3.3 AIR QUALITY

This section includes a discussion of existing air quality conditions, a summary of applicable regulations, and an analysis of potential construction and operational air quality impacts caused by potential annexation and development of the Bilby Ridge Sphere of Influence Amendment (SOIA) area (or "project site"). The method of analysis for short-term construction, long-term regional (operational), local mobile-source, and toxic air emissions is consistent with the recommendations of the Sacramento Metropolitan Air Quality Management District (SMAQMD), the California Air Resources Board (CARB), and the U.S. Environmental Protection Agency (EPA). In addition, mitigation measures are recommended as necessary to reduce significant air quality impacts.

Comments received in response to the Notice of Preparation expressed concerns about evaluating the project's consistency with existing plans, examining the project's effect on vehicle miles traveled (VMT) by directing growth to an area with higher VMT per household than the regional average, and ensuring that short-term construction emissions and the appropriate mitigation measures are addressed. Additionally, it was recommended that the preparation of an Air Quality Mitigation Plan be required for projects annexed within the SOIA area (or project site).

3.3.1 Environmental Setting

The SOIA area is located within Sacramento County, California, which is within the Sacramento Valley Air Basin (SVAB). The SVAB also includes all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba Counties; the western portion of Placer County; and the eastern portion of Solano County. The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by the sources of air pollutants and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

CLIMATE AND METEOROLOGY

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

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

The mountains surrounding the SVAB create a barrier to airflow, which leads to the entrapment of air pollutants when meteorological conditions are unfavorable for transport and dilution. The highest frequency of poor air movement occurs in the fall and winter when high-pressure cells are present over the SVAB. The lack of surface wind during these periods, combined with the reduced vertical flow caused by a decline in

surface heating, reduces the influx of air and leads to the concentration of air pollutants under stable metrological conditions. Surface concentrations of air pollutant emissions are highest when these conditions occur in combination with agricultural burning activities or with temperature inversions, which hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground.

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

The local meteorology of the SOIA area and surrounding area is represented by measurements recorded at the Western Regional Climate Center (WRCC) Clarksburg station. The normal annual precipitation is approximately 18 inches. January temperatures range from a normal minimum of 38°F to a normal maximum of 54°F. July temperatures range from a normal minimum of 58°F to a normal maximum of 93°F (WRCC 2016). The predominant wind direction is from the south (WRCC 2017).

CRITERIA AIR POLLUTANTS

Concentrations of emissions from criteria air pollutants are used to indicate the quality of the ambient air. A brief description of key criteria air pollutants in the SVAB and their health effects is provided below. Criteria air pollutants include ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (respectively PM_{10} and $PM_{2.5}$), and lead. However, for the purposes of this analysis, criteria air pollutants of primary concern because of their nonattainment status include ozone (and ozone precursors) and particulate matter. Sacramento County's attainment status for the California ambient air quality standards (CAAQS) and the national ambient air quality standards (NAAQS) are shown in Table 3.3-1. Monitoring data applicable to the SOIA area is provided in Table 3.3-2.

Table 3.3-1 Attainment Status Designations for Sacramento County

Pollutant	Federal Standard	State Standard
Ozone	Attainment (1-hour)[1]	Nonattainment (1-hour) Classification-Serious[2]
	Nonattainment (8-hour)[3] Classification, Severe	Nonattainment (8-hour)
	Nonattainment (8-hour)[4] Classification, Severe	
Respirable particulate matter (PM_{10})	Attainment (24-hour)	Nonattainment (24-hour)
		Nonattainment (Annual)
Fine particulate matter ($PM_{2.5}$)	Nonattainment (24-hour)	(No State Standard for 24-Hour)
	Attainment (Annual)	Attainment (Annual)
Carbon monoxide (CO)	Attainment (1-hour)	Attainment (1-hour)
	Attainment (8-hour)	Attainment (8-hour)
Nitrogen dioxide (NO_2)	Unclassified/Attainment (1-hour)	Attainment (1-hour)
	Unclassified/Attainment (Annual)	Attainment (Annual)
Sulfur dioxide (SO_2)[5]	(Attainment Pending) (1-Hour)	Attainment (1-hour)
		Attainment (24-hour)
Lead (Particulate)	Attainment (3-month rolling avg.)	Attainment (30-day average)

Table 3.3-1 Attainment Status Designations for Sacramento County

Pollutant	Federal Standard	State Standard
Hydrogen Sulfide	No Federal Standard	Unclassified (1-hour)
Sulfates		Attainment (24-hour)
Visibly Reducing Particles		Unclassified (8-hour)
Vinyl Chloride		Unclassified (24-hour)

Notes:
[1] Air Quality meets federal 1-hour Ozone standard (77 FR 64036). EPA revoked this standard, but some associated requirements still apply. SMAQMD attained the standard in 2009. SMAQMD has requested EPA recognize attainment to fulfill the requirements.
[2] Per Health and Safety Code (HSC) § 40921.5(c), the classification is based on 1989 – 1991 data, and therefore does not change.
[3] 1997 Standard.
[4] 2008 Standard.
[5] 2010 Standard.

Source: SMAQMD 2016a

Ozone

Ozone is a photochemical oxidant (a substance whose oxygen combines chemically with another substance in the presence of sunlight) and the primary component of smog. Ozone is not directly emitted into the air but is formed through complex chemical reactions between precursor emissions of ROG and NO_X in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels. Emissions of the ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. Emissions of ROG and NO_X decreased from 2000 to 2010 and are projected to continue decreasing from 2010 to 2035 (CARB 2013).

Acute health effects of ozone exposure include increased respiratory and pulmonary resistance, cough, pain, shortness of breath, and lung inflammation. Chronic health effects include permeability of respiratory epithelia and possibility of permanent lung impairment (EPA 2016).

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local sources of NO_X emissions (EPA 2012).

Acute health effects of exposure to NO_X includes coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema, breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, and death. Chronic health effects include chronic bronchitis and decreased lung function (EPA 2016).

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (CARB 2013). Fine particulate matter ($PM_{2.5}$) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM_{10} emissions in the SVAB are dominated by emissions from area sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, farming operations, construction and

demolition, and particles from residential fuel combustion. Direct emissions of PM_{10} are projected to remain relatively constant through 2035. Direct emissions of $PM_{2.5}$ have steadily declined in the SVAB between 2000 and 2010 and then are projected to increase very slightly through 2035. Emissions of $PM_{2.5}$ in the SVAB are dominated by the same sources as emissions of PM_{10} (CARB 2013).

Acute health effects of PM_{10} exposure include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, and premature death. Chronic health effects include alterations to the immune system and carcinogenesis (EPA 2016).

EMISSIONS INVENTORY

Monitoring Station Data and Attainment Area Designations

Criteria air pollutant concentrations are measured at several monitoring stations in the SVAB. The Elk Grove-Bruceville Road station is the closest station to the SOIA area with recent data for ozone, $PM_{2.5}$, and PM_{10}. Where there was no data available for the Elk Grove-Bruceville Road station, data from the next closest station (Sacramento Health Department Stockton Boulevard) was used. Table 3.3-2 summarizes the air quality data from the last 3 years (2013-2015).

Table 3.3-2 Summary of Annual Data on Ambient Air Quality (2013-2015)[1]

	2013	2014	2015
Ozone			
Maximum concentration (1-hr/8-hr avg, ppm)	0.086/0.069	0.089/0.072	0.091/0.082
Number of days state standard exceeded (1-hr/8-hr)	0/0	0/2	0/2
Number of days national standard exceeded (8-hr)	0	1	2
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration (24-hour µg/m^3)	38.0	52.2	36.5
Number of days national standard exceeded (24-hour measured[2])	10.2[2]	0[2]	3.5[2]
Respirable Particulate Matter (PM_{10})			
Maximum concentration (µg/m^3)	50.0[2]	41.0[2]	42.0[2]
Number of days state standard exceeded	6.1	0	0
Number of days national standard exceeded	0	0	0

Notes: µg/m^3 = micrograms per cubic meter; ppm = parts per million
[1] Measurements from the Elk Grove-Bruceville Road Court station for ozone, respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).
[2] Data was unavailable for Elk Grove-Bruceville Road station, thus next closest station data was used (Sacramento Health Department Stockton Boulevard station).
Source: CARB 2016a

Both CARB and EPA use this type of monitoring data to determine their attainment status with respect to the CAAQS and NAAQS for criteria air pollutants (attainment designations are summarized above in Table 3.3-1).

TOXIC AIR CONTAMINANTS

According to the *California Almanac of Emissions and Air Quality* (CARB 2013), the majority of the estimated health risks from toxic air contaminants (TACs) can be attributed to relatively few compounds, the most important being diesel PM. Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control system is being used. Unlike

the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

Diesel PM poses the greatest health risk among these 10 TACs mentioned. Based on receptor modeling techniques, CARB estimated its health risk to be 360 excess cancer cases per million people in the SVAB in the year 2000. Since 1990, the health risk associated with diesel PM has been reduced by 52 percent. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (CARB 2013).

ODORS

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals can smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Sources of odor in the area consist of agricultural operations, including cattle operations, including a large-scale cattle operation approximately 0.70 mile southwest of the SOIA area.

SENSITIVE RECEPTORS

Sensitive receptors are generally considered to include those land uses where exposure to pollutants could result in health-related risks to sensitive individuals, such as children or the elderly. Residential dwellings, schools, hospitals, playgrounds, and similar facilities are of primary concern because of the presence of individuals particularly sensitive to pollutants and/or the potential for increased and prolonged exposure of individuals to pollutants.

The closest nearby existing sensitive receptors consist primarily of residential land uses located along the northern, western, and eastern boundaries of the SOIA area, and existing residences within the SOIA area. Additionally, Henry Backer Sr. Park is located adjacent to the northern boundary of the SOIA area, along Bilby Road.

3.3.2 Regulatory Framework

Air quality within the SOIA area is regulated 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, planning, policy-making, education, and a variety of other programs. The agencies responsible for improving the air quality within the air basins are discussed below.

FEDERAL

U.S. Environmental Protection Agency

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

Criteria Air Pollutants

The CAA required EPA to establish NAAQS. As shown in Table 3.3-3, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare a State implementation plan (SIP) for attaining and maintaining the NAAQS. The federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a federal implementation plan that imposes additional control measures may be prepared for the nonattainment area. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basin.

Table 3.3-3 Ambient Air Quality Standards

Pollutant	Averaging Time	California[a,b]	National[c]	
			Primary[b,d]	Secondary[b,e]
Ozone	1-hour	0.09 ppm (180 µg/m³)	–[e]	Same as primary standard
	8-hour	0.070 ppm (137 µg/m³)	0.070 ppm (147 µg/m³)	
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	Same as primary standard
	8-hour	9 ppm[f] (10 mg/m³)	9 ppm (10 mg/m³)	
Nitrogen dioxide (NO_2)	Annual arithmetic mean	0.030 ppm (57 µg/m³)	53 ppb (100 µg/m³)	Same as primary standard
	1-hour	0.18 ppm (339 µg/m³)	100 ppb (188 µg/m³)	–
Sulfur dioxide (SO_2)	24-hour	0.04 ppm (105 µg/m³)	–	–
	3-hour	–	–	0.5 ppm (1300 µg/m³)
	1-hour	0.25 ppm (655 µg/m³)	75 ppb (196 µg/m³)	–
Respirable particulate matter (PM_{10})	Annual arithmetic mean	20 µg/m³	–	Same as primary standard
	24-hour	50 µg/m³	150 µg/m³	
Fine particulate matter ($PM_{2.5}$)	Annual arithmetic mean	12 µg/m³	12.0 µg/m³	15.0 µg/m³
	24-hour	–	35 µg/m³	Same as primary standard
Lead[f]	Calendar quarter	–	1.5 µg/m³	Same as primary standard
	30-Day average	1.5 µg/m³	–	–
	Rolling 3-Month Average	–	0.15 µg/m³	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m³)	No national standards	
Sulfates	24-hour	25 µg/m³		
Vinyl chloride[f]	24-hour	0.01 ppm (26 µg/m³)		
Visibility-reducing particulate matter	8-hour	Extinction of 0.23 per km		

Table 3.3-3 Ambient Air Quality Standards

Notes: µg/m^3 = micrograms per cubic meter; km = kilometers; ppb = parts per billion; ppm = parts per million.

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

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

[c] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. Environmental Protection Agency for further clarification and current federal policies.

[d] National primary standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

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

Source: CARB 2016b

Hazardous Air Pollutants and Toxic Air Contaminants

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

A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis or genetic damage; or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with CAPs for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 3.3-3). Cancer risk from TACs is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure.

EPA and, in California, CARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum available control technology or best available control technology for toxics to limit emissions.

STATE

CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required CARB to establish CAAQS (Table 3.3-3).

Criteria Air Pollutants

CARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered

during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

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

Toxic Air Contaminants

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

After a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate best available control technology for toxics to minimize emissions.

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

CARB has adopted diesel exhaust control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be 85 percent less in 2020 in comparison to year 2000 (CARB 2000). Adopted regulations are also expected to continue to reduce formaldehyde emissions emitted by cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

LOCAL

Sacramento Metropolitan Air Quality Management District

Criteria Air Pollutants

SMAQMD is the primary agency responsible for planning to meet NAAQS and CAAQS in Sacramento County. SMAQMD works with other local air districts in the Sacramento region to maintain the region's portion of the SIP for ozone. The SIP is a compilation of plans and regulations that govern how the region and State will comply with the federal Clean Air Act requirements to attain and maintain the NAAQS for ozone. The Sacramento Region has been designated as a "severe" 8-hour ozone nonattainment area with an extended attainment deadline of June 15, 2019.

SMAQMD has developed a set of guidelines for use by lead agencies when preparing environmental documents. The guidelines contain thresholds of significance for criteria pollutants and TACs, and also make recommendations for conducting air quality analyses. After SMAQMD guidelines have been consulted and the air quality impacts of a project have been assessed, the lead agency's analysis undergoes a review by

SMAQMD. SMAQMD submits comments and suggestions to the lead agency for incorporation into the environmental document.

All projects are subject to adopted SMAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of future projects within the SOIA area, if annexed, may include but are not limited to the following:

- **Rule 201**: General Permit Requirements. Any project that includes the use of equipment capable of releasing emissions to the atmosphere may be required to obtain permit(s) from SMAQMD before equipment operation. The applicant, developer, or operator of a project that includes an emergency generator, boiler, or heater should contact SMAQMD early to determine whether a permit is required, and to begin the permit application process. Portable construction equipment (e.g., generators, compressors, pile drivers, lighting equipment) with an internal combustion engine greater than 50 horsepower must have a SMAQMD permit or CARB portable equipment registration.

- **Rule 202**: New Source Review. The purpose of this rule is to provide for the issuance of authorities to construct and permits to operate at new and modified stationary air pollution sources and to provide mechanisms, including emission offsets, by which authorities to construct such sources may be granted without interfering with the attainment or maintenance of ambient air quality standards.

- **Rule 402**: Nuisance. A person shall not discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause or have natural tendency to cause injury or damage to business or property.

- **Rule 403**: Fugitive Dust. The developer or contractor is required to control dust emissions from earthmoving activities or any other construction activity to prevent airborne dust from leaving the project area.

- **Rule 902**: Asbestos. The developer or contractor is required to notify SMAQMD of any regulated renovation or demolition activity. Rule 902 contains specific requirements for surveying, notification, removal, and disposal of material containing asbestos.

Toxic Air Contaminants

At the local level, air districts may adopt and enforce CARB control measures. Under SMAQMD Rule 201 ("General Permit Requirements"), Rule 202 ("New Source Review"), and Rule 207 ("Federal Operating Permit"), all sources that possess the potential to emit TACs are required to obtain permits from SMAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including New Source Review standards and air toxics control measures. SMAQMD limits emissions and public exposure to TACs through a number of programs. SMAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors. Sensitive receptors are people, or facilities that generally house people (e.g., schools, hospitals, residences), that may experience adverse effects from unhealthful concentrations of air pollutants.

Odors

Although offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable stress among the public and often generating citizen complaints to local governments and SMAQMD. SMAQMD's Rule 402 (Nuisance) regulates odorous emissions.

Sacramento County General Plan

The goal of the Air Quality Element of the General Plan is to improve air quality to promote the public health, safety, welfare, and environmental quality of the community (Sacramento County 2011). There are 22 air quality-specific policies, including the following policies that may be applicable to the project:

- **Policy AQ-1.** New development shall be designed to promote pedestrian/bicycle access and circulation to encourage community residents to use alternative modes of transportation to conserve air quality and minimize direct and indirect emission of air contaminants.

- **Policy AQ-3.** Buffers and/or other appropriate mitigation shall be established on a project-by-project basis and incorporated during review to provide for protection of sensitive receptors from sources of air pollution or odor. The CARB's "Air Quality and Land Use Handbook: A Community Health Perspective," and the AQMD's approved Protocol (Protocol for Evaluating the Location of Sensitive Land uses Adjacent to Major Roadways) shall be utilized when establishing these buffers.

- **Policy AQ-4.** Developments which meet or exceed thresholds of significance for ozone precursor pollutants as adopted by the SMAQMD, shall be deemed to have a significant environmental impact. An Air Quality Mitigation Plan shall be submitted to the County of Sacramento prior to project approval, subject to review and recommendation as to technical adequacy by the Sacramento Metropolitan Air Quality Management District.

- **Policy AQ-5.** Reduce emissions associated with vehicle miles travelled and evaporation by reducing the surface area dedicated to parking facilities; reduce vehicle emissions associated with "hunting" for on-street parking by implementing innovative parking innovative parking solutions including shared parking, elimination of minimum parking requirements, creation of maximum parking requirements, and utilize performance pricing for publicly owned parking spaces both on- and off-street, as well as creating parking benefit districts.

- **Policy AQ-10.** Encourage vehicle trip reduction and improved air quality by requiring development projects that exceed the SMAQMD's significance thresholds for operational emissions to provide on-going, cost-effective mechanisms for transportation services that help reduce the demand for existing roadway infrastructure.

- **Policy AQ-11**. Encourage contractors operating in the county to procure and to operate low-emission vehicles, and to seek low emission fleet status for their off-road equipment.

- **Policy AQ-16.** Prohibit the idling of on-and off-road engines when the vehicle is not moving or when the off-road equipment is not performing work for a period of time greater than five minutes in any one-hour period.

- **Policy AQ-17.** Promote optimal air quality benefits through energy conservation measures in new development.

- **Policy AQ-19.** Require all feasible reductions in emissions for the operation of construction vehicles and equipment on major land development and roadway construction projects.

- **Policy AQ-21.** Support SMAQMD's particulate matter control measures for residential wood burning and fugitive dust.

City of Elk Grove General Plan

The SOIA area lies in an unincorporated area of Sacramento County; however, the site could potentially be annexed by the City of Elk Grove. Therefore, the City's policies with respect to air quality would be applicable. Relevant policies and standards related to air quality are described below.

- **Policy CAQ-26.** It is the policy of the City of Elk Grove to minimize air pollutant emissions from all City facilities and operations to the extent feasible and consistent with the City's need to provide a high level of public service.

- **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.

- **Policy CAQ-28.** The City shall emphasize "demand management" strategies which seek to reduce single-occupant vehicle use in order to achieve state and federal air quality plan objectives.

- **Policy CAQ-30.** 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.

- **Policy CAQ-31.** The City shall support intergovernmental efforts directed at stringent tailpipe emission standards and inspection and maintenance programs for all feasible vehicle classes and revisions to the Air Quality Attainment Plan to accelerate and strengthen market-based strategies consistent with the General Plan.]

- **Policy CAQ-32.** 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.

- **Policy CAQ-33.** 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.

City of Elk Grove Climate Action Plan

The Elk Grove Climate Action Plan (CAP) was adopted on March 27, 2013 by the Elk Grove City Council and was incorporated into the Elk Grove General Plan Sustainability Element by reference. The CAP includes goals, implementation measures, and action items related to air quality and developed to help the city reach its goals. The CAP includes GHG emission reduction targets, strategies, and implementation measures developed to help the city reach these targets. Reduction strategies address GHG emissions associated with the build environment, resource conservation, transportation, and municipal programs.

However, the CAP does not demonstrate the City's ability to meet 2030 reduction goals (set by SB 32) and subsequently future target years (e.g., 2050). Thus, because of the anticipated buildout date of the SOIA area being beyond 2020 this method of analysis would not demonstrate consistency with State GHG targets set by legislation (i.e., SB 32) or recommendations in the 2017 proposed Scoping Plan.

Updates to the CAP have been initiated as part of the general plan update process. The updated CAP (and associated key policies to be included in the policy document) will be consistent with new State legislation and guidance issued since the existing CAP was adopted in 2013, such as SB 32, EO B-30-15, and updates to the State's Climate Change Scoping Plan.

3.3.3 Environmental Impacts and Mitigation Measures

ANALYSIS METHODOLOGY

The Bilby Ridge SOIA consists of approximately 480 acres and is located in the unincorporated area of Sacramento County, just south of the City of Elk Grove. For purposes of evaluating the impacts of the development of the SOIA area, a conceptual land use plan has been development and is described in Chapter 3, "Project Description." This conceptual land use plan was used in the air quality impact analysis

provided below. Regional and local criteria air pollutant emissions and associated impacts, as well as impacts from TACs, CO concentrations, and odors were assessed in accordance with SMAQMD-recommended methodologies.

Construction-related emissions of criteria air pollutants and precursors were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.1 computer program, as recommended by (CAPCOA 2016). Modeling was based on conceptual land use scenario that could take place on the SOIA site (e.g., size, number of units being built, area to be graded, area to be paved, energy information), where available; reasonable assumptions based on typical construction activities; and default values in CalEEMod that are based on the SOIA location and land use type.

For program-level analysis of annexation of lands where it is not possible to know how much construction activity would occur in a given year, SMAQMD recommends that lead agencies conservatively assume 25 percent of the total land uses could be constructed in a single year (SMAQMD 2016b: 9-4). For the purposes of this analysis, and to ensure conservative results, 25 percent of the land uses that could be developed were assumed to be constructed in the earliest possible construction year (2018). This is a conservative assumption because it is unlikely that 25 percent of potential future development in the proposed SOIA Area could be constructed in a single year, and construction equipment fleet emissions are expected to continue to decrease after 2018 with increased emission controls and standards. For a detailed description of model input and output parameters and assumptions, refer to Appendix B.

The potential for traffic generated by potential future development within the SOIA area to result in localized concentrations of CO that exceed NAAQS and CAAQS for this pollutant was evaluated using SMAQMD-recommended screening criteria, as described in Impact 3.3-3 below.

Health risk from potential future SOIA area development construction- and operational-related emissions of TACs were assessed qualitatively. This assessment is based on the location from which construction- or operational-related TAC emissions would be generated by land uses developed under the conceptual land use scenario relative to on-site sensitive receptors as construction occurs, as well as the duration during which TAC exposure would occur.

Similarly, the assessment of odor-related impacts is based on the types of odor sources associated with the types of land uses that could be developed on the SOIA area and their location relative to sensitive receptors, both on and off site.

THRESHOLDS OF SIGNIFICANCE

Per Appendix G of the CEQA Guidelines and SMAQMD recommendations, air quality impacts would be significant if development of the SOIA area would:

- cause construction-generated emissions of criteria air pollutant or precursors that exceed the SMAQMD-recommended thresholds of 85 lb/day for NO_X, 80 lb/day and 14.6 tons/year for PM_{10}, and 82 lb/day and 15 tons/year for $PM_{2.5}$ and/or uncontrolled fugitive dust emissions. SMAQMD does not specific a mass emission threshold for evaluating construction-generated emissions of $PM_{2.5}$. Because $PM_{2.5}$ is a subset of PM_{10}, the mass emission thresholds of 80 lb/day and 14.6 tons/year for PM_{10} serves as a proxy to determine whether operational emissions of $PM_{2.5}$ would be a significant contribution to the SVAB;

- result in a net increase in long-term operational emissions of criteria air pollutant or precursors that exceed the SMAQMD-recommended thresholds of 65 lb/day for ROG and NO_X, 80 lb/day and 14.6 tons/year for PM_{10}, and 82 lb/day and 15 tons/year for $PM_{2.5}$.;

- result in long-term operational local mobile-source CO emissions that would violate or contribute substantially to localized concentrations that exceed the 1-hour CAAQS of 20 ppm or the 8-hour CAAQS of 9 ppm;

- generate TAC emissions that would expose sensitive receptors to an incremental increase in cancer risk that that exceed 10 in 1 million and/or a hazard index of 1.0 or greater; or
- create objectionable odors affecting a substantial number of people.

ISSUES NOT EVALUATED FURTHER

All issues applicable to air quality listed under the significance criteria above are addressed in this section.

IMPACT ANALYSIS

Impact 3.3-1: Construction emissions of criteria air pollutants and ozone precursors.

Construction-related activities associated with future development within the SOIA area upon annexation could result in emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ from site preparation (e.g., excavation, clearing), off-road equipment, material and equipment delivery trips, and worker commute trips, and other miscellaneous activities (e.g., building construction, asphalt paving, application of architectural coatings). Construction activities could result in mass emissions of NO_X and PM_{10} that exceed SMAQMD's thresholds of 85 lb/day and 80 lb/day, respectively. Therefore, construction-generated emissions of NO_X and PM_{10} could contribute to the existing nonattainment status of the SVAB with respect to the CAAQS and NAAQS for ozone, the CAAQS forPM_{10} and the NAAQS for $PM_{2.5}$. This would be a **significant** impact.

Construction-related activities for the conceptual land use plan would result in emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ from site preparation (e.g., excavation, clearing), off-road equipment, material delivery, worker commute trips, and other miscellaneous activities (e.g., building construction, asphalt paving, application of architectural coatings). Fugitive dust emissions of PM_{10} and $PM_{2.5}$ are associated primarily with site preparation and vary as a function of soil silt content, soil moisture, wind speed, acreage of disturbance, and vehicle miles traveled on and off the site. Emissions of ozone precursors, ROG and NO_X, are emitted in the exhaust of construction equipment and on-road vehicles. Paving and the application of architectural coatings also results in off-gas emissions of ROG. PM_{10} and $PM_{2.5}$ are also contained in equipment and vehicle exhaust.

Typical construction activities would require all-terrain forks, fork lifts, cranes, pick-up and fuel trucks, compressors, loaders, backhoes, excavators, dozers, scrapers, pavement compactors, welders, concrete pumps, concrete trucks, and off-road haul trucks, as well as other diesel-fueled equipment as necessary.

Based on SMAQMD guidance for program-level analysis of annexation of lands where it is not known how much construction activity would occur in a given year, 25 percent of the land uses that could be developed as part of the conceptual land use scenario were assumed to be constructed in one single year, and modeled as such, in the earliest possible construction year (2018). Conservative assumptions were used and individual phases were overlapped (i.e., building construction, paving, and architectural coating) to account for construction activities on different parts of the site occurring simultaneously. As such, reported emissions represent a conservative estimate of maximum daily emissions. It is also important to note that the equipment exhaust emission rates of construction in the future would decrease as newer, more emission-efficient construction equipment replaces older, less efficient equipment. For specific assumptions and modeling inputs, refer to Appendix B.

Table 3.3-4 summarizes the modeled maximum daily emissions from construction activity over the estimated 1-year period. Annual emissions for PM_{10} and $PM_{2.5}$ for the modeled year of construction were also estimated to allow for evaluation of compliance with SMAQMD's recommended tons/year thresholds.

As shown in Table 3.3-4, maximum daily emissions of NO_X and PM_{10} could potentially exceed applicable mass emission thresholds. Daily emissions of ROG and $PM_{2.5}$, and annual emissions of PM_{10} and $PM_{2.5}$ would not exceed the respective thresholds. However, it is likely that emissions of NO_X and PM_{10} would exceed

applicable thresholds. Additionally, because of the nonattainment status of the SVAB with respect to the CAAQS for PM_{10} and the NAAQS for $PM_{2.5}$, construction-generated fugitive dust emissions may result in adverse air quality impacts to existing surrounding land uses and may contribute to the existing adverse air quality condition in the SVAB. Therefore, construction emissions could contribute to the existing nonattainment condition in the SVAB with respect to the CAAQS and NAAQS for ozone, the CAAQS forPM_{10} and the NAAQS for $PM_{2.5}$. This would be a **significant** impact.

Table 3.3-4 Summary of Maximum Daily Emissions of Criteria Air Pollutants and Precursors Associated with Project Construction

	ROG lb/day	NO_X lb/day	PM_{10}		$PM_{2.5}$	
			lb/day	tons/year	lb/day	tons/year
2018	672	240	84	2	48	1
SMAQMD Threshold of Significance	NONE	85	80	14.6	82	15
Exceed Significance Threshold?	N/A	Yes	Yes	No	No	No

Notes: Notes: N/A= not applicable; lb/day = pounds per day; tons/year = tons per year; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter.

Total values may not add correctly because of rounding. See Appendix B for detailed input parameters and modeling results.

Source: Modeling performed by Ascent Environmental 2017

Mitigation Measure 3.3-1: Construction exhaust and fugitive dust emissions controls

At the time of any application to annex territory within the Bilby Ridge SOIA area, the City of Elk Grove shall require that the applicants implement SMAQMD's Basic Construction Emission Control Practices and SMAQMD's Enhanced Exhaust Control Practices during any construction or ground disturbance activities to reduce construction-related fugitive dust emissions, diesel PM, and NO_X emissions. These measures are included below and are consistent with General Plan Policy CAQ-30 and Policy CAQ-33. Evidence of compliance with this mitigation measure shall be provided in the annexation application to LAFCo.

<u>Basic Construction Fugitive Dust Emissions Control Practices</u>

- Water all exposed surfaces two times daily. Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and access roads.
- Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways should be covered.
- Use wet power vacuum street sweepers to remove any visible trackout mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited.
- Limit vehicle speeds on unpaved roads to 15 miles per hour (mph).
- All roadways, driveways, sidewalks, parking lots to be paved should completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.
- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes [required by California Code of Regulations, Title 13, sections 2449(d)(3) and 2485]. Provide clear signage that posts this requirement for workers at the entrances to the site.

- Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.

Enhanced Exhaust Control Practices

- Prior to any activities on the site, the applicant shall submit to the City and 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 before any grading activities. The inventory shall include the horsepower rating, engine model year, and projected hours of use for each piece of equipment. The project applicant shall provide the anticipated construction timeline including start date, and name and phone number of the project manager and on-site foreman. The information shall be submitted at least 4 business days before the use of subject heavy-duty off-road 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.

- Prior to any grading activities, the applicant shall provide a plan for approval by the City and SMAQMD demonstrating that the heavy-duty off-road vehicles (50 horsepower or more) to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project wide fleet-average 20-90 percent NO_X reduction (depending on available technology and engine Tier) and 45 percent particulate reduction compared to the most recent CARB fleet average. This plan shall be submitted in conjunction with the equipment inventory. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.

- The applicant shall ensure that emissions from all off-road, diesel-powered equipment used on the project area do not exceed 40 percent opacity for more than three minutes in any one hour. Use of any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be discontinued immediately until equipment is repaired or replaced. Non-compliant equipment will be documented and a summary provided to the lead agency and SMAQMD monthly. A visual survey of all in-operation equipment shall be made at least weekly. A monthly summary of the visual survey 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.

Enhanced Fugitive PM Dust Control Practices

Soil Disturbance Areas

- Water exposed soil with adequate frequency for continued moist soil. However, do not overwater to the extent that sediment flows off the site.

- Suspend excavation, grading, and/or demolition activity when wind speeds exceed 20 mph.

- Install wind breaks (e.g., plant trees, solid fencing) on windward side(s) of construction areas.

- Plant vegetative ground cover (fast-germinating native grass seed) in disturbed areas as soon as possible. Water appropriately until vegetation is established.

Unpaved Roads

- Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site.

- Treat site accesses to a distance of 100 feet from the paved road with a 6 to 12-inch layer of wood chips, mulch, or gravel to reduce generation of road dust and road dust carryout onto public roads.

- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the District shall also be visible to ensure compliance.

Significance after Mitigation

Implementation of Mitigation Measure 3.3-1 would result in a reduction of fugitive PM_{10} and $PM_{2.5}$ dust and NO_X emissions from off-road equipment. Additionally, development within the SOIA Area, upon annexation, would be subject to City of Elk Grove General Plan policy CAQ-33, which requires assessment and mitigation of criteria air pollutant emissions, including the use of low-emission vehicles and equipment during construction, where feasible. If emissions reduction measures to support policy CAQ-30 of the City of Elk Grove General Plan were to be developed and implemented before construction were to begin, emissions would be further reduced.

However, because of the uncertainty of construction timing, phasing, and overlap of development of the SOIA area, construction-related emissions of criteria air pollutants and precursors could still exceed significance thresholds. No additional feasible mitigation is available at this time. Therefore, this impact would be **significant and unavoidable**.

Impact 3.3-2: Long-term operational emissions of air pollutants.

While approval of the SOIA would not result in any physical changes to the environment, development in the SOIA area upon future annexation could result in long-term operational emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ that exceed SMAQMD-recommended mass emission thresholds and, therefore, could conflict with the air quality planning efforts and contribute substantially to the nonattainment status of the SVAB with respect to the CAAQS and NAAQS for ozone, the CAAQS forPM_{10} and the NAAQS for$PM_{2.5}$. This would be **significant** impact.

Approval of the SOIA would not result in any physical changes to the environment or increases in long-term operational emission of air pollutants. However, approval of the SOIA would remove an obstacle to potential future annexation and development of the site. Operations associated with development of the SOIA area upon future annexation would result in the generation of long-term operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ as a result of mobile, stationary, and area sources. Mobile-source emissions of criteria air pollutants and precursors would result from vehicle trips generated by residents, users of the parks, students at the elementary school, as well as by employee commute trips, and other associated vehicle trips (e.g., delivery of supplies, shoppers, maintenance vehicles for commercial land uses). Stationary and area-wide sources would include the combustion of natural gas for space and water heating (i.e., energy use), the use of landscaping equipment and other small equipment, the periodic application of architectural coatings, and the use of consumer products.

Table 3.3-5 summarizes the maximum daily operational-related emissions of criteria air pollutants during the summer season (higher emissions scenario), as well as annual emissions of PM_{10} and $PM_{2.5}$. Emissions were calculated based on the proposed conceptual land use scenario and using default trip rates and trip lengths in CalEEMod.

Table 3.3-5 Summary of Maximum (Unmitigated) Operational Emissions of Criteria Air Pollutants and Precursors at Full Buildout (2019)

Source Type	Maximum Daily Emissions (lb/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Area[1]	151	2	1	1
Energy	2	18	1	1
Mobile	142	422	333	91
Total	295	442	335	93
Annual Emissions	—[3]	—[3]	53 tons/year	14.5 tons/year

Table 3.3-5 Summary of Maximum (Unmitigated) Operational Emissions of Criteria Air Pollutants and Precursors at Full Buildout (2019)

Source Type	Maximum Daily Emissions (lb/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
SMAQMD Threshold of Significance[2]	65	65	80 lb/day and 14.6 tons/year	82 lb/day and 15 tons/year
Exceed Significance Threshold?	Yes	Yes	Yes	Yes

Notes: Notes: lb/day = pounds per day; tons/year = tons per year; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter.

[1] Area-source emissions include emissions from landscaping, application of architectural coatings, and consumer products, and are estimated based on default model settings.

[2] Mass emission significance criteria apply to the sum of area, energy, and mobile sources.

[3] SMAQMD does not recommend a tons-per-year threshold for evaluating emissions of ROG and NOx associated with the operation of land use developments.

Total values may not add correctly because of rounding. See Appendix B for detailed input parameters and modeling results.

Source: Modeling performed by Ascent Environmental 2017

As shown in Table 3.3-5, operation-related activities would result in mass emissions of ROG, NO_x, PM_{10}, and $PM_{2.5}$ that exceed the SMAQMD-recommended thresholds of significance. Thus, ROG, NO_x, PM_{10}, and $PM_{2.5}$ emissions generated under full buildout of the SOIA may result in adverse air quality impacts to existing surrounding land uses and may contribute to the existing adverse air quality condition in the SVAB. This would be a **significant** impact.

Mitigation Measure 3.3-2: Prepare an Air Quality Mitigation Plan to reduce potential operational emissions

At the time of any application to annex territory within the Bilby Ridge SOIA area, the City of Elk Grove shall require that the applicants prepare and implement an operational air quality mitigation plan (AQMP) that achieves a 35 percent reduction in operational emissions of ROG and NO_X compared to unmitigated project emissions. The AQMP shall be prepared in accordance with guidance from SMAQMD's *Recommended Guidance for Land Use Emission Reductions, Version 3.3* (SMAQMD 2016c). A 35 percent reduction is recommended by SMAQMD, rather than SMAQMD's standard 15 percent reduction, because SOIA area was not included in the 2016 Sacramento Area Council of Governments (SACOG) Metropolitan Transportation Plan/Sustainable Communities Strategy, which is used to develop mobile-source emissions inventories for the region, and used to show consistency with adopted air quality plans and not conflict with the ability to bring the SVAB into attainment of the CAAQS and NAAQS for ozone (SMAQMD 2016b:4). The AQMP shall also include all feasible measures to reduce operational emissions of PM_{10}, and $PM_{2.5}$, though SMAQMD has not determined any specific percent reductions for PM_{10}, and $PM_{2.5}$ to be feasible (SMAQMD 2016c:4). The AQMP can include policies and emissions reduction measures demonstrating compliance with the City of Elk Grove's General Plan Conservation and Air Quality Element. The City's development of an AQMD may be conducted in parallel with implementation of Mitigation Measure 3.7-1a of this EIR, which requires implementation of on-site greenhouse gas reduction measures. The AQMP shall be approved by SMAQMD before the construction of any new land use development on the SOIA site. The City can require future developers of the SOIA site to be responsible for funding preparation of the AQMP. Evidence of compliance with this mitigation measure shall be provided in the annexation application to LAFCo.

The AQMP can be prepared after a more detailed development plan is determined. However, in addition to the conditions of approval required by this mitigation measure, the following text shall also be included as a condition of approval for the annexation of territory in the SOIA area into the City of Elk Grove:

"All amendments to the detailed land use plan on which the AQMP is based and that have the potential to result in a change in ozone precursor emissions shall include an analysis which quantifies, to the extent

practicable, the effect of the established AQMP on ozone precursor emissions. The amendment shall not increase total ozone precursor emissions above what was considered in the AQMP for the entire project area and shall achieve the original 35 percent reduction in total operational emissions. If the amendment would require a change in the AQMP to meet that requirement, then the proponent of the amendment shall consult with SMAQMD on the revised analysis and shall prepare a revised AQMP for approval by the City, in consultation with SMAQMD."

Significance after Mitigation

Implementation of Mitigation Measure 3.3-2 would require preparation of an AQMP for land use development on the SOIA area. This mitigation would exceed the 15 percent reduction provision of General Plan Policy CAQ-30. It would also be consistent with the City's General Plan Policy CAQ-32, which requires the implementation of an AQMP for land use development projects that may conflict with applicable air quality plans—in addition to those required by Policy CAQ-30. Preparation and implementation of an AQMP could potentially achieve a 35 percent reduction in emissions of ROG and NO_X when compared to the unmitigated emissions scenario of 35 percent. Many of the measures implemented to reduce ROG and NO_X would likely result in reductions of PM_{10}, and $PM_{2.5}$. However, even with a 35 percent reduction in operational emissions of ROG and NO_X, emissions of these ozone precursors would continue to exceed SMAQMD's mass emission thresholds. Similarly, measures required by the AQMP may not be sufficient to reduce operational emission of PM_{10}, and $PM_{2.5}$ to less than SMAQMD's applicable mass emission thresholds. Thus, future development within the SOIA area and the associated operations may contribute to the nonattainment status of the SVAB with respect to the CAAQS and NAAQS for ozone, the CAAQS for PM_{10} and the NAAQS for $PM_{2.5}$. This impact would be **significant and unavoidable.**

Impact 3.3-3: Mobile-source CO concentrations.

While approval of the SOIA would not result in any physical changes to the environment, long-term operational mobile-source emissions of CO potentially generated by vehicle trips associated with future annexation and development of the SOIA area would not be large enough to violate or contribute substantially to localized concentrations of CO that exceed the CAAQS or NAAQS for CO. As a result, this impact would be **less than significant**.

Local mobile-source CO emissions near roadway intersections are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. However, under stable meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels adversely affecting nearby sensitive land uses, such as residential units, hospitals, schools, and childcare facilities. CO is a pollutant of localized concern and, therefore, analyzed at the local level.

Approval of the SOIA would not result in any physical changes to the environment or increases in mobile source CO concentration. However, approval of the SOIA would remove an obstacle to potential future annexation and development of the site. Project-generated traffic would be associated primarily with the operational phase. As described in Section 3.13, "Traffic, Transportation, and Circulation," at complete buildout of the conceptual land use plan, up to 34,529 daily trips would be generated, including up to 2,730 trips during the a.m. peak hour and up to 3,097 during the p.m. peak hour.

SMAQMD recommends a screening methodology to determine whether CO emissions generated by traffic at congested intersections have the potential to exceed, or contribute to an exceedance of, the 8-hour CAAQS of 9.0 µg/m^3 or the 1-hour CAAQS of 20.0 µg/m^3 (SMAQMD 2016b). The screening methodology consists of two tiers of screening criteria, listed below. If the first tier is not met, then the second tier may be applied.

First-Tier

A project will result in a less-than-significant impact to air quality for local CO if:

- traffic generated by the project will not result in deterioration of intersection level of service (LOS) to LOS E or F, and
- the project will not contribute additional traffic to an intersection that already operates at LOS E or F.

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

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

If the conceptual land use plan were to be constructed, deterioration of LOS to unacceptable levels at area intersections could occur. However, because intersection-level analyses were not performed for this EIR, SMAQMD's first tier of screening criteria cannot be applied as part of this environmental review. The first tier would be used once a development plan is developed.

As described in Section 3.13, "Traffic, Transportation, and Circulation," and mentioned above, development of the SOIA area would generate a maximum of 2,730 trips during the a.m. peak hour and up to 3,097 during the p.m. peak hour. The highest daily volume for the cumulative-plus-project condition along the roadway segments analyzed is estimated to be 158,000 for SR 99 from the Bond Road on/off ramps to the Elk Grove Boulevard on/off. The percentage of daily traffic that occurs in the peak period (a.k.a., the K factor) for SR 99 in Sacramento County ranges from 6.35 percent to 10.31 percent (California Department of Transportation 2015). Conservatively assuming the highest end of this range and applying it to the highest-volume roadway segment in the study area of 158,000 vehicles per day, the segment of SR 99 from the Bond Road on/off ramps to the Elk Grove Boulevard on/off ramps would experience a peak-hour volume of approximately 16,290 vehicles per hour. This peak-hour volume does not approach the SMAQMD screening level of 31,600 vehicles per hour. Additionally, because of stricter vehicle emissions standards in newer cars, new technology, and increased fuel economy, CO emissions are expected to be substantially lower in future years compared to the vehicle fleet operating in the region under existing conditions.

The mix of vehicle types generated by the conceptual land use scenario within the SOIA area is not anticipated to have a greater percentage of heavy-duty vehicles and would not be substantially different from the County average. Furthermore, development within the SOIA would not contribute traffic to a tunnel, parking garage, bridge underpass, urban street canyon, below-grade roadway, or other location in which horizontal or vertical mixing of mobile-source CO emissions would be substantially limited. Thus, project-generated local mobile-source CO emissions would not result in or substantially contribute to concentrations of CO that exceed the 1-hour or 8-hour CAAQS and NAAQS. As a result, this impact would be **less than significant.**

Mitigation Measures
None required.

Impact 3.3-4: Exposure of sensitive receptors to TACs.

Approval of the SOIA would not result in any physical changes to the environment. Further, development associated with future annexation of the site would not result in the generation of TACs during construction that would result in an incremental increase in cancer risk greater than 10 in one million or a hazard index greater than 1.0 at existing or future sensitive receptors based on the short duration of construction activities and

distance to existing sensitive receptors. However, new operational TAC sources associated with commercial development may expose existing or new receptors to TAC emissions. This impact would be **significant**.

Approval of the SOIA would not result in any physical changes to the environment or exposure of sensitive receptors to TACs. However, approval of the SOIA would remove an obstacle to potential future annexation and development of the site which could result in the construction of TAC sources and potential exposure of sensitive receptors to TAC sources. The exposure of sensitive receptors to TAC emissions from project-generated construction and operational sources is discussed separately below. The TAC that is the focus of this analysis is diesel PM because it would be emitted during project construction and operation. Although other TACs exist (e.g., benzene, 1,3-butadiene, hexavalent chromium, formaldehyde, methylene chloride), they are primarily associated with industrial operations and the conceptual land use scenario does not include any industrial land uses.

Construction

Construction-related activities associated with the conceptual land use scenario would result in temporary, intermittent emissions of diesel PM from the exhaust of off-road, heavy-duty diesel equipment use for site preparation, grading, paving, application of architectural coatings, on-road truck travel, and other miscellaneous activities. For construction activity, diesel PM is the primary TAC of concern. On-road diesel-powered haul trucks traveling to and from the construction area to deliver materials and equipment are less of a concern because they would not stay on the site for long durations.

Diesel PM was identified as a TAC by CARB in 1998. The potential cancer risk from the inhalation of diesel PM outweighs the potential for all other health impacts (i.e., non-cancer chronic risk, short-term acute risk) and health impacts from other TACs (CARB 2003). With regards to exposure of diesel PM, the dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher level of health risk for any exposed receptor. According to the Office of Environmental Health Hazard Assessment (OEHHA), *Guidance Manual for Preparation of Health Risk Assessments*, which determine the exposure of sensitive receptors to TAC emissions should be based on a 30-year exposure period for estimating cancer risk at the maximum exposed individual resident (MEIR), with 9- and 70-year exposure periods at the MEIR as supplemental information. Furthermore, 70-year exposure period is required for estimating cancer burden or providing an estimate of population-wide risk (OEHHA 2015:8-1).

It is important to consider that the use of off-road heavy-duty diesel equipment would be limited to the construction phase. As construction progresses, activity intensity and duration would vary throughout the site. Emissions of diesel PM would not be generated at any single location during the entire construction phase because land uses would be developed at different locations throughout the SOIA area, as shown in the conceptual land use scenario. As construction progresses, activity intensity and duration would vary throughout the site. As such, diesel PM-emitting construction activity would not take place near any single existing or future receptor for extended periods of time, or event during the entire construction period.

Existing off-site residential receptors are located approximately 60 feet to the north and to the east of the SOIA area. Studies show that diesel PM is highly dispersive, and receptors must be near emission sources to result in the possibility of exposure to concentrations of concern and must be in close proximity for a long duration of time. Given the temporary and intermittent nature of construction activities likely to occur within close proximity to receptors the exposure of diesel PM to any one receptor would be limited (WRCC 2017).

Therefore, considering the relatively short duration of diesel PM-emitting construction activity at any one location of the SOIA area, the distance to the nearest off-site sensitive receptors, and the highly dispersive properties of diesel PM, construction-related TAC emissions would not expose sensitive receptors to an incremental increase in cancer risk greater than 10 in 1 million or a hazard index greater than 1.0.

Long-Term Operation

Operation of the conceptual land use plan could result in new sources of TACs associated with new vehicular trips on existing and new roadways as well as new sources of diesel PM associated with commercial delivery trucks occurring within the commercial and office land uses. New TAC sources could expose existing surrounding land uses and new receptors to TAC emissions. Development of the conceptual land use scenario would also locate new sensitive land uses near existing TAC sources associated with surrounding roadways.

Guidance from SMAQMD's Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways and CARB's Air Quality and Land Use Handbook recommends that new sensitive receptors should not be placed within 500 feet of freeways or urban streets with traffic volumes that exceed 100,000 vehicles per day or rural roads with 50,000 vehicles per day (CARB 2005). As described in Section 3.13, "Traffic, Transportation, and Circulation," development within the SOIA would generate approximately 34,529 daily trips (i.e., new TAC sources) that travel on the surrounding roadway network. Further, under cumulative –plus-project conditions, traffic volumes along roadways adjacent to the SOIA area would range from 4,800 to 35,800 vehicles per day. These traffic volumes would not exceed the 100,000-vehicles-per-day criterion identified by SMQMD and CARB and would be spread through the City's roadway network, thus new and existing sensitive receptors would not be exposed to increased health risk.

The SOIA area is not near existing industrial or commercial land uses, thus would not be impacted by existing stationary TAC emission sources. The nearest roadways which would experience traffic volumes that exceed 100,000 vehicles per day in the cumulative plus project scenario are I-5 and SR-99 which would daily traffic volumes of 102,400 and 158,000 vehicles per day along their most heavily traveled segments within the study area. The SOIA area is approximately 1.75 miles east of I-5, and 2.5 miles west of SR-99. Thus, new sensitive receptors would not be located within 500 feet of either freeway, and thus, would not be exposed to excessive health risk. No other urban roadways or freeways near the SOIA area would experience volumes that exceed the applicable thresholds in the cumulative-plus-project scenario.

Development on the SOIA areas would also likely include commercial and business park land uses. Commercial and business park land uses may include loading docks or loading areas where diesel PM-emitting delivery trucks frequently operate, which could result in the exposure of nearby existing or new sensitive receptors to TACs. According to the CARB guidance document *Air Quality and Land Use Handbook*, ARB recommends avoiding the siting of new commercial trucking facilities that accommodate more than 100 trucks per day, or 40 trucks equipped with transportation refrigeration units (TRUs), within 1,000 feet of sensitive receptors (CARB 2005). No industrial land uses are planned for the SOIA area that could be a future source of TACs.

Summary

TACs emitted during construction of new land uses developed on the SOIA area upon annexation would not expose nearby sensitive receptors to incremental increases in cancer, chronic, and acute risk that exceed applicable thresholds (incremental increase in cancer risk greater than 10 in 1 million or a hazard index greater than 1.0). Additionally, new and existing sensitive receptors would not experience traffic volumes exceeding the 100,000-vehicles-per-day criterion identified by SMQMD and CARB, and thus would not be exposed to increased health risk. However, diesel PM-generating delivery trucks at commercial loading docks could expose new or existing sensitive receptors to increased TAC emissions, thus resulting in an incremental increase in cancer risk that that exceeds 10 in 1 million and/or a hazard index of 1.0 or greater. This impact would be **significant**.

Mitigation Measure 3.3-4: Incorporate design features to minimize exposure of sensitive receptors to TACs generated at commercial land uses.

At the time of any application to annex territory within the Bilby Ridge SOIA area, the City of Elk Grove shall require that the applicants implement the measures to address TAC exposure identified below. Evidence of compliance with this mitigation measure shall be provided in the annexation application to LAFCo.

To reduce exposure of existing or future receptors to diesel PM generated at commercial loading docks, the following design measures shall be incorporated into land uses developed within the SOIA area:

- Proposed commercial land uses that have the potential to emit TACs or host TAC-generating activity (e.g., loading docks) shall be located as far away from existing and proposed on-site sensitive receptors as possible such that they do not expose sensitive receptors to TAC emissions that exceed an incremental increase of 10 in 1 million for the cancer risk and/or a noncarcinogenic Hazard Index of 1.0.
- Commercial facilities with truck loading areas shall be designed such that buildings or walls shield locations of truck activity from nearby residences or other sensitive land uses.
- Commercial facilities with truck loading areas that accommodate more than 100 trucks per day, or 40 trucks equipped with transportation refrigeration units (TRUs), shall be located further than 1,000 feet of sensitive receptors.
- Require electrification hook-ups for at all commercial land uses that will receive deliveries from trucks with TRUs so that TRU engines need not be operated at loading docks.
- Signs shall be posted at all loading docks and truck loading areas which indicate that diesel powered delivery trucks must be shut off when not in use for longer than 5 minutes on the premises to reduce idling emissions of diesel PM.

Significance after Mitigation

Implementation of Mitigation Measure 3.3-4 would incorporate design features to minimize exposure of sensitive receptors and ensure that any new sources of TACs associated with the proposed commercial land uses would not expose existing or new sensitive land uses to excessive TAC levels. Thus, the TAC sources generated by land uses proposed within the conceptual development scenario would not result in an increased health risk to existing levels in the SOIA area and this impact would be reduced to **less than significant**.

Impact 3.3-5: Exposure of sensitive receptors to odors.

While approval of the SOIA would not result in any physical changes to the environment, future development of the SOIA area upon annexation could introduce new odor sources into the area (e.g., temporary diesel exhaust emissions during construction and delivery trucks associated with commercial land uses). Thus, receptors located near the commercial land uses may be exposed to odorous emissions depending upon the specific land uses developed. As a result, potential exposure of sensitive receptors to odors would be considered a **significant** impact.

The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the affected receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generate citizen complaints to local governments and regulatory agencies. Projects with the potential to frequently expose a substantial number of people to objectionable odors would be deemed to have a significant impact.

Construction

Minor odors from the use of heavy-duty diesel equipment, and the laying of asphalt during construction activities would be intermittent and temporary, and would dissipate rapidly from the source with an increase in distance. While construction would most likely occur intermittently over an extended buildout period, these types of odor-generating activities would not occur at any single location, or within proximity to off-site receptors, for an extended period of time. Existing off-site receptors include residences located approximately 60 feet to the north and to the east, and 200 feet to the west of the SOIA area. Additionally, ten existing residential receptors are located on-site, and depending on the phasing of development, these receptors could experience odors associated with construction activities. Given the temporary and

intermittent nature of construction activities within specific locations in the project area, construction is not anticipated to result in an odor-related impact during the construction phase.

Long-Term Operation

Operation of development within the SOIA would include new commercial land uses which would likely result in diesel-fueled delivery trucks visiting loading docks at these areas; however, these types of sources are not different from those that currently deliver materials to existing land uses in developed urban areas to the north, and would be relatively short and infrequent. Facilities developed would be subject to SMAQMD Rule 402 (Nuisance) regarding the control of nuisances, including odors. Receptors located in the general vicinity of such sources may be exposed to odorous emissions. These receptors could include the new residences built around the commercial development, as well as existing residences located adjacent to the SOIA area.

No major odor emission sources that would result in a potentially significant impact to the occupants of the proposed on-site land uses would be anticipated based on the proposed land use plan. However, specific commercial uses have not yet been identified, thus, uses considered to be minor sources of odors may be developed. Such sources typically include dry cleaning establishments, restaurants, and gasoline stations. No industrial land uses are planned for the SOIA area that could be a source of odors.

As a result, potential exposure of sensitive receptors to odors associated with potential commercial land uses in the SOIA area and the siting of new sensitive receptors in proximity to these potential future odor sources would be considered **significant**.

Mitigation Measure 3.3-5: Incorporation of design features for suburban center to address potential odor sources.

At the time of any application to annex territory within the Bilby Ridge SOIA area, the City of Elk Grove shall require that the applicants implement the following measures:

- Land uses that have the potential to emit objectionable odorous emissions (e.g., dry cleaning establishments, restaurants, and gasoline stations) shall be located as far away as possible from existing and proposed sensitive receptors or downwind of nearby receptors.

- If an odor-emitting facility is to occupy space in the retail area, odor control devices shall be installed to reduce the exposure of receptors to objectionable odorous emissions. SMAQMD shall be consulted to determine applicable/feasible control devices to be installed. Use of setbacks, site design considerations, and emission controls are typically sufficient to ensure that receptors located near retail uses would not be exposed to odorous emissions on a frequent basis.

Evidence of compliance with this mitigation measure shall be provided in the annexation application to LAFCo.

Significance after Mitigation

Through implementation of the mitigation measure above, and given that emissions from such sources would typically be intermittent and would disperse rapidly with increased distance from the source, implementation of the project would not be anticipated to result in a frequent exposure of a substantial number of people to odorous emissions. This impact would be reduced to a **less-than-significant** level.

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