal levels for projects which are likely to result in emission impacts in Sacramento County. The guide is also intended to act as a guide for planners, consultants, land use developers, and any other entity concerned with accurate estimation and mitigation of project-related air emission impacts in Sacramento County.

Sacramento Transportation and Air Quality Collaborative

The Sacramento Transportation and Air Quality Collaborative is a consortium of 48 regional and local organizations established to address air quality, transportation, land use, and governance issues in the greater Sacramento area. The collaborative seeks to increase public participation through education, evaluation of transit systems, land use developments, jobs/housing balances, and encouragement of regional planning efforts to achieve and maintain clean air quality as measured by federal and state ambient air quality standards.

The Sacramento Transportation and Air Quality Collaborative is jointly funded by ten public agencies within the Sacramento countywide area: the County of Sacramento, the cities of Citrus Heights, Elk Grove, Folsom, Rancho Cordova, and Sacramento, the Sacramento Regional Transit District (RT); the Sacramento Area Council of Governments (SACOG), the Sacramento Metropolitan Air Quality Management District (SMAQMD), and the Sacramento Transportation Authority (STA). In addition, Caltrans provides in-kind support.

City of Elk Grove General Plan

Table 4.7-3 identifies the General Plan policies regarding air quality that are applicable to the proposed Sheldon/99 GPA and Rezone project and presents an evaluation of the consistency of the project with these statements as required by CEQA Guidelines Section 15125(d). This assessment is based on City staff's interpretation of the General Plan policies and action items. The final authority for interpretation of these policy statements and determination of the project's consistency rests with the City Council.

**TABLE 4.7-3
PROJECT CONSISTENCY WITH THE GENERAL PLAN POLICIES: AIR QUALITY**

General Plan Policies and Action Items	Consistency with General Plan	Analysis
<p>Policy CAQ-27 The City shall promote energy conservation measures in new development to reduce on-site emissions and power plant emissions. The City shall seek to reduce the energy impacts from new residential and commercial projects through investigation and implementation of energy efficiency measures during all phases of design and development.</p>	<p>Yes</p>	<p>While the project does not include any development plans at this time, any subsequent improvement plans for the project would be required to incorporate energy conservation measures into all phases of design and development. For example, the City of Elk Grove Design Guidelines stress the importance of mixed-use development with multiple structures or tenants, which encourages pedestrian-friendly development and reduces automobile dependency, thus conserving energy. Furthermore, the City Design Guidelines require the consideration of the local climate and seasonal conditions when designing a building. Strategic site planning, such as tree screening or limiting the amount of window surfaces on the west side of the building, can reduce impacts</p>

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General Plan Policies and Action Items	Consistency with General Plan	Analysis
		associated with excessive energy use. Compliance with the City's energy conservation requirements would result in consistency with this policy.
<p>Policy CAQ-30</p> <p>All new development projects, which have the potential to result in substantial air quality impacts, shall incorporate design, construction, and/or operational features to result in a reduction in emissions equal to 15 percent compared to an "unmitigated baseline" project. An "unmitigated baseline project" is a development project which is built and/or operated without the implementation of trip-reduction, energy conservation, or similar features, including any such features which may be required by the Zoning Code or other applicable codes.</p>	Yes	An Air Quality Management Plan will be required to be prepared for the project, if necessary. This plan must identify design, construction and operational features to reduce the project's emissions by 15 percent over "Existing Base" conditions. The project would be required to implement "Emission Reduction Measures" as required by mitigation measures in this section to reduce air related impacts, thereby making it consistent with this General Plan policy.
<p>Policy CAQ-32</p> <p>As part of the environmental review of projects, the City shall identify the air quality impacts of development proposals to avoid significant adverse impacts and require appropriate mitigation measures, potentially including—in the case of projects which may conflict with applicable air quality plans—emission reductions in addition to those required by Policy CAQ-30.</p>	Yes	This section of the DEIR (Section 4.7, Air Quality) identifies the potential air quality impacts resulting from the project. Implementation of mitigation measures included in this section and requirements imposed by the City would ensure consistency with this policy.
<p>Policy CAQ-33</p> <p>The City shall require that public and private development projects use low emission vehicles and equipment as part of project construction and operation, unless determined to be infeasible.</p>	Yes	Refer to the analysis for Policy CAQ-27.

4.7.3. IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the following State CEQA Guidelines Appendix G thresholds of significance:

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

- 5) Create objectionable odors affecting a substantial number of people.

In addition, the following thresholds of significance, as identified by SMAQMD, have been used to determine whether implementation of the proposed project would result in significant air quality impacts:

- Short-term Emissions of Criteria Air Pollutants. Construction-generated criteria air pollutant or precursor emissions exceed the SMAQMD-recommended threshold of 85 pounds per day (lbs/day) for NO_x or substantially contribute to emissions concentrations (e.g., PM₁₀) that exceed the NAAQS or CAAQS. When emissions of NO_x can be reduced to below 85 lbs/day with implementation of all feasible mitigation measures and offsets, other construction-generated mobile-source pollutants can be considered to be less than significant (SMAQMD, 2004).

SMAQMD provides screening criteria that can also be used for the evaluation of construction-generated PM₁₀, based on the overall maximum daily area of disturbance associated with proposed projects (refer to **Table 4.7-4**). In accordance with these criteria, areas of disturbance in excess of SMAQMD’s screening criteria would also be considered potentially significant. These screening levels are based on the maximum actively disturbed area of the project site. For example, assuming a maximum daily disturbance of less than 15 acres, implementation of recommended “Level Three Mitigation” would typically be considered sufficient to reduce fugitive dust-related impacts to a less than significant level. If the maximum daily area of disturbance would exceed the screening criteria or if the project cannot undertake the mitigation measures that would be required, a more detailed analysis, involving dispersion modeling, may be required (SMAQMD, 2004).

**TABLE 4.7-4
SMAQMD PARTICULATE MATTER SCREENING LEVELS FOR CONSTRUCTION PROJECTS**

Maximum Daily Area of Disturbance	Recommended Mitigation
5 Acres and Below	No mitigation required.
5.1 – 8 Acres	Level One Mitigation required: Water exposed soil twice daily. Maintain two feet of freeboard space on haul trucks.
8.1 – 12 Acres	Level Two Mitigation required: Water exposed soil three times daily. Water soil piles three times daily. Maintain two feet of freeboard space on haul trucks.
12.1 – 15 Acres	Level Three Mitigation required: Keep soil moist at all times. Maintain two feet of freeboard space on haul trucks. Use emulsified diesel or diesel catalysts on applicable heavy-duty diesel construction equipment.

Source: SMAQMD, 2004.

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- Long-term Emissions of Criteria Air Pollutants. Long-term regional criteria air pollutant or precursor emissions exceed the SMAQMD-recommended threshold of 65 lbs/day for ROG and NO_x or substantially contribute to emissions concentrations (e.g., PM₁₀) that exceed the NAAQS or CAAQS.
- Local Carbon Monoxide Concentrations. Local mobile-source emissions exceed or substantially contribute to CO concentrations that violate the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm.
- Local Toxic Air Contaminant Concentrations. Exposure of sensitive receptors to TAC emissions exceeds 10 in one million for the Maximally Exposed Individual (MEI) to contract cancer and/or a Hazard Index of one for the MEI.
- Local Odor Concentrations. Frequent exposure of a substantial number of individuals to odorous emissions would be considered significant.

Climate Change

While AB 32 requires ARB to develop thresholds of significance for GHGs by 2008, no air district in California, including the Sacramento Metropolitan Air Quality Management District, has identified a significance threshold for GHG emissions or a methodology for analyzing air quality impacts related to greenhouse gas emissions at this time. The state has identified 1990 emission levels as a goal through adoption of AB 32. To meet this goal, California would need to generate lower levels of GHG emissions than current levels. However, no standards have yet been adopted quantifying 1990 emission targets. It is recognized that for most projects there is no simple metric available to determine if a single project would help or hinder meeting the AB 32 emissions goals. In addition, at this time AB 32 only applies to stationary source emissions. Consumption of fossil fuels in the transportation sector accounted for over 40 percent of the total GHG emissions in California in 2004. Current standards for reducing vehicle emissions considered under AB 1493 call for "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles" and do not provide a quantified target for GHG emissions reductions for vehicles.

Emitting CO₂ into the atmosphere is not itself an adverse environmental effect. It is the cumulative increased concentration of CO₂ in the atmosphere resulting in global climate change and the associated consequences of climate change that results in adverse environmental affects (e.g., sea level rise, loss of snowpack, severe weather events). Although it is possible to generally estimate a project's incremental contribution of CO₂ into the atmosphere, it is typically not possible to determine whether or how an individual project's relatively small incremental contribution might translate into physical effects on the environment. Given the complex interactions between various global and regional-scale physical, chemical, atmospheric, terrestrial, and aquatic systems that result in the physical expressions of global climate change, it is impossible to discern whether the presence or absence of CO₂ emitted by the project would result in any altered conditions.

Given the challenges associated with determining project-specific significance criteria for GHG emissions when the issue must be viewed on a global scale, a quantitative significance criteria is not proposed for the Sheldon/99 GPA and Rezone project. For this analysis, the project's incremental contribution to global climate change would be considered significant if due to the size or nature of the project it would generate a substantial increase in GHG emissions relative to existing conditions.

METHODOLOGY

The analysis of air quality impacts was based on the conceptual site plan prepared for the project site. Uses analyzed included commercial development on 33.1 acres and 11.85 acres of high-density residential uses at the east side of the Sheldon Road/SR 99 interchange.

The Initial Study prepared for the project determined that the project proposed is not expected to result in additional impacts related to objectionable odors. As a result, this issue will not be discussed further in this analysis.

Short-term Impacts

SMAQMD recommends that construction-generated emissions of ROG and NO_x be quantified and presented as part of the analysis of project-generated emissions. However, because construction equipment emits relatively low levels of ROG and because ROG emissions from other construction processes for the proposed project (e.g., asphalt paving, architectural coatings) are typically regulated by SMAQMD, SMAQMD has not adopted a construction emissions threshold for ROG. SMAQMD has, however, adopted a construction emissions threshold of 85 lbs/day for NO_x. In addition, if daily emissions of NO_x from heavy-duty mobile equipment do not exceed the 85 lbs/day threshold, then SMAQMD considers exhaust emissions of other pollutants to also be less than significant (SMAQMD, 2004).

Short-term construction emissions of ROG and NO_x were estimated using the ARB-approved URBEMIS 2007 (Version 9.2.4) computer program as recommended by SMAQMD (**Appendix D**). URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Detailed construction information (e.g., equipment requirements, type, hours of operation, number of employees, etc.) was not available at the time this analysis was conducted. As a result, the estimation of construction-generated emissions was based primarily on the default assumptions contained in the model. Model parameters were adjusted to include equipment assumptions recommended by SMAQMD, based on the size of the proposed project site (i.e., 44.95± acres).

Long-term Impacts

Regional area- and mobile-source emissions associated with the proposed project were estimated using the ARB-approved URBEMIS 2007 (Version 9.2.4) computer program, which includes options for the estimation of operational emissions for land use development projects. Emissions were calculated for both summer and winter conditions based on the default parameters contained in the model. Cumulative increases in regional criteria air pollutants were analyzed in comparison to the emission inventories used for development of regional air quality attainment plans.

SMAQMD's *Guide to Air Quality Assessment (2004)* provides a project-level screening procedure to determine whether detailed intersection-level modeling is required for a proposed development project. The screening procedure conservatively estimates the background CO concentration in the project area and the project's contribution to predicted future concentrations, based on an estimation of peak-hour vehicle trips.

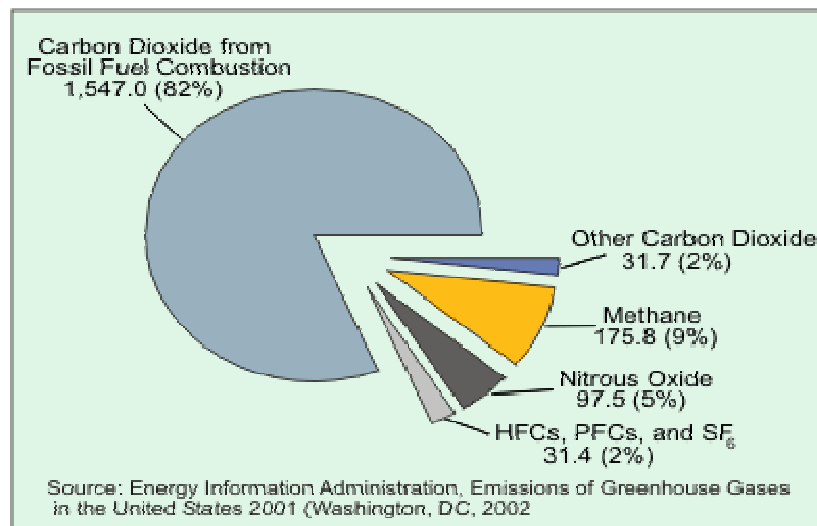
Climate Change Impacts

GHG emissions associated with the Sheldon/99 GPA and Rezone project were estimated using CO₂ emissions as a proxy for all GHG emissions. This is consistent with the current reporting

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protocol of the California Climate Action Registry (CCAR). Calculations of GHG emissions typically focus on CO₂ because it is the most commonly produced GHG in terms of both number of sources and volume generated (energy-related carbon dioxide emissions, resulting from petroleum and natural gas, represent 82 percent of total U.S. human-made greenhouse gas emissions according to the U.S. Energy Information Administration) (see **Figure 4.7-1** below), and because it is among the easiest GHGs to measure. However, it is important to note that other GHGs have a higher global warming potential than CO₂. For example, one pound of methane has an equivalent global warming potential of 21 pounds of CO₂ (California Climate Action Registry, 2006). While there are various methods for determining the potential GHG emissions of a specific project, at this time there is not an approved ARB method. For the Sheldon/99 GPA and Rezone project, emission sources (buildings or vehicles) were analyzed to ascertain the potential CO₂ emissions at project buildout. The impact analysis discusses the estimated CO₂ emissions for residential buildings, non-residential buildings, residential vehicles, and non-residential vehicles. The methodology used to determine the CO₂ emissions of each of these categories is discussed within that category analysis.

FIGURE 4.7-1
UNITED STATES HUMAN-MADE GREENHOUSE GAS EMISSIONS



PROJECT IMPACTS AND MITIGATION MEASURES

Construction-Related Air Quality Impacts

Impact 4.7.1 Construction activities associated with the development of the proposed project would result in short-term increase in criteria air pollutants during construction. This would result in a **potentially significant** impact.

Construction activities such as excavation and grading operations, construction vehicle traffic, and wind blowing over exposed soils would generate exhaust emissions and fugitive particulate matter emissions that would affect local air quality at various times during project construction. This is variable depending on the weather, soil conditions, the amount of activity taking place, and the nature of dust control efforts. The dry climate of the area during the summer months creates a high potential for dust generation.

Construction activities would be subject to SMAQMD Rule 403 that requires taking reasonable precautions to prevent the emissions of fugitive dust, such as “using water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the construction of roadways, or the clearing of land” where possible and applying “asphalt, oil, water, or suitable chemicals on dirt roads, materials, stockpiles, and other surfaces, which can give rise to airborne dust.”

Daily emissions from the potential development based on the proposed land use designations have been estimated using SMAQMD methodology and are shown in **Table 4.7-5**. These emissions are based on the worst-case assumption that construction would occur simultaneously for the residential and commercial components of the project. Proposed project emissions would not exceed the SMAQMD significance criterion of 85 pounds per day of NO_x.

**TABLE 4.7-5
CONSTRUCTION EMISSIONS UNDER PROPOSED PROJECT
(POUNDS PER DAY)**

Source	Emissions (pounds per day)		
	ROG	NO _x	PM ₁₀
Maximum Construction Emissions (unmitigated)	798.85	65.89	228.9
Maximum Construction Emissions (mitigated)	798.85	65.89	55.08
Sacramento Metropolitan AQMD Threshold	N/A	85	CAAQ

Source: URBEMIS 2007 ver. 9.2.4.

During construction, various diesel-powered vehicles and equipment in use on the site would create odors. These sources are mobile and transient in nature, and the emission occurs at a substantial distance from nearby receptors (which provides for dilution of odor-producing constituents). These odors would be temporary and unlikely to be noticeable beyond the project boundaries.

As indicated in **Table 4.7-5** the proposed General Plan Amendment and Rezone is projected to emit approximately 65.89 pounds/day of NO_x during construction activities. Therefore, the proposed project would not exceed SMAQMD’s established threshold of 85 pounds/day for NO_x.

While the air quality impacts associated with the Sheldon/SR 99 GPA and Rezone project would not increase air pollutant emissions over the SMAQMD threshold, the project emissions of ROG and PM₁₀ would be substantial. Although the potential to locally exceed the PM₁₀ CAAQ standard exists with the proposed project, SMAQMD has no established daily thresholds for PM₁₀ during construction activities due to the temporary generation of this emission which would cease once construction is completed. Although construction impacts are temporary and would cease once construction is completed, they nevertheless would have a substantial effect on particulate matter emissions while such activities occur. Implementation of mitigation measures **MM 4.7.1a** through **MM 4.2.1h** below is required in order to reduce project construction-related emissions.

Mitigation Measures

- MM 4.7.1a** The project applicant shall require that the contractors water all exposed surfaces, graded areas, storage piles, and haul roads at least twice daily during construction. This requirement shall be included as a note in all project construction plans.

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Timing/Implementation: During all grading and construction phases of the project.

Enforcement/Monitoring: City of Elk Grove Development Services, Planning; SMAQMD.

MM 4.7.1b The project applicant shall require that the contractor limit vehicle speed for on-site construction vehicles to 15 mph when winds exceed 20 miles per hour. This requirement shall be included as a note on the improvement plan submittal.

Timing/Implementation: During all grading and construction phases of the project.

Enforcement/Monitoring: City of Elk Grove Development Services, Planning; SMAQMD.

MM 4.7.1c Wash dirt off construction vehicles and equipment within the staging area prior to leaving the construction site. This requirement shall be noted in project improvement plans.

Timing/Implementation: During all grading and construction phases of the project.

Enforcement/Monitoring: City of Elk Grove Development Services, Planning; SMAQMD.

MM 4.7.1d The project applicant shall require that, when transporting soil or other materials by truck during construction activities, two feet of freeboard shall be maintained by the contractor, and that the materials are covered. This requirement shall be noted in project improvement plans.

Timing/Implementation: During all grading and construction phases of the project.

Enforcement/Monitoring: City of Elk Grove Development Services, Planning; SMAQMD.

MM 4.7.1e Pave, apply water three times daily, or apply (non-stick) soil stabilizers on all unpaved access roads, parking areas, and staging areas. This requirement shall be noted in project improvement plans.

Timing/Implementation: During all grading and construction phases of the project.

Enforcement/Monitoring: City of Elk Grove Development Services, Planning; SMAQMD.

MM 4.7.1f The project shall provide a plan for approval by the City of Elk Grove and SMAQMD demonstrating that the heavy-duty (> 50 horsepower) off-road vehicles to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project-wide fleet-average 45 percent

particulate reduction compared to the most recent ARB fleet average at time of construction.

AND

The project applicant shall submit to SMAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours during any portion of the construction project. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs. At least 48 hours prior to the use of subject heavy-duty off-road equipment, the project representative shall provide SMAQMD with the anticipated construction timeline including start date and name and phone number of the project manager and on-site foreman.

Timing/Implementation: Plan shall be submitted to SMAQMD for review and approval prior to approval of improvement plans and shall be implemented during all grading and construction phases of the project.

Enforcement/Monitoring: City of Elk Grove Development Services, Planning; SMAQMD.

MM 4.7.1g

The project applicant shall ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately, and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this section shall supersede other SMAQMD or state rules or regulations.

Timing/Implementation: During all grading and construction phases of the project.

Enforcement/Monitoring: City of Elk Grove Development Services, Planning; SMAQMD.

MM 4.7.1h

The project applicant shall require paved streets adjacent to construction sites to be washed or swept daily to remove accumulated dust. This requirement shall be included as a note on the improvement plans.

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Timing/Implementation: During all grading and construction phases of the project.

Enforcement/Monitoring: City of Elk Grove Development Services, Planning; SMAQMD.

Implementation of the above mitigation measures **MM 4.7.1a** through **4.7.1h** would reduce the project's air quality construction impacts for nuisance conditions in accordance with SMAQMD regulations by performing dust control measures and the required utilization of lower emission construction. Construction-related air quality impacts are considered **less than significant**.

Short-term Exposure to Toxic Air Contaminants

Impact 4.7.2 Implementation of conceptual development associated with the proposed General Plan Amendment and Rezone would result in short-term exposure to toxic air contaminants. This impact is considered **less than significant**.

Construction of the uses identified on the conceptual site plan would result in construction-generated diesel-exhaust emissions. Particulate-exhaust emissions from diesel-fueled engines (diesel-exhaust PM) were identified as a TAC by ARB in 1998. Implementation of the proposed project would result in the generation of diesel PM emissions during construction from the use of off-road diesel equipment for site grading and excavation, paving, demolition, and other construction activities.

Health-related risks associated with diesel-exhaust emissions are primarily connected to long-term exposure and the potential risk of contracting cancer. For residential land uses, the calculation of cancer risk associated with exposure to TACs are typically calculated based on a 70-year period of exposure. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. In addition, measures required by SMAQMD for the control of particulate emissions from on-site construction equipment would substantially reduce emissions of diesel-exhaust PM. For these reasons, diesel-exhaust PM generated by project construction, in and of itself, would not be expected to create conditions where the probability of contracting cancer is greater than 10 in 1 million for nearby receptors. Long-term health risks associated with short-term construction activities would therefore be considered **less than significant**.

Mitigation Measures

None required.

Long-term Increases of Criteria Air Pollutants

Impact 4.7.3 Implementation of conceptual development associated with the proposed General Plan Amendment and Rezone would result in long-term increases in criteria air pollutants. This impact is considered **potentially significant**.

An URBEMIS 2007 (Version 9.2.4) analysis was completed to illustrate the effect the proposed land use changes would have compared to existing conditions. **Table 4.7-6** contains predicted maximum daily operational emissions based on the potential development that could occur under the proposed project. As depicted in **Table 4.7-6**, during the summer months, long-term operation of the uses identified for the project site would generate emissions of approximately 214.61lbs/day of ROG, 226.21 lbs/day NO_x, and 298.51 lbs/day of PM₁₀. During the winter

months, operational emissions of ROG, NO_x, and PM₁₀ would increase to approximately 242.88 lbs/day, 342.32 lbs/day, and 330.40 lbs/day respectively. Increased emissions during the winter months resulting from development of the project are primarily associated with changes in emissions rates from mobile sources under cooler operating temperatures. As noted previously, SMAQMD has not adopted a significance threshold for emissions of CO, SO_x, or PM₁₀. State and federal standards are used as a basis for the determination of the air district's thresholds. SMAQMD is in non-attainment for ozone and therefore thresholds for NO_x and ROG have been set to reduce these ozone precursors. PM, CO and SO_x emissions do not exceed the state or federal standards in the SMAQMD and therefore emission thresholds are not necessary according to the air district. However, as emissions of ROG and NO_x are anticipated to exceed SMAQMD's recommended significance threshold of 65 lbs/day, this impact is considered **significant**.

**TABLE 4.7-6
AREA AND OPERATIONAL AIR POLLUTANT EMISSIONS – PROPOSED LAND USES**

Source	Estimated Emissions (lbs/day)				
	ROG	NO _x	CO	SO _x	PM ₁₀
PROPOSED LAND USE CONFIGURATION					
Summer Emissions	214.61	226.21	2,655.07	1.87	298.51
Winter Emissions	242.88	342.32	2,513.78	2.14	330.40
SMAQMD Significance Threshold:	65	65	None	None	None

Emissions were estimated using the URBEMIS 2007 (v 9.2.4) computer program, based on default model settings recommended by SMAQMD.

Mitigation Measures

MM 4.7.3

Prior to the issuance of grading permits, the project applicant will coordinate with SMAQMD and the City of Elk Grove and develop a project Air Quality Mitigation Plan (AQMP). In accordance with City of Elk Grove General Plan Policy CAQ-30, the AQMP shall reduce criteria emissions associated with potential development by a minimum of 15 percent compared to the unmitigated baseline project (an "unmitigated baseline project" is a development project which is built and/or operated without the implementation of emission reduction features). Project applicants shall coordinate with SMAQMD to determine the specific mitigation measures to be included in the AQMP. The AQMP shall be reviewed and approved by SMAQMD staff prior to project implementation. Available measures to be included in the AQMP include, but are not limited to, the following:

Commercial Facilities

- Provide preferential carpool/vanpool parking spaces.
- Provide transit facility improvements (e.g., pedestrian shelters, route information, benches, lighting).

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- Provide bicycle storage/parking facilities.
- Provide shower/locker facilities.
- Provide incentives to employees to rideshare or take public transportation.
- Provide a parking lot that provides clearly marked and shaded pedestrian pathways between transit facilities, pedestrian walkways and trails, and building entrances.

Residential Uses

- Prohibit use of wood-burning stoves or fireplaces within interior and exterior areas. Install only USEPA-certified gas-fired fireplaces.
- Install Energy Star or ground source heat pumps.
- Install Energy Star labeled roof materials.
- Exceed Title 24 energy standards.
- Include incentives for purchasers of new residential dwellings to incorporate solar-powered energy systems.

Timing/Implementation: Prior to issuance of grading permits.

Enforcement/Monitoring: City of Elk Grove Development Services; SMAQMD.

Emissions of ROG and NO_x associated are of particular concern during the summer ozone season, which extends from the beginning of May through the end of October. Emissions during these warmer months of the year are anticipated to exceed SMAQMD's recommended significance threshold of 65 lbs/day; winter emissions would also exceed SMAQMD's threshold. Implementation of mitigation measure **MM 4.7.3** would lower emissions for ROG, NO_x, and PM₁₀, yet impacts associated with long-term increases in criteria air pollutants would still result in a **significant and unavoidable** impact on air quality.

4.2.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for air quality is the Sacramento Valley Air Basin (SVAB). This includes the five counties of Sacramento, Solono, Yolo, Placer, and Sutter. The projects identified in **Table 4.0-1** in Section 4.0 as well as existing and reasonably foreseeable projects in the greater SVAB are included in the cumulative setting for air quality. The climate and geography of the lower SVAB severely limits the dilution and transportation of any air pollutants that are released to the atmosphere. At current levels of development (residential, commercial, industrial, etc.) and activity, the air basin exceeds the state/federal ambient standards for particulates and ozone. Cumulative growth in population, vehicle use, and industrial activity could inhibit efforts to improve regional air quality and attain the ambient air quality standards.

In addition to cumulative air pollutant issues, the cumulative setting and impact analysis considers the ongoing research and concerns regarding greenhouse gas emissions and their associated effect on global climate change. The Existing Setting discussion above contains a detailed description of the environmental effects of global climate change.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Regional Air Plan Impacts

Impact 4.7.4 Implementation of the proposed project in combination with growth throughout the air basin would exacerbate existing regional problems with ozone and particulate matter. This is considered a **cumulatively considerable** impact.

Sacramento County is classified a severe non-attainment area for the federal ozone standards. In order to improve air quality and attain the health-based standards, reductions in emissions are necessary within the non-attainment area. The growth in population, vehicle usage, and business activity within the non-attainment area that would occur under cumulative conditions would contribute to cumulative regional air quality impacts. Implementation of the proposed project, along with other growth in the area, may either delay attainment of the standards or require the adoption of additional controls on existing and future air pollution sources to offset emission increases associated with cumulative conditions.

The proposed General Plan Amendment and Rezone project would result in an increase of construction and operational related air quality impacts as discussed under **Impact 4.7.1**, **Impact 4.7.2**, and **Impact 4.7.3**. Implementation of the proposed project would have a significant adverse incremental effect on the region's ability to attain state and federal air quality standards and would contribute to cumulative significant air quality impacts anticipated under cumulative conditions.

Mitigation Measures

With implementation of mitigation measures **MM 4.7.1a** through **MM 4.7.1h** and **MM 4.7.2**, the project would generate a reduced level of air pollution emissions. Nevertheless, implementation of the proposed project would have a **cumulatively considerable** contribution to emissions that affect the region's ability to attain state and federal air quality standards, and the cumulative impact would be **significant and unavoidable**.

Potential Increase in Long-Term Atmospheric Greenhouse Gas Emissions

Impact 4.7.5 The project, in addition to existing, approved, proposed and reasonably foreseeable development in the Sacramento Valley Air Basin, may contribute to an increase in greenhouse gas (GHG) emissions in the Earth's atmosphere. Higher concentrations of GHGs have been linked to the phenomenon of climate change. This would be a **cumulatively considerable** impact on the state's GHG reduction efforts.

Human activities are exerting a major and growing influence on the climate by changing the composition of the atmosphere through the increased consumption of fossil fuels (natural gas, coal, gasoline, etc.) for energy production and transportation fuel, which has substantially increased atmospheric levels of greenhouse gases. The amount of GHG emissions produced

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from residential and commercial buildings are related to the amount of energy that is used to operate the buildings, such as electricity, natural gas, and fuel oil.

Residential Buildings

Under project conditions, the implementation of the proposed Sheldon/99 GPA and Rezone project will result in an estimated total CO₂ emission for residential buildings of 6,982,968 lbs/yr. This is compared to an estimated 10,960,608 lbs/yr of CO₂ emission for residential buildings under existing land use designations for the project site. The method used to determine CO₂ emissions from buildings is based on the EPA Personal GHG Calculator which is available at http://www.epa.gov/climatechange/emissions/ind_calculator.html. The following attributes were input into the GHG calculator to determine the amount of CO₂ emissions of a single home in Elk Grove:

- All residential building types were treated the same.
- The CO₂ emissions for residential buildings were produced solely by the EPA Personal Greenhouse Gas (GHG) Calculator Annual Household Estimator and include CO₂-equivalent amounts as well as sources of emissions other than electricity use.
- Assumptions used in EPA Personal GHG Calculator include:
 - 0 miles vehicle per week traveled (vehicle travel will be analyzed separately).
 - No recycling.

This emission was then multiplied by the potential number of housing units under the proposed project's buildout conditions (237) as identified in Section 3.0, Project Description, and Section 4.0, Introduction to the Environmental Analysis and Assumptions Used. **Table 4.7-7** illustrates the CO₂ emissions under existing project buildout conditions.

**TABLE 4.7-7
RESIDENTIAL BUILDING CO₂ EMISSIONS**

GHG Calculator Question	Data	Pounds of CO ₂ per Year per Dwelling Unit (lbs/yr/du)
Average number of persons per home	2.99*	-
Home heat source	Electric	-
Average monthly gas bill	\$105	10,988 lbs/yr/du
Average monthly electric bill	\$100	16,440 lbs/yr/du
Average monthly fuel oil bill	\$0	0 lbs/yr/du
GHG emissions from waste (for 2.99 persons per home)	--	2,036 lbs/yr/du
Total CO ₂ Emissions		29,464 lbs/yr/du
Condition	Housing Units	Total CO ₂ Emissions
Project Land Use Designation Potential	237	6,982,968 lbs/yr

Source: EPA Personal GHG Calculator; DOF; PMC, 2007

Notes: *Average number of persons per home is based on a 2007 city population of 136,318 and 46,495 housing units as identified by the DOF Table E-5 Population and Housing Estimates.

Non-Residential Buildings

As discussed in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, 504,644 square feet of commercial development is estimated to occur with implementation of the proposed General Plan Amendment and Rezone. The following parameters were used to calculate the amount of CO₂ emitted by the non-residential buildings in the project area:

- All non-residential building types were treated the same (i.e., same energy intensity, percentage from coal/natural gas, and emission factors).
- The CO₂ emissions for non-residential buildings are not CO₂-equivalent emissions but only CO₂ emissions.
- CO₂ emissions estimates for non-residential buildings are based solely on electricity use and no other energy source. These estimates are weighted according to coal and natural gas-based electricity generation in California.
- Non-residential building annual energy intensity is based on the year 2002 for the Sacramento Municipal Utility District (SMUD) service area as a whole and is estimated to be 16.5 kWh/ft²/yr¹ as identified in the SMUD summary table for the California Commercial End-Use Survey report, available at <http://capabilities.itron.com/CeusWeb/Chart.aspx>.
- CO₂ emissions factors for non-residential uses are based the EPA Power Profiler for commercial uses available at <http://www.epa.gov/cleanenergy/powerprofiler.htm>.

Table 4.7-8 illustrates the estimated CO₂ emissions for non-residential uses in Elk Grove under project buildout conditions. This calculation does not include vehicle trips for non-residential uses. It is estimated that buildout of the proposed project will result in the production of 5,802,054 lbs/year of CO₂ for non-residential uses.

**TABLE 4.7-8
NON-RESIDENTIAL BUILDINGS CO₂ EMISSIONS**

Condition	Area	CO ₂ Emission ¹
Project Land Use Designation Non-Residential Potential	504,644 square feet	5,802,054 lbs/yr

Source: EPA Power Profiler.

Notes: 1) CO₂ emissions are based on the EPA Power Profiler program. The program's output, which is based on a monthly 1 kWh average use, was adjusted to reflect a monthly 1.883 kWh as identified by Itron¹ for commercial SMUD accounts in Forecasting Climate Zone 6 (which includes the City of Elk Grove).

Traffic

The traffic analysis conducted for the project (**Appendix B**) provides data that can be used to estimate CO₂ emissions from project-generated residential and non-residential vehicle trips. According to the traffic analysis, the proposed General Plan Amendment and Rezone could potentially result in 16,695 residential and non-residential daily vehicle trips per day (see **Table**

¹ kWh/ft²/yr = kilowatt-hour per square foot per year

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4.7-9). Assuming a trip rate of seven miles per trip,² the proposed project at full buildout would generate an average of 116,865 vehicle miles traveled (VMT) per day, or approximately 43 million VMT annually. Assuming an emissions factor for future CO₂ emissions from vehicles of approximately 366 grams (0.807 pounds) of CO₂ per mile (California Air Resources Board, 2002), approximately 17,211 tons (34,423,150 lbs) of CO₂ per year could potentially be generated by all vehicle trips under the proposed project.

Table 4.7-9 illustrates the residential and non-residential vehicle emissions that could potentially result from development allowed under the proposed General Plan Amendment and Rezone.

According to the traffic study prepared for the project, the type of residential units allowed under proposed project conditions (high-density residential) would result in an average 6.63 daily vehicle trips per unit (237 units x 6.63 average daily trips = 1,571 total residential daily trips).

According to the traffic study, commercial development would result in 15,124 total commercial-related daily trips [(504,644 square feet/1,000) = 504.6 x 42.92 average daily trips per 1,000 square feet x 30 percent passby rate = 15,124 total commercial related daily trips].

**TABLE 4.7-9
RESIDENTIAL AND NON-RESIDENTIAL VEHICLE CO₂ EMISSIONS UNDER PROPOSED PROJECT**

Source	Daily Vehicle Trips	Daily Vehicle Miles Traveled	CO ₂ Emission (lbs)	
			Daily	Annually
Residential (237 low rise apartment units)	1,571	10,997	8,875	3,239,375
Non-Residential (504,644 square feet of commercial)	15,124	105,868	85,435	31,183,775
Total	16,695	116,865	94,310	34,423,150

Note that although this future CO₂ emissions factor does assume certain reductions in vehicle emissions due to future vehicle models operating more efficiently, it does not take into account additional vehicle emission reductions that might take place in response to AB 1493, if mobile source emission reductions are ultimately implemented through this legislation.

Total General Plan Buildout CO₂ Emissions

Table 4.7-10 illustrates the total buildout amount of CO₂ emissions as a result of implementation of the Sheldon/SR 99 GPA and Rezone project. According to the methodologies listed previously for the identification of CO₂ emissions, buildout of the project will result in an increase in CO₂ emissions of .021 million metric tons (MMT) annually. In comparison, the amount of CO₂ emitted in California in 2004 was 334.9 MMT.

² Default value used by URBEMIS Version 9.2.4, Environmental Management Software Air Quality monitoring software. Rimpo and Associates, 2007.

**TABLE 4.7-10
PROJECT CO₂ EMISSIONS**

Source	CO ₂ Emission (lbs/yr)	Million Metric Tons (MMT)
Residential Buildings	6,982,968 lbs/yr	0.003 MMT
Non-Residential Buildings	5,802,054 lbs/yr	0.002 MMT
Vehicles	34,423,150 lbs/yr	0.016 MMT
Total	47,208,172 lbs/yr	0.021 MMT
California 2004 total CO ₂ Emissions		334.9 MMT

Source: PMC; CEC 2006a Table 6

The analysis methodology used for the emissions estimate assumes that all emissions sources are new sources and that emissions from these sources are 100 percent additive to existing conditions. This is a standard approach taken for air quality analyses. In many cases, such an assumption is appropriate because it is impossible to determine whether emissions sources associated with a project move from outside the air basin and are in effect new emissions sources or whether they are sources that were already in the air basin and just shifted to a new location. However, because the effects of GHGs are global, a project that merely shifts the location of a GHG-emitting activity (e.g., where people live, where vehicles drive, or where companies conduct business) would result in no net change in global GHG emissions levels.

For example, if a substantial portion of California's population migrated from the South Coast Air Basin to the North Coast Air Basin, this would likely result in decreased emissions in the South Coast Air Basin and increased emissions in the North Coast Air Basin, but little change in overall global GHG emissions. However, if a person moves from one location where the land use pattern requires substantial vehicle use for day-to-day activities (commuting, shopping, etc.) to a new development that promotes shorter and fewer vehicle trips, more walking, and overall less energy usage, then it could be argued that the new development would result in a potential net reduction in global GHG emissions.

It is impossible to know at this time whether residents in the City of Elk Grove will have longer or shorter commutes relative to their existing homes, whether they will walk, bike, and use public transportation more or less than under existing circumstances, and whether their overall driving habits will result in higher or lower VMT. Much of the vehicle-generated CO₂ emissions attributed to the project could simply be from vehicles currently emitting CO₂ at an existing location moving to the project site and not from new vehicle emissions sources relative to global climate change. Under cumulative conditions, population growth is expected, and as regional population increases, VMT and CO₂ emissions will correspondingly increase. Future changes in building energy efficiency standards as well as higher production of non-CO₂ emitting energy sources (i.e., wind and solar power) would decrease the amount of CO₂ emissions from buildings than those calculated today. As a result, although it is possible to calculate the estimated contribution of building- and vehicle-generated CO₂ emissions from buildout of the project, the actual CO₂ contribution during the life of the project would likely be much less than the 0.021 million metric tons of CO₂ per year calculated above. This net CO₂ contribution is much less than the 334.9 million metric tons (US) of CO₂ emissions produced in California in 2004 (CEC, 2006a). The actual percentage of the statewide GHG emissions totals generated by the proposed project are likely much lower than the percentage listed above, as the vast majority of the vehicle trips "generated" by the proposed project are already occurring elsewhere.

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The proposed project is considered to be a major emitter of GHGs. As described above, the primary source of GHG emissions from the project is vehicle emissions. California vehicle emissions standards are regulated by the state and federal governments, the only entities which have jurisdiction over vehicle emissions in California. Therefore, until such time that there are thresholds of significance for which to compare the city's GHGs contribution, it must be assumed that any increase in GHGs will lead to a change in climate. This impact is considered **significant and unavoidable**, and the proposed project would have a **cumulatively considerable** contribution.

Mitigation Measures

None available.

Cumulative Effects of Global Climate Change on the City of Elk Grove

Impact 4.7.6 The impacts of global climate change would cumulatively result in the potential decrease in water supply, increase in air pollutants, and increase in health hazards. The proposed project would have a **less than cumulatively considerable** contribution to this impact.

According to a report on the effects of climate change in California by the California Climate Change Center (CCCC), based on state-of-the art climate models, if global heat-trapping emissions proceed at a medium to high rate, temperatures in California are expected to rise 4.7 to 10.5°F by the end of the century. In contrast, a lower emissions rate would keep the projected warming to 3 to 5.6°F. These temperature increases would have widespread cumulative consequences including substantial loss of snowpack, increased risk of large wildfires, reductions in the quality and quantity of certain agricultural products, and health effects. Refer to the Existing Setting section for a description of effects of climate change.

These consequences would potentially affect the residents of the city. For instance, a substantial loss in snowpack may reduce river volumes in the Sacramento River and potentially the amount of groundwater available for use as a water supply. Also, the potential for flooding and drought conditions are increased. Decreasing snowmelt and spring stream flows coupled with increasing demand for water resulting from both a growing population and hotter climate could lead to increasing water shortages. By the end of the century, if temperatures rise to the medium warming range and precipitation decreases, late spring stream flow could decline by up to 30 percent. Agricultural areas could be hard hit, with California farmers losing as much as 25 percent of the water supply they need (CCCC, page 7).

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, if temperatures rise to the medium warming range, there will be 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions. This is more than twice the increase expected if temperature rises are kept in the lower warming range.

Global warming scenarios provided by CCCC in their report *Our Changing Climate Assessing the Risk to California* indicate that by 2100, if temperatures rise to the higher warming range, there could be up to 100 more days per year with temperatures above 95°F in Sacramento, which means that temperatures in Elk Grove will certainly rise as well. This is a striking increase over historical patterns. As temperatures rise, residents of Elk Grove will face greater risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

With implementation of mitigation measures **MM 4.7.1a** through **MM 4.7.1h** and **MM 4.7.2**, the project would generate a reduced level of air pollution emissions than under its existing zoning designation. Additionally, mitigation measure **MM 4.4.5** would reduce impacts associated with project traffic impacts.

While the proposed project would expose persons and structures to the cumulative effects of climate change, the proposed project would not increase the rate of exposure or result in exposure to climate change effects that would occur without the project. Therefore, the project would have a **less than cumulatively considerable** contribution to this impact.

Mitigation Measures

None required.

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