4.1 AIR QUALITY

4.1.1 INTRODUCTION

The Air Quality section of the EIR describes the effects of the proposed project on local and regional air quality. The section includes a discussion of the existing air quality setting and applicable regulations, estimation of emissions that would be generated during the construction and operational phases of the proposed project, comparison of the project's emissions with relevant thresholds of significance, and identification of impacts and mitigation measures intended to reduce all impacts to the maximum extent feasible. The Air Quality section is primarily based on information, guidance, and analysis protocol provided by the Yolo-Solano Air Quality Management District (YSAQMD) per the *Handbook for Assessing and Mitigating Air Quality Impacts*,[1] as well as emissions projections obtained by means of the California Emissions Estimator Model (CalEEMod) version 2016.3.2.[2] In addition, the section uses information obtained from the *Davis General Plan*[3] and associated EIR.[4]

It should be noted that an analysis of the proposed project's potential impacts related to Greenhouse Gas Emissions and Energy is included in Section 4.2, of this EIR.

4.1.2 EXISTING ENVIRONMENTAL SETTING

The following information provides an overview of the existing environmental setting in relation to air quality within the proposed project area. The air basin characteristics, ambient air quality standards (AAQS), attainment status and regional air quality plans, local air quality monitoring, and sensitive receptors are discussed below.

Air Basin Characteristics

The City of Davis is located in Yolo County, within the Yolo-Solano portion of the Sacramento Valley Air Basin (SVAB), which is under the jurisdiction of the YSAQMD. Air quality in the SVAB is largely the result of the following factors: emissions, geography, and meteorology (wind, atmospheric stability, and sunlight). The Sacramento Valley is often described as a bowl-shaped valley, with the SVAB being bounded by the North Coast Ranges on the west, the northern Sierra Nevada Mountains on the east, and the intervening terrain being flat.

The Sacramento Valley has a Mediterranean climate, characterized by hot, dry summers and mild, rainy winters. During the year, the temperature may range from 20 to 115 degrees Fahrenheit, with summer highs usually in the 90-degree Fahrenheit range and winter lows occasionally below freezing. Average annual rainfall is approximately 20 inches, with snowfall being very rare. The winds in the area are moderate in strength and vary from moist, clean

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1 Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts*. July 11, 2007. Available at: http://www.ysaqmd.org/documents/CEQAHandbook2007.pdf. Accessed July 2019.

2 BREEZE Software, A Division of Trinity Consultants, in collaboration with South Coast Air Quality Management District and the California Air Districts. *California Emissions Estimator Model User's Guide Version 2016.3.2*. November 2017.

3 City of Davis. *Davis General Plan*. Adopted May 2001. Amended through January 2007.

4 City of Davis. *Program EIR for the City of Davis General Plan Update and Project EIR for Establishment of a New Junior High School*. January 2000.

breezes from the south to dry land flows from the north.[5] According to the Western Regional Climate Center, the prevailing wind direction throughout the year in the project area is from the south.[6]

The mountains surrounding the Sacramento Valley create a barrier to airflow, which can trap air pollutants in the valley when meteorological conditions are right and a temperature inversion exists. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells lie over the valley. The lack of surface wind during autumn and early winter and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in the air. The surface concentrations of pollutants are highest when these conditions are combined with smoke from agricultural burning, which is regulated through YSAQMD permits, or when temperature inversions trap cool air, fog, and pollutants near the ground.

The ozone season (May through October) in the Sacramento Valley is characterized by stagnant morning air or light winds, with the Delta sea breeze arriving in the afternoon out of the southwest. Usually the evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. However, during approximately half of the days from July to September, a phenomenon called the "Schultz Eddy" prevents the transport from occurring. Instead of allowing for the prevailing wind patterns to move north, carrying the pollutants out of the valley, the Schultz Eddy causes the wind pattern and pollutants to circle back southward. The Schultz Eddy effect exacerbates the pollution levels in the area and increases the likelihood of violating the federal and State air quality standards.

Ambient Air Quality Standards

The federal Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, known as criteria pollutants, because the criteria air pollutants could be detrimental to human health and the environment. The criteria pollutants include particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. Primary standards are the set of limits based on human health; and secondary standards are the set of limits intended to prevent environmental and property damage. States may also establish their own ambient air quality standards, provided the State standards are at least as stringent as the NAAQS. California has established California Ambient Air Quality Standards (CAAQS) pursuant to Health and Safety Code Section 39606(b) and its predecessor statutes. The State of California has established air quality standards for some pollutants not addressed by federal standards, including hydrogen sulfide, sulfates, vinyl chloride, and visibility-reducing particles. The NAAQS and CAAQS summarized in Table 4.1-1 below, represent the maximum amount of a pollutant that can be present in outdoor air without harm to public health.[7] As shown in the table, in general, the CAAQS are more stringent, particularly for ozone and particulate matter, than the NAAQS.

[5] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts*. July 11, 2007. Available at: http://www.ysaqmd.org/documents/CEQAHandbook2007.pdf. Accessed September 2016.

[6] Western Regional Climate Center. *Prevailing Wind Direction*. Available at: http://www.wrcc.dri.edu/htmlfiles/westwinddir.html. Accessed September 2016.

[7] California Air Resources Board. *Ambient Air Quality Standards (AAQS)*. July 2, 2013. Available at: http://www.arb.ca.gov/research/aaqs/aaqs.htm. Accessed September 2016.

Table 4.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	NAAQS	
			Primary	Secondary
Ozone	1 Hour	0.09 ppm	-	Same as primary
	8 Hour	0.070 ppm	0.070 ppm	
Carbon Monoxide	8 Hour	9 ppm	9 ppm	-
	1 Hour	20 ppm	35 ppm	
Nitrogen Dioxide	Annual Mean	0.030 ppm	53 ppb	Same as primary
	1 Hour	0.18 ppm	100 ppb	-
Sulfur Dioxide	24 Hour	0.04 ppm	-	-
	3 Hour	-	-	0.5 ppm
	1 Hour	0.25 ppm	75 ppb	-
Respirable Particulate Matter (PM_{10})	Annual Mean	20 ug/m^3	-	Same as primary
	24 Hour	50 ug/m^3	150 ug/m^3	
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	12 ug/m^3	12 ug/m^3	15 ug/m^3
	24 Hour	-	35 ug/m^3	Same as primary
Lead	30 Day Average	1.5 ug/m^3	-	-
	Calendar Quarter	-	1.5 ug/m^3	Same as primary
Sulfates	24 Hour	25 ug/m^3	-	-
Hydrogen Sulfide	1 Hour	0.03 ppm	-	-
Vinyl Chloride	24 Hour	0.010 ppm	-	-
Visibility Reducing Particles	8 Hour	see note below	-	-

ppm = parts per million
ppb = parts per billion
µg/m^3 = micrograms per cubic meter

Note: Statewide Visibility Reducing Particle Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Source: California Air Resources Board. Ambient Air Quality Standards. May 4, 2016. Available at: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed May 2019.

A summary of the pollutants, their characteristics, health effects, and typical sources is provided in Table 4.1-2 below. Of the pollutants, particle pollution and ground-level ozone are the most widespread health threats.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are also a category of environmental concern. TACs are present in many types of emissions with varying degrees of toxicity. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases. Common stationary sources of TACs include gasoline stations, dry cleaners, and diesel backup generators, which are subject to YSAQMD stationary source permit requirements. The other common source type is on-road motor vehicles, such as cars and trucks, on freeways and roads, and off-road sources such as construction equipment, ships, and trains. In addition to manmade TACs, natural occurring TACs also exist, such as asbestos.

Table 4.1-2
Summary of Criteria Air Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Ozone (O_3)	• A highly reactive gas consisting of three oxygen atoms • Often called photochemical smog • Produced by photochemical process involving the sun's energy • A secondary pollutant formed from a chemical reaction between ROG and NO_X emissions in the presence of sunlight • Levels are highest during summer and during the afternoon and early evening hours	• Eye irritation • Wheezing, chest pain, dry throat, headache, or nausea • Aggravated respiratory disease such as emphysema, bronchitis, and asthma	Combustion sources such as factories, automobiles, and evaporation of solvents and fuels.
Reactive Organic Gas (ROG)	• Reactive chemical gas composed of hydrocarbon compounds • Contributes to formation of smog and ozone through atmospheric chemical reactions	• Some compounds that make up ROG are toxic, such as the carcinogen benzene	Paints and solvents.
Oxides of Nitrogen (NO_X)	• Gaseous nitrogen compounds • Precursors to the formation of ozone and particulate matter • Nitrogen dioxide is major component • NO_X reacts with ROG to form smog	• Component of acid rain • Lung irritation • Lung damage • Chronic respiratory disease	Combustion of fossil fuels under high temperature and pressure, and motor vehicles.
Carbon Monoxide (CO)	• An odorless, colorless, highly toxic gas formed by the incomplete combustion of fuels • Emitted directly into the air • Primarily a winter pollution problem due to cold stagnant weather conditions	• Impairment of oxygen transport in the bloodstream • Impaired vision, reduced alertness, chest pain, and headaches • Reduction in mental and physical functions • Can be fatal in the case of very high concentrations	Automobile exhaust, combustion of fuels, and combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide (NO_2)	• A reddish-brown gas that discolors the air and is formed during combustion of fossil fuels under high temperature and pressure.	• Lung irrigation and damage • Increased risk of acute and chronic respiratory disease	Automobile and diesel truck exhaust, industrial processes, and fossil-fueled power plants.
Sulfur Dioxide (SO_2)	• A colorless, irritating gas • Has a rotten egg odor • Particles are a component of PM_{10}	• Aggravation of chronic obstruction lung disease • Increased risk of acute and chronic respiratory disease	Combustion of sulfur-containing fossil fuels from mobile sources, such as locomotives,

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			shops, and off-road diesel equipment, and industrial processes, such as petroleum refining and metal processing.
Particulate Matter (PM_{10} and $PM_{2.5}$)	• A complex mixture of extremely small particles and liquid droplets • Made up of a number of components, including acids, organic chemicals, metals and soil or dust particles • Size of particles directly linked to potential for causing health impacts • Particles 10 micrometers in diameter or smaller (PM_{10}) can pass through the throat and nose and enter the lungs • USEPA groups particle pollution into three categories based on the size of the particles and where they are deposited: o "Inhalable coarse particles ($PM_{2.5-10}$)," which are found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs. o "Fine particles ($PM_{2.5}$)," which are found in smoke and haze, are 2.5 micrometers in diameter and smaller. $PM_{2.5}$ particles could be directly emitted from sources such as forest fires, or could form when gases emitted from power plants, industries, and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs. o "Ultrafine particles (UFP)," which are very, very small particles (less than 0.1 micrometers in diameter) largely resulting from the combustion of fossil fuels, meat, wood, and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, their high surface area, deep lung penetration, and transfer into the bloodstream could result in disproportionate health impacts relative to their mass. UFP is not currently regulated separately, but is analyzed as part of $PM_{2.5}$. • PM_{10}, $PM_{2.5-10}$, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants	• Aggravation of chronic respiratory disease • Heart and lung disease • Coughing or difficulty breathing • Bronchitis • Chronic respiratory disease in children • Irregular heartbeat • Nonfatal heart attacks • Increased blood pressure	Combustion sources such as automobiles, power generation, industrial processes, and wood burning. Also from unpaved roads, farming activities, and fugitive windblown dust.

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	(formed in the atmosphere by chemical reactions among precursors)		
Lead	• A soft and chemically resistant metal • A natural constituent of air, water, and the biosphere • Is not created nor destroyed in the environment • As an air pollutant, lead is present in small particles • Present in many soils and could become re-suspended into the air	• Impaired blood formation and nerve conduction • Fatigue, anxiety, short-term memory loss, depression, loss of appetite, weakness, apathy, and miscarriage • Lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract • Learning disabilities in children • Cancer	Industrial sources combustion of leaded gasoline, and contaminated soils.
Sulfates (SO_4^{2-})	• The fully oxidized ionic form of sulfur • Colorless gas • Occur in combination with metal and/or hydrogen ions • Sulfur compounds occur from combustion of petroleum fuels containing sulfur, where the sulfur is oxidized to SO_2 during the combustion process and converted to sulfate compounds in the atmosphere • Conversion of SO_2 to sulfates occurs rapidly and completely in urban areas	• Aggravation of respiratory symptoms • Decrease in ventilatory function • Aggravation of asthmatic symptoms • Increased risk of cardio-pulmonary disease	Combustion of petroleum-derived fuels that contain sulfur.
Hydrogen Sulfide (H_2S)	• A colorless, flammable gas with a rotten egg odor • Extremely hazardous in high concentrations, especially in enclosed spaces • Occurs naturally in crude petroleum, natural gas, and hot springs • Produced by bacterial breakdown of organic materials and human and animal wastes	• Irritation of the eyes, nose, throat, and respiratory system • Aggravation of asthmatic symptoms • Headaches, fatigue, irritability, insomnia, digestive disturbances, and weight loss • Nausea, vomiting, staggering, and excitability • High concentrations can cause shock, convulsions, inability to breathe, extremely rapid unconsciousness, coma, and death	Geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations.

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Vinyl Chloride (C_2H_3Cl, or VCM)	• A colorless gas that does not occur naturally, but is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down • Used to make polyvinyl chloride (PVC), which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials	• Central nervous system effects, such as dizziness, drowsiness, and headaches • Liver damage • Cancer	Exhaust gases from factories that manufacture or process vinyl chloride, or evaporation from chemical waste storage areas.
Sources: • ***California Air Resources Board. California Ambient Air Quality Standards (CAAQS). Available at: http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm. Accessed June 2019.*** • ***Sacramento Metropolitan, El Dorado, Feather River, Placer, and Yolo-Solano Air Districts, Spare the Air website. Air Quality Information for the Sacramento Region. Available at: http://www.sparetheair.com/health.cfm?page=healthoverall. Accessed June 201-.*** • ***California Air Resources Board. Glossary of Air Pollution Terms. Available at: http://www.arb.ca.gov/html/gloss.htm. Accessed June 2019.***			

Health risks from TACs are a function of both the concentration of emissions and the duration of exposure, which typically are associated with long-term exposure and the associated risk of contracting cancer. Health effects of exposure to TACs other than cancer include birth defects, neurological damage, and death. Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level. The identification, regulation, and monitoring of TACs is relatively new compared to that for criteria air pollutants that have established AAQS. TACs are regulated or evaluated on the basis of risk to human health rather than comparison to an AAQS or emission-based threshold.

TACs related to on-road and off-road sources, as well as emissions from gasoline stations and asbestos, are discussed in further depth below.

On-Road and Off-Road Sources

Diesel engines emit a complex mixture of air pollutants, including both gaseous and solid material. In terms of health risks, the most volatile contaminants from diesel engines are diesel particulate matter (DPM), benzene, formaldehyde, 1,3-butadiene, toluene, xylenes, and acetaldehyde. Gasoline vapors and exhaust from gasoline combustion also contain several TACs, including benzene, toluene, and xylenes.

During the combustion and emission of diesel gas, small carbon particles or "soot" are created and emitted along with over 40 cancer-causing substances. The small carbon soot particles become coated by and absorb many of the other 40 cancer-causing substances within the exhaust. The resulting combination of small carbon particles and chemicals is collectively referred to as DPM.[8] Diesel exhaust also contains gaseous pollutants, including volatile organic compounds and NO_X. Due to the published evidence of a relationship between diesel exhaust exposure and lung cancer and other adverse health effects, the California Air Resources Board (CARB) has identified DPM from diesel-fueled engines as a TAC. Although a variety of TACs are emitted by fossil fueled combustion engines, the cancer risk due to DPM exposure represents a more significant risk than the other TACs discussed above.[9]

More than 90 percent of DPM is less than one micrometer in diameter, and, thus, DPM is a subset of $PM_{2.5}$. As a California statewide average, DPM comprises about eight percent of $PM_{2.5}$ in outdoor air, although DPM levels vary regionally due to the non-uniform distribution of sources throughout the State. Most major sources of diesel emissions, such as ships, trains, and trucks, operate in and around ports, rail yards, and heavily-traveled roadways. Areas with elevated DPM concentrations are often located near highly populated areas. Thus, elevated DPM levels are mainly an urban problem, with large numbers of people exposed to higher DPM concentrations, resulting in greater health consequences compared to rural areas.

Due to the high levels of diesel activity, high volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated health risks from DPM. Construction-related activities also have the potential to generate concentrations of DPM from on-road haul trucks and off-road equipment exhaust emissions.

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[8] California Air Resources Board. *Summary: Diesel Particulate Matter Health Impacts*. Accessible at: https://ww2.arb.ca.gov/resources/summary-diesel-particulate-matter-health-impacts. Accessed February 2019. California Air Resources Board and Office of Environmental Health Hazard Assessment. *Executive Summary For the "Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant*". April 22, 1998.

[9] California Air Resources Board. *Reducing Toxic Air Pollutants in California's Communities*. February 6, 2002.

The size of diesel particulates that are of the greatest health concern are fine particles (i.e., $PM_{2.5}$) and ultrafine particles (UFPs), which are a subset of $PM_{2.5}$. UFPs have a small diameter (on the order of 0.1 micrometers).[10] The small diameter of UFPs imparts the particulates with unique attributes, such as high surface areas and the ability to penetrate deeply into lungs. Once UFPs have been deposited in lungs, the small diameter allows the UFPs to be transferred to the bloodstream. The high surface area of the UFPs also allows for a greater adsorption of other chemicals, which are transported along with the UFPs into the bloodstream of the inhaler, where the chemicals can eventually reach critical organs.[11] The penetration capability of UFPs may contribute to adverse health effects related to heart, lung, and other organ health.[12] UFPs are a subset of DPM and activities that create large amounts of DPM, such as the operations involving heavy diesel-powered engines, also release UFPs. Considering that UFPs are a subset of DPM, and DPM is considered a subset of $PM_{2.5}$, estimations of either concentrations or emissions of $PM_{2.5}$ or DPM include UFPs.

The project site is not located near high volume freeways or any land uses that involve the frequent or heavy use of diesel-powered engines.

Gasoline Dispensing Facilities

Operation of gasoline dispensing facilities (GDFs) releases TACs into the air including benzene. Benzene is a potent carcinogen and is identified by the CARB as one of the highest risk air pollutants under CARB regulation. The majority of benzene in the environment is released through motor vehicle related activity, and GDFs represent a small portion of total benzene emissions. Nevertheless, benzene emissions and concentrations are elevated in proximity to facilities that handle large amounts of gasoline such as GDFs.

Significant progress has been made in reducing benzene emissions within the state, with statewide emissions being reduced by over 75 percent between 1990 and 2005. The majority of the reductions are attributable to motor vehicle vapor recovery equipment at gas stations and regulation of the benzene content in gasoline. In fact, vapor recovery systems can decrease emissions of benzene by more than 90 percent compared to uncontrolled facilities. Risks of benzene exposure due to GDF operations are proportional to the throughput of gasoline at GDFs, where GDFs experiencing higher gasoline throughputs emit larger amounts of benzene as compared to GDFs experiencing lower gasoline throughputs. It should be noted that health impacts related to GDF operations are distance dependent and rapidly decline as the distance from the GDF increases.

A GDF exists adjacent to the southeast corner of the project site, at the corner of the Anderson Road and Russell Boulevard intersection.

Naturally Occurring Asbestos

Another concern related to air quality is naturally occurring asbestos (NOA). Asbestos is a term used for several types of naturally-occurring fibrous minerals found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in California. When rock containing asbestos is broken or crushed, asbestos fibers may be released and become airborne. Exposure to asbestos fibers may result in health issues such as lung cancer, mesothelioma (a rare cancer of the thin membranes lining the lungs, chest and abdominal cavity),

[10] South Coast Air Quality Management District. *Final 2012 Air Quality Management Plan*. December 2012.
[11] Health Effects Institute. *Understanding the Health Effects of Ambient Ultrafine Particles*. January 2013.
[12] South Coast Air Quality Management District. *Final 2012 Air Quality Management Plan*. December 2012.

and asbestosis (a non-cancerous lung disease which causes scarring of the lungs). Because asbestos is a known carcinogen, NOA is considered a TAC. Sources of asbestos emissions include: unpaved roads or driveways surfaced with ultramafic rock; construction activities in ultramafic rock deposits; or rock quarrying activities where ultramafic rock is present.

According to mapping prepared by the California Geological Survey, Yolo County is not in an area likely to contain NOA.[13] In addition, the project site is located in a developed area of the City and currently contains existing development. For the aforementioned reasons, NOA is not expected to be present at the project site.

For a discussion of the potential presence of asbestos within the existing structures at the project site, refer to Section VIII of the Initial Study prepared for the proposed project, included as Appendix C to this EIR.

Attainment Status and Regional Air Quality Plans

Areas not meeting the NAAQS presented in Table 4.1-1, above, are designated by the USEPA as nonattainment. Further classifications of nonattainment areas are based on the severity of the nonattainment problem, with marginal, moderate, serious, severe, and extreme nonattainment classifications for ozone. Nonattainment classifications for PM range from marginal to serious. The CAA requires areas violating the NAAQS to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The SIP contains the strategies and control measures for states to use to attain the NAAQS. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, rules, and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA reviews SIPs to determine if they conform to the mandates of the federal CAA amendments and would achieve air quality goals when implemented.

The 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) of 1988. The CCAA classifies ozone nonattainment areas as moderate, serious, severe, and extreme based on severity of violations of CAAQS. For each nonattainment area classification, the CCAA specifies air quality management strategies that must be adopted. For all nonattainment areas, attainment plans are required to demonstrate a five-percent-per-year reduction in nonattainment air pollutants or their precursors, averaged every consecutive three-year period, unless an approved alternative measure of progress is developed. Air districts with air quality that is in violation of CAAQS are required to prepare an air quality attainment plan that lays out a program to attain the CCAA mandates.

Table 4.1-3 below presents the current attainment status of the jurisdictional area of the YSAQMD. As shown in the table, Yolo County is in attainment for all State and federal AAQS, with the exception of ozone, PM_{10}, and $PM_{2.5}$. At the federal level, the area is designated as severe nonattainment for the 8-hour ozone standard, nonattainment for the 24-hour $PM_{2.5}$ standard, unclassified/nonattainment for annual $PM_{2.5}$, and attainment or unclassified for all other criteria pollutants.

[13] California Department of Conservation, Division of Mines and Geology. *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos*. August 2000.

Table 4.1-3
Attainment Status

Pollutant	Designation/Classification	
	Federal Standards	**State Standards**
Ozone – 1-Hour	Revoked in 2005	**Nonattainment**
Ozone – 8-Hour	**Nonattainment**	**Nonattainment**
Carbon Monoxide	Attainment	Attainment
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Sulfur Dioxide	Attainment (Pending)	Attainment
PM_{10}	Attainment	**Nonattainment**
$PM_{2.5}$ – 24-Hour	**Nonattainment**	No State Standard
$PM_{2.5}$ – Annual	**Unclassified/Nonattainment**	**Nonattainment**
Lead	Unclassified/Attainment	Attainment
Sulfates	No Federal Standard	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Visibility Reducing Particles	No Federal Standard	Unclassified

Sources:
- ***YSAQMD. Ambient Air Quality Standards. Available at: https://www.ysaqmd.org/wp-content/uploads/2016/06/Attainment_Detailed.jpg. Accessed May 2019.***
- ***California Air Resources Board. Air Quality Standards and Area Designations. Available at: https://www.arb.ca.gov/desig/desig.htm. Accessed May 2019.***

At the State level, the area is designated as a nonattainment area for the 1-hour ozone standard, nonattainment for the 8-hour ozone standard, nonattainment for the PM_{10} and $PM_{2.5}$ standards, and attainment or unclassified for all other State standards. Although the 1-Hour federal ozone standard has been revoked, on October 18, 2012, the USEPA officially determined that the Sacramento Federal Nonattainment Area (SFNA), which includes Sacramento and Yolo counties, Placer and El Dorado counties (except Lake Tahoe Basin portions), Solano County (eastern portion), and Sutter County (southern portion), attained the revoked 1-hour ozone NAAQS. The determination became effective November 19, 2012.[14]

Due to the nonattainment designations, the YSAQMD, along with the other air districts in the SVAB region, is required to develop plans to attain the federal and State standards for ozone and particulate matter. The air quality plans include emissions inventories to measure the sources of air pollutants, to evaluate how well different control measures have worked, and show how air pollution would be reduced. In addition, the plans include the estimated future levels of pollution to ensure that the area would meet air quality goals. Each of the attainment plans currently in effect are discussed in further detail in the Regulatory Context discussion of this section.

Local Air Quality Monitoring

Air quality is monitored by CARB at various locations to determine which air quality standards are being violated, and to direct emission reduction efforts, such as developing attainment plans and rules, incentive programs, etc. The nearest local air quality monitoring station to the project site is the Davis-UCD Campus station, located along Campbell Road between Hutchinson Drive and Garrod Road in Davis, approximately 1.3 miles from the project site. The Davis-UCD Campus station does not have data available for $PM_{2.5}$ and PM_{10}; thus, the nearest station with $PM_{2.5}$ and PM_{10} data was used, which was the Woodland-Gibson Road station located at 41929 Gibson Road in Woodland, approximately eight miles north of the project site. Table 4.1-4 presents the

[14] U.S. Environmental Protection Agency. *Air Actions in the Sacramento Metro Area*. October 3, 2012. Available at: http://www.epa.gov/region9/air/actions/sacto/index.html. Accessed March 2018.

number of days that each criteria air pollutant standard was exceeded and/or the annual average mean concentrations for the years 2014 through 2016 for those pollutants for which monitoring data is available from the Davis-UCD Campus and Woodland-Gibson Road monitoring stations. The USEPA uses the data (air quality monitoring data for the most recent three-year period), as well as a number of other factors, in making final determinations regarding area designations.

Table 4.1-4
Air Quality Monitoring Data Summary for Project Area

Pollutant	Standard	Days Standard Exceeded During:		
		2015	2016	2017
Ozone	1-Hour State	0	0	0
	8-Hour State	1	1	1
	8-Hour Federal	1	1	1
PM_{10}[1]	24 Hour State	2	2	3
	Annual Mean State	21.8	19.7	22.0
	24 Hour Federal	0	0	0
$PM_{2.5}$[1]	Annual Mean State	7.6	6.4	8.7
	Annual Mean Federal	7.5	6.3	8.6
	24 Hour Federal	0	0	2
Nitrogen Dioxide	Annual Mean State	5	*	*
	1-Hour State	0	0	0
	1-Hour Federal	0	0	0

[1] Obtained from the Woodland-Gibson Road monitoring station.
* Data not available.

Source: California Air Resources Board. Aerometric Data Analysis and Management (ADAM): Top Four Summary. Available at: http://www.arb.ca.gov/adam/topfour/topfour1.php. Accessed May 2019.

Existing Criteria Air Pollutant Emissions Associated with the Project Site

Operation of the existing University Mall within the project site currently results in emissions of criteria pollutants. As discussed in further detail in the Method of Analysis section below, existing emissions associated with the current operation of the University Mall have been estimated. The estimated existing criteria pollutant emissions levels are presented in Table 4.1-5 in tons per year (tons/yr). As shown in Table 4.1-5, the majority of criteria pollutant emissions related to existing operations of the University Mall are associated with mobile emission sources.

Table 4.1-5
Existing University Mall Emissions (tons/yr)

Emission Source	Existing University Mall Annual GHG Emissions		
	ROG	NO_X	PM_{10}
Area	0.38	0.00	0.00
Energy	0.00	0.01	0.00
Mobile	1.61	11.53	6.32
Total Emissions	**1.99**	**11.54**	**6.32**

Source: CalEEMod, June 2019 (see Appendix F).

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others, due to the types of population groups or activities involved. Children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, day care centers, playgrounds, and medical facilities. Residential developments exist to the north, east, and west of the project site as well as to the south, across Russell Boulevard. Additionally, the Davis Parent Nursery School is located 0.4-mile northeast of the project site. For analysis purposes the aforementioned residences and elementary school would be considered sensitive receptors, with the residences to the north being the closest receptors, approximately 100 feet from the project site.

4.1.3 REGULATORY CONTEXT

Air quality is monitored and regulated through the efforts of various international, federal, State, and local government agencies. Agencies work jointly and individually to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for regulating and improving the air quality within the project area are discussed below.

Federal Regulations

The most prominent federal regulation is the FCAA, which is implemented and enforced by the USEPA.

FCAA and USEPA

The FCAA requires the USEPA to set NAAQS and designate areas with air quality not meeting NAAQS as nonattainment. The USEPA is responsible for enforcement of NAAQS for atmospheric pollutants and regulates emission sources that are under the exclusive authority of the federal government including emissions of greenhouse gases (GHGs). The USEPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990. The USEPA has adopted policies consistent with FCAA requirements demanding states to prepare SIPs that demonstrate attainment and maintenance of the NAAQS.

State Regulations

California has adopted a variety of regulations aimed at reducing air pollution emissions. Only the most prominent and applicable California air quality-related legislation is included below; however, an exhaustive list and extensive details of California air quality legislation can be found at the CARB website (http://www.arb.ca.gov/html/lawsregs.htm).

CCAA and CARB

The CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the CCAA. The CCAA requires that air quality plans be prepared for areas of the State that have not met the CAAQS for ozone, CO, NO_X, and SO_2. Among other requirements of the CCAA, the plans must include a wide range of implementable control measures, which often include transportation control measures and performance standards. In order to implement the transportation-related provisions of the CCAA, local air pollution control districts have been granted explicit authority to adopt and implement transportation controls. The CARB, California's air quality management agency, regulates and oversees the activities of county air pollution control districts and regional air quality management

districts. The CARB regulates local air quality indirectly using State standards and vehicle emission standards, by conducting research activities, and through planning and coordinating activities. In addition, the CARB has primary responsibility in California to develop and implement air pollution control plans designed to achieve and maintain the NAAQS established by the USEPA. Furthermore, the CARB is charged with developing rules and regulations to cap and reduce GHG emissions.

Air Quality and Land Use Handbook

CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB Handbook) addresses the importance of considering health risk issues when siting sensitive land uses, including residential development, in the vicinity of intensive air pollutant emission sources including freeways or high-traffic roads, distribution centers, ports, petroleum refineries, chrome plating operations, dry cleaners, and gasoline dispensing facilities.[15] The CARB Handbook draws upon studies evaluating the health effects of traffic traveling on major interstate highways in metropolitan California centers within Los Angeles (I-405 and I-710), the San Francisco Bay, and San Diego areas. The recommendations identified by CARB, including siting residential uses a minimum distance of 500 feet from freeways or other high-traffic roadways, are consistent with those adopted by the State of California for location of new schools. Specifically, the CARB Handbook recommends, "Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day" (CARB 2005).

Importantly, the Introduction chapter of the CARB Handbook clarifies that the guidelines are strictly advisory, recognizing that: "[l]and use decisions are a local government responsibility. The Air Resources Board Handbook is advisory and these recommendations do not establish regulatory standards of any kind." CARB recognizes that there may be land use objectives as well as meteorological and other site-specific conditions that need to be considered by a governmental jurisdiction relative to the general recommended setbacks, specifically stating, "[t]hese recommendations are advisory. Land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues" (CARB 2005).

Assembly Bill 1807

Assembly Bill (AB) 1807, enacted in September 1983, sets forth a procedure for the identification and control of TACs in California. CARB is responsible for the identification and control of TACs, except pesticide use, which is regulated by the California Department of Pesticide Regulation.

AB 2588

The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588), California Health and Safety Code Section 44300 et seq., provides for the regulation of over 200 TACs, including DPM, and is the primary air contaminant legislation in California. Under the act, local air districts may request that a facility account for its TAC emissions. Local air districts then prioritize facilities on the basis of emissions, and high priority designated facilities are required to submit a health risk assessment and communicate the results to the affected public.

[15] California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective*. April 2005.

Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations

In 2002, the Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (Title 17, Section 93105, of the California Code of Regulations) went into effect, which requires each air pollution control and air quality management district to implement and enforce the requirements of Section 93105 and propose their own asbestos ATCM as provided in Health and Safety Code section 39666(d).[16]

Senate Bill 656

In 2003, the Legislature passed Senate Bill (SB) 656 to reduce public exposure to PM_{10} and $PM_{2.5}$ above the State CAAQS. The legislation requires the CARB, in consultation with local air pollution control and air quality management districts, to adopt a list of the most readily available, feasible, and cost-effective control measures that could be implemented by air districts to reduce PM_{10} and $PM_{2.5}$ emissions. The CARB list is based on California rules and regulations existing as of January 1, 2004, and was adopted by CARB in November 2004. Categories addressed by SB 656 include measures for reduction of emissions associated with residential wood combustion and outdoor greenwaste burning, fugitive dust sources such as paved and unpaved roads and construction, combustion sources such as boilers, heaters, and charbroiling, solvents and coatings, and product manufacturing. Some of the measures include, but are not limited to, the following:

- Reduce or eliminate wood-burning devices allowed;
- Prohibit residential open burning;
- Permit and provide performance standards for controlled burns;
- Require water or chemical stabilizers/dust suppressants during grading activities;
- Limit visible dust emissions beyond the project boundary during construction;
- Require paving/curbing of roadway shoulder areas; and
- Require street sweeping.

Under SB 656, each air district is required to prioritize the measures identified by CARB, based on the cost effectiveness of the measures and their effect on public health, air quality, and emission reductions. On July 13, 2005, the YSAQMD adopted an implementation schedule for SB 656.

Heavy-Duty Vehicle Idling Emission Reduction Program

On October 20, 2005, CARB approved a regulatory measure to reduce emissions of toxics and criteria pollutants by limiting idling of new and in-use sleeper berth equipped diesel trucks.[17] The regulation consists of new engine and in-use truck requirements and emission performance requirements for technologies used as alternatives to idling the truck's main engine. For example, the regulation requires 2008 and newer model year heavy-duty diesel engines to be equipped with a non-programmable engine shutdown system that automatically shuts down the engine after five minutes of idling, or optionally meet a stringent NO_X emission standard. The regulation also requires operators of both in-state and out-of-state registered sleeper berth equipped trucks to manually shut down their engine when idling more than five minutes at any location within California beginning in

[16] California Air Resources Board. *2002-07-29 Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations*. June 3, 2015. Available at: http://www.arb.ca.gov/toxics/atcm/asb2atcm.htm. Accessed July 2019.

[17] California Air Resources Board. *Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling*. October 24, 2013. Available at: http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm. Accessed May 2019.

2008. Emission producing alternative technologies such as diesel-fueled auxiliary power systems and fuel-fired heaters are also required to meet emission performance requirements that ensure emissions are not exceeding the emissions of a truck engine operating at idle.

In-Use Off-Road Diesel Vehicle Regulation

On July 26, 2007, CARB adopted a regulation to reduce DPM and NO_X emissions from in-use (existing), off-road, heavy-duty diesel vehicles in California.[18] Off-road, heavy-duty diesel vehicles are used in construction, mining, and industrial operations. The regulation is designed to reduce harmful emissions from vehicles by subjecting fleet owners to retrofit or accelerated replacement/repower requirements, imposing idling limitations on owners, operators, renters, or lessees of off-road diesel vehicles. The idling limits require operators of applicable off-road vehicles (self-propelled diesel-fueled vehicles 25 horsepower and up that were not designed to be driven on-road) to limit idling to less than five minutes. The idling requirements are specified in Title 13 of the California Code of Regulations.

Local

The most prominent local regulations related to air quality are established by the YSAQMD and the City of Davis General Plan.

YSAQMD

Various local, regional, State and federal agencies share the responsibility for air quality management in Yolo County. The YSAQMD operates at the local level with primary responsibility for attaining and maintaining the federal and State AAQS in Yolo County. The YSAQMD is tasked with implementing programs and regulations required by the FCAA and the CCAA, including preparing plans to attain federal and State AAQS. The YSAQMD works jointly with the USEPA, CARB, Sacramento Area Council of Governments (SACOG), other air districts in the region, county and city transportation and planning departments, and various non-governmental organizations to improve air quality through a variety of programs. Programs include the adoption of regulations, policies and guidance, extensive education and public outreach programs, as well as emission reducing incentive programs.

Nearly all development projects in the region have the potential to generate air pollutants that may increase the difficulty of attaining federal and State AAQS. Therefore, for most projects, evaluation of air quality impacts is required to comply with CEQA. In order to help public agencies evaluate air quality impacts, the YSAQMD has developed the *Handbook for Assessing and Mitigating Air Quality Impacts*.[19] The YSAQMD's handbook includes screening methodology and recommended thresholds of significance, including mass emission thresholds for construction-related and operational ozone precursors (ROG and NO_X) and PM_{10}. The YSAQMD's handbook also includes screening criteria for localized CO emissions and thresholds for new stationary sources of TACs. The YSAQMD's recommended thresholds of significance, as well as screening criteria and methodology, are discussed in further detail in the Standards of Significance section below.

[18] California Air Resources Board. *In-Use Off-Road Diesel Vehicle Regulation*. December 10, 2014. Available at: http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm. Accessed May 2019.

[19] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts*. July 11, 2007.

YSAQMD Rules and Regulations

All projects under the jurisdiction of the YSAQMD are required to comply with all applicable YSAQMD rules and regulations. In addition, YSAQMD permit requirements apply to most industrial processes (e.g., manufacturing facilities, food processing), many commercial activities (e.g., print shops, drycleaners, gasoline stations), and other miscellaneous activities (e.g., demolition of buildings containing asbestos and aeration of contaminated soils). The YSAQMD regulations and rules include, but are not limited to, the following:

Regulation II – Prohibition, Exceptions - Requirements

Regulation II is comprised of prohibitory rules that are written to achieve emission reductions from specific source categories. The rules are applicable to existing sources as well as new sources. Examples of prohibitory rules include Rule 2.1 (Control of Emissions), Rule 2.28 (Cutback and Emulsified Asphalts), Rule 2.5 (Nuisance), Rule 2.11 (Particulate Matter Concentration), Rule 2.14 (Architectural Coatings), and Rule 2.40 (Wood Burning Appliances).

Air Quality Attainment Plans

Each of the attainment plans currently in effect for the SVAB are discussed in further detail below.

2013 Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan

The most recent attainment plan for the ozone NAAQS is the *2013 Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan* (2013 Ozone Attainment Plan),[20] which demonstrates how existing and new control strategies would provide the necessary future emission reductions to meet the federal NAAQS. The SVAB's attainment deadline is 2027. Because the project site is located within the nonattainment area for ozone, the project would be subject to the requirements set forth in the 2013 Ozone Attainment Plan, as enforced by YSAQMD through rules and regulations.

$PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area

The Sacramento federal $PM_{2.5}$ Nonattainment Area attained the federal $PM_{2.5}$ health standards on December 31, 2011. The *$PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area* ($PM_{2.5}$ Implementation/Maintenance Plan)[21] was prepared to show that the region has met the requirements and requests that the USEPA re-designate the area to attainment. The USEPA issued a final rule for Determination of Attainment for the Sacramento Nonattainment Area effective August 14, 2013. The $PM_{2.5}$ Implementation/Maintenance Plan would be adopted by the air districts within the nonattainment area, as well as the CARB, as a revision to the SIP. Contents of the $PM_{2.5}$ Implementation/Maintenance Plan include demonstration that the NAAQS was met and that all requirements have been met for a re-designation to attainment, specification of actions to be taken if the standards are violated in the future, and establishment of regional motor vehicle emission budgets.

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[20] Sacramento Metropolitan Air Quality Management District. *2013 Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan.* September 26, 2013.

[21] Sacramento Metropolitan Air Quality Management District. *$PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area*. October 24, 2013.

Because the project site is located within the nonattainment area for $PM_{2.5}$, the proposed project would be subject to the requirements set forth in the $PM_{2.5}$ Implementation/Maintenance Plan, as enforced by YSAQMD through rules and regulations.

2016 Triennial Assessment and Plan Update

In addition to the federal attainment plans discussed above for meeting NAAQS, the CCAA requires air districts to endeavor to achieve and maintain the CAAQS and develop plans for attainment. Yolo County meets the CAAQS for sulfur dioxide, nitrogen dioxide, and carbon monoxide, but is designated nonattainment for the State ozone and particulate matter standards. The CCAA requires districts that do not meet the State ozone standard to adopt an Air Quality Attainment Plan and to submit progress reports to the CARB every three years.[22] In July 2016, the YSAQMD adopted the 2016 Triennial Assessment and Plan Update.[23] The 2016 Triennial Assessment and Plan Update analyzes and summarizes data from the years 2012 through 2014, while also forecasting future emissions and reviewing efforts made by YSAQMD to improve air quality.

The YSAQMD is not required to prepare an attainment plan for PM_{10} or $PM_{2.5}$; however, the YSAQMD continues to work to reduce particulate emissions through rules affecting stationary sources, the construction industry, and the YSAQMD's agricultural burning program. The YSAQMD also works with the CARB to identify measures that can, where possible, reduce both ozone and particulate emissions. The YSAQMD has been proactive in attempts to implement the most readily available, feasible, and cost-effective measures that can be employed to reduce emissions of PM.

Because the proposed project site is located within the nonattainment area for State ozone and PM standards, the project would be subject to any requirements set forth in the 2016 Triennial Assessment and Plan Update or YSAQMD efforts related to PM emissions, as enforced by YSAQMD through rules and regulations.

City of Davis General Plan

The following applicable goals and policies related to air quality are from the Air Quality chapter of the City's General Plan:

Goal AIR 1. Maintain and strive to improve air quality.

Policy AIR 1.1 Take appropriate measures to meet the AQMD's goal for improved air quality.

In addition, the Transportation Element of the City's General Plan includes the following applicable goals, performance objectives, and policies related to air quality emissions.

Goal #2 The Davis transportation system will evolve to improve air quality, reduce carbon emissions, and improve public health by encouraging usage of clean, energy-efficient, active (i.e. human powered), and economically sustainable means of travel.

[22] Yolo-Solano Air Quality Management District. *Planning for Ozone Standards*. Available at: https://www.ysaqmd.org/plans-data/ozone/. Accessed May 2018.

[23] Yolo-Solano Air Quality Management District. *Triennial Assessment and Plan Update*. March 11, 2016.

Performance Objective #2.2	Reduce vehicle miles traveled (VMT) 39 percent by 2035.
Policy TRANS 1.6	Reduce carbon emissions from the transportation system in Davis by encouraging the use of non-motorized and low carbon transportation modes.
Policy TRANS 1.7	Promote the use of electric vehicles and other low-polluting vehicles, including Neighborhood Electric Vehicles (NEV).
Policy TRANS 1.8	Develop and maintain a work trip-reduction program designed to reduce carbon emissions, criteria pollutants, and local traffic congestion.
Policy TRANS 3.3	Require new development to be designed to maximize transit potential.
Policy TRANS 4.4	Provide pedestrian and bicycle amenities.
Policy TRANS 4.5	Establish and implement bicycle parking standards for new developments and significant redevelopment.

City of Davis Municipal Code

Section 8.01.090 of the Municipal Code requires mandatory compliance with Tier 1 standards of the CALGreen Code, which would otherwise be voluntary under the California Building Standards Code (CBSC). Furthermore, Section 8.01.060 of the Davis Municipal Code was recently updated by Ordinance Number 2554. Section 8.01.060 now includes updated requirements related to energy efficient water heating systems, electric vehicle charging infrastructure, and on-site photovoltaic systems in high-rise residential developments. In particular, Section 8.01.060 now requires that new non-residential and high-rise multi-family structures include photovoltaic systems sized to provide the lesser of approximately 80 percent offset of the building's modelled annual electric load or 15 direct current watts per square foot of solar zone.

4.1.4 IMPACTS AND MITIGATION MEASURES

The standards of significance and methodology used to analyze and determine the proposed project's potential project-specific impacts related to air quality are described below. In addition, a discussion of the project's impacts, as well as mitigation measures where necessary, is also presented.

Standards of Significance

Based on the recommendations of YSAQMD and in coordination with the City, consistent with Appendix G of the CEQA Guidelines, the effects of a project are evaluated to determine if they would result in a significant adverse impact on the environment. For the purposes of this EIR, an impact is considered significant if the proposed project would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality

standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations (including localized CO concentrations and TAC emissions); or
- Result in other emissions (such as those leading to odors) affecting a substantial number of people.

Issues Not Discussed Further

The Initial Study prepared for the proposed project (see Appendix C) determined that development of the proposed project would result in a less-than-significant impact with mitigation incorporated related to the following:

- Create objectionable odors affecting a substantial number of people;

For the reasons cited in the Initial Study, the potential impacts associated with odors are not analyzed further in this EIR.

Criteria Pollutant Emissions and TAC Emissions

In order to evaluate air pollutant emissions from development projects, the YSAQMD established significance thresholds for emissions of ROG, NO_X, and PM_{10}. Table 4.1-6 below presents the YSAQMD's recommended thresholds of significance, which are expressed in tons/yr for ROG and NO_X and pounds per day (lbs/day) for PM_{10}. If the proposed project's emissions exceed the pollutant thresholds presented in Table 4.1-6, the project could have a significant effect on air quality, the attainment of federal and State AAQS, and could conflict with or obstruct implementation of the applicable air quality plan.

Table 4.1-6
YSAQMD Thresholds of Significance

Pollutant	Construction Threshold	Operational / Cumulative Threshold
ROG	10 tons/yr	10 tons/yr
NO_X	10 tons/yr	10 tons/yr
PM_{10}	80 lbs/day	80 lbs/day

Source: YSAQMD. Handbook for Assessing and Mitigating Air Quality Impacts. July 11, 2007.

In addition to the thresholds of significance presented above for criteria air pollutants, YSAQMD has also developed thresholds for potential exposure of the public to TACs from new stationary sources. Exposure of the public to TACs from new stationary sources in excess of the following thresholds would be considered a significant impact:

- Probability of contracting cancer for the Maximally Exposed Individual (MEI) equals to 10 in one million or more; and
- Ground-level concentrations of non-carcinogenic TACs would result in a Hazard Index equal to 1 for the MEI or greater.

The nearby Sacramento Metropolitan Air Quality Management District (SMAQMD) and Bay Area Air Quality Management District (BAAQMD) also recommend the industry standard thresholds of an increased cancer risk of 10 in one million and a Hazard Index greater than 1 for project-level TAC impacts from stationary sources. Although the YSAQMD has established thresholds for exposure to TACs from new stationary sources, a threshold for exposure of the public to mobile

TAC emissions does not currently exist. In the absence of a specified threshold for assessing impacts of mobile sources of TACs on a sensitive land use, the industry standard is to use the stationary source threshold of an increase in cancer risk of 10 in one million and a Hazard Index greater than 1, which is the standard that has been used throughout the State for similar health risk analyses. Off-road construction equipment used during project-related construction activities would be considered a potential mobile source of TAC emissions. Accordingly, the City, as lead agency, has selected to use the YSAQMD's stationary source TAC emissions thresholds listed above for the purposes of determining cancer risk of exposing sensitive receptors to construction-related mobile source TAC emissions.

In addition to a project-level TAC emissions analysis, cumulative cancer risks are analyzed in this EIR as well. The YSAQMD does not maintain a cumulative threshold that is applicable to cumulative TAC emissions. However, the nearby BAAQMD has an established cumulative threshold of significance for TAC emissions of an excess cancer risk level of more than 100 persons in one million or a Hazard Index greater than 10.0.[24] In the recent court case *Mission Bay Alliance et al. v. Office of Community Investment and Infrastructure et al., GSW Arena LLC et al*, the Superior Court of the City and County of San Francisco upheld the validity of the use of the 100 in one million threshold for use in cumulative analyses of TACs.[25] Thus, the City, as lead agency, has selected BAAQMD's cumulative cancer risk standard for use in the analysis of the cumulative TAC emissions, associated with project-related TAC emissions in combination with existing cumulative TAC emissions, on nearby sensitive receptors.

The CARB Handbook provides recommendations for siting new sensitive land uses near existing sources typically associated with significant levels of TAC emissions. However, the California Supreme Court decision in the case of *California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal. 4th 369* clarified that CEQA does not require lead agencies to analyze the impact of existing environmental conditions on a project's future users or residents unless the project will exacerbate the existing environmental hazards or conditions. This limits the CEQA analysis of impacts from existing sources that emit odors and TACs on new receptors from a proposed development project, unless the situation is specifically required to be analyzed by statute (such as a school). While existing sources that emit odors and TACs may not be considered a CEQA impact, local jurisdictions have the authority to protect the public health, safety, and welfare of their communities through their police powers.[26] While not required pursuant to CEQA, in order to address potential public health impacts, a discussion of the nearby gas station has been included in Impact 4.1-3 and Impact 4.1-5 for informational purposes.

The YSAQMD recommends the use of screening thresholds to assess a project's potential to create an impact through the creation of CO hotspots. A violation of the CO standard could occur if either of the following criteria is true of any street or intersection affected by the mitigated project:[27]

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[24] Bay Area Air Quality Management District. *California Environmental Quality Act: Air Quality Guidelines*. June 2010.

[25] City and County of San Francisco Superior Court. *Mission Bay Alliance et al. v. Office of Community Investment and Infrastructure et al., GSW Arena LLC et al*. Filed November 29, 2016.

[26] California Constitution, Article XI, Section 7. Available at: http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=CONS&sectionNum=SEC.%207.&article=XI. Accessed May 2018.

[27] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts* [p. 21]. July 11, 2007.

- The project would reduce peak-hour level of service (LOS) on one or more streets or at one or more intersections to an unacceptable LOS (typically LOS E or F); or
- The project would increase a traffic delay by 10 or more seconds on one or more streets or at one or more intersections in the project vicinity where a peak hour LOS of F currently exists.

If either or both of the above criteria are met by the mitigated project, YSAQMD recommends performing a full CO Protocol Analysis. If the results of the CO Protocol Analysis indicate a potential impact related to CO could occur, such as in instances where a project would worsen operations at a signalized intersection operating at LOS E or LOS F, YSAQMD directs Lead Agencies to perform CO dispersion modeling analysis using a modeling program such as CALINE-4. The CALINE-4 dispersion model can estimate local CO concentrations at intersections based on traffic estimates and lane configurations. Once the CO concentrations at affected intersections are estimated, the CO concentration must then be compared to the one hour and eight hour AAQS for CO. If the local CO concentration estimated using CALINE-4 exceeds either the one or eight hour AAQS for the affected intersection, then a significant impact would result; however, if the localized CO concentrations are shown to be below the applicable AAQS, the project would not result in an impact related to localized CO concentrations.

GHG Emissions and Other Cumulative Emissions

The project's impacts related to GHG emissions, global climate change, and energy are addressed in Section 4.2, Greenhouse Gas Emissions and Energy, of this EIR.

Method of Analysis

The analysis protocol and guidance provided by the YSAQMD's *Handbook for Assessing and Mitigating Air Quality Impacts* was used to analyze the proposed project's air quality impacts, including screening criteria and pollutant thresholds of significance. Details regarding the methodology and assumptions used for the proposed project's air quality impact analysis are provided below.

Construction Emissions

The proposed project's short-term construction emissions were estimated using the CalEEMod version 2016.3.2 software, which is a statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions from land use projects. The model applies inherent default values for various land uses, including trip generation rates based on the ITE Manual, vehicle mix, trip length, average speed, etc. However, where project-specific data was available, such data was input into the model.

The proposed project is expected to be built in one phase over 27 months. Based on project information, the following assumptions were made for the construction modeling for the proposed project:

- Demolition would involve removal of approximately 90,563 sf of material from the project site, which would include debris from the demolition of existing structures within the project site;
- Approximately 3,000 cubic yards of material may be exported during site preparation;

- Approximately 1,500 cubic yards of material may be imported and an additional 3,000 cubic yards may be exported during site grading; and
- A total of approximately eight acres would be disturbed during the grading phase.

The results of emissions estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. All CalEEMod modeling results are included in Appendix F to this EIR.

Construction-Related DPM Emissions

Because the project site is in proximity to existing residential receptors, the City has conducted a health risk assessment to determine if construction activity related to implementation of the proposed project could result in health risks to the nearby existing receptors.

As discussed in the Existing Environmental Setting section above, fossil fueled combustion engines, including those used in some pieces of construction equipment release various TACs, including DPM, benzene, formaldehyde, 1,3-butadiene, toluene, xylenes, and acetaldehyde. Although a variety of TACs are emitted by fossil fueled combustion engines, the cancer risk due to DPM exposure represents a more significant risk than the other TACs discussed above.[28] Therefore, the potential health effects resulting from construction activities related to implementation of the proposed project were estimated based on emissions of the TAC with the most significant health risk, DPM, which includes UFPs and is considered a subset of $PM_{2.5}$.

The $PM_{2.5}$ (assumed to encompass both DPM and UFP) concentration associated with short-term construction activities resulting from implementation of the proposed project under the aforementioned construction assumptions, at the maximally exposed sensitive receptor nearest to the site, has been estimated using the American Meteorological Society/Environmental Protection Agency (AMS/EPA) Regulatory Model (AERMOD) dispersion model. The associated cancer risk and non-cancer hazard index were calculated using the CARB's Hotspot Analysis Reporting Program Version 2 (HARP 2) Risk Assessment Standalone Tool (RAST), which calculates the cancer and non-cancer health impacts using the risk assessment guidelines of the 2015 Office of Environmental Health Hazard Assessment (OEHHA) Guidance Manual for Preparation of Health Risk Assessments.[29] The modeling was performed in accordance with the USEPA's User's Guide for the AMS/EPA Regulatory Model – AERMOD[30] and the 2015 OEHHA Guidance Manual.

The CalEEMod results for average annual unmitigated construction exhaust $PM_{2.5}$ emissions from the proposed project were used to calculate the emission rate applied in AERMOD. Construction activities were assumed to occur seven days per week and restricted to the hours between 7:00 AM and 7:00 PM Monday through Friday and between the hours of 8:00 AM and 8:00 PM Saturdays and Sundays per Chapter 24 of the City's Municipal Code, Noise Regulations. The construction exhaust emissions were modeled in AERMOD as a series of volume sources located throughout the site where improvements are proposed. A receptor grid using flagpole receptors was applied to AERMOD at the surrounding sensitive receptor locations (i.e., residences to the north, east, and west, as well as the residences south across Russell Boulevard). The AERMOD

[28] California Air Resources Board. *Reducing Toxic Air Pollutants in California's Communities*. February 06, 2002.
[29] Office of Environmental Health Hazard Assessment. *Air Toxics Hot Spots Program Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments* [pg. 8-18]. February 2015.
[30] U.S. Environmental Protection Agency. *User's Guide for the AMS/EPA Regulatory Model (AERMOD)*. December 2016.

analysis relied on data from the meteorological station at the Sacramento International Airport, approximately 12 miles northeast of the project site.

The maximum annual average and maximum one-hour average concentrations from AERMOD were applied to HARP 2 RAST to calculate the cancer risk and non-cancer hazard index, respectively, to the maximally exposed resident in the area surrounding the project site (based on the AERMOD outputs, the maximally exposed resident would be located to the west of the site, across Sycamore Lane). The 2015 OEHHA Guidance Manual recommends that the exposure period for short-term activities involving TAC emissions (i.e., construction activities) lasting more than six months be evaluated for the duration of the project. Construction activities related to the proposed project are assumed to occur over 27 months. Considering OEHHA's guidance for exposure periods resulting from short-term activities involving TAC emissions, the exposure period within HARP 2 RAST was set to 2.25 years, with exposure conservatively assumed to occur for 365 days per year. The 2015 OEHHA Guidance Manual recommends that the fraction of time spent at home be used for a residential receptor based on the assumption that exposure at nearby residences is not occurring away from home. However, in addition to residences near the proposed project site, schools and daycares exist within one-mile of the project site. Therefore, the possibility exists that school children residing in nearby residences could attend school in proximity to the project site, which would result in exposure to pollutants from construction both at the nearby residences and at the nearby school. Considering the proximity of the project site to the aforementioned uses, the HARP 2 RAST modeling was adjusted to conservatively assume that school children would be exposed to construction related emissions during the entire 12-hour per day work period. The 12-hour work period is assumed based on compliance with Chapter 24 of the City's Municipal Code, Noise Regulations.

The resultant cancer and non-cancer health risks associated with construction-related DPM emissions were compared to the standards of significance discussed above in order to determine the associated level of impact. The AERMOD and HARP 2 RAST modeling results are included in Appendix E to this EIR.

Operational Emissions

Operations of the existing University Mall development within the project site currently involve emissions of criteria pollutants. In the absence of the proposed project, existing operations of the University Mall would be anticipated to continue, which would continue to result in emissions of criteria pollutants. As discussed throughout this EIR, the proposed project would involve replacement of the existing commercial development with commercial and residential uses. Considering that the existing operations of the University Mall involve criteria air pollutant emissions, and the emissions would continue in the absence of the proposed project, the analysis of operational emissions presented in this chapter focuses on the net change in emissions that would occur when emissions resulting from existing operations are compared to emissions estimated for operation of the proposed project.

Existing University Mall Development

Operational emissions of criteria pollutants related to the existing University Mall development were estimated using CalEEMod. To provide a direct comparison of emissions against that of the proposed project, operational emissions of the existing University Mall were modeled assuming an operational year of 2024, which is the same operational year as assumed for the proposed project. Considering the age of the existing structure, the energy use assumptions within CalEEMod were adjusted to reflect historical energy use assumptions. Although the existing

structures were built as early as 1966, CalEEMod does not include energy use data for buildings constructed before 2005. Buildings constructed prior to 2005, such as the existing University Mall structures, consume more energy than those built in 2005; consequently, emissions related to energy consumption of the existing University Mall structures likely represent an underestimate.

In addition to adjusting the energy use assumptions, emissions modeling of the existing University Mall development was adjusted to reflect the trip generation and vehicle miles travelled (VMT) resulting from existing operations. The trip generation and VMT were determined by Fehr and Peers through driveway counts and mode split observations, and adjustments were applied based on the existing level of occupancy at the project site.

Proposed Project

The proposed project's operational emissions of criteria pollutants were estimated using CalEEMod. Based on the construction information provided by the project applicant, the proposed project is anticipated to be fully operational by 2024. The modeling performed for the proposed project included compliance with YSAQMD rules and regulations (i.e., low-VOC cleaning supplies). As further discussed in Chapter 4.2, Greenhouse Gas Emissions and Energy, of this EIR, adjustments to the model were applied to reflect the City's requirements that new high-rise residential structures include the installation of on-site photovoltaic energy systems.

The project-specific trip generation and VMT data provided by Fehr and Peers for full buildout of the proposed project was applied to the project modeling.[31]

The results of emissions estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. All CalEEMod modeling results are included in Appendix F to this EIR.

Localized CO Emissions

Concentrations of CO were estimated using the California Department of Transportation (Caltrans) CALINE4, version 2.1, modeling software for intersections that could cause a potential CO hotspot per YSAQMD screening criteria. The CALINE4 model is a dispersion model for predicting air pollutant concentrations near roadways.[32] The YSAQMD's preliminary screening methodology for localized CO emissions provides a conservative indication of whether project-generated vehicle trips would result in the generation of CO emissions that would contribute to an exceedance of AAQS. Per the YSAQMD screening methodology, if either of the following occurs associated with any intersection affected by a project, then that project has the potential to result in localized CO emissions that could violate CO standards:

- A traffic study for the project indicates that the peak-hour LOS on one or more streets or at one or more intersections in the project vicinity will be reduced to an unacceptable LOS (typically LOS E or F); or
- A traffic study indicates that the project will substantially worsen an already existing peak-hour LOS F on one or more streets or at one or more intersections in the project vicinity. "Substantially worsen" includes situations where delay would increase by 10 seconds or more when project-generated traffic is included.

[31] Fehr & Peers. *University Commons, Transportation Impact Study.* July 2019.
[32] California Department of Transportation. *User's Guide for CL4: A User-Friendly Interface for the CALINE4 Model for Transportation Project Impact Assessments*. June 1998.

The analysis within Section 4.6, Transportation and Circulation, of this EIR was used in comparison to the screening criteria above in order to determine which intersections, if any, would be degraded by the proposed project and could generate CO emissions that would contribute to an exceedance of the applicable AAQS. The only intersection that would exceed the YSAQMD's screening thresholds would be the intersection of Russell Boulevard, Anderson Road, and La Rue Road under the Cumulative Plus Project condition. Thus, all other intersections that would be potentially affected by the proposed project would not be expected to experience CO concentrations in excess of the CO concentrations estimated for the intersection of Russell Boulevard, Anderson Road, and La Rue Road. The nearest sensitive receptors to the intersection are the UC Davis dormitories, located to the southeast of the intersection. The results of the model were compared to the threshold established by the YSAQMD, which refers to the CAAQS for CO.

Project-Specific Impacts and Mitigation Measures

The following discussion of impacts is based on implementation of the proposed project in comparison with the standards of significance identified above.

4.1-1 Conflict with or obstruct implementation of the applicable air quality plan during project construction. Based on the analysis below, the impact is *less than significant*.

During construction of the project, various types of equipment and vehicles would temporarily operate on the project site. Construction-related emissions would be generated from demolition activity, construction equipment, vegetation clearing and earth movement activities, construction workers' commute, and construction material hauling for the entire construction period. The aforementioned activities would involve the use of diesel- and gasoline-powered equipment that would generate emissions of criteria pollutants. Project construction activities also represent sources of fugitive dust, which includes PM emissions. As construction of the proposed project would generate emissions of criteria air pollutants, including ROG, NO_X, and PM_{10}, intermittently within the site and in the vicinity of the site, until all construction has been completed, construction is a potential concern, as the proposed project is located in a nonattainment area for ozone and PM.

The maximum unmitigated construction emissions have been estimated using CalEEMod for the proposed project. The construction modeling assumptions are described in the Method of Analysis section above. The estimated construction-related emissions for the proposed project are presented in Table 4.1-7.

Table 4.1-7
Maximum Unmitigated Project Construction-Related Emissions

	ROG	NO_X	PM_{10}
Project Emissions	2.25 tons/yr	5.17 tons/yr	20.51 lbs/day
YSAQMD Significance Threshold	*10 tons/yr*	*10 tons/yr*	*80 lbs/day*
Exceeds Threshold?	**NO**	**NO**	**NO**

Source: CalEEMod, June 2019 (see Appendix F).

As shown in the table, the project's associated short-term construction-related emissions would be below the applicable YSAQMD thresholds of significance.

Therefore, the construction-related emissions resulting from implementation of the proposed project would not result in a contribution to the region's nonattainment status of ozone or PM and would not violate an air quality standard or contribute substantially to an existing or projected air quality violation.

All projects within the YSAQMD, including the proposed project, are required to comply with all YSAQMD rules and regulations for construction, including Rule 2.1 (Control of Emissions), Rule 2.28 (Cutback and Emulsified Asphalts), Rule 2.5 (Nuisance), Rule 2.14 (Architectural Coatings), and Rule 2.11 (Particulate Matter Concentration). The aforementioned rules and regulations are not readily applicable in CalEEMod and are, therefore, not included in the project-specific modeling. Because compliance with the rules and regulations would likely result in some additional reduction in emissions, the proposed project construction emissions would likely be slightly reduced from what is presented in Table 4.1-7 through compliance with the rules and regulations. In addition, YSAQMD encourages all projects to implement best management practices to reduce dust emissions and avoid localized health impacts. The YSAQMD's best management practices for dust could include, but are not necessarily limited to, the following:

- Watering of all active construction sites at least twice daily;
- Maintenance of at least two feet of freeboard in haul trucks;
- Covering of all trucks hauling dirt, sand, or loose materials;
- Application of non-toxic binders to exposed areas after cut and fill operations and hydroseeding of area, as applicable and/or necessary;
- Application of chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days), as applicable and/or necessary;
- Planting of vegetative ground cover in disturbed areas as soon as possible;
- Covering of inactive storage piles;
- Sweeping of streets if visible soil material is carried out from the construction site; and
- Treatment of accesses to distance of 100 feet from the paved road with a six- to 12-inch layer of wood chips, mulch, or gravel.

Compliance with the aforementioned rules and regulations related to construction, as well as implementation of best management practices for dust, would help to minimize emissions generated during construction activities.

Conclusion

Because implementation of the proposed project would result in construction-related emissions below the applicable thresholds of significance and would comply with applicable YSAQMD rules, regulations, and best management practices for dust, construction activities associated with development of the proposed project would result in a ***less-than-significant*** impact to air quality.

Mitigation Measure(s)

None required.

4.1-2 Conflict with or obstruct implementation of the applicable air quality plan during project operation. Based on the analysis below, the impact is *less than significant*.

As discussed above, due to the nonattainment designations of the area, the YSAQMD has developed plans to attain the State and federal standards for ozone and particulate matter. The currently applicable air quality plan is the 2013 Ozone Attainment Plan. Adopted YSAQMD rules and regulations, as well as the thresholds of significance, have been developed with the intent to ensure continued attainment of AAQS, or to work towards attainment of AAQS for which the area is currently designated nonattainment, consistent with the applicable air quality plan. Thus, if a project's operational emissions exceed the YSAQMD's mass emission thresholds for operational emissions of ROG, NO_X, or PM_{10}, a project would be considered to conflict with or obstruct implementation of the YSAQMD's air quality planning efforts.

The project site is currently developed with commercial uses, operations of which generate ROG, NO_X, and PM_{10} from both mobile and stationary sources. Implementation of the proposed project would include replacement of the existing sources of emissions as well as introduction of additional sources related to the proposed residential uses and additional commercial uses. Emissions related to operation of the proposed project and the existing development would include sources such as architectural coatings, landscape maintenance equipment exhaust, and consumer products (e.g., deodorants, detergents, hair spray, cleaning products, spray paint, insecticides, floor finishes, polishes, etc.). However, the most significant source of emissions related to both the proposed project and the existing development would be from mobile sources. As discussed in the Method of Analysis section above, to capture the potential emissions related to mobile sources from the proposed project and the existing development, Fehr and Peers prepared an estimate of annual VMT and project-specific trip generation rates.

Because operations of the existing on-site commercial development currently result in ROG, NO_X, and PM_{10} emissions, and the proposed project would involve redevelopment of the project site with similar and expanded uses, it is appropriate to consider the level of existing emissions as a baseline for the environmental analysis of the proposed project. Therefore, the analysis included in this EIR will focus on the net new emissions that would result from implementation of the proposed project. In order to determine the net new emissions, operational emissions from the existing development as well as the proposed project are presented and compared in Table 4.1-8 below. In addition, Table 4.1-8 compares the net new emissions resulting from project operations to the YSAQMD's thresholds of significance.

As shown in the table above, the proposed project's maximum unmitigated operational emissions of ROG, NO_X, and PM_{10} would be below the YSAQMD's thresholds of significance. Accordingly, the proposed project would not violate an air quality standard or contribute substantially to an existing or projected air quality violation. Therefore, the proposed project would be considered to result in a ***less-than-significant*** impact related to air quality.

Table 4.1-8
Maximum Unmitigated Net New Operational Emissions

	ROG (tons/yr)	NO_X (tons/yr)	PM_{10} (lbs/day)
Proposed Project	4.13	16.80	49.27
Existing University Mall	1.99	11.54	35.88
Net New Emissions	**2.15**	**5.27**	**13.22**
YSAQMD Significance Threshold	*10*	*10*	*80.0*
Exceeds Threshold?	**NO**	**NO**	**NO**

Source: CalEEMod 2019 (see Appendix F).

Mitigation Measure(s)

None required.

4.1-3 Expose sensitive receptors to substantial pollutant concentrations. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.

The major pollutants of concern are localized CO emissions and TAC emissions, which are addressed below.

Localized CO Emissions

Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. Implementation of the proposed project would increase traffic volumes on streets near the project site; therefore, the project would be expected to increase local CO concentrations. Concentrations of CO approaching the ambient air quality standards are only expected where background levels are high, and traffic congestion levels are high. The YSAQMD's preliminary screening methodology for localized CO emissions provides a conservative indication of whether project-generated vehicle trips would result in the generation of CO emissions that would contribute to an exceedance of AAQS. Per the YSAQMD screening methodology, if either of the following results at any street or intersection affected by a project, after implementation of mitigation,[33] the project has the potential to result in localized CO emissions that could violate CO standards:

- Degrade the peak hour LOS on one or more streets or at one or more intersections in the project vicinity from an acceptable LOS (i.e., LOS A, B, C, or D) to an unacceptable LOS (i.e., LOS E or F); or
- Increase a traffic delay by 10 or more seconds on one or more streets or at one or more intersections in the project vicinity where a peak hour LOS of F already exists.

As discussed in the Method of Analysis section above, anticipated operations of the intersection of Russell Boulevard, Anderson Road, and La Rue Road would exceed the YSAQMD's screening thresholds under the Cumulative Plus Project Condition.

[33] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts* [p. 21]. July 11, 2007. Available at: http://www.ysaqmd.org/documents/CEQAHandbook2007.pdf. Accessed June 2019.

Consequently, CO concentrations resulting from operations of the intersection of Russell Boulevard, Anderson Road, and La Rue Road under the Cumulative Plus Project condition were estimated using the CALINE4 roadway dispersion model. CO concentrations were modeled during both 1-hour and 8-hour scenarios for the nearest sensitive receptor. As shown in Table 4.1-9, the highest predicted concentrations of CO associated with the intersection of Russell Boulevard, Anderson Road, and La Rue Road under Cumulative Plus Project conditions would be well below the 1-hour and 8-hour CAAQS for CO at the nearest sensitive receptor. It should be noted that the 8-hour CO concentrations were modeled under the very conservative assumptions that traffic levels throughout the entire 8-hour modeling period equaled the traffic levels at the PM peak hour. Despite this conservative approach, as demonstrated in Table 4.1-9, operations of the intersection of Russell Boulevard, Anderson Road, and La Rue Road under the Cumulative Plus Project condition would not be expected to generate localized CO emissions that would contribute to an exceedance of CAAQS. The intersection of Russell Boulevard, Anderson Road, and La Rue Road under the Cumulative Plus Project condition is considered to experience the most severe operating condition, from a CO emissions standpoint. Operations at all other intersections would result in lower concentrations of CO emissions, and analysis of the CO emissions from operations of the Russell Boulevard, Anderson Road, and La Rue Road intersection under the Cumulative Plus Project condition represent a worst-case scenario. Because the worst-case intersection of Russell Boulevard, Anderson Road, and La Rue Road would not result in impacts related to CO concentrations, the proposed project would not expose sensitive receptors to substantial concentrations of localized CO.

Table 4.1-9
Maximum Predicted CO Concentrations (parts per million)

Averaging Period	CO Concentration	CAAQS	Exceeds Threshold?
1-Hour Average	1.2	20.0	**NO**
8-Hour Average	1.2	9.0	**NO**

Source: CALINE4, July 2019 (see Appendix E).

TAC Emissions

The proposed project construction could involve new emissions of TACs. Potential sources of TAC emissions associated with the proposed project are further addressed below.

The CARB Handbook provides recommendations on siting new sources of TACs near existing sensitive receptors. Operational-related emissions of TACs are typically associated with stationary diesel engines or land uses that involve heavy truck traffic or idling. The residential development included as part of the proposed project would not involve long-term operation of any stationary diesel engines or other major on-site stationary source of TACs, and a small number of heavy-duty trucks would occur as a result of the retail development included as part of the proposed project. The CARB considers land uses that experience 100 daily heavy-duty truck trips or more to be a significant source of DPM.[34] Because the proposed project would not result in 100 or more heavy-duty truck per day at the site, operation of the retail portion of the proposed

[34] California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective*. April 2005.

project would not be considered a substantial source of DPM. However, given the proximity of the project site to residences and schools, construction-related activities have the potential to generate concentration of TACs, specifically DPM, from on-road haul trucks and off-road equipment exhaust emissions near existing sensitive receptors.

Construction-Related DPM Emissions

While the proposed project could create new sources of TACs near existing sensitive receptors during construction activities, construction is temporary and occurs over a relatively short duration in comparison to the operational lifetime of the proposed project. While methodologies for conducting health risk assessments are associated with long-term exposure periods (e.g., over a 30-year period), construction activities associated with the proposed project would occur over an approximately 27-month period. Nonetheless, given the project's proximity to existing sensitive receptors, the potential impacts on nearby sensitive receptors associated with DPM from construction activities at the project site has been evaluated.

Details regarding the construction DPM analysis assumptions are described in the Method of Analysis section above. As described, the increase in cancer risk and non-cancer hazard index was calculated for the maximally exposed receptor. The AERMOD results indicate that the maximally exposed receptor (i.e., the receptor exposed to the highest pollutant concentrations) associated with construction of the proposed project would be located within the residential development to the west of the project site, across Sycamore Lane. The maximally exposed receptor would experience the highest level of cancer risk and non-cancer hazard index. All other sensitive receptors in proximity to the project site, including the schools in the project area, as well as the other surrounding residential areas, would be exposed to lower pollutant concentrations and, subsequently, lower levels of cancer risk and non-cancer hazard index.

Considering that the project site is in proximity to existing residences, preschools, and existing commercial developments, the possibility exists that a receptor could reside in proximity to the project site and attend one of the nearby schools. Should a receptor both reside and attend school in proximity to the project site, the receptor would be exposed to emissions throughout the entire construction period, both at the receptor's residence and at school. To provide a worst-case analysis, the maximally exposed receptor was assumed to be exposed to the maximum pollutant concentration both at home and at school. The approach is considered a worst-case analysis because actual emissions concentrations would vary within the vicinity of the project site. For example, if an individual receptor resided at a residence located west of the site, where the highest pollutant concentrations are expected to occur, also attended one of the schools in the project vicinity, the receptor would be exposed to a relatively lower concentration of emissions while at the school compared to the concentrations experienced while at the residence. In such a situation, the actual exposure of the receptor to DPM and UFPs would be less than the levels analyzed within this EIR. Consequently, the analysis within this EIR presents an environmental worst-case scenario, and actual cancer risk and non-cancer hazard indices experienced by the maximally exposed receptor and all other receptors in the project vicinity would be lower than those presented within this EIR.

The increases in cancer risk and non-cancer hazard index at the maximally exposed resident resulting from exposure to the maximum quantified concentration of DPM over the entire work period are shown in Table 4.1-10.

Table 4.1-10
Maximum Cancer Risk and Hazard Index Associated With Unmitigated Project Construction DPM

	Cancer Risk (per million persons)	Non-Cancer Hazard Index
At Maximally Exposed Receptor	49.82	0.17
Thresholds of Significance	*10*	*1.0*
Exceeds Thresholds?	**YES**	**NO**

Sources: CalEEMod, AERMOD, and HARP 2 RAST, June 2019 (see Appendix E).

As shown in Table 4.1-10, the proposed project would result in a hazard index for the maximally exposed resident below the applicable YSAQMD threshold of significance. However, the anticipated concentration of DPM due to unmitigated construction of the proposed project would result in an increased risk of cancer for the maximally exposed resident of 49.82 cases per one million persons. It should be noted that in order to provide a worst-case scenario for project analysis, the Health Risk Assessment prepared for the proposed project assumed that the maximally exposed resident would be exposed to the maximum concentration of DPM for the entire construction period. In reality, the exposure of nearby receptors to construction-related DPM would vary as residents or students would travel to and from the project area for various reasons. Should the maximally exposed receptor be exposed to concentrations of DPM lower than the concentration assumed in the health risk assessment prepared for this analysis, the maximally exposed resident would experience a cancer risk and non-cancer hazard risk less than that which is presented in Table 4.1-10.

Nevertheless, construction-activity related to implementation of the proposed project would exceed the YSAQMD's threshold for increased cancer risk being used for this analysis. Thus, a potentially significant impact related to TAC emissions would occur during construction.

Operational-Related TAC Emissions

Operational-related emissions of TACs are typically associated with stationary diesel engines or land uses that involve heavy truck traffic or idling. The CARB's Handbook includes facilities (distribution centers) associated with 100 or more heavy-duty diesel trucks per day as a source of substantial DPM emissions. The project is not a distribution center, and, while heavy-duty diesel trucks may transport goods to the project site, the use of heavy-duty truck trips would be well below the CARB's Handbook 100 trips per day screening level. Furthermore, State regulations prohibit idling of diesel trucks for more than five minutes. Trucks operating within the site would be subject to State regulations, which would ensure that emissions from trucks operating in the northernmost drive aisle would be limited to the extent feasible. Accordingly, the proposed project would not be anticipated to represent a significant source of DPM from mobile sources.

Considering the above, the proposed project would not be considered a significant source of mobile or stationary DPM emissions, and operation of the proposed project would not result in an increase in cancer risk levels of more than 10 in one million persons or a non-cancer hazard index greater than 1.0, and existing nearby sensitive receptors would not be exposed to substantial pollutant concentrations.

Gasoline Dispensing Facility

The proposed project would place residences within the vicinity of an existing GDF, located adjacent to the southeast corner of the project site, at the intersection of Russell Boulevard and Anderson Road. The CARB Handbook provides recommendations for siting new sensitive land uses near existing sources typically associated with significant levels of TAC emissions, such as GDFs. However, the California Supreme Court decision in the case of *California Building Industry Association v. Bay Area Air Quality Management District (2015) 62 Cal. 4th 369* clarified that CEQA does not require lead agencies to analyze the impact of existing environmental conditions on a project's future users or residents unless the project will exacerbate the existing environmental hazards or conditions. This limits the CEQA analysis of impacts from existing sources that emit odors and TACs on new receptors from a proposed development project, unless the situation is specifically required to be analyzed by statute (such as a school). While existing sources that emit odors and TACs may not be considered a CEQA impact, local jurisdictions have the authority to protect the public health, safety, and welfare of their communities through their police powers.[35] While not required pursuant to CEQA, in order to address potential public health concerns, the City has chosen to address potential impacts related to the existing GDF on future residential receptors.

The CARB Handbook recommends a setback of 300 feet from a sensitive receptor to a large GDF (defined as a facility with a throughput of 3.6 million gallons per year or greater) or a setback of 50 feet from a typical GDF (defined as a facility with a throughput of less than 3.6 million gallons per year).[36] The current gas station permit limits the annual throughput of the gas station to 3.6 million gallons or less;[37] thus, the applicable setback distance as recommended by the CARB would be 50 feet from the nearest sensitive receptor.

As shown in Figure 4.1-1, the nearest proposed residential unit would be approximately 195 feet away from the GDF, and thus, would be beyond the CARB's recommended setback zone. Furthermore, based on a Health Risk Assessment conducted prior to issuance of the gas station permit by YSAQMD, the cancer risk was determined to be below 10 in one million cases at a reference distance of 105 feet.[38] Accordingly, development of the residences 195 feet away from the gas station would not put sensitive receptors at risk of health hazards associated with TACs from the gas station.

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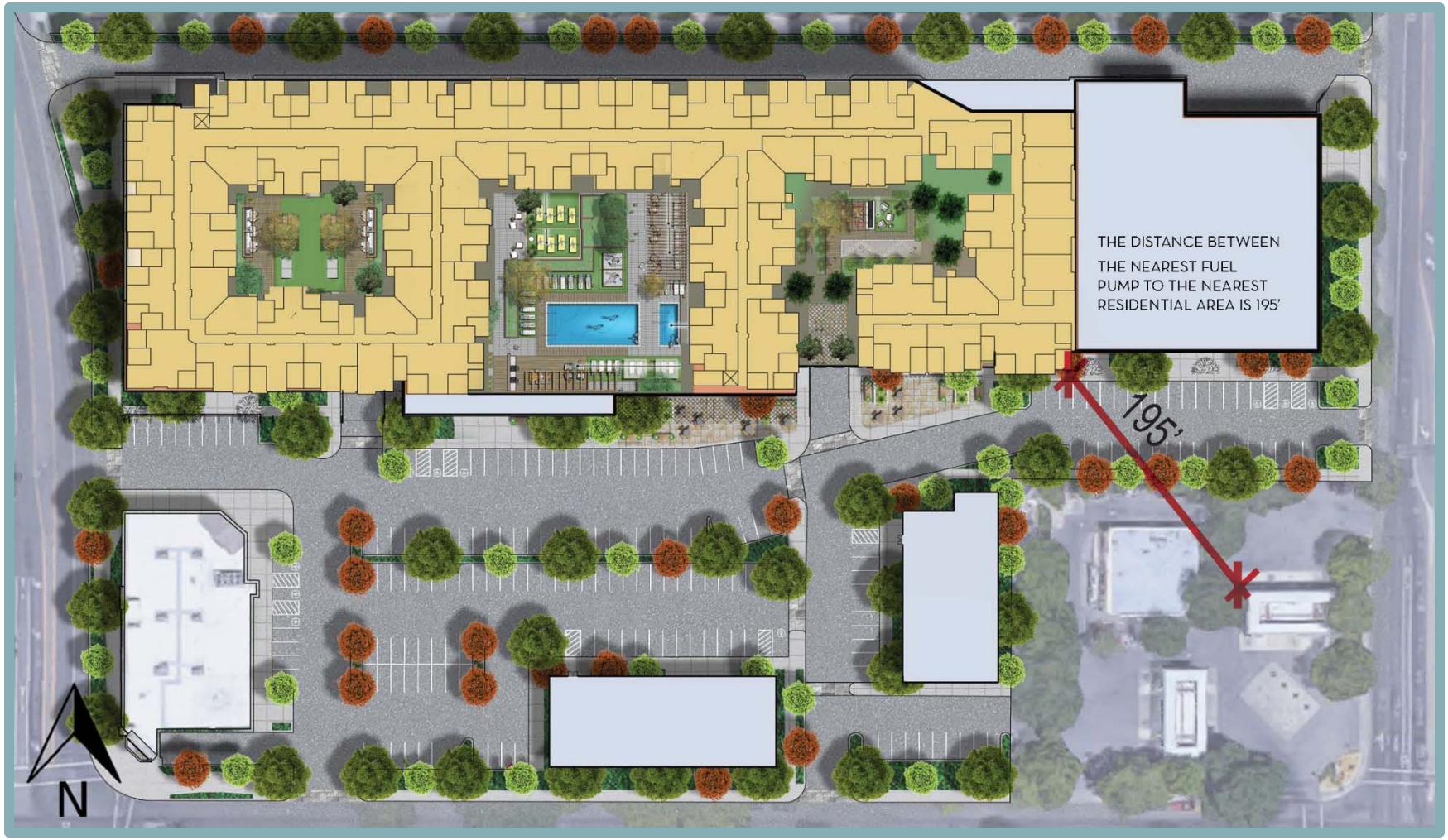
35 California Constitution, Article XI, Section 7. Available at: http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=CONS&sectionNum=SEC.%207.&article=XI. Accessed May 2018.

36 California Environmental Protection Agency California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective [pg. 32].* April 2005.

37 Yolo-Solano Air Quality Management District. *Permit to Operate P-12-91(a3)*. February 15, 2019.

38 Yolo-Solano Air Quality Management District. *Authority to Construct C-09-45*. March 11, 2009.

Figure 4.1-1
Distance Between Nearest Residential Area and Existing GDF



In addition to the proposed residences, the project would include construction of new commercial structures approximately 70 feet away from the existing GDF. The CARB does not consider commercial uses to be sensitive receptors, as children, seniors, and/or individuals with health conditions are not expected to be present at commercial uses for extended periods of time. Furthermore, the commercial structures would be outside of the CARB's recommended 50-foot setback distance.

Considering the above, the proposed project would not result in exposure of sensitive receptors to excess pollutant concentrations from the existing GDF operations.

Conclusion

Based on the above analysis, the operation of the proposed project would not be anticipated to result in the production of substantial concentrations of DPM or localized CO that would expose sensitive receptors to substantial pollutant concentrations. However, construction activities related to the proposed project would have the potential to result in DPM concentrations that could result in an increased cancer risk for nearby receptors in excess of the applicable threshold of significance. Therefore, the proposed project would have the potential to result in the exposure of sensitive receptors to substantial concentrations of DPM, and a ***significant*** impact would result.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the construction-related exhaust emissions of $PM_{2.5}$. Because emissions of $PM_{2.5}$ is a metric for DPM emissions, and DPM emissions are the TAC of concern, by reducing $PM_{2.5}$ emissions, the mitigation below would reduce the anticipated DPM concentration and the associated cancer risk at the maximally exposed receptor. The cancer risk at the maximally exposed receptor would be reduced as shown in Table 4.1-11.

Table 4.1-11
Maximum Mitigated Cancer Risk Associated with Project Construction DPM

	Cancer Risk (per million persons)
Unmitigated	49.82
Mitigated	3.88

Note: The use of CARB Tier 4 engines was applied to all construction equipment used on the project site in this modeling scenario. Tier 4 engines reduce the amount of PM emissions, including DPM, from equipment.

Sources: CalEEMod, AERMOD, and HARP 2 RAST, June 2019 (see Appendix E).

As shown in Table 4.1-11, with implementation of the following mitigation measure, the cancer risk at the maximally exposed receptor associated with the proposed project's construction activity would be reduced from an increase of 49.82 cases in one million persons to an increase of 3.88 cases in one million persons, which would be below the threshold of significance of an increase of 10 cases in one million persons being applied in this analysis. Therefore, implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

4.1-3 Prior to approval of any grading or demolition plans, the project applicant shall show on the plans via notation that the contractor shall ensure that all

off-road diesel-powered equipment over 25 horsepower to be used in the construction of the project (including owned, leased, and subcontractor equipment) shall meet California Air Resources Board (CARB) Tier 4 emissions standards or cleaner. The plans shall be submitted for review and approval to the Department of Community Development and Sustainability. In addition, all off-road equipment operating at the construction site must be maintained in proper working condition according to manufacturer's specifications. Idling shall be limited to 5 minutes or less in accordance with the Off-Road Diesel Fueled Fleet Regulation as required by CARB.

Portable equipment over 50 horsepower must have either a valid District Permit to Operate (PTO) or a valid statewide Portable Equipment Registration Program (PERP) placard and sticker issued by CARB.

Idling shall be limited to five minutes or less for all on-road related and/or delivery trucks in accordance with CARB's On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation. Clear Signage regarding idling restrictions should be placed at the entrances to the construction site.

Cumulative Impacts and Mitigation Measures

A project's criteria pollutant emissions may be individually limited, but cumulatively considerable when taken in combination with past, present, and future development projects. The geographic context for the proposed project's cumulative air quality analysis includes the City of Davis and surrounding areas within the SVAB.

4.1-4 Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). Based on the analysis below, the project's incremental contribution to this significant cumulative impact is *less than cumulatively considerable*.

The proposed project is within an area currently designated as nonattainment for Ozone, PM_{10}, and $PM_{2.5}$. By nature, air pollution is largely a cumulative impact. Thus, the proposed project, in combination with other proposed and pending projects in the region would significantly contribute to air quality effects within the SVAB, resulting in an overall significant cumulative impact. However, any single project is not sufficient enough in size to, alone, result in nonattainment of AAQS. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's incremental impact on air quality would be considered significant. In developing thresholds of significance for air pollutants, YSAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the significance thresholds, as identified by the YSAQMD and shown in Table 4.1-6 above, that project's emissions would be

cumulatively considerable, resulting in a significant adverse air quality impact to the region's existing air quality conditions.[39] As discussed above, under Impacts 4.1-1 and 4.1-2, the construction and operational emissions of the proposed project would be below the applicable thresholds of significance. Therefore, the proposed project's emissions would not be considered cumulatively considerable.

The YSAQMD is part of the Sacramento Federal Nonattainment Area (SFNA) for ozone. The YSAQMD, in concert with other air districts within the SFNA, has adopted a regional 8-hour Ozone Attainment and Regional Further Progress Plan to demonstrate the region's attainment of the 2008 federal ozone standard. The plan relies on growth estimates provided by SACOG and included in the Metropolitan Transportation Plan/Sustainable Communities Strategies (MTP/SCS). Growth forecasts within the MTP/SCS are based on growth estimates from general plans for cities and counties within the SACOG area. Using general plan estimates, the MTP/SCS identified growth forecasts for the SACOG region, and identified the project site as within an Established Community that would experience a range of low to high density residential, commercial, office, and industrial uses.[40] The site has a current General Plan designation of Community Retail. Under the Community Retail designation, residential uses are allowed with approval of a Conditional Use Permit. However, the proposed project would require an amendment to the City's General Plan text to create a new land use designation of Mixed Use Urban Retail to allow for the mix of retail and residential uses at the proposed density. Although the proposed project includes a request for redesignation of the project site, the proposed development would fall within one of SACOG's Transit Priority Areas. Per the letter provided by SACOG (see Appendix A), the proposed project qualifies as a Transit Priority Area because the project would involve greater than 50 percent residential uses, has a minimum density of 20 units per acre, and is located within 0.5-mile of a high-quality transit corridor. Furthermore, the proposed project is an infill project within an Established Community designation of the MTP/SCS for the City of Davis. Within the Established Community, the MTP/SCS forecasts a range of low- to high-density residential, commercial, office, and industrial uses. The proposed project's land uses fall within the range of general uses, densities, and building intensities. Thus, development of the proposed project would be considered consistent with the overall goals within SACOG's MTP/SCS.

The MTP/SCS integrates land use and transportation planning to achieve improvements in air quality through a reduction in the use of single-passenger vehicles. Thus, the proposed project would result in operational emissions below YSAQMD's thresholds, while also contributing to regional air quality emission reductions related to implementation of the MTP/SCS. Therefore, the proposed project's incremental contribution to cumulative regional air quality impacts would be ***less than cumulatively considerable***.

Mitigation Measure(s)

None required.

[39] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts* [pg. 7]. July 11, 2007. Available at: http://www.ysaqmd.org/documents/CEQAHandbook2007.pdf. Accessed July 2019.

[40] Sacramento Area Council of Governments. *2016 Metropolitan Transportation Plan Sustainable Communities Strategy* [Appendix E-3, pg. 148]. February 18, 2016.

4.1-5 Expose sensitive receptors to cumulatively substantial pollutant concentrations. Based on the analysis below the cumulative impact is *less than significant*.

With regard to TAC emissions, cumulative impacts from TAC exposure may occur when receptors are exposed to multiple sources of TAC emissions, which collectively increase health risks for individual receptors. As discussed in Impact 4.1-3, the only substantial source of TAC emissions related to project implementation would be DPM emissions resulting from project construction. However, implementation of Mitigation Measure 4.1-3 would ensure that project construction would not result in significant exposure of nearby receptors to DPM. The proposed project would not involve any other sources of TACs that could act cumulatively with construction-related DPM to increase health risks to nearby receptors. On-site construction activity would occur prior to occupancy of the proposed residential units; therefore, future residents would not be exposed to health risks from construction of the proposed project. However, construction-related DPM emissions at the maximally exposed receptor could act cumulatively with other existing sources of TACs to result in cumulatively considerable risks. Due to the potential for project-related construction activity to act cumulatively with existing sources of TACs to expose nearby receptors to substantial pollutant concentrations, nearby existing sources of TACs are considered in combination with DPM from project construction activity.

Health risks from TAC exposures are generally localized to the area surrounding the source of TACs; thus, cumulative health risk analyses typically consider only those sources of TACs within 1,000 feet of a receptor. In the case of the proposed project, the only source of TACs within 1,000 feet is the GDF located at the southwestern corner of the project site. Although other substantial sources of TACs are not located within 1,000 feet of the project site, State Route (SR) 113 is located approximately 1,700 feet to the west of the project site. The City recently conducted a health risk analysis for the Davis Live project site, which analyzed the health risks to residents of the Davis Live project site from operations of SR 113. Although SR 113 is outside of the 1,000-foot radius from the project site, because recent data is available for analysis, health risks from SR 113 are considered in this cumulative analysis.

Considering the disparate nature of the foregoing sources of TACs, no one receptor would be exposed to the maximum health risks from all three sources. For instance, while the maximum health risks from operations of the GDF occur 105 feet away from the GDF, the maximum health risk from construction of the proposed project occurs to the west of the project site, at a location that is approximately 740 feet west of the GDF. Thus, the receptor exposed to the maximum health risks from construction of the proposed project would experience health risks from the GDF far below those estimated for the receptor exposed to the maximum GDF health risks. Similarly, the receptor exposed to the maximum health risks from construction of the proposed project is located approximately 670 feet further east of SR 113 than the Davis Live project site. Thus, the receptor exposed to the maximum health risks from construction would experience a much lower health risk from SR 113 than receptors at the Davis Live project site, because the receptor exposed to the maximum health risks from construction is almost twice as far from SR 113 as the Davis Live project site.

Nevertheless, to provide a conservative analysis, this analysis considers that the maximally exposed receptor in the project area is exposed the maximum health risk from project construction-related DPM, GDF emissions, and the same health risk as residents at the Davis Live project site. Under the conservative assumptions, the maximum cumulative health risk is presented in Table 4.1-12 below.

Table 4.1-12
Cumulative Cancer Risk

	Cancer Risk (per million persons)
Construction-Related DPM[1]	3.88
GDF Operations	9.9
SR 113	0.00
Cumulative Health Risk	**13.78**
Threshold of Significance[2]	*100*
Exceeds Thresholds?	**NO**

[1] Cancer risk from construction-related DPM reflects mitigated cancer risk presented in Table 4.1-11.

[2] The City, as lead agency, has selected BAAQMD's cumulative cancer risk standard for use in the analysis of the cumulative TAC emissions, associated with project-related TAC emissions in combination with existing cumulative TAC emissions, on nearby sensitive receptors.

Sources:

- ***CalEEMod, AERMOD, and HARP 2 RAST, June 2019; (see Appendix E).***
- ***Yolo-Solano Air Quality Management District. Authority to Construct C-09-45. March 11 ,2009.***
- ***City of Davis Department of Community Development and Sustainability. Davis Live Project Appendix N Infill Environmental Checklist. July 2018.***

As shown in Table 4.1-12, even if a single receptor was exposed to the maximum health risks from all TACs in the vicinity, the maximally exposed receptor would experience a cumulative cancer risk far below the cumulative risk threshold being applied. Thus, cumulative impacts in the project area related to substantial concentrations of TACs would be less than significant.

Because the proposed project would only contribute to cumulative TAC concentrations in the project area during construction activities, which have been included in the health risk analysis presented above, the proposed project's contribution to cumulative concentrations of TACs would not result in the exposure of sensitive receptors to cumulatively substantial concentrations of TACs. The cumulative impact of the proposed project would, therefore, be considered ***less than significant***.

Mitigation Measure(s)

None required.