

3.3 AIR QUALITY AND ODORS

This section includes a discussion of existing air quality conditions, a summary of applicable air quality regulations, and an analysis of potential short-term and long-term air quality impacts (including odors) that could result from adoption and implementation of the proposed CLUO, including issuance of subsequent Cannabis Use Permits pursuant to the adopted CLUO.

Comments were received on the NOP pertaining to air quality and odor impacts from cannabis uses. The Yocha Dehe Wintun Nation, a tribal nation; concerned residents; and members of the public who attended the Scoping Meeting on September 13, 2019, noted concerns regarding the potential for odor emissions from cultivation. Yolo County Farm Bureau expressed concerns over dust emissions from travel on unpaved roads as well as odor impacts. These issues are considered below. The reader is referred to Appendix A for NOP comment letters.

3.3.1 Environmental Setting

The project area is located in the Sacramento Valley Air Basin (SVAB). The SVAB 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 and odor 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, METEOROLOGY, AND TOPOGRAPHY

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–San Joaquin 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 often 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 meteorological 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.

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

The local meteorology of the project area is represented by measurements recorded at the Western Regional Climate Center Woodland 1 WNW station. The normal annual precipitation is approximately 18.5 inches. January temperatures range from a normal minimum of 37.6°F to a normal maximum of 54.1°F. July temperatures range from a normal minimum of 57.9°F to a normal maximum of 96.3°F (WRCC 2016). The prevailing wind direction is from the south southwest, as measured at the Vacaville Airport station (WRCC 2019).

CRITERIA AIR POLLUTANTS

Concentrations of 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 are provided below. Criteria air pollutants include ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), respirable particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), and lead. However, ozone, PM₁₀, and PM_{2.5} are the criteria air pollutants of primary concern in this analysis due to their nonattainment status with respect to the applicable National Ambient Air Quality Standards (NAAQS) and/or California Ambient Air Quality Standards (CAAQS). The attainment status of criteria air pollutants with respect to the NAAQS and CAAQS in Yolo County are shown in Table 3.3-1. Monitoring data representative of ambient air concentrations in Yolo County are summarized in Table 3.3-2.

Table 3.3-1 Attainment Status Designations for Yolo County

Pollutant	National Ambient Air Quality Standard	California Ambient Air Quality Standard
Ozone	Nonattainment (1-hour)	Nonattainment (1-hour)
	Nonattainment (8-hour) ¹	Nonattainment (8-hour)
	Nonattainment (8-hour) ²	
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)	Attainment (1-hour)	Attainment (1-hour)
	Attainment (Annual)	Attainment (Annual)
Sulfur dioxide (SO ₂)	Attainment (1-Hour)	Attainment (1-hour)
		Attainment (24-hour)
Lead (Particulate)	Attainment (3-month rolling avg.)	Attainment (30-day average)
Hydrogen Sulfide	No Federal Standard	Unclassified (1-hour)
Sulfates		Attainment (24-hour)
Visibly Reducing Particles		Unclassified (8-hour)
Vinyl Chloride		Unclassified (24-hour)

¹ 1997 Standard.

² 2008 Standard.

Sources: YSAQMD 2016a; CARB 2015

Table 3.3-2 Summary of Annual Data on Ambient Air Quality (2015-2017)¹

	2015	2016	2017
Ozone			
Maximum concentration (1-hr/8-hr avg, ppm)	0.086/0.072	0.095/0.076	0.089/0.074
Number of days state standard exceeded (1-hr/8-hr)	0/4	1/4	0/2
Number of days national standard exceeded (8-hr)	3	4	2
Fine Particulate Matter (PM_{2.5})			
Maximum concentration (24-hour µg/m ³)	29.4	16.4	60.1
Number of days national standard exceeded (24-hour measured ²)	0	0	12.3
Respirable Particulate Matter (PM₁₀)			
Maximum concentration (µg/m ³)	69.4	68.7	130.8
Number of days state standard exceeded	12.2	12.2	18.4
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 Woodland-Gibson Road station.			
Source: CARB 2019			

Ozone

Ground-level ozone is not emitted directly into the air but is created by chemical reactions between ROG and NO_x. This happens when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight. Ozone at ground level is a harmful air pollutant, because of its effects on people and the environment, and is the main ingredient in smog (EPA 2018).

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 2018). Emissions of the ozone precursors ROG and NO_x have decreased over the past two decades because of more stringent motor vehicle standards and cleaner burning fuels (CARB 2014).

Nitrogen Dioxide

NO₂ is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO₂ 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 NO₂. The combined emissions of NO and NO₂ are referred to as nitrogen oxide (NO_x) and are reported as equivalent NO₂. Because NO₂ is formed and depleted by reactions associated with photochemical smog (ozone), the NO₂ 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 2018).

Particulate Matter

“Particulate matter” is the term used to describe a mixture of solid particles and liquid droplets found in the air (EPA 2018). Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM₁₀. PM₁₀ 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, as well as particulate matter formed in the atmosphere by reaction of gaseous precursors (CARB 2014). PM₁₀ particles are often large or dark enough to see with the naked eye (EPA 2018). Fine particulate matter (PM_{2.5}) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM_{2.5} particles are so small that they can only be detected using an electron microscope (EPA 2018). PM₁₀ 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 PM₁₀ 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 primarily generated by the same sources as emissions of PM₁₀ (CARB 2014).

Acute health effects of PM₁₀ exposure include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, and premature death. Chronic health effects include alternations to the immune system and carcinogenesis (EPA 2018).

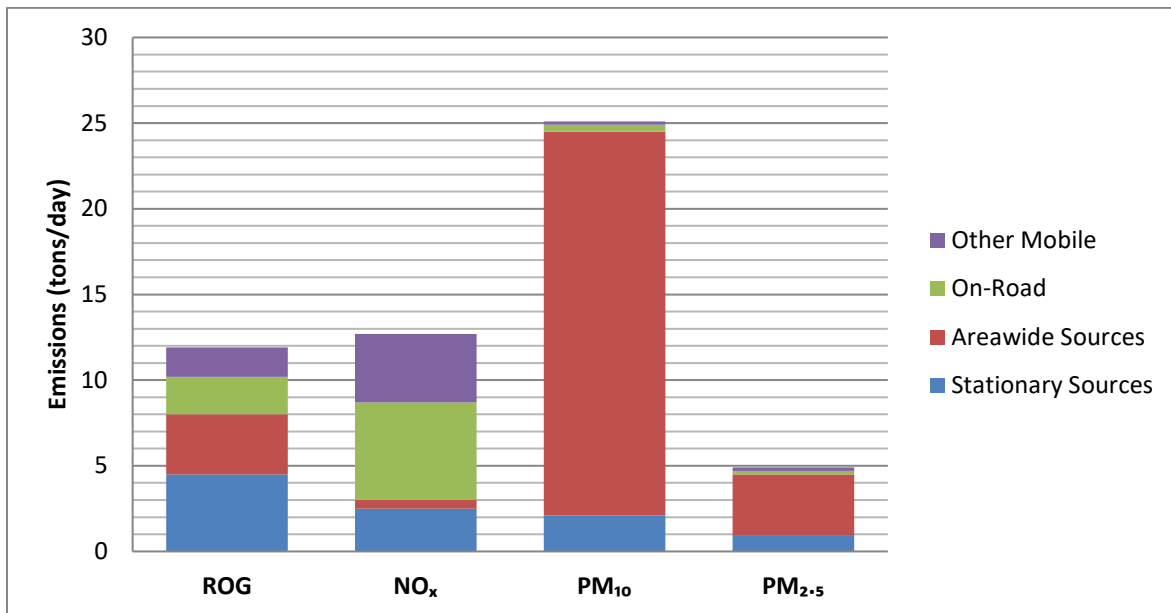
ATTAINMENT DESIGNATIONS AND MONITORING STATION DATA

Criteria air pollutant concentrations are measured at several monitoring stations in the SVAB. There are two monitoring stations in Yolo County: Woodland-Gibson Road station and the UC Davis station. The Woodland-Gibson Road station was used for consideration in this EIR of all pollutants because it is most representative of air quality in unincorporated Yolo County. Table 3.3-2 summarizes the air quality data measured at monitoring stations near the project area during the last 3 years (2015–2017).

Both the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (EPA) use monitoring data to designate areas according to their attainment status for criteria air pollutants (attainment designations are summarized below in Table 3.3-1).

EMISSIONS INVENTORY

Exhibit 3.3-1 summarizes an estimated emissions inventory of criteria air pollutants projected for Yolo County for various source categories in 2015 based on the 2016 State Implementation Plan (SIP) Emissions Projection Data from CARB. According to the emissions inventory, mobile sources are the largest contributor to the estimated daily air pollutant levels of ROG and NO_x, accounting for approximately 33 percent and 76 percent of the total daily emissions, respectively. Area-wide source (i.e., sources that occur over a large area rather than at a point source [e.g., smokestack] or a mobile source [e.g., tailpipe]) account for approximately 89 percent and 73 percent of the County’s PM₁₀ and PM_{2.5} emissions, respectively (CARB 2016a), due in part to the agricultural and semi-rural conditions in Yolo County. This is the most current emissions inventory available for Yolo County.



Source: CARB 2016a; data compiled by Ascent Environmental in 2018.

Exhibit 3.3-1 Yolo County 2015 Criteria Air Pollutant Emissions Inventory

TOXIC AIR CONTAMINANTS

According to the *California Almanac of Emissions and Air Quality*, the majority of the estimated health risks from toxic air contaminants (TACs) can be attributed to relatively few compounds, the most important being particulate matter (PM) exhaust from diesel engines (diesel PM) (CARB 2014:5-2 to 5-4). 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 PM₁₀ database, ambient PM₁₀ 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 the average cancer risk associated with diesel PM concentrations in the SVAB to be 360 excess cancer cases per million people in the year 2000 (CARB 2010:5-83). Overall, statewide emissions of diesel PM are forecasted to decline by 71 percent between 2000 and 2035 (CARB 2014:3-8) due to more stringent emissions standards and the introduction of cleaner burning diesel fuel.

NATURALLY OCCURRING ASBESTOS

Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. Naturally occurring asbestos, which was identified as a TAC by CARB in 1986, is located in many parts of California and is commonly associated with serpentine soils and rocks. According to the U.S. Geological Survey, Yolo County is not likely to contain naturally occurring asbestos (USGS 2011).

ODORS

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

Environmental odor quantification is inherently challenging for several reasons including:

1. Odor usually results from a mixture of substances (as opposed to a single chemical or compound).
2. Odor is prone to subjectivity and opinion (not everyone agrees on what smells good or bad).
3. Odor is highly influenced by meteorological conditions such as seasonality, wind, humidity, temperature, cloud cover, precipitation, and time of day.

These challenges are important to recognize and overcome when establishing an odor verification protocol that is both practical and objective.

The strength of an odor can be objectively measured with an acceptable degree of precision using an instrument called an olfactometer. The Nasal Ranger device recently purchased by Yolo County is an example of a conventional field olfactometer. The field olfactometer provides odor data that is consistent from location to location by quantifying odor strength in the ambient air. Numerically, the strength of an odor is identified by how many clean air dilutions are required to no longer detect any given odor. The more clean air dilutions required, then the stronger the odor – and strong odors are a good indicator of potential nuisance.

An olfactometer works by controlling the proportion of “clean air” (odor-free or carbon filtered air) to “odorous” air to which an odor investigator is exposed. As an example, for a given odor, a numeric value of 60 dilutions of clean air using an olfactometer would objectively be much stronger and likely much more offensive than a value of 15 dilutions of clean area. In this example, an olfactometer value of 60 represents a stronger odor than a value of 15 because the tested air simply requires much more clean air to dilute the sample of odorous air to a level that is undetectable. These values are known as dilution-to-threshold Or “D/T” values.

While an olfactometer determines the strength of a given odor, it does not identify the character of the odor (i.e. what does the odor smell like?). Other observable characteristics such as the frequency, intensity, duration, and offensiveness of the odor are equally as important as measuring the strength. These parameters are noted alongside the numeric odor strength measurements from the olfactometer.

It is good practice to apply what is known as the “FIDOL” parameters to odor measurements. FIDOL is an acronym for the following characteristics or parameters:

Frequency – how often the odor impacts occur

Intensity – the relative odor strength (faint to overwhelming)

Duration – the length of time for a given odor event

Offensiveness – the character or description of the odor

Location – mapping impact and identifying other off-property contributing sources

As part of the odor verification process, the trained odor investigator addresses the FIDOL parameters on a standardized odor documentation field sheet. For consistency in qualifying the character of a specific odor, an odor wheel (see Exhibit 3.3-2) is commonly used to define the descriptors of possible scents and provide investigators a standard set list from which to choose. The numerical values depicted in the exhibit allow for shorthand recordkeeping of odor descriptors only and are not indicative of odor strength or offensiveness.

Reliable ambient odor measurement limits require trained odor investigators with tested sensitivity within an acceptable range for detecting odors, as defined by European Standard EN13725. Competent investigators are trained to understand the various characteristics and parameters of odor and how to document them, and also how to assess and document various externalities (such as topography and meteorology) that might have relevance to the particular odor condition.

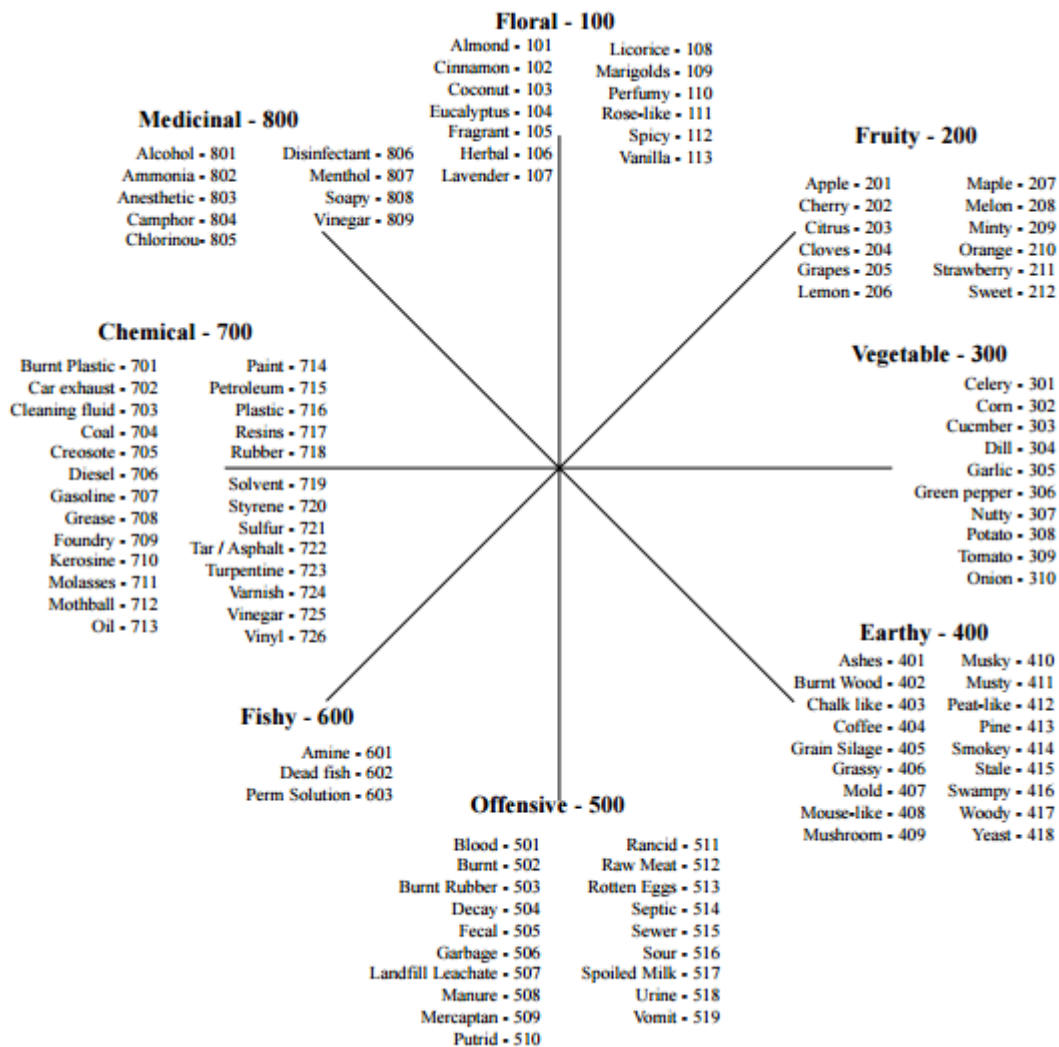


Exhibit 3.3-2

Odor Descriptor Wheel¹

Cannabis Odor Research

The typical smell of cannabis originates from roughly 140 different terpenes. A terpene is a volatile, unsaturated hydrocarbon that is found in essential oils of plants, especially conifers and citrus trees. Some terpenes are identified explicitly in research (myrcene, pinene, limonene). The “skunk” odor is primarily volatile thiols² (i.e., commonly offensive odor that vaporizes easily). Cannabis contains alpha-linolenic acid which may break down under ultraviolet rays of sunlight into methyl and butyl thiols.

Some researchers define an “odor activity value” (OAV) which is the chemical compound concentration divided by the chemical compound odor detection threshold (which is a literature-based value). A higher OAV could mean a more significant odor. One shortcoming of the OAV is the quality of the odor detection thresholds may be low. Highly odorous compounds in low concentrations which may have more potent OAV are nonanal, decanol, o-cymene, and benzaldehyde. In other research findings, it is believed the majority of the odor in the flowers is linked to pinene, limonene, and terpinolene.

¹ Odor descriptor wheel obtained from St. Croix Sensory.

² Thiol is an organosulfur compound that can generate offensive odors.

Terpenes which are either commonly identified and/or thought to warrant further evaluation for odor impacts include: myrcene, pinene, limonene, b-caryophyllene, terpinolene, nonanal, decanol, o-cymene, and benzaldehyde. Utilizing published literature-based odor detection thresholds (where available) for these chemical compounds yields a range of 1 part per billion (ppb) to 3,500 ppb. Literature-based odor detection thresholds can vary widely (by orders of magnitude) for the same chemical compound.

Dispersion modeling has been conducted by other counties to determine distance that cannabis odor may be detected. This modeling indicated that specific cannabis compounds may be detectable at a distance of 2 miles or more depending on weather conditions (Kern County 2017:4.3-66 and 4.3-67).

Cannabis grown in enclosed, indoor environments (buildings and greenhouses) results in a concentration of odor-causing chemicals which can result in to the generation of significant odors within the internal air space. It has been reported that greenhouses can generate odor with strengths ranging from 30,000 to 50,000 odor units (COC, 2018). This implies that the untreated indoor air would need to be diluted up to 50,000 times with clean air to be reduced to levels which are no longer detectable to humans with normal odor sensitivity. While containment of cannabis in buildings is an effective means of addressing odors, unfiltered release of odors from vents or doors do generate concentrated odors into the surrounding areas that can create nuisances to off-site land uses and sensitive receptors.

Public Health/Nuisance Issues

In a review of recent scientific publications, there were no studies which evaluated the health effects associated with exposure to cannabis odors. An evidence brief prepared by Public Health Ontario (Public Health Ontario, Canada 2018) states that “most substances responsible for odors in the outdoor air are not present at levels that can cause long-term health effects. However, exposure to unpleasant odors may affect an individual’s quality of life and sense of well-being.” This statement was in context to odors in general and not specific to cannabis odors. The City of Denver prepared a Cannabis Environmental Best Management Practices document (City of Denver, Colorado 2018), which states that while “the rate of VOC [volatile organic compound] emissions from cannabis cultivation facilities is relatively unknown.... [T]hese VOCs from the cannabis industry typically do not pose a direct threat to human health.” Although research is limited, it is generally agreed that concentrated cannabis odors do not create a public health concern for receptors. Odor issues are discussed in further detail in Section 3.3.3, Environmental Impacts and Mitigation Measures, below.

Examples of Odor Regulations in Other Jurisdictions

There are no numerical odor thresholds (such as a D/T or an intensity rating) established at the local level by an air district or at the state level in California. As shown in Table 3.3-3, there are other states that have established numerical thresholds for all odor types along with an established frequency and receptor location (e.g., property line, off property, sensitive receptor). Compliance with these numerical odor thresholds is determined off property with tools such as a field olfactometer, dynamic olfactometer (in an odor laboratory) or through odor dispersion modeling. The sense of smell, like vision and hearing, is logarithmic. The Nasal Ranger measures 2 D/T, 4 D/T, 7 D/T, 15 D/T, 30 D/T, and 60 D/T odor strength ratios, essentially doubling the amount of clean air added to the odorous air each test measurement, to reflect an increment of change that would be perceptible to the human nose.

Table 3.3-3 Ambient Air Odor Threshold Examples

Jurisdiction	Ambient Air Odor Threshold	Observed Frequency of Potential Violation	Observed Location	Regulatory Citation (cites to a relevant law, rule or ordinance)
Colorado ¹	7 D/T (residential/commercial) 15 D/T (all other areas) 127 D/T (violation level)	2 measurements in 1 hour separated by 15 minutes	Outside the property line	Regulation Number 2
Connecticut	7 D/T	3 samples or observations in 1 hour separated by 15 minutes	Ambient air (off-property)	Section 22a-174-23
Illinois	8 D/T (residential) 16 D/T (other land uses) 24 D/T (industrial property line)	2 out of 3 positive determinations where 2 observations are 15 minutes apart within 1 hour with 3 person team	On or adjacent to specified land use	Title 35, Part 245
Kentucky	7 D/T	At any time	Ambient air	401 KAR 53:010
Nevada	8 D/T	2 measurements in 1 hour separated by 15 minutes ²	Places of occupancy	NAC 445B.22087
North Dakota	7 D/T	May not discharge at 7 D/T or higher	Property boundary for sources in City; residential/near public receptor for sources outside of City ³	Chapter 33-15-16
Wyoming	7 D/T	2 measurements in 1 hour separated by at least 15 minutes	Odor producer property line	WDEQ Chapter 2 Section 11

¹ Colorado also has industry specific thresholds for swine, which are not summarized in the table above.

² Nevada requires investigation when 30% or more of sample of people are exposed to odor and believe it to be objectionable; sample must be at least 20 people or 75% of those exposed if sample is less than 20 people exposed.

³ North Dakota has an additional provision for agricultural operations that have been in operation for more than 1 year and the business or residence making the complaint was built/established after the agricultural operation. There are different thresholds depending on whether the complainant is in the City or outside of the City. In this situation, for a complainant in the City, measurement must be taken within 100 ft of established residence rather than the property boundary of the agricultural operation, and the measurement may not be taken within 500 ft of the property boundary of the agricultural operation. See rule for additional provision for complainants located outside of the City.

Prepared by Trinity Consultants 2019

As shown above, many states are using 7 D/T as an odor nuisance threshold. Many states require multiple observations within an hour to establish a nuisance. However, some jurisdictions establish alternative thresholds or do not allow any odor in excess of 7 D/T (Kentucky and North Dakota). There is also some variability in where the odor must be observed or measured to constitute a nuisance (property line vs. receptor location). The 7 D/T standard is based on scientific publications on odor pollution control that have identified that odors above 7 D/T will often result in complaints (i.e., objectionable), with 15 D/T often described as a nuisance, and odors above 30 D/T described as a serious nuisance (i.e., nauseating) (McGinley 2000 and Huey et al. 1960).

The use of an olfactometer and D/T provides the strength of an odor. Examples of odor types that have been documented at the 7 D/T standard includes the following:

- Wastewater treatment plant site (on the site): smelled like a musty/musky odor
- Compost facility that accepts biosolids and food waste (across the street): smelled like manure septic odor
- Compost facility (adjacent to the site): smelled like an earthy/urine odor

- Agricultural area (adjacent to the field): smelled like a grassy odor (Wanger 2019)

Recently, the City of Denver updated its odor ordinance. The update focused on specific industry types, including cannabis (grows and cannabis-infused products). Businesses must develop and submit an Odor Control Plan (OCP) if they:

- fall within a regulated industry (together, cannabis grows and cannabis-infused products are one of the regulatory industry categories);
- have received five or more complaints from individuals in separate households/businesses within a 30-day period; or
- emit odorous contaminants that exceed state regulatory standards for odor intensity (7 D/T).

An OCP must include compliance monitoring obligations. If noncompliance is identified, it could lead to a citation. It is common to see the requirement for an OCP in municipality ordinances. Use of an OCP and/or establishment of other applicable best practices in addition to numerical limits, are common methods for regulating odor.

Cannabis Odor Complaints in Yolo County

As described in Chapter 2, “Description of Preferred Alternative and Equal Weight Alternatives,” there are 78 existing and eligible cannabis cultivation sites operating in the County. The Yolo County Cannabis Task Force investigates complaints regarding cannabis operations that include the verification of odor complaints. The process consists of the following:

- Complaint is logged through a geographic information system (automatically for e-complaints; by County staff for phone complaints).
- County staff contact the reporting party to discuss complaint with them and gather additional details.
- County staff attempt to verify odor complaint in the field.
- County staff investigate to determine if the odor could be coming from a personal or illegal grow.
- If an odor complaint is verified in the field, County staff sends email communication to the party it believes may have caused odor complaint. This communication requests correction of the odor nuisance.
- County staff may issue a Notice of Violation pursuant to Yolo County Code Section 5-20.11, requiring abatement of the odor nuisance within 72 hours.

The County has received 17 odor complaints that consist of multiple contacts between October 2017 and January 2019. The majority of these complaints were received during the summer and fall months when cannabis is ready for harvest. These complaints were associated with cultivation sites along the State Route (SR) 16 corridor west of Woodland and sites along SR 128 and Interstate 505 (I-505) south of SR 16. Weather conditions associated with these complaints generally consisted of calm weather conditions (light wind and temperatures ranging from 75 to 95 °F).

SENSITIVE RECEPTORS

Sensitive receptors relative to air quality conditions are locations where human populations, especially children, seniors, and persons with poor health are found, and there is reasonable expectation of continuous human exposure according to the averaging period for ambient air quality standards. Sensitive receptors defined by the 2030 Countywide General Plan (General Plan) include residentially designated land uses, hospitals, schools, hotels and lodgings, and neighborhood parks (Yolo County 2009:CO-83). In general, these

sensitive receptors are concentrated in the incorporated cities and unincorporated communities in the County; however, scattered rural residences are also located throughout the undeveloped or rural lands. Rural residences located in agricultural designated land areas of the County are not considered sensitive receptors under the General Plan.

3.3.2 Regulatory Setting

FEDERAL

U.S. Environmental Protection Agency

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 3.3-4, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, CO, NO₂, SO₂, PM₁₀ and PM_{2.5}, and lead. The primary standards protect public health and the secondary standards protect public welfare. The CAA also required each state to prepare a SIP for attaining and maintaining the NAAQS. The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and 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.

EPA and the National Highway Traffic Safety Administration (NHTSA) regulate emissions from on-road vehicles. In 2012, EPA and NHTSA, issued final rules to further reduce emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 Federal Register [FR] 62624). These rules would increase fuel economy to the equivalent of 54.5 miles per gallon (77 FR 62630). Transportation plans, such as this, rely on steadily cleaner tailpipe emissions from motor vehicles to achieve federal clean air standards (e.g., Conformity). However, on April 2, 2018, EPA administrator announced a final determination that the current standards should be revised. On August 2, 2018, the U.S. Department of Transportation (DOT) and EPA proposed the Safer Affordable Fuel-Efficient Vehicles Rule (SAFE Rule), which would amend existing CAFE standards for passenger cars and light trucks, and retaining the current model year 2020 standards through model year 2026, establish new standards covering model years 2021 through 2026. Vehicles operating in the County would be subject to the CAFE standards. However, at the time of writing this Draft EIR, the SAFE Rule has not been formally adopted by EPA, and 17 states—including California—have filed a lawsuit against EPA. The timing for ultimate approval of the SAFE Rule and the outcome of any pending or potential lawsuits (and how such could delay or affect its implementation) are unknown at this time. The SAFE Rule's impact on future motor vehicle emissions is also unknown.

Further, though the U.S. Congress preempted states from issuing any standard relating to the control of emissions from new motor vehicles, an exception was made for California in recognition of California's policy leadership and its particular problems with smog caused by vehicles. Congress included a carve-out for California that is still enshrined in the CAA today. This special exemption allows California to issue its own vehicle emission standards if it seeks a federal preemption "waiver" from EPA. As long as California's vehicle emission standards protect public health and welfare at least as strictly as federal law and are necessary to meet compelling and extraordinary conditions, the law requires EPA to grant California's request for a preemption waiver. Each time California adopts new vehicle emission standards, the state applies to EPA for

a preemption waiver for those standards (e.g., over 100 have been approved). However, EPA is also proposing, in addition to the SAFE Rule but as a separate action, to revoke California's waiver that would allow the state to keep the 2021-2025 standards in place. The ultimate revocation of California's waiver and the outcome of any related lawsuits (and how such could delay or affects its implementation) is unknown at this time alongside on how future motor vehicle emissions could be affected. However, if less strict standards for model years 2021 through 2026 were actually implemented, emissions could increase.

Table 3.3-4 Ambient Air Quality Standards

Pollutant	Averaging Time	California (CAAQS) ^{a,b}	National (NAAQS) ^c	
			Primary ^{b,d}	Secondary ^{b,e}
Ozone	1-hour	0.09 ppm (180 µg/m ³)	– ^e	Same as primary standard
	8-hour	0.070 ppm (137 µg/m ³)	0.070 ppm (147 µg/m ³)	
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	Same as primary standard
	8-hour	9 ppm ^f (10 mg/m ³)	9 ppm (10 mg/m ³)	
Nitrogen dioxide (NO ₂)	Annual arithmetic mean	0.030 ppm (57 µg/m ³)	53 ppb (100 µg/m ³)	Same as primary standard
	1-hour	0.18 ppm (339 µg/m ³)	100 ppb (188 µg/m ³)	–
Sulfur dioxide (SO ₂)	24-hour	0.04 ppm (105 µg/m ³)	–	–
	3-hour	–	–	0.5 ppm (1300 µg/m ³)
	1-hour	0.25 ppm (655 µg/m ³)	75 ppb (196 µg/m ³)	–
Respirable particulate matter (PM ₁₀)	Annual arithmetic mean	20 µg/m ³	–	Same as primary standard
	24-hour	50 µg/m ³	150 µg/m ³	
Fine particulate matter (PM _{2.5})	Annual arithmetic mean	12 µg/m ³	12.0 µg/m ³	15.0 µg/m ³
	24-hour	–	35 µg/m ³	Same as primary standard
Lead ^f	Calendar quarter	–	1.5 µg/m ³	Same as primary standard
	30-Day average	1.5 µg/m ³	–	–
	Rolling 3-Month Average	–	0.15 µg/m ³	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m ³)	No national standards	
Sulfates	24-hour	25 µg/m ³		
Vinyl chloride ^f	24-hour	0.01 ppm (26 µg/m ³)		
Visibility-reducing particulate matter	8-hour	Extinction of 0.23 per km		

Notes: µg/m³ = micrograms per cubic meter; km = kilometers; ppb = parts per billion; ppm = parts per million (by volume).

^a California standards for ozone, carbon monoxide, SO₂ (1- and 24-hour), NO₂, 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 3 years, is equal to or less than the standard. The PM₁₀ 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 1. The PM_{2.5} 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

^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. This allows for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: CARB 2016b

Toxic Air Contaminants/Hazardous Air Pollutants

TACs (also known as hazardous air pollutants (HAPs) for federal purposes), 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 effects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and noncarcinogens 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 criteria air pollutants, for which acceptable levels of exposure can be determined and for which ambient standards have been established (Table 3.3-4). 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 regulates 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 3.3-4).

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 emission sources.

Toxic Air Contaminants

TACs in California are regulated primarily through the Tanner Air Toxics Act (AB 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Hot Spots Act) (AB 2588, Chapter 1252, Statutes of 1987). The Tanner Air Toxics Act 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, diesel PM was added to CARB's list of TACs.

After a TAC is identified, CARB 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.

AB 617 (Chapter 136, Statutes of 2017) aims to help protect air quality and public health in communities around industries subject to the state's cap-and-trade program for GHG emissions, AB 617 imposes a new state-mandated local program to address nonvehicular sources (e.g., refineries, manufacturing facilities) of criteria air pollutants and TACs. The law requires CARB to identify high-pollution areas and directs air districts to focus air quality improvement efforts through adoption of community emission reduction programs within these identified areas. Currently, air districts review individual sources and impose emissions limits on emitters based on best available control technology, pollutant type, and proximity to nearby existing land uses. This law addresses the cumulative and additive nature of air pollutant health effects by requiring community-wide air quality assessment and emission reduction planning.

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.

California Code of Regulations

The following requirements are included in the CalCannabis regulations, CCR, Title 3, Division 8, Chapter 1 and pertain to cultivation sites.

Section 8306. Generator Requirements

- (a) For the purposes of this section, "generator" is defined as a stationary or portable compression ignition engine pursuant to title 17, division 3, chapter 1, subchapter 7.5, section 93115.4 of the California Code of Regulations.
- (b) Licensees using generators rated at 50 horsepower and greater shall demonstrate compliance with either, as applicable, the Airborne Toxic Control Measure for stationary engines pursuant to title 17, division 3, chapter 1, subchapter 7.5, sections 93115 through 93115.15 of the California Code of Regulations, or the Airborne Toxic Control Measure for portable engines pursuant to title 17, division 3, chapter 1, subchapter 7.5, sections 93116 through 93116.5 of the California Code of Regulations. Compliance shall be demonstrated by providing a copy of one of the following to the department upon request:
 - (1) For portable engines, a Portable Equipment Registration Certificate provided by the California Air Resources Board; or
 - (2) For portable or stationary engines, a Permit to Operate, or other proof of engine registration, obtained from the Local Air District with jurisdiction over the licensed premises.
- (c) Licensees using generators rated below 50 horsepower shall comply with the following by 2023:
 - (1) Either (A) or (B):

(A) Meet the “emergency definition for portable engines in title 17, division 3, chapter 1, subchapter 7.5, sections 93116.2(a)(12) of the California Code of Regulations, or the “emergency use” definition for stationary engines in title 17, division 3, chapter 1, subchapter 7.5, section 93115.4(a)(30); or

(B) Operate 80 hours or less in a calendar year; and

(2) Either (A) or (B):

(A) Meet Tier 3 with Level 3 diesel particulate filter requirements pursuant to title 13, division 3, chapter 14, sections 2700 through 2711 of the California Code of Regulations;

(B) Meet Tier 4, or current engines requirements if more stringent, pursuant to title 40, chapter 1, subchapter U, part 1039, subpart B, section 1039.101 of the Code of Federal Regulations.

(d) All generators shall be equipped with non-resettable hour-meters. If a generator does not come equipped with a non-resettable hour-meter an after-market non-resettable hour-meter shall be installed.

LOCAL

Yolo-Solano Air Quality Management District

The Yolo-Solano Air Quality Management District (YSAQMD) attains and maintains air quality conditions in Yolo and Solano Counties through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of YSAQMD includes the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. YSAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA, CAAA, and CCAA.

All projects are subject to adopted YSAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the project may include but are not limited to the following (YSAQMD 2016a):

- **Rule R2-3: Ringelmann Chart.** This rule prohibits stationary diesel-powered equipment from generating visible emissions that would exceed the rule’s visibility threshold. This would apply to diesel-powered off-road equipment or generators used at commercial cannabis sites.
- **Rule R2-5: Nuisance.** This rule prohibits any source from generating air contaminants or other materials that would cause injury, detriment, nuisance, or annoyance to the public; endanger the comfort, repose, health, or safety of the public; or damage businesses or property. This would apply to commercial noncultivation cannabis sites such as manufacturing uses.
- **Rule R2-6: Additional Exemption.** The provisions of Rule 2.5. do not apply to odors emanating from agricultural operations in the growing of crops or raising of fowl, animals, or bees.
- **Rule R2-11: Particulate Matter Concentration.** This rule prohibits any source that would emit dust, fumes, or total suspended particulate matter from generated emissions that would exceed the rule’s established emission concentration limit. This would apply to diesel-powered off-road equipment or generators used at commercial cannabis cultivation sites.
- **Rule R2-14: Architectural Coatings.** This rule establishes volatile organic compound (VOC) content limits for all architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured within YSAQMD’s jurisdiction. This would apply to all buildings at commercial cannabis sites.

- **Rule R2-16: Fuel Burning Heat or Power Generators.** This rule prohibits operation of non-mobile fuel burning equipment, such as boilers, generators, and furnaces, that exceed 200 pounds (lb) per hour of sulfur compounds, 140 lb per hour of nitrous oxides (NO_x), or 40 lb per hour of PM emissions from exhaust. This rule exempts emergency generators. This would apply to generators used at commercial cultivation cannabis sites.
- **Rule R3-1: General Permit Requirements.** This rule establishes permitting processes (i.e., Authority to Construct and Permit to Operate) to review new and modified sources of air pollution. This would apply to off-road equipment used at commercial cannabis sites.
- **Rule R9-9: Asbestos.** This rule limits the emission of asbestos to the atmosphere and requires appropriate work practice standards and waste disposal procedure, applicable to all non-exempt renovations or demolitions. This would apply to relocated commercial cannabis sites or sites renovating existing buildings.

YSAQMD's CEQA Handbook also provides a list of feasible mitigation measures to reduce fugitive dust PM₁₀ emissions from construction activities that is required by all projects (YSAQMD 2007:27). This list includes the following:

- Water all active construction sites at least twice daily. Frequency should be based on the type of operation, soil, and wind exposure.
- Haul trucks shall maintain at least 2 feet of freeboard.
- Cover all trucks hauling dirt, sand, or loose materials.
- Apply nontoxic binders (e.g., latex acrylic copolymer) to exposed areas after cut and fill operations and hydroseed area.
- Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least 4 consecutive days).
- Plant tree windbreaks on the windward perimeter of construction projects if adjacent to open land.
- Plant vegetative ground cover in disturbed areas as soon as possible.
- Cover inactive storage piles.
- Sweep streets if visible soil material is carried out from the construction site.
- Treat accesses to a distance of 100 feet from the paved road with a 6- to 12-inch layer of woodchips or mulch, or
- Treat accesses to a distance of 100 feet from the paved road with a 6-inch layer of gravel.

Criteria Air Pollutants

The CCAA requires districts to submit air quality plans for areas that do not meet state standards for ozone, CO, SO₂, NO₂, PM₁₀, and PM_{2.5}. YSAQMD has attained all standards with the exception of ozone and PM (YSAQMD 2016b). The CCAA does not currently require attainment plans for PM. For the attainment and maintenance of ozone, in July 2016, YSAQMD adopted its 2015 Triennial Plan Update which examined air quality conditions for 2012–2014 and documents efforts made by YSAQMD to improve air quality (YSAQMD 2016c).

In addition, as a part of the Sacramento federal ozone nonattainment area, YSAQMD works with the Sacramento Metropolitan Air Quality Management District to develop a regional air quality management plan under CAA requirements. The 2017 Sacramento Regional 2008 8-Hour Ozone Attainment and Further Reasonable Progress Plan was approved by CARB on November 16, 2017. The previous 2013 Update to the 8-Hour Ozone Attainment and Reasonable Further Progress Plan was approved and promulgated by EPA for the 1997 8-Hour Ozone Standard. EPA has not released notice of approval and promulgation of the 2017 SIP (CARB 2017).

Toxic Air Contaminants

At the local level, air pollution control or management districts may adopt and enforce CARB's control measures. Under YSAQMD Rule R3-1 ("General Permit Requirements"), Rule R3-4 ("New Source Review"), and Rule R3-8 ("Federal Operating Permits"), all sources that may possess the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new source review standards (see Rule R3-4 above) and air-toxics control measures. YSAQMD limits emissions and public exposure to TACs through many programs. YSAQMD prioritizes the permitting of TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors and land uses.

Sources that require a permit are analyzed by YSAQMD (e.g., health risk assessment) based on their potential to emit toxics. If it is determined that the project will emit toxics in excess of YSAQMD's threshold of significance for TACs (see Section 3.3.3, below), sources will have to implement BACT for TACs to reduce emissions. If a source cannot reduce the risk below the threshold of significance even after BACT has been implemented, YSAQMD will deny the permit required by the source. This helps to apply new technology when retrofitting with respect to TACs. Although YSAQMD regulates sources that generate TACs, it does not regulate land uses that may be sited in locations exposed to TACs. The decision on whether to approve projects in TAC-exposed locations is typically the responsibility of the lead agency charged with determining whether to approve a project.

Yolo County

Yolo County 2030 Countywide General Plan

The General Plan includes the following air quality policies that are applicable to the project:

- **Policy CC-4.9:** Encourage construction and other heavy equipment vehicles (e.g., mining, agriculture, etc.) to use retrofit control devices.
- **Policy CC-4.11:** Site specific information shall be required for each application, subject to site conditions and available technical information, as determined by the County lead department, in order to enable informed decision-making and ensure consistency with the General Plan and with the assumptions of the General Plan EIR. Technical information and surveys requested may include, but not be limited to, the following: air quality and/or greenhouse gas emissions calculations, agricultural resource assessment/agricultural and evaluation and site assessment (LESA), biological resources assessment, cultural resources assessment, fiscal impact analysis, flood risk analysis, hydrology and water quality analysis, geotechnical/soils study, land use compatibility analysis, noise analysis, Phase One environmental site assessment, sewer capacity and service analysis, storm drainage capacity and service analysis, title report, traffic and circulation study, visual simulation and lighting study, and water supply assessment.

When a technical study is required, it must cover the entire acreage upon which development is being proposed including any off-site improvements (e.g. wells; pumps; force mains; new roads; dirt borrow sites; etc.) that may be necessary. Technical studies must meet CEQA standards and the standards in the applicable industry. As necessary, the technical studies shall include recommendations that are to be implemented as part of the project.

- **Policy CO-6.1:** Improve air quality through land use planning decisions.
- **Action CO-A105:** For discretionary permits, require agricultural Best Management Practices regarding odor control, stormwater drainage, and fugitive dust control where appropriate.
- **Policy CO-6.6:** Encourage implementation of YSAQMD Best Management Practices, such as those that reduce emissions and control dust during construction activities.

3.3.3 Environmental Impacts and Mitigation Measures

METHODS AND ASSUMPTIONS

The impact analysis below evaluates to what extent adoption and implementation of the CLUO, including issuance of subsequent Cannabis Use Permits pursuant to the CLUO, may result in significant impacts to air quality. This program-level analysis is based upon current air quality data provided by CARB as described in Section 3.3-1, “Environmental Setting,” and emissions modeling tools available from the California Air Pollution Control Officers Association. The design of site-specific cannabis projects is not known at this time, but this analysis uses the extent and general locations of future cannabis uses assumed under each of the five alternatives based on Table 2-4, Table 2-5, and Exhibits 2-4 through 2-8, which are provided in Chapter 2, “Description of Preferred Alternative and Equal Weight Alternatives,” Section 3.0, “Approach to the Environmental Analysis,” and Appendix D to provide an assessment and comparison of reasonably foreseeable outcomes from different regulatory scenarios.

Construction Emissions

Permitted commercial cannabis cultivation and noncultivation operations could result in an increase in emissions from short-term construction-related activities. Construction activities that may result in air quality-related impacts are assumed for each alternative to take place within the activity footprint of cannabis cultivation sites and noncultivation sites as described in Chapter 2, “Description of Preferred Alternative and Equal Weight Alternatives” (see Table 2-4) and Appendix D. Details about the extent of site relocation under each alternative due to compliance with zoning and buffer standards under the CLUO is included in Appendix D. The California Emissions Estimator Model (CalEEMod) Version 2016.3.2 was used to estimate emissions of criteria air pollutants and precursors associated with the construction and operation of the types and sizes of indoor, outdoor, mixed-light, and noncultivation operations that could be allowed under the CLUO. This modeling is based on the assumed size of each license type, as well as climatic conditions in the County. It was assumed that all permitted license types would be under construction for 6 months. Construction activities would likely require forklifts, graders, rubber-tired dozers, backhoes, welders, paving equipment, and off-road haul trucks. For details about construction assumptions used in the modeling, refer to Appendix E.

Construction of commercial cannabis uses under each alternative were analyzed individually by license type using YSAQMD’s construction-related thresholds for development projects. Construction of all commercial cannabis uses that could be permitted under each alternative were analyzed collectively and evaluated for consistency with applicable air quality plans, as recommended by YSAQMD for plan-level documents.

Operational Emissions

Operation of cannabis uses were assumed to be contained within the identified activity footprint for cultivation and noncultivation sites, which can be found in Appendix D. CalEEMod was also used to estimate on-site operational emissions for cultivation and noncultivation sites, including emissions generated by maintenance activity, fertilizer application, and paint for paved parking lots. The application of paint for parking lots would result in off-gassing of ROG emissions from the painting of stripes, handicap symbols, directional arrows, and car space descriptions. Paved parking lots that would include painting were assumed for only noncultivation sites. CalEEMod default energy consumption rates were adjusted to account for energy efficiency improvements from the 2019 California Energy Code, which will result in a 30

percent reduction in energy consumption compared with the 2016 California Energy Code that is included in CalEEMod. Off-road equipment includes the use of a forklift for noncultivation sites, and the use of a utility vehicle for cultivation sites. Back-up diesel generators were also assumed to be used at mixed-light and indoor cultivation sites. These auxiliary uses were all modeled using CalEEMod. Refer to Appendix E for modeling assumptions and calculations. Operational emissions were estimated for each license type that would be permitted under the CLUO and it was assumed that these sites could be fully operational by 2022.

Operation of commercial cannabis uses under each alternative were analyzed individually by license type using YSAQMD's operational thresholds for development projects. Operation of all commercial cannabis uses that could be permitted under each alternative were analyzed collectively and evaluated for consistency with applicable air quality plans, as recommended by YSAQMD for plan-level documents.

As discussed in Section 3.14, "Transportation and Circulation," the project is not anticipated to generate notable changes in vehicle miles traveled as compared to existing conditions. Thus, mobile source emissions are not included in this analysis.

As described in Section 3.3.1, "Environmental Setting," 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). Odor is inherently complex because it is often caused by a mixture of chemical substances and has subjective components associated with human perception by the olfactory senses. Thus, the impact analysis qualitatively evaluates the potential of cannabis uses to create odors that create a public nuisance or adversely affect nearby residents or businesses using existing odor complaint data and research on odor control. The analysis also evaluates the effectiveness of Sections 8-21.1408(CC) and 8-2.1408(DD) of the CLUO to address odor issues.

Specific requirements of existing laws and regulations described in the regulatory setting as well as the proposed CLUO (see Appendix C) were assessed for their ability to avoid or reduce emissions of criteria air pollutants and precursors and odors.

Chapter 4, "Cumulative Impact and Overconcentration," contains a separate detailed analysis of the potential for cumulative effects not otherwise identified in this section, and effects from concentrations or clusters of multiple cannabis uses located in distinct subregions of the County.

THRESHOLDS OF SIGNIFICANCE

YSAQMD has developed guidance for use by lead agencies when preparing CEQA documents (YSAQMD 2007). YSAQMD has adopted CEQA thresholds of significance for evaluating impacts to air quality. YSAQMD has both project-level and plan-level thresholds of significance. Project-level thresholds are intended to be used for individual developments while plan-level thresholds are intended to be used for general plan amendments, redevelopment plans, specific area plans, annexations, and similar planning activities (YSAQMD 2007:7). This project consists of individual commercial cannabis uses that could be permitted under an adopted ordinance. Because of this, individual licenses and the total licenses allowed under the ordinance are evaluated using YSAQMD's thresholds for project and plan level analyses, respectively.

CEQA-related air quality thresholds of significance are tied to achieving or maintaining attainment designations with the NAAQS and CAAQS, which are scientifically substantiated, numerical concentrations of criteria air pollutants considered to be protective of human health.

In consideration of new and more stringent NAAQS and CAAQS adopted since 2000, YSAQMD identified numerical thresholds for project-generated emissions of criteria air pollutants and precursors that would determine whether a project's discrete emissions would result in a cumulative, regional contribution (i.e., significant) to the baseline nonattainment status of the YSAQMD. YSAQMD's quantitative thresholds of significance for project-level CEQA evaluation that may be used to determine the extent to which a project's

emissions of criteria air pollutants and precursors would contribute to regional degradation of ambient air quality within the SVAB.

Using federal and state guidance pertaining to TACs/HAPs, YSAQMD developed cancer risk and noncancer health hazard thresholds for TAC exposure. Unlike criteria air pollutants, there is no known safe concentration levels of TACs. Moreover, TAC emissions contribute to the deterioration of localized air quality due to the dispersion characteristics of TACs, emissions do not cause regional-scale air quality impacts. The YSAQMD thresholds are designed to ensure that a source of TACs does not contribute to a localized, significant impact to existing or new receptors.

As such, for the purpose of this analysis, the following thresholds of significance are used to determine if project-generated emissions would produce a significant localized and/or regional air quality impact such that human health would be adversely affected. Additionally, the cumulative effect of all cannabis uses under each alternative that were assumed for analysis purposes are evaluated using the plan-level thresholds recommended by YSAQMD.

Per Appendix G of the CEQA Guidelines and YSAQMD recommendations, a project would have a significant impact on air quality if it would (YSAQMD 2007):

- conflict with or obstruct implementation of the applicable air quality plan from the cumulative development of all cannabis uses;
- cause construction-generated criteria air pollutant or precursor emissions to exceed the YSAQMD-recommended thresholds of 10 tons per year for ROG and NO_x, and 80 pounds per day for PM₁₀ for an individual license;
- result in a net increase in long-term operational criteria air pollutant or precursor emissions that exceed the YSAQMD-recommended thresholds of 10 tons per year for ROG and NO_x, 80 lb per day for PM₁₀, and violation of a state ambient air quality standard for CO for an individual license; or
- result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

These thresholds also address the Mandatory Findings of Significance under State CEQA Guidelines Section 15065(a)(4) on whether the environmental effects of the project will cause adverse effect on human beings, either directly or indirectly. As described in Section 3.0, "Approach to the Environmental Analysis," implementation of the CLUO would not result in the significant impacts related to the creation of local carbon monoxide concentrations from mobile sources or expose sensitive receptors to toxic air contaminant emissions. Therefore, these impact issue areas are not further evaluated.

IMPACT ANALYSIS

Impact AQ-1: Conflict with or Obstruct Implementation of Policies and Regulations Related to the Air Quality

The CLUO incorporates dust control, odor, and generator emission standards that are consistent with YSAQMD and state regulations, General Plan policies, and YSAQMD's 2016 Triennial Assessment and Plan Update. This impact would be **less than significant** for all alternatives.

The following CLUO sections are consistent with nuisance provisions of YSAQMD Rule 2.5. These CLUO provisions are also consistent with General Plan Policies CC-4.9, CO-6.1, and CO-6.6 that identify measures for reducing air pollutant emissions.

- Section 8-2.1408(L) Dust Control: Permittees shall comply with the requirements of the Yolo-Solano Air Quality Management District related to control of dust. Cultivation sites shall ensure dust control in a manner consistent with standard agricultural practices.
- Section 8-2.1408(T) Generators: Use of generators (of any fuel type) is allowed for CDFA licensees. Use of generators for other use types is prohibited, except for temporary use in the event of a power outage or emergency. CDFA licensees must demonstrate compliance with the requirements of the Yolo-Solano Air Quality Management District, and Section 8306, Generator Requirements, of the CDFA Regulations.
- Section 8-2.1408(CC) Nuisance: Cannabis uses shall not create a public nuisance or adversely affect the health or safety of nearby residents or businesses by, among other things, creating dust, light, glare, heat, noise, noxious gases, odor, smoke, traffic, vibration, unsafe conditions, or other impacts, in excess of allowable thresholds, or be hazardous due to the use or storage of materials, processes, products, runoff, unauthorized releases or illegal disposal of wastes.
 1. Subject to subsection 7 below, it is unlawful and it shall be a public nuisance to cause or permit persistent cannabis odors. A persistent cannabis odor is one which is verified by persons of normal odor sensitivity (as defined by European Standard EN 13725) to exist for three consecutive days within any two-week period at a maximum dilution-to-threshold (D/T ratio of seven parts clean or filtered air to one-part filtered odorous air, 7:1), measured at the property line of the site, as a result of investigations resulting from subsection 2, below.
 2. Subject to subsection 7 below, for the purposes of this subsection, cannabis odors shall be deemed to be persistent if the County enforcement officer (i) independently determines that the cannabis odor violates the standards of subsection 1 above, and/or (ii) the County enforcement officer receives three or more complaints of cannabis odor representing separate residences or places of occupied business, of a cannabis odor emanating from the subject property for three consecutive days within any two-week period, that the enforcement officer determines violates the standards of subsection 1 above.
 3. Subject to subsection 7 below, nothing in this subsection shall be deemed to require three verified complaints before the County may initiate enforcement action. The County may determine that a public nuisance exists under this subsection if less than three verified complaints are received or if no complaints are received but County officials or employees observe cannabis odor conditions that violate this subsection.
 4. Failure to effectively resolve a public nuisance shall result in enforcement action, up to and including additional conditions, suspension and revocation of the County Cannabis Use Permit and/or County Cannabis License pursuant to the process below.
 5. The County applies a three-level citation system to cannabis nuisance violations. Depending on the severity, frequency, or the failure to resolve the cause of the violation, the County enforcement officer may issue an alert, a warning citation, or a Notice of Violation. The alert shall identify the problem, identify relevant code sections, discuss the abatement process, and identify corrective action. The warning citation shall identify the problem, document the history, and mandate specific abatement actions including submittal of a plan and schedule to remedy the problem. A Notice of Violation shall follow the procedures set forth in Section 5-20.10 (*this citation will be revised one the licensing ordinance is moved to Chapter 4 of Title 20*).
 6. Subject to subsection 7 below, if at any time during the citation system identified above in subsection 5, the County enforcement officer determines that the conditions at the site are deleterious to the health, safety, or general welfare of any one or more surrounding properties, or that the permittee and/or landowner is not acting in good faith or in a manner sufficient to timely

address the complaint, the County enforcement officer may bypass the citation process and take immediate steps to address the violation, including by abatement or any other lawful means.

7. Permittees operating in compliance with this article, in particular Section 8-2.1408(DD)(1), Odor Control, the terms of their Cannabis Use Permit, and other applicable laws shall be presumptively assumed to not cause or contribute to a public nuisance.
 8. The County may elect not to investigate any complaint due to resource limitations or other matters. In addition, the County may elect not to investigate complaints submitted by complainants that submit more than three unsubstantiated complaints within a one-year period.
- Section 8-2.1408(DD) Odor Control:
 1. The allowable threshold for cannabis odor shall be defined as a maximum dilution-to-threshold (D/T) ratio of seven parts clean or filtered air to one-part odorous air (7:1) measured at the property line of the site. Cannabis odor at or below this threshold shall be considered acceptable and shall not be considered a nuisance. Indoor and mixed light uses must install and maintain the following minimum equipment: an exhaust air filtration system with odor control that effectively minimizes internal odors from being emitted externally; an air system that creates negative air pressure between the facilities interior and exterior so that odors outside of the facility will not exceed the maximum dilution-to-threshold (allowable threshold), as defined herein; or other odor control system which effectively minimizes odor to a level compliant with the allowable threshold.
 2. Applicants shall submit the following information: a. Identification and description of cannabis odor emitting activities and nature and characteristics of emissions. b. Description of procedures and engineering controls for reducing/controlling odors. c. Certification by a Professional Engineer or Qualified Odor Professional that the procedures and engineering controls proposed to control cannabis odors are consistent with accepted/available industry-specific best control technologies and methods designed to abate odor and will be effective in abating cannabis odors to the maximum dilution-to-threshold (allowable threshold), as defined herein, measured at the property line of the site. This shall be submitted in the form of an Odor Control Plan, subject to regular monitoring and reporting.
 3. Odor control for outdoor activities may include different plant strains, smaller grow areas, relocation of outdoor activities indoors or in a mixed light facility, use of site design or other technology, odor easements over neighboring property, and/or other methods proven to be effective and accepted by the County.

YSAQMD's 2016 Triennial Assessment and Plan Update includes three measures to reduce ozone emissions through the regulation of architectural coatings, printing processes for graphic arts, and process boilers. Architectural coatings are the only source of ozone precursors associated with construction. All architectural coatings applied to cannabis sites would be required to comply with YSAQMD regulations for VOC content. There is no anticipated graphic art printing associated with cannabis sites, nor are process boilers anticipated to be used at cultivation nor noncultivation sites. Thus, the project would not conflict with the 2016 Triennial Assessment and Plan Update that aims to reduce ozone precursor emissions. Because the CLUO would not conflict with or obstruct implementation of policies and regulations related to air quality and odor, this impact, would be **less than significant** for all alternatives.

Mitigation Measures

No mitigation is required for any of the alternatives.

Impact AQ-2: Generate Construction-Related Emissions of Criteria Pollutants and Precursors That Exceed YSAQMD-Recommended Thresholds

Construction-generated emissions associated with adoption and implementation of the proposed CLUO, including subsequent Cannabis Use Permits pursuant to the adopted CLUO, would not exceed YSAQMD-recommended annual emissions of ROG and NO_x and maximum daily emissions of PM₁₀ for individual permitted cannabis uses. Construction of each new site permitted under the CLUO would not contribute to an existing air quality violation and would not expose sensitive receptors to substantial pollutant concentrations. Construction of all sites permitted under the CLUO would be consistent with applicable air quality plans. This impact would be **less than significant** for all alternatives.

Section 8-2.1408(V) of the CLUO requires a County Grading Permit prior to construction activities for cannabis sites that require soil erosion control, and Section 8.2-1408(L) of the CLUO requires compliance with YSAQMD’s dust mitigation measures. Additionally, these measures would reduce construction emissions from individual cannabis sites permitted under the CLUO. YSAQMD’s 2016 Triennial Assessment and Plan Update includes three measures to reduce ozone emissions through the regulation of architectural coatings, printing processes for graphic arts, and process boilers. Architectural coatings are the only source of ozone precursors associated with construction. All architectural coatings applied to cannabis sites would be required to comply with YSAQMD regulations for VOC content. Thus, the project would not conflict with the 2016 Triennial Assessment and Plan Update that aims to reduce ozone precursor emissions.

Construction of individual commercial cultivation and noncultivation sites would require minimal earthwork, such as grading and clearing, and use of heavy-duty off-road equipment that would generate exhaust emissions and fugitive dust. Generally, the intensity of construction activity for cultivation sites would require clearing and grading of the site. It is assumed that approximately half of new cultivation sites would require the construction of greenhouses and other related buildings, while the other half would use pre-existing structures on the sites (see Section 3.0, “Approach to the Environmental Analysis,” and Appendix D). Construction of individual noncultivation sites could involve the clearing of vegetation, grading, or other earth disturbance activities to establish an activity footprint; building construction; and paving of the parking lot. Building sizes could vary based on license type and are assumed to range from 1,000 square feet (sq. ft.) to 140,000 sq. ft. for both cultivation and noncultivation sites.

The construction of new individual cultivation and noncultivation sites would last approximately 6 months at each site. Emissions of fugitive PM₁₀ and PM_{2.5} dust would primarily be generated by ground-disturbance during site preparation and grading and would vary as a function of such parameters as travel on unpaved roads, soil silt content, soil moisture, wind speed, and the size of the disturbance area. PM₁₀ and PM_{2.5} would also be emitted in vehicle and equipment exhaust.

Construction of new cannabis uses would generate exhaust emissions and fugitive dust. Construction emission impacts of each alternative is evaluated below. Emissions of criteria air pollutants and ozone precursors are shown by individual cannabis use type in Table 3.3-5. Note that the columns in Table 3.3-5 are not additive; rather, each row in the table represents construction associated with a specific cannabis use site on a particular site. Refer to Appendix E for detailed modeling input parameters and results.

Table 3.3-5 Construction-Generated Emissions of Criteria Air Pollutants and Precursors for Each Cannabis Use Type

Cannabis Use	ROG (tons/year)	NO _x (tons/year)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)
Cultivation				
Outdoor	0.4	0.7	7	4
Mixed-Light	0.9	0.9	9	4
Indoor	0.4	0.7	7	5

Noncultivation

Table 3.3-5 Construction-Generated Emissions of Criteria Air Pollutants and Precursors for Each Cannabis Use Type

Cannabis Use	ROG (tons/year)	NO _x (tons/year)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)
Nursery	1.1	1.1	21	12
Processing	0.1	0.4	1	1
Manufacturing	0.1	0.3	1	1
Testing	0.1	0.5	1	1
Distribution	<0.1	0.3	1	1
Retail	0.1	0.3	1	1
Microbusiness	<0.1	0.3	1	1
YSAQMD Thresholds of Significance	10	10	80	N/A
Exceeds Threshold?	No	No	No	N/A

Notes: ROG = reactive organic gases; NO_x = oxides of nitrogen; PM₁₀ = respirable particulate matter; PM_{2.5} = fine particulate matter; lb/day = pounds per day; YSAQMD = Yolo-Solano Air Quality Management District; N/A = not applicable.

Source: Modeling conducted by Ascent Environmental in 2019

As shown in Table 3.3-5, construction of relocated individual cultivation sites and new cannabis sites (cultivation and noncultivation uses) would not generate annual levels of ROG and NO_x and daily levels of PM₁₀ that exceed applicable YSAQMD emission thresholds for a development project. Construction activities resulting from the project would not contribute substantially to Yolo County's nonattainment status for ozone and PM₁₀ and would not result in an increase in the potential for adverse health impacts to occur from exposure to ozone and PM₁₀.

The addition of NO_x, which is a precursor to ozone, could result in an increase in ambient concentrations of ozone in Yolo County and, moreover, increase the likelihood that ambient concentrations exceed the CAAQS and NAAQS. As summarized in "Environmental Setting," above, human exposure to ozone may cause acute and chronic health impacts including coughing, pulmonary distress, lung inflammation, shortness of breath, and permanent lung impairment. YSAQMD's project-level thresholds were developed to meet the CAAQS and NAAQS, which are scientifically substantiated, numerical concentrations of criteria air pollutants considered to be protective of human health.

Alternatives 1, 2, 3, and 5 assume that personal use outdoor cultivation may occur in any zoning district on a parcel with a legal residence. Personal use outdoor cultivation of up to six plants is assumed to occur within pots or garden areas of such parcels. Alternative 4 would limit personal use cultivation to indoor only. These activities would likely involve no more than 100 square feet of land area and would be required to be outside of front yard and side yard setback areas. Given the minor extent of this potential ground disturbance contained within existing developed parcels, minimal criteria air pollutant and precursor emissions would be generated that would not exceed YSAQMD thresholds.

Alternative 1: Cultivation (Ancillary Nurseries and Processing Only) with Existing Limits (Existing Operations with CLUO) (CEQA Preferred Alternative)

While most of the existing licensed commercial cannabis cultivation operations would remain in their current locations, nine of the existing sites are assumed to be required to relocate under the CLUO zoning standards. No other construction activities are assumed to occur under this alternative. The relocated sites are assumed to either construct new buildings and infrastructure or occupy existing agricultural buildings and facilities (see Section 3.0, "Environmental Analysis Approach," and Appendix D). Construction emissions associated with relocated sites were quantified and are shown in Table 3.3-5 by cultivation type for an individual site and would not exceed applicable YSAQMD emission thresholds. Individual site construction would be required to comply with Sections 8-2.1408(L) and (V) of the CLUO, as well as YSAQMD Best Management Practices, which would further reduce construction emissions. Construction assumed under Alternative 1 could generate total of 12.6 tons per year of ROG, 15.0 tons per year of NO_x, 141 lbs per day of

PM₁₀, and 74 lbs per day of PM_{2.5} if all constructed at the same time period. These amounts would not conflict with the General Plan or 2016 Triennial Assessment and Plan Update. Consistency with these applicable plans would meet YSAQMD's threshold for plan-level documents.

This impact would be **less than significant** under Alternative 1.

Alternative 2: All License Types with Moderate Limits

Under Alternative 2, it was assumed for analysis purposes that there would be two new cultivation sites constructed as well as a total of 52 new noncultivation uses of which up to 47 would be vertically integrated and constructed on single parcels (see Table 2-4 and Appendix D). Additionally, it was assumed for analysis purposes that 30 of the 78 existing cultivation sites would be relocated due to zoning and buffering standards under the CLUO. As described in Section 3.0, "Approach to the Environmental Analysis," and Appendix D, relocated sites would either construct new buildings and infrastructure or occupy existing agricultural buildings and facilities.

As shown in Table 3.3-5, construction of new individual sites and relocated cultivation sites assumed for analysis purposes would not generate annual levels of ROG and NO_x and daily levels of PM₁₀ that exceed applicable YSAQMD emission thresholds. Individual site construction would be required to comply with Sections 8-2.1408(L) and (V) of the CLUO, as well as YSAQMD Best Management Practices, which would further reduce construction emissions. Construction of all cannabis uses that are assumed to be constructed in a single year under Alternative 2 could generate total of 30.9 tons per year of ROG, 54.6 tons per year of NO_x, 462 lbs per day of PM₁₀, and 263 lbs per day of PM_{2.5}. These would not conflict with the General Plan or 2016 Triennial Assessment and Plan Update. Consistency with these applicable plans would meet YSAQMD's threshold for plan-level documents.

For these reasons, this impact would be **less than significant** under Alternative 2.

Alternative 3: All License Types with High Limits

Under Alternative 3, it was assumed for analysis purposes that construction of all new individual cannabis uses would occur over 2 years (2021 and 2022) because of the extent of new cannabis uses assumed (see Section 3.0, "Environmental Analysis Approach," and Appendix D). This alternative is assumed to result in the construction of 82 new cultivation sites and a total of 104 new noncultivation uses of which up to 94 would be vertically integrated and constructed on single parcels (see Table 2-4 and Appendix D). Additionally, it was assumed for analysis purposes that nine of the 78 existing cultivation sites would be relocated under the CLUO zoning standards. The relocated sites would either construct new buildings and infrastructure or occupy existing agricultural buildings and facilities (Appendix D). As shown in Table 3.3-5, construction of new individual sites and relocated cultivation sites assumed for analysis purposes would not generate annual levels of ROG and NO_x and daily levels of PM₁₀ that exceed applicable YSAQMD emission thresholds. Individual site construction would be required to comply with Sections 8-2.1408(L) and (V) of the CLUO, as well as YSAQMD Best Management Practices, which would further reduce construction emissions. Highest construction emissions assumed under Alternative 3 could generate total of 47.9 tons per year of ROG, 83.5 tons per year of NO_x, 714 lbs per day of PM₁₀, and 406 lbs per day of PM_{2.5}. These would not conflict with the General Plan or 2016 Triennial Assessment and Plan Update. Consistency with these applicable plans would meet YSAQMD's threshold for plan-level documents.

For these reasons, this impact would be **less than significant** under Alternative 3.

Alternative 4: Mixed-Light/Indoor License Types Only with Moderate Limits, No Hoop Houses or Outdoor Types

Under Alternative 4, it was assumed for analysis purposes that nine of the 78 existing cultivation sites would be relocated under the CLUO zoning standards. The relocated sites would either construct new buildings and infrastructure or occupy existing agricultural facilities. It was also assumed that 75 of the existing and eligible cannabis sites with outdoor cultivation would convert entirely to indoor or mixed-light (greenhouse) cultivation. This alternative is also assumed to result in the construction of 2 new mixed-light or indoor cultivation sites and a total of 52 new noncultivation uses of which up to 47 would be vertically integrated and constructed on single parcels. Refer to Section 3.0, "Approach to the Environmental Analysis," and

Appendix D for detailed descriptions of the construction assumptions for cannabis uses. As shown in Table 3.3-5, construction of new individual sites and relocated cultivation sites assumed for analysis purposes would not generate annual levels of ROG and NO_x and daily levels of PM₁₀ that exceed applicable YSAQMD emission thresholds. Individual site construction would be required to comply with Sections 8-2.1408(L) and (V) of the CLUO, as well as YSAQMD Best Management Practices, which would further reduce construction emissions. Construction of all cannabis uses that are assumed to be constructed in a single year under Alternative 4 could generate total of 73.1 tons per year of ROG, 90.9 tons per year of NO_x, 812 lbs per day of PM₁₀, and 443 lbs per day of PM_{2.5} (see Section 3.0, “Environmental Analysis Approach,” and Appendix D). These would not conflict with the General Plan or 2016 Triennial Assessment and Plan Update. Consistency with these applicable plans would meet YSAQMD’s threshold for plan-level documents.

For these reasons, this impact would be **less than significant** under Alternative 4.

Alternative 5: All License Types with Moderate Limits, within Agricultural Zones Only, No Retail

Under Alternative 5, it was assumed for analysis purposes that there would be two new cultivation sites constructed as well as a total of 50 new noncultivation uses of which up to 45 would be vertically integrated and constructed on single parcels (see Section 3.0, “Environmental Analysis Approach,” and Appendix D). Additionally, it was assumed for analysis purposes that 30 of the 78 existing cultivation sites would be relocated due to zoning and buffering standards under the CLUO. The relocated sites would either construct new buildings and infrastructure or occupy existing agricultural facilities. As shown in Table 3.3-5, construction of new individual sites and relocated cultivation sites assumed for analysis purposes would not generate annual levels of ROG and NO_x and daily levels of PM₁₀ that exceed applicable YSAQMD emission thresholds. Individual site construction would be required to comply with Sections 8-2.1408(L) and (V) of the CLUO, as well as YSAQMD Best Management Practices, which would further reduce construction emissions. Construction of all cannabis uses that are assumed to be constructed in a single year under Alternative 5 could generate total of 30.8 tons per year of ROG, 53.9 tons per year of NO_x, 459lbs per day of PM₁₀, and 261 lbs per day of PM_{2.5}. These would not conflict with the General Plan or 2016 Triennial Assessment and Plan Update. Consistency with these applicable plans would meet YSAQMD’s threshold for plan-level documents.

For these reasons, this impact would be **less than significant** under Alternative 5.

Mitigation Measures

No mitigation is required for any of the alternatives.

Impact AQ-3: Create Long-Term Operational Emissions of Criteria Pollutants and Precursors That Exceed YSAQMD-Recommended Thresholds

Operation of commercial cannabis cultivation and noncultivation sites associated with adoption and implementation of the proposed CLUO, including subsequent Cannabis Use Permits pursuant to the adopted CLUO would result in ROG, NO_x, and PM₁₀ emissions. Implementation of individual permitted cannabis uses under all alternatives would not exceed the YSAQMD thresholds of significance for development projects. Operation of all sites permitted under the CLUO would be consistent with applicable air quality plans. This impact would be **less than significant** for all alternatives.

The following CLUO requirements would address operational air quality.

- Section 8-2.1408(K) Driveway Access: Driveway approaches to County and State maintained roads shall be per current County Improvement Standards or Caltrans requirements, as applicable. An encroachment permit may be required. Controlled access entries must provide a rapid entry system (e.g. Knox Box approved by the local Fire District or fire service provider) for use by emergency personnel and provide adequate space for vehicles to access the lock without impeding the right-of-way. A County assigned street address is a requirement. The address must be posted and adhere to display requirements of the Fire Code. Permittees must demonstrate safe and adequate driveway access to the

satisfaction of the County or Caltrans, as applicable, in compliance with applicable standards. Access considerations identified in Section 8-1.802 of the County Code shall apply. *(For the convenience of the reader these include: will the proposed use have access characteristics different from other permitted land uses; does the proposed access have inadequate design; will emergency vehicle access be impaired; would the proposed access adversely affect safe operations on the adjoining roadway system; are site distance, visibility, proximity to parking, drainage, turning radius, angle of intersection, vertical alignment, and pavement condition adequate for the proposed use and consistent/equitable in relation to access requirements for other permitted uses; proximity to other driveways and intersections; other relevant circumstances identified by the County).* Driveways shall have an all-weather surface, such as compacted gravel.

- Section 8-2.1408(O) Energy Use: Permittees shall demonstrate availability of adequate energy, and compliance with applicable local and regional energy saving goals. Permittees shall demonstrate use of energy efficient best practices for each proposed use type. Onsite generation of energy from clean and/or renewable sources is encouraged. Permittees shall purchase or generate a minimum of 50 percent renewable power through the Valley Clean Energy Alliance or other available energy purveyor. CDFG licensees must satisfy the requirements of Section 8305, Renewable Energy Requirements, of the CDFG Regulations (effective January 1, 2023).

Section 8-2.1408(T) of the CLUO requires compliance of generators with YSAQMD rules and CCR Section 8306. These measures would reduce operational emissions from individual cannabis sites permitted under the CLUO.

YSAQMD's 2016 Triennial Assessment and Plan Update includes three measures to reduce ozone emissions through the regulation of architectural coatings, printing processes for graphic arts, and process boilers. There is no anticipated graphic art printing associated with cannabis sites, nor are process boilers anticipated to be used at cultivation and noncultivation sites. Thus, the project would not conflict with the 2016 Triennial Assessment and Plan Update that aims to reduce ozone precursor emissions.

The cultivation and noncultivation sites permitted under the CLUO would result in long-term operational emissions of ROG, NO_x, PM₁₀, and PM_{2.5}. ROG and NO_x emissions would be generated by area sources, building energy, stationary sources, and off-road equipment. PM₁₀ emissions would be generated from the use of off-road equipment. Because VMT from on-road sources would not be expected to be notably different than existing VMT, mobile-source emissions would not increase, as previously explained.

Emissions associated with the operation of cannabis-related sites across the County would be highest when the most cultivation operations are in harvest at the same time because additional workers are needed at each commercial cannabis cultivation site to work the harvest. The harvest of a single cultivation site of any type (i.e., outdoor, mixed-light, indoor) would occur over a 6-week period between three and four times per year.

As described in Chapter 2, "Description of Preferred Alternative and Equal Weight Alternatives," cannabis uses are required to generate 50 percent of their energy demand from renewable sources under the CLUO. It was also assumed for analysis purposes that all existing cultivation sites would comply with the renewable energy requirement of the CLUO and is included in the emissions modeling. All new and relocated cultivation and noncultivation sites were assumed to meet the 2019 California Energy Code.

Regional area-source and off-road equipment emissions of criteria pollutants and precursors associated with adoption and implementation of the proposed CLUO were modeled using CalEEMod. This includes the use of fertilizers, landscaping equipment, backup diesel generators at mixed-light and indoor cultivation sites, and the use of a utility vehicle at outdoor and mixed-light cultivation sites. CCR Section 8306 would require backup diesel generators to meet Tier 3 with Level 3 diesel particulate filter requirements or Tier 4 engines standards beginning in 2023.

Air quality impacts for each alternative is evaluated below. Emissions of criteria air pollutants and ozone precursors associated with operation are shown by license type in Table 3.3-6. Note that the columns in Table 3.3-6 are not additive; rather, each row in the table represents construction associated with a specific cannabis use site on a particular site. Refer to Appendix E for detailed modeling input parameters and results.

Table 3.3-6 Operational Emissions of Criteria Air Pollutants and Precursors for Each Cannabis Use Type

Cannabis Use	ROG (tons/year)	NO _x (tons/year)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)
Cultivation				
Outdoor	0.2	0.1	<0.1	<0.1
Mixed-Light	0.5	<0.1	<0.1	<0.1
Indoor	0.2	0.1	<0.1	<0.1
Noncultivation				
Nursery	0.7	0.1	<0.1	<0.1
Processing	<0.1	0.1	<0.1	<0.1
Manufacturing	<0.1	0.1	<0.1	<0.1
Testing	<0.1	0.1	<0.1	<0.1
Distribution	<0.1	0.1	<0.1	<0.1
Retail	<0.1	0.1	<0.1	<0.1
Microbusiness	<0.1	0.1	<0.1	<0.1
YSAQMD Thresholds of Significance	10	10	80	N/A
Exceeds Threshold?	No	No	No	N/A
Notes: ROG = reactive organic gases; NO _x = oxides of nitrogen; PM ₁₀ = respirable particulate matter; PM _{2.5} = fine particulate matter; lb/day = pounds per day; YSAQMD = Yolo-Solano Air Quality Management District; N/A = not applicable.				
Source: Modeling conducted by Ascent Environmental in 2019				

Alternatives 1, 2, 3, and 5 assume that personal use outdoor cultivation may occur in any zoning district on a parcel developed with a legal residence. Personal use outdoor cultivation of up to six plants is assumed to occur within pots or garden areas of such parcels. Alternative 4 would limit personal use cultivation to indoor only. These activities would likely involve no more than 100 square feet of land area and would be required to be outside of front yard and side yard setback areas. Once operational, these activities would not differ from typical personal gardening, which would generate minimal criteria air pollutant and precursor emissions from landscaping equipment that would not exceed YSAQMD thresholds.

Alternative 1 consists of existing and eligible cultivation sites and would not create any new operational air pollutant emissions. Alternatives 2 through 5 are assumed to result in the development of new individual cannabis uses as described in Impact AQ-2. As shown in Table 3.3-6, operation of new individual cannabis sites would not result in annual emissions of ROG and NO_x or daily emissions of PM₁₀ that would exceed YSAQMD's thresholds of significance. The estimate of emissions from individual sites is considered conservative because it was assumed sites would be operational by 2021 that thus the requirements of CCR Section 8306 were not included because they do not take effect until 2023.

Operation emissions of all assumed cannabis uses under each alternative could generate the following total emissions:

- Alternative 1: 20.9 tons per year of ROG, 6.3 tons per year of NO_x, 3 lbs per day of PM₁₀, and 3 lbs per day of PM_{2.5}.
- Alternative 2: 25.9 tons per year of ROG, 10.6 tons per year of NO_x, 6 lbs per day of PM₁₀, and 5 lbs per day of PM_{2.5}.

- Alternative 3: 51.5 tons per year of ROG, 21.2 tons per year of NO_x, 11 lbs per day of PM₁₀, and 10 lbs per day of PM_{2.5}.
- Alternative 4: 43.6 tons per year of ROG, 11.5 tons per year of NO_x, 5 lbs per day of PM₁₀, and 5 lbs per day of PM_{2.5}.
- Alternative 5: 25.9 tons per year of ROG, 10.5 tons per year of NO_x, 5 lbs per day of PM₁₀, and 5 lbs per day of PM_{2.5}.

As discussed in the “Thresholds of Significance” section, YSAQMD developed these thresholds in consideration of achieving and maintaining the NAAQS and CAAQS, which represent concentration limits of criteria air pollutants needed to adequately protect human health. Therefore, the project’s contribution to operational criteria pollutants and precursors would not result in greater acute or chronic health impacts compared to existing conditions. Operation of all cannabis sites that could be permitted under any of the alternatives would not conflict with the General Plan or 2016 Triennial Assessment and Plan Update. Consistency with these applicable plans would meet YSAQMD’s threshold for plan-level documents.

This impact would be **less than significant** under all alternatives.

Mitigation Measures

No mitigation is required for any of the alternatives.

Impact AQ-4: Expose a Substantial Number of People to Adverse Odors

Operation of cannabis uses associated with adoption and implementation of the proposed CLUO, including subsequent Cannabis Use Permits pursuant to the adopted CLUO could expose residents, businesses and recreation users to objectionable odors created by the growing, processing, and manufacturing of cannabis. The CLUO includes standards that establish a numeric threshold for the concentration of cannabis odors, requirements for the development of an Odor Control Plan, and an enforcement process to correct identified cannabis odor impacts. While these measures would minimize the likelihood of nuisance odors, the potential for odors to occur remains. This impact would be **significant** for all alternatives.

As described in Section 3.3.1, “Environmental Setting,” the typical smell of cannabis originates from roughly 140 different terpenes. A terpene is a volatile, unsaturated hydrocarbon that is found in essential oils of plants, especially conifers and citrus trees. Some terpenes are identified explicitly in research (myrcene, pinene, limonene). The “skunk” odor attributable to cannabis is primarily volatile thiols. Cannabis uses that have potential to generate nuisance odors include cultivation, processing, manufacturing, and microbusiness.

As noted above, the County received 17 odor complaints between October 2017 and January 2019 associated with existing cannabis cultivation sites. The majority of these complaints were received during the summer and fall months when cannabis is ready for harvest. These complaints were associated with cultivation sites along the State Route (SR) 16 corridor west of Woodland and sites along SR 128 and Interstate 505 (I-505) south of SR 16.

The CLUO addresses odor impacts through limiting the location of cannabis uses, buffers for outdoor cannabis uses, odor control requirements, and enforcement. The specific provisions are included below.

Section 8-2.1407 of the CLUO requires that cannabis uses to be located in agricultural, commercial, and industrial zones that generally do not contain concentrations of receptors sensitive to odors (e.g., residential uses) (see Table 2-6). In addition to the zoning standards, Section 8-2.1408(E) of the CLUO requires buffers (75 - 1,000 feet) established under alternatives 1, 2, 3, and 5 between outdoor cannabis uses and defined sensitive receptors in order to minimize to potential for nuisances:

A buffer of X feet³ is required from the following receptors (inside or outside of the County unincorporated area): off-site individual legal residences under separate ownership, residentially designated land, licensed day cares, public parks, recognized places of worship, public or licensed private schools, licensed treatment facilities for drugs or alcohol, federal lands held in trust by the federal government or that is the subject of a trust application for a federally recognized tribal government, licensed youth centers that are in existence at the time a use permit is issued for any CDFA permittee. These buffers apply to cannabis uses as specified in Section 8-2,1407, Table of Cannabis Development Regulations, of this article. The buffer shall be measured from the closest point of the cultivation site to:

1. The closest surface of the building for residences, day cares, places of worship, schools, treatment facilities, and youth centers.
2. The closest point of the zone boundary for residentially designated land.
3. The closest point of the parcel boundary for public parks and tribal trust land.

Approved cannabis uses, operating within the terms of their approvals and conditions, shall be exempted from the buffer requirement as applicable to later new uses within the categories identified above, that locate within the described buffer distance.

Section 8-2.1408(CC) of the CLUO establishes the following limits on odor concentration at the property line of a cannabis site, defines what is considered a persistent odor nuisance, and enforcement measures to address verified odor nuisances:

Cannabis uses shall not create a public nuisance or adversely affect the health or safety of nearby residents or businesses by, among other things, creating dust, light, glare, heat, noise, noxious gases, odor, smoke, traffic, vibration, unsafe conditions, or other impacts, in excess of allowable thresholds, or be hazardous due to the use or storage of materials, processes, products, runoff, unauthorized releases or illegal disposal of wastes.

1. Subject to subsection 7 below, it is unlawful and it shall be a public nuisance to cause or permit persistent cannabis odors. A persistent cannabis odor is one which is verified by persons of normal odor sensitivity (as defined by European Standard EN 13725) to exist for three consecutive days within any two-week period at a maximum dilution-to-threshold (D/T ratio of seven parts clean or filtered air to one-part filtered odorous air, 7:1), measured at the property line of the site, as a result of investigations resulting from subsection 2, below.
2. Subject to subsection 7 below, for the purposes of this subsection, cannabis odors shall be deemed to be persistent if the County enforcement officer (i) independently determines that the cannabis odor violates the standards of subsection 1 above, and/or (ii) the County enforcement officer receives three or more complaints of cannabis odor representing separate residences or places of occupied business, of a cannabis odor emanating from the subject property for three consecutive days within any two-week period, that the enforcement officer determines violates the standards of subsection 1 above.
3. Subject to subsection 7 below, nothing in this subsection shall be deemed to require three verified complaints before the County may initiate enforcement action. The County may determine that a public nuisance exists under this subsection if less than three verified complaints are received or if no complaints are received but County officials or employees observe cannabis odor conditions that violate this subsection.

³ The buffer distance in the CLUO will be determined by the Board of Supervisors at the time of approval of the ordinance.

4. Failure to effectively resolve a public nuisance shall result in enforcement action, up to and including additional conditions, suspension and revocation of the County Cannabis Use Permit and/or County Cannabis License pursuant to the process below.
5. The County applies a three-level citation system to cannabis nuisance violations. Depending on the severity, frequency, or the failure to resolve the cause of the violation, the County enforcement officer may issue an alert, a warning citation, or a Notice of Violation. The alert shall identify the problem, identify relevant code sections, discuss the abatement process, and identify corrective action. The warning citation shall identify the problem, document the history, and mandate specific abatement actions including submittal of a plan and schedule to remedy the problem. A Notice of Violation shall follow the procedures set forth in Section 5-20.10 (*this citation will be revised one the licensing ordinance is moved to Chapter 4 of Title 20*).
6. Subject to subsection 7 below, if at any time during the citation system identified above in subsection 5, the County enforcement officer determines that the conditions at the site are deleterious to the health, safety, or general welfare of any one or more surrounding properties, or that the permittee and/or landowner is not acting in good faith or in a manner sufficient to timely address the complaint, the County enforcement officer may bypass the citation process and take immediate steps to address the violation, including by abatement or any other lawful means.
7. Permittees operating in compliance with this article, in particular Section 8-2.1408(DD)(1), Odor Control, the terms of their Cannabis Use Permit, and other applicable laws shall be presumptively assumed to not cause or contribute to a public nuisance.
8. The County may elect not to investigate any complaint due to resource limitations or other matters. In addition, the County may elect not to investigate complaints submitted by complainants that submit more than three unsubstantiated complaints within a one-year period.

Section 8-2.1408(DD) of the CLUO also provides the following requirements for odor control:

1. The allowable threshold for cannabis odor shall be defined as a maximum dilution-to-threshold (D/T) ratio of seven parts clean or filtered air to one-part odorous air (7:1) measured at the property line of the site. Cannabis odor at or below this threshold shall be considered acceptable and shall not be considered a nuisance. Indoor and mixed light uses must install and maintain the following minimum equipment: an exhaust air filtration system with odor control that effectively minimizes internal odors from being emitted externally; an air system that creates negative air pressure between the facilities interior and exterior so that odors outside of the facility will not exceed the maximum dilution-to-threshold (allowable threshold), as defined herein; or other odor control system which effectively minimizes odor to a level compliant with the allowable threshold.
2. Applicants shall submit the following information: a. Identification and description of cannabis odor emitting activities and nature and characteristics of emissions. b. Description of procedures and engineering controls for reducing/controlling odors. c. Certification by a Professional Engineer or Qualified Odor Professional that the procedures and engineering controls proposed to control cannabis odors are consistent with accepted/available industry-specific best control technologies and methods designed to abate odor and will be effective in abating cannabis odors to the maximum dilution-to-threshold (allowable threshold), as defined herein, at the property line of the site. This shall be submitted in the form of an Odor Control Plan, subject to regular monitoring and reporting.
3. Odor control for outdoor activities may include different plant strains, smaller grow areas, relocation of outdoor activities indoors or in a mixed light facility, use of site design or other technology, odor easements over neighboring property, and/or other methods proven to be effective and accepted by the County.

In addition to these standards the CLUO also includes the following requirements that address nuisance odors as well as the ability for the County to re-evaluate the effectiveness of nuisance and odor control standards:

- Section 8-2.1408(PP) Site Maintenance (General): Permittee shall at all times maintain, manage, and operate the site, all improvements and alterations, and all structures, in good repair, acceptable in appearance, and in reasonably safe condition, including securing all necessary licenses and permits for this work. The site shall be kept free of litter, clutter, and graffiti. The permittee shall prevent and eliminate conditions that constitute a public nuisance.
- Section 8-2.1410(D)(2) Operational Information Required: Odor Control Plan.
- Section 8-2.1413 Effectiveness: Assessment of Effectiveness – Following two years of implementation of this article, staff shall present the Board of Supervisors with an assessment of its effectiveness and any recommendations for change. This evaluation shall include in particular an assessment of the effectiveness of Section 8-2.1408, Specific Use Requirements and Performance Standards, of this article, including Section 8-2.1408(E) Buffers, Section 8-2.1408(U) Good Neighbor Communication, Section 8-2.1408(CC) Nuisance, Section 8-2.1408(DD) Odor Control, and Section 8-2.1412 Enforcement.

The furthest distance cannabis odors may be recognizable or detectable is approximately two miles or more, depending on topography and meteorology (Kern County 2017). This is consistent with the experience of the Cannabis Task Force. However, recognition of an odor does not imply that the odor is a nuisance, only that it can be identified or detected as cannabis. Typically, the odor is detectable much closer to the source, such as adjacent to or on a cultivation site. The distance for odor detection is very site-specific and can be affected by many variables including meteorology, topography, plant strain, and how ready plants are for harvesting. Based on review of County odor complaint data, calm and/or light wind conditions tend to create the greatest potential for odor complaints. In addition, human perception of cannabis plant odors may be influenced by personal views regarding cannabis. Whether the odor is acceptable and the level at which it should be defined as objectionable at various strengths and distances from various land uses is a matter of policy.

The County is considering five alternative variations to the proposed CLUO, all of which rely on the same underlying regulatory requirements that would regulate cannabis activities through land use, zoning, and development standards. The alternatives vary by the assumed type of cannabis license/activity, limits on the number of operations, performance standards and buffer distances. Each EIR alternative and the buffers assumed for that alternative are summarized below:

Table 3.3-7 Alternative Buffer Distances

Alternative	Buffer
Alternative 1: Cultivation (Ancillary Nurseries and Processing Only) with Existing Limits (Existing Operations with CLUO)	75 Feet from Individual Residence 1,000 Feet from Other Sensitive Uses
Alternative 2: All License Types with Moderate Limits	1,000 Feet
Alternative 3: All License Types with High Limits	75 Feet
Alternative 4: Mixed-Light/Indoor License Types only with Moderate Limits, No Hoop Houses or Outdoor Types	None
Alternative 5: All License Types with Moderate Limits, within Agricultural Zones Only, No Retail	1,000 Feet

Pursuant to CLUO Section 8.2-1408(E), buffers would apply to the following receptors (inside or outside of the County unincorporated area): individual legal residences under separate ownership, residentially designated land, licensed day cares, public parks, recognized places of worship, public or licensed private schools, licensed treatment facilities for drugs or alcohol, federal lands held in trust by the federal government or that is the subject of a trust application for a federally recognized tribal government.

CLUO Section 1408(DD)(1) defines an acceptable level of cannabis odor as a maximum dilution-to-threshold (D/T) of seven parts clean or filtered air to one-part odorous air (7:1) or less at the property line of the site. Cannabis odor at or below 7:1 D/T may still be detected off-site; however, pursuant to the CLUO, odor at this threshold would be considered acceptable, and not a nuisance. The public may occasionally detect cannabis odors. However, as noted herein, the 7:1 D/T standard is based on scientific publications on odor pollution control that have identified that odors above 7 D/T will often result in complaints (i.e. objectionable), with 15 D/T often described as a nuisance, and odors above 30 D/T described as a serious nuisance (i.e. nauseating) (McGinley 2000 and Huey et al. 1960).

The CLUO also includes several provisions intended to minimize odor. CLUO Section 1408(DD)(1) requires that indoor and mixed light cannabis uses install odor control equipment to minimize odor. Outdoor cannabis activities are also required to implement odor control measures such as less odorous plant strains, smaller grow areas, relocation of outdoor activities indoors or in a mixed light facility, use of site design or other technology, odor easements over neighboring property, and/or other methods proven to be effective and accepted by the County.

Pursuant to CLUO Section 1408(DD)(2), Cannabis use permit applicants are also required to submit an Odor Control Plan which would include:

- a. Identification and description of cannabis odor emitting activities and nature and characteristics of emissions.
- b. Description of procedures and engineering controls for reducing/controlling odors.
- c. Certification by a Professional Engineer or Qualified Odor Professional that the procedures and engineering controls proposed to control cannabis odors are consistent with accepted/available industry-specific best control technologies and methods designed to abate odor and will be effective in abating cannabis odors to the maximum dilution-to-threshold, as defined in the CLUO, measured at the property line of the site.

Buffers provide a means of reducing the strength or concentration of an odor and the frequency at which it may be detected since buffers provide atmospheric dispersion of odor. The larger the buffer, the more distance is available for dispersion of the odor to occur before it may reach a sensitive receptor. Given this, smaller buffers are generally not as effective in reducing the strength and frequency of the odor compared to a larger buffer distance. In addition, since a larger buffer would provide greater dispersion, it would also likely reduce the number of odor complaints and complaint verification enforcement activities.

Odors with distinct odor characteristics, emanating from proximate sources, are generally not additive or amplified. However, odor with the same or similar odor characteristics, emanating from proximate sources may be additive. Therefore, multiple odor sources in a given geographic area would not necessarily increase the strength of an odor, although a higher frequency of odor detection would be expected. It is not possible to predict what specific cannabis plant strains would occur at proximate sources. However, the overall strength of odor generally would not necessarily be worse under Alternative 3 (All License Types with High Limits) versus Alternative 1 (Existing Operations with CLUO). It should be noted that both the strength and frequency at which the odors from any specific alternative may be detected would be reduced with a large buffer as compared to a small buffer because greater dispersion would occur under the larger separation distance.

Notwithstanding implementation of the cannabis odor minimization measures specified above, including buffers, odors cannot be completely eliminated such that they would not be detectable off-site. This is true for each of the five alternatives and various buffer distances evaluated as part of this EIR. While the measures would reduce the likelihood of nuisance odors, the potential for odor emissions to occur remains. Therefore, this impact is conservatively considered significant for all alternatives, as explained further below.

To ensure the overall quality and consistency of odor investigations, odor verification is conducted by County cannabis enforcement officers who have been screened and determined to be of normal odor sensitivity pursuant to European Standard EN 13725. The officers have also been trained in odor detection using a Nasal Ranger field olfactometer.

When a complaint is received via the County's on-line cannabis complaint form, the weather conditions at the time of the complaint are automatically provided. Since meteorology plays a role in cannabis odors, the County tries to verify the complaint on a day and time when the weather conditions at the time of the complaint can best be replicated. (Strachan 2019)

Compliance with odor control requirements under CLUO Section 8-2.1408(DD)(1) for cannabis uses located within a greenhouse or building can be accomplished through the use of equipment such as the following (Trinity Consultants 2019):

- Activated carbon air filters (carbon scrubber) – forced air circulation through activated carbon filter to filter out odors prior release from the facility.
- Biofilters – a control that utilizes biological adsorptive media.
- Plasma ion technology – odorous gases and aerosols interact with ions and are neutralized.
- Air filters – air passes through densely woven fiber screens which trap odorous particulates (this is viewed as a less effective option relative to carbon scrubbers, biofilters, and is often paired with other technologies).

Using an appropriate odor control technology (such as the examples listed above) coupled with a well-engineered ventilation design, it would be expected that a facility could achieve the allowable threshold for cannabis odor in CLUO Section 8-2.1408 (DD)(1). (Scullion, 2019).

CLUO Section 8-2.1408(DD)(3) includes suggested odor control for outdoor cannabis uses that consist of using different plant strains, relocation of outdoor cultivation to mixed-light or indoor cultivation in a greenhouse or indoor building, odor easements, and/or other methods proven to be effective and accepted by the County. There are cannabis plant strains under development that have reduced odor potential. However, no technical studies are available at this time to confirm the effectiveness of these strains. As discussed above, conversion to indoor or mixed-light cultivation in a greenhouse building can provide effective odor control through operation of filtration systems and comply with the CLUO 7 D/T standard. Odor easements and buffer areas are often used for facilities such as landfills and wastewater treatment plants (e.g., Sacramento Regional Wastewater Treatment Plant) to effectively address nuisance odors. Implementation of the enforcement provisions of CLUO Section 8-2.1408(CC) when a persistent odor nuisance from a cannabis site is verified would require the County enforcement officer to either issue an alert, warning citation, or a Notice of Violation that identifies the need for corrective action. If complaints are not addressed by the cannabis site operators, the County enforcement officer may take immediate steps to address the nuisance which could include revocation of cannabis licensing and/or the Cannabis Use Permit.

Alternatives 1, 2, 3, and 5 assume that personal use outdoor cultivation may occur in any zoning district on a parcel developed with a legal residence. Personal use outdoor cultivation of up to six plants is assumed to occur within pots or garden areas of such parcels. Alternative 4 would limit personal use cultivation to indoor only. These activities would likely involve no more than 100 square feet of land area and would be required

to be outside of front yard and side yard setback areas. No odor impacts are expected to occur because the limited odor potential of six plants is not expected to generate nuisance odors in excess of 7 D/T off the parcel. Personal use outdoor cultivation would be subject to enforcement actions by the County if it creates a verified persistent nuisance odor issue as provided under CLUO Sections 8-2.1408(CC) and 8-2.1412.

Alternative 1: Cultivation (Ancillary Nurseries and Processing Only) with Existing Limits (Existing Operations with CLUO) (CEQA Preferred Alternative)

While most of the existing licensed commercial cannabis cultivation operations would remain in their current locations, nine of the existing sites are assumed to be required to relocate under the CLUO zoning standards because of proposed zoning restrictions (e.g., locations in residential zones). As shown in Exhibit 2-4, most of this existing cultivation occurs along the SR 16 corridor west of the City of Woodland with 22 sites located between the communities of Rumsey and Guinda. This alternative assumes 75-foot buffers between cultivation sites and occupied residences and 1,000-foot buffers between cultivation sites and identified sensitive receptors under the CLUO. No new commercial cannabis uses are assumed under this alternative.

As identified above, the CLUO would restrict cannabis uses to agricultural, commercial, and industrial zoned land that generally does not contain sensitive receptors (CLUO Section 8-2.1407), buffers between outdoor cannabis uses and sensitive receptors (CLUO Section 8-2.1408[E] establish odor control requirements that would prohibit nuisance odors from leaving the cannabis site in excess of 7 D/T, identifies a process of corrective actions for nuisance odor conditions, and requires the development of an Odor Control Plan (CLUO Sections 8-2.1408[CC] and 8-2.1408[DD]). It is acknowledged that this could involve the conversion from outdoor cultivation operations to mixed-light or indoor cultivation within greenhouse buildings designed with odor control in order to achieve compliance with the CLUO odor standards, similar to what is assumed under Alternative 4. As noted above, this alternative is assumed to result in the relocation of nine existing cultivation sites from residential zoned areas, which would substantially reduce potential nuisance odor issues in these residential zoned areas.

While these measures would minimize the likelihood of nuisance odors, the potential for odor emissions to occur remains. This impact is conservatively considered **significant** for Alternative 1.

Alternative 2: All License Types with Moderate Limits

Under Alternative 2, it was assumed for analysis purposes that there would be two new cultivation sites constructed as well as a total of 52 new noncultivation uses. Additionally, it was assumed for analysis purposes that 30 of the 78 existing cultivation sites would be relocated due to zoning restrictions (e.g., locations in residential zones) and buffering standards under the CLUO.

New cannabis uses assumed under this alternative that could generate odors include cultivation (two new sites), nurseries (five sites), processing (five sites), microbusiness (five sites) and manufacturing (20 sites). As shown in Exhibit 2-5, this Alternative assumes the following new cannabis uses and potential odor sources in proximity to various communities:

- Guinda: three manufacturing sites and two microbusiness sites
- Esparto: one manufacturing site and one microbusiness site
- Yolo: one manufacturing site
- Dunnigan: two manufacturing site, one nursery site, one processing site, and one cultivation site

The CLUO would restrict cannabis uses to agricultural, commercial, and industrial zoned land that generally does not contain sensitive receptors (CLUO Section 8-2.1407). Buffers between outdoor cannabis uses and sensitive receptors (CLUO Section 8-2.1408[E] establish odor control requirements that would prohibit nuisance odors from leaving the cannabis site in excess of 7 D/T, identifies a process of corrective actions for nuisance odor conditions, and requires the development of an Odor Control Plan (CLUO Sections 8-

2.1408[CC] and 8-2.1408[DD]). As noted above, this alternative is assumed to result in the relocation of 30 existing cultivation sites from residential zoned areas and compliance with the buffer requirements that would substantially reduce potential nuisance odor issues associated with these existing and eligible cultivation sites by increasing the distance between the odor source and defined sensitive receptors.

While these measures would minimize the likelihood of nuisance odors, the potential for odor emissions to occur remains. This impact is conservatively considered **significant** for Alternative 2.

Alternative 3: All License Types with High Limits

This alternative is assumed to result in the construction of 82 new cultivation sites and total of 104 new noncultivation uses. Additionally, it was assumed for analysis purposes that nine of the 78 existing cultivation sites would be relocated under the CLUO zoning restrictions (e.g., locations in residential zones).

New cannabis uses assumed under this alternative that could generate odors include cultivation (82 new sites), nurseries (10 sites), processing (10 sites), microbusinesses (10 sites), and manufacturing (40 sites). As shown in Exhibit 2-6, this Alternative assumes the following new cannabis uses and potential odor sources in proximity to various communities:

- Guinda: three manufacturing sites, three cultivation sites, three microbusinesses, one nursery site, and two processing sites
- Esparto: two manufacturing sites, three cultivation sites, one microbusiness, and one processing site
- City of Woodland: four manufacturing sites and three cultivation sites
- Yolo: one manufacturing site and one cultivation site
- Dunnigan: four manufacturing sites, two cultivation sites, two nursery sites, two microbusinesses, and one processing site

As identified in Alternative 2, the CLUO would restrict cannabis uses to agricultural, commercial, and industrial zoned land that generally does not contain sensitive receptors (CLUO Section 8-2.1407). Buffers between outdoor cannabis uses and sensitive receptors (CLUO Section 8-2.1408[E] establish odor control requirements that would prohibit nuisance odors from leaving the cannabis site in excess of 7 D/T, identifies a process of corrective actions for nuisance odor conditions, and requires the development of an Odor Control Plan (CLUO Sections 8-2.1408[CC] and 8-2.1408[DD]). As noted above, this alternative is assumed to result in the relocation of nine existing cultivation sites from residential zoned areas that would substantially reduce potential nuisance odor issues in these residential zoned areas.

While these measures would minimize the likelihood of nuisance odors, the potential for odor emissions to occur remains. This impact is conservatively considered **significant** for Alternative 3.

Alternative 4: Mixed-Light/Indoor License Types Only with Moderate Limits, No Hoop Houses or Outdoor Types

Under Alternative 4, it was assumed for analysis purposes that nine of the 78 existing cultivation sites would be relocated under the CLUO zoning restrictions (e.g., locations in residential zones). It was also assumed that 75 of the existing and eligible cannabis sites with outdoor cultivation would convert entirely to indoor or mixed-light (greenhouse) cultivation. This alternative is also assumed to result in the construction of two new mixed-light or indoor cultivation sites and a total of 52 new noncultivation uses.

New cannabis uses assumed under this alternative that could generate odors include cultivation (two new sites), nurseries (five sites), processing (five sites), microbusinesses (five sites), and manufacturing (20 sites). As shown in Exhibit 2-7, this alternative assumes the following new cannabis uses and potential odor sources in proximity to various communities:

- Guinda: three manufacturing sites and two microbusiness sites
- Esparto: one manufacturing site and one microbusiness site
- Yolo: one manufacturing site
- Dunnigan: one manufacturing site, one nursery site, and one processing site

As identified in Alternative 2, the CLUO would restrict cannabis uses to agricultural, commercial, and industrial zoned land that generally does not contain sensitive receptors (CLUO Section 8-2.1407), buffers between outdoor cannabis uses and sensitive receptors (CLUO Section 8-2.1408[E] establish odor control requirements that would prohibit nuisance odors from leaving the cannabis site in excess of 7 D/T, identifies a process of corrective actions for nuisance odor conditions, and requires the development of an Odor Control Plan (CLUO Sections 8-2.1408[CC] and 8-2.1408[DD]). Odor control for building ventilation systems associated with mixed-light cultivation, indoor cultivation, nurseries, manufacturing, microbusinesses, and processing facilities would be required by CLUO Section 8-2.1408(DD).

Because Alternative 4 assumes all cannabis activities are conducted within structures, this Alternative is likely to have lower odor impacts overall than Alternatives 1, 2, 3, and 5. Specifically, CLUO Section 8-2.1408 (DD) (1) requires that: “Indoor and mixed light uses must install and maintain the following minimum equipment: an exhaust air filtration system with odor control that effectively minimizes internal odors from being emitted externally; an air system that creates negative air pressure between the facilities interior and exterior so that odors outside of the facility will not exceed the maximum dilution-to-threshold, as defined herein; or other odor control system which effectively minimizes odor. Nevertheless, while the assumptions of this alternative and the identified odor control measures would minimize the likelihood of nuisance odors, the potential for odor emissions to occur remains. This impact is conservatively considered **significant** for Alternative 4.

Alternative 5: All License Types with Moderate Limits, within Agricultural Zones Only, No Retail

Under Alternative 5, it was assumed for analysis purposes that there would be two new cultivation sites constructed as well as a total of 50 new noncultivation uses. Additionally, it was assumed for analysis purposes that 30 of the 78 existing cultivation sites would be relocated due to zoning restrictions (e.g., locations in residential zones) and buffering standards under the CLUO.

New cannabis uses assumed under this alternative that could generate odors include cultivation (two new sites), nurseries (five sites), processing (five sites), microbusinesses (five sites), and manufacturing (10 sites). As shown in Exhibit 2-8, this Alternative assumes the following new cannabis uses and potential odor sources in proximity to various communities:

- Guinda: three manufacturing sites and two microbusiness sites
- Esparto: one manufacturing site and one microbusiness site
- Yolo: one manufacturing site
- Dunnigan: two manufacturing site, one nursery site, one processing site, and one cultivation site

As identified in Alternative 2, the CLUO would restrict cannabis uses to agricultural zoned land that generally does not contain sensitive receptors (CLUO Section 8-2.1407), buffers between outdoor cannabis uses and sensitive receptors (CLUO Section 8-2.1408[E] establish odor control requirements that would prohibit nuisance odors from leaving the cannabis site in excess of 7 D/T, identifies a process of corrective actions for nuisance odor conditions, and requires the development of an Odor Control Plan (CLUO Sections 8-2.1408[CC] and 8-2.1408[DD]). It is acknowledged that this may require the conversion from outdoor cultivation operations to mixed-light or indoor cultivation within greenhouse buildings designed with odor

control to comply with the CLUO odor standards similar to what is assumed under Alternative 4. As noted above, this alternative is assumed to result in the relocation of 30 existing cultivation sites from residential zoned areas and compliance with the buffer requirements that would substantially reduce potential nuisance odor issues associated with these existing and eligible cultivation sites by increasing the distance between the odor source and defined sensitive receptors.

While these measures would minimize the likelihood of nuisance odors, the potential for odor emissions to occur remains. This impact is conservatively considered **significant** for Alternative 5.

Mitigation Measures

Mitigation Measure AQ-1: Conduct Wind Pattern Evaluations to Evaluate Odor Control (Alternatives 1, 2, 3, 4, and 5)

The following shall be included as a new performance standard in Section 8-2.1408 (DD) of the CLUO:

- As part of the cannabis use permit process, County staff shall conduct a wind pattern evaluation of each cannabis use application. This evaluation will utilize wind roses (a circular display of the frequency of wind coming from specific directions over a specified period of time). The wind pattern evaluation will identify receptors (as defined in Section 8.2-1408 [E]) located downwind of a proposed cannabis use and potentially affected by nuisance odor for a predominant period of time based on the wind frequency. This will provide staff with additional information for consideration when evaluating a cannabis use permit application.

Notwithstanding the implementation of this measure and other identified existing and proposed regulations, the potential for impacts to occur is conservatively identified as significant and unavoidable because:

- Cannabis remains a controversial activity.
- Some neighbors have expressed that they are very sensitive to the odor and find it to be highly objectionable.
- The proposed regulatory threshold is not zero-detect which means that some odor will be detectable and will be considered acceptable under the regulations.
- Odor exceedances in excess of the allowable level may be higher in early years as the industry and technology evolve despite the fact that enforcement will occur under the ordinance.

Therefore, this impact is conservatively considered **significant and unavoidable** for all alternatives.