Section 3.2
Air Quality

This section describes the regulatory setting and environmental setting for air quality. It also describes the air quality impacts that would result from implementation of the San Rafael Transit Center Replacement Project (proposed project) and other build alternatives and mitigation measures that would reduce significant impacts, where feasible and appropriate. Impacts related to the No-Project Alternative are discussed in Chapter 5, Alternatives to the Project.

3.2.1 Existing Conditions

3.2.1.1 Regulatory Setting

The federal Clean Air Act (CAA) and its subsequent amendments form the basis for the nation's air pollution control effort. The United States Environmental Protection Agency (EPA) is responsible for implementing most aspects of the CAA. A key element of the CAA is the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. The CAA delegates enforcement of the NAAQS to the states. In California, the California Air Resources Board (CARB) is responsible for enforcing air pollution regulations and ensuring the NAAQS and California Ambient Air Quality Standards (CAAQS) are met. CARB, in turn, delegates regulatory authority for stationary sources and other air quality management responsibilities to local air agencies. The Bay Area Air Quality Management District (BAAQMD) is the local air agency for the project area. The following sections provide more detailed information on federal, state, and local air quality regulations that apply to the proposed project.

Federal

Clean Air Act and National Ambient Air Quality Standards

The CAA was first enacted in 1963 and has been amended in 1965, 1967, 1970, 1977, and 1990. The CAA establishes federal air quality standards, known as NAAQS, for six criteria pollutants and specifies future dates for achieving compliance. The CAA also mandates that the states submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 CAA amendments identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. Table 3.2-1 shows the NAAQS currently in effect for each criteria pollutant, as well as the CAAQS (discussed further below).

Table 3.2-1. Federal and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards[a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None[b]	None[b]
	8–hour	0.070 ppm	0.070 ppm	0.070 ppm
Carbon Monoxide (CO)	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Coarse Particulate Matter (PM_{10})	24-hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
	Annual mean	20 μg/m^3	None	None
Fine Particulate Matter ($PM_{2.5}$)	24-hour	None	35 μg/m^3	35 μg/m^3
	Annual mean	12 μg/m^3	12.0 μg/m^3	15 μg/m^3
Nitrogen Dioxide (NO_2)	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur Dioxide (SO_2)[c]	Annual mean	None	None	None
	24-hour	0.04 ppm	None	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day average	1.5 μg/m^3	None	None
	Calendar quarter	None	1.5 μg/m^3	1.5 μg/m^3
	3-month average	None	0.15 μg/m^3	0.15 μg/m^3
Sulfates	24-hour	25 μg/m^3	None	None
Visibility-Reducing Particles	8-hour	-[c]	None	None
Hydrogen Sulfide	1-hour	0.03 ppm	None	None
Vinyl Chloride	24-hour	0.01 ppm	None	None

Source: CARB 2016

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for SIPs.

[c] CAAQS for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer, which is visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.

ppm = parts per million; μg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter

Non-Road Diesel Rule

EPA has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and locomotives. New equipment, including heavy-duty trucks and off-road construction, is required to comply with these emission standards.

Corporate Average Fuel Economy Standards

The Corporate Average Fuel Economy Standards (CAFE) were first enacted in 1975 to improve the average fuel economy of cars and light-duty trucks. The National Highway Traffic Safety Administrative (NHTSA) sets the CAFE standards, which are regularly updated to require additional improvements in fuel economy. The standards were last updated in October 2012 to apply to new passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2017 through 2025, and are equivalent to 54.5 miles per gallon. However, On August 2, 2018, NHTSA and EPA proposed to amend the fuel efficiency standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 per the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule. On September 19, 2019, EPA and NHTSA issued a final action on the One National Program Rule, which is considered Part 1 of the SAFE Vehicles Rule and a precursor to the proposed fuel efficiency standards. The One National Program Rule enables EPA/NHTSA to provide nationwide uniform fuel economy and greenhouse gas (GHG) vehicle standards, specifically by (1) clarifying that federal law preempts state and local tailpipe GHG standards, (2) affirming NHTSA's statutory authority to set nationally applicable fuel economy standards, and (3) withdrawing California's CAA preemption waiver to set state-specific standards.

EPA and NHTSA published their decisions to withdraw California's waiver and finalize regulatory text related to the preemption on September 27, 2019, in Volume 84, Number 188 of the *Federal Register*, page 51310. The agencies also announced that they will later publish the second part of the SAFE Vehicles Rule (i.e., the standards). California, 22 other states, the District of Columbia, and two cities filed suit against the proposed One National Program Rule on September 20, 2019.[1] The lawsuit requests a "permanent injunction prohibiting Defendants from implementing or relying on the Preemption Regulation," but does not stay its implementation during legal deliberations. Part 1 of the SAFE Vehicles Rule went into effect on November 26, 2019, and Part 2 went into effect on March 30, 2020. The SAFE Vehicles Rule will decrease the stringency of CAFE standards to 1.5 percent each year through model year 2026, as compared with the standards issued in 2012, which would have required annual increases of about 5 percent. California, 22 other states, and the District of Columbia filed a petition for review of the final rule on May 27, 2020. The fate of the SAFE Vehicles Rule remains uncertain in the face of pending litigation and potential rulemakings by the Biden Administration.

State

California Clean Air Act and California Ambient Air Quality Standards

In 1988, the state legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. The CCAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Unlike the CAA, the CCAA does not set precise attainment deadlines. Instead, the CCAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride. The CAAQS and NAAQS are shown above in Table 3.2-1.

CARB and local air districts bear responsibility for meeting the CAAQS, which are to be achieved through district-level air quality management plans incorporated into a SIP. In California, EPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

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[1] *California et al. v. United States Department of Transportation et al.*, 1:19-cv-02826, U.S. District Court for the District of Columbia.

The CCAA substantially adds to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA also emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. The CCAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution.

Air Toxic Control Measure

In 2004, CARB developed multiple measures under its Air Toxic Control Measure to address specific mobile- and stationary-source categories that can have an impact on the public health of communities. The measures mainly focused on reducing public exposure to diesel particulate matter (DPM) and toxic air contaminant (TAC) emissions. The Air Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling required heavy-duty trucks with a gross vehicle weight rating greater than 10,000 pounds, including buses and sleeper berth–equipped trucks, to not idle the primary engine for more than 5 minutes at any given time or operate an auxiliary power system for more than 5 minutes within 100 feet of a restricted area (CARB 2005).

Statewide Truck and Bus Regulation

CARB also focused its efforts to reduce DPM, oxides of nitrogen (NO_X), and other criteria pollutants from diesel-fueled vehicles by adopting the Truck and Bus Regulation in 2008. This regulation applied to any diesel-fueled, dual-fuel, or alternative diesel-fueled vehicle that would travel on public highways, yard trucks with on-road engines, yard trucks with off-road engines used for agricultural operations, school buses, and vehicles with a gross vehicle weight greater than 14,000 pounds. The purpose of the regulation is to require nearly all trucks and buses registered in the state to have a 2010 or newer model engine year by 2023. Compliance schedules have been established for lighter vehicles (14,000–26,000 gross vehicle weight rating) and heavier vehicles (over 26,001 gross vehicle weight rating) (CARB 2020a). Beginning January 1, 2020, only vehicles that meet the requirements of the Trucks and Bus Regulation will be allowed to register with the California Department of Motor Vehicles.

State Tailpipe Emission Standards

Like EPA at the federal level, CARB has established a series of increasingly strict emission standards for new off-road diesel equipment and on-road diesel trucks operating in California. New equipment used to construct the proposed project would be required to comply with the standards.

Carl Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The program is a partnership between CARB and the local air districts throughout the state to reduce air pollution emissions from heavy-duty engines. Locally, the air districts administer the program.

Toxic Air Contaminant Regulation

California regulates TACs primarily through the Toxic Air Contaminant Identification and Control Act (Tanner Act) and the Air Toxics "Hot Spots" Information and Assessment Act of 1987 ("Hot Spots" Act). In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Tanner Act created California's program to reduce exposure to air toxics. The "Hot Spots" Act supplements the Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

Local

Bay Area Air Quality Management District

At the local level, responsibilities of air quality districts include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by the California Environmental Quality Act (CEQA). The air quality districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

The proposed project falls under the jurisdiction of BAAQMD. BAAQMD has local air quality jurisdiction over projects in the San Francisco Bay Area Air Basin (SFBAAB) including Marin County. BAAQMD developed advisory emission thresholds to assist CEQA lead agencies in determining the level of significance of a project's emissions, which are outlined in its *California Environmental Quality Act Air Quality Guidelines* (BAAQMD 2017a). BAAQMD has also adopted air quality plans to improve air quality, protect public health, and protect the climate, including the 2017 Clean Air Plan: *Spare the Air, Cool the Climate* (BAAQMD 2017b).

The 2017 Clean Air Plan was adopted by BAAQMD on April 19, 2017. The 2017 Clean Air Plan updates the prior 2010 Bay Area ozone (O_3) plan and outlines feasible measures to reduce O_3; provides a control strategy to reduce particulate matter (PM), air toxics, and GHGs in a single, integrated plan; and establishes emission control measures to be adopted or implemented. The 2017 Clean Air Plan contains the following primary goals; consistency with these goals is evaluated in this section:

- Protect Air Quality and Health at the Regional and Local Scale: Attain all state and national air quality standards and eliminate disparities among Bay Area communities in cancer health risk from TACs.
- Protect the Climate: Reduce Bay Area GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050; the 2017 Clean Air Plan is the most current applicable air quality plan for the air basin and consistency with this plan is the basis for determining whether the proposed project would conflict with or obstruct implementation of an air quality plan.

In addition to air quality plans, BAAQMD adopts rules and regulations to improve existing and future air quality. The proposed project may be subject to the following district rules:

- Regulation 2, Rule 5 (New Source Review of Toxic Air Contaminants): This regulation outlines guidance for evaluating TAC emissions and their potential health risks.
- Regulation 6, Rule 1 (PM): This regulation restricts emissions of PM darker than a 1 on the Ringlemann Chart to less than 3 minutes in any 1 hour.

- Regulation 7 (Odorous Substances): This regulation establishes general odor limitations on odorous substances and specific emission limitations on certain odorous compounds.
- Regulation 8, Rule 3 (Architectural Coatings): This regulation limits the quantity of reactive organic gas (ROG) in architectural coatings.
- Regulation 11, Rule (Hazardous Pollutants – Asbestos Demolition, Renovation, and Manufacturing): This regulation, which incorporates EPA's asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations, controls emissions of asbestos to the atmosphere during demolition, renovation, and transport activities.

~~City of~~ San Rafael General Plan 2040

~~The~~ *~~City of~~ San Rafael General Plan 2040~~2020~~* was adopted in 2021~~2004~~. The ~~Air and Water Quality Element and Circulation~~Conservation and Climate Change Element outlines goals and policies that will improve air quality in the City of San Rafael (City). The relevant policies are summarized ~~as follows~~below. For the full text of the policies, refer to the Conservation and Climate Change Element (City of San Rafael 2021~~16~~):

~~Air and Water Quality Element~~

Goal C-2: Clean Air. Reduce air pollution to improve environmental quality and protect public health.

- **Policy C-2.1: State and Federal Air Quality Standards.** Continue to comply with state and federal air quality standards.
  - **Program C-2.1A: Cooperation with Other Agencies.** Work with the Bay Area Air Quality Management District (BAAQMD) and other agencies to ensure compliance with air quality regulations and proactively address air quality issues.
- **Policy C-2.2: Land Use Compatibility and Building Standards.** Consider air quality conditions and the potential for adverse health impacts when making land use and development decisions.
  - **Program C-2.2A: Protection of Sensitive Receptors**. Use the development review process to require an evaluation of air quality impacts and the inclusion of measures to mitigate the exposure of sensitive receptors to both construction-related and long-term operational impacts.
- **Policy C-2.3: Improving Air Quality Through Land Use and Transportation Choices.** Recognize the air quality benefits of reducing dependency on gasoline-powered vehicles. Implement land use and transportation policies, supportable by objective data, to reduce the number and length of car trips, improve alternatives to driving, reduce vehicle idling, and support the shift to electric and cleaner-fuel vehicles.
  - **Program C-2.3A: Air Pollution Reduction Measures.** Implement air pollution reduction measures as recommended by BAAQMD's Clean Air Plan and supporting documents to address local sources of air pollution in community planning. This should include Transportation Control Measures (TCM) and Transportation Demand Management (TDM) programs to reduce emissions associated with diesel and gasoline-powered vehicles.
- **Policy C-2.4: Particulate Matter Pollution Reduction.** Promote the reduction of particulate matter from roads, parking lots, construction sites, agricultural lands, wildfires, and other sources
  - **Program C-2.4A: Particulate Matter Exposure**. Through development review, require that Best Available Control Technology (BACT) measures (such as setbacks,

landscaping, paving, soil and dust management, and parking lot street sweeping) are used to protect sensitive receptors from particulate matter

- **Program C-2.4B: Wildfire Smoke**. Support efforts to reduce health hazards from wildfire smoke, such as limits on outdoor activities, access to respirators and air filtration systems, access to clean air refuge centers, and public education.
- **Program C-2.4C: Wood-Burning Stoves and Fireplaces.** Regulate wood-burning stoves and fireplaces to reduce particulate pollution.

- **Policy C-2.5: Indoor Air Pollutants**. Reduce exposure to indoor air pollutants such as mold, lead, and asbestos through the application of state building standards, code enforcement activities, education, and remediation measures.
- **Policy C-2.6: Education and Outreach**. Support public education regarding air pollution prevention and mitigation.
  - **Program C-2.6A: Air Quality Education Programs.** Actively participate in the air quality education programs of the BAAQMD. Use social media and other means of outreach to alert residents of Spare the Air days and associated recommendations.
  - **Program C-2.6B: Equipment and Generators**. Encourage the use of non-gasoline powered leaf blowers and other yard maintenance equipment, as well as clean-powered generators.

~~**AW-1. State and Federal Standards.** Continue to comply and strive to exceed state and federal standards for air quality for the benefit of the Bay Area.~~

~~**AW-3. Air Quality Planning with Other Processes.** Integrate air quality considerations with the land use and transportation processes by mitigating air quality impacts through land use design measures, such as encouraging project design that will foster walking and bicycling.~~

~~**AW-6. Education and Outreach.** Support public education of regarding air pollution and prevention and mitigation programs.~~

~~**AW-6b. Benefits of Transit-Oriented Development.** Assist in educating developers and the public on the benefits of pedestrian and transit-oriented development.~~

~~**Circulation Element**~~

~~**C-11. Alternative Transportation Mode Users.** Encourage and promote individuals to use alternative modes of transportation, such as regional and local transit, carpooling, bicycling, walking and use of low-impact alternative vehicles. Support development of programs that provide incentives for individuals to choose alternative modes.~~

~~**C-16. Transit Information.** Encourage the development and dissemination of local and regional transit information to facilitate greater use of transit systems. This includes service, educational and promotional information. Support efforts to provide transit information in languages other than English as needed.~~

3.2.1.2 Environmental Setting

The project area is within the SFBAAB. Ambient air quality is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The following sections summarize how air pollution moves through the air, water, and soil within the air basin, and how it is chemically changed in the presence of other chemicals and particles. This section also summarizes regional and local climate conditions, existing air quality conditions, and sensitive receptors that may be affected by project-generated emissions.

Pollutants of Concern

Criteria Pollutants

The federal and state governments have established ambient air quality standards for six criteria pollutants. These pollutants are PM, photochemical oxidants (including O_3), carbon monoxide (CO), sulfur oxides (SO_X), NO_X, and lead. O_3 is considered a regional pollutant because its precursors affect air quality on a regional scale. Pollutants such as CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead are considered local pollutants that tend to accumulate in the air locally. PM is both a regional and local pollutant. The primary pollutants that would be generated by the proposed project are O_3 precursors (i.e., NO_X and ROGs), CO, and PM (Reşitoğlu 2018).[2,3]

All criteria pollutants can have human health effects at elevated concentrations. The ambient air quality standards for these pollutants are set to protect public health and the environment with an adequate margin of safety (CAA Section 109). Epidemiological, controlled human exposure, and toxicology studies evaluate potential health and environmental effects of criteria pollutants and form the scientific basis for new and revised ambient air quality standards.

The principal characteristics and possible health and environmental effects from exposure to the primary criteria pollutants generated by the proposed project are discussed below.

Ozone, or smog, is photochemical oxidant that is formed when ROGs and NO_X (both byproducts of the internal combustion engine) react with sunlight. ROGs are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle use is the major source of hydrocarbons. Other sources of ROGs are emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. The two major forms of NO_X are nitric oxide and NO_2. Nitric oxide is a colorless, odorless gas that forms from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown, irritating gas formed by the combination of nitric oxide and oxygen. In addition to serving as an integral participant in O_3 formation, the NO_2 component of NO_X also acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.

O_3 poses a higher risk to those who already suffer from respiratory diseases (e.g., asthma), children, older adults, and people who are active outdoors. Exposure to O_3 at certain concentrations can make breathing more difficult, cause shortness of breath and coughing, inflame and damage the airways, aggravate lung diseases, increase the frequency of asthma attacks, and cause chronic obstructive pulmonary disease. Studies show associations between short-term O_3 exposure and non-accidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to O_3 may increase the risk of respiratory-related deaths (EPA 2020a). The concentration of O_3 at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding, for individuals exposed to 400 parts per billion of O_3

[2] As discussed above, there are also ambient air quality standards for SO_2, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. However, these pollutants are typically associated with industrial sources, which are not included as part of the project. Accordingly, they are not evaluated further.

[3] Most emissions of NO_X are in the form of nitric oxide. Conversion to NO_2 occurs in the atmosphere as pollutants disperse downwind. Accordingly, NO_2 is not considered a local pollutant of concern for the project and is not evaluated further.

for 2 hours including 1 hour of heavy exercise, that the least responsive individual experienced no symptoms or lung function changes while the most sensitive individual experienced a 50-percent reduction in forced expiratory volume along with severe coughing and shortness of breath (EPA 2016). Although the results vary, evidence suggests that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum O_3 concentration reaches 80 parts per billion (EPA 2016). The average background level of O_3 in the Bay Area is approximately 45 parts per billion (BAAQMD 2017b).

In addition to human health effects, O_3 has been tied to crop damage, typically in the form of stunted growth, leaf discoloration, cell damage, and premature death. O_3 can also act as a corrosive and oxidant, resulting in property damage such as the degradation of rubber products and other materials.

Carbon monoxide is a colorless, odorless toxic gas produced by incomplete combustion of hydrocarbons, such as gasoline or diesel fuel. High CO levels are of greatest concern during the winter, when periods of light winds combine with the formation of ground-level temperature inversions from evening through early morning. These conditions trap pollutants near the ground, reducing the dispersion of vehicle emissions. Moreover, motor vehicles exhibit increased CO emission rates at low air temperatures. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation. Exposure to CO at high concentrations can also cause fatigue, headaches, confusion, dizziness, and chest pain. There are no ecological or environmental effects of CO at or near existing background CO levels (CARB 2020b).

Particulate matter consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of particulates are now generally considered: inhalable coarse particles, or PM_{10}, and inhalable fine particles, or $PM_{2.5}$. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind on arid landscapes also contributes substantially to local particulate loading.

Particulate pollution can be transported over long distances and may adversely affect humans, especially people who are naturally sensitive or susceptible to breathing problems. Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms. Studies show that long-term exposure to $PM_{2.5}$ was associated with increased risk of mortality, ranging from a 6 to 13 percent increased risk per 10 micrograms per cubic meter ($\mu g/m^3$) of $PM_{2.5}$ (CARB 2010). Every 1 $\mu g/m^3$ reduction in $PM_{2.5}$ results in a 1-percent reduction in the mortality rate for individuals over 30 years old (CARB 2010). Studies also show an increase in overall mortality of approximately 0.5 percent for every 10 milligrams per cubic meter increase in PM_{10} measured the day before death (EPA 2005). PM_{10} levels have been greatly reduced since 1990. Peak concentrations have declined by 60 percent, and annual average values have declined by 50 percent (EPA 2005). Depending on its composition, both PM_{10} and $PM_{2.5}$ can also affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain (EPA 2020b).

Toxic Air Contaminants

Although ambient air quality standards have been established for criteria pollutants, no ambient standards exist for TACs. Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, CARB has consistently found that there are no levels or thresholds below which exposure is risk free. Individual TACs vary greatly in the risks they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment (OEHHA). The primary TACs of concern associated with the proposed project are asbestos and DPM.

Asbestos is the name given to several naturally occurring fibrous silicate minerals. Before the adverse health effects of asbestos were identified, asbestos was widely used as insulation and fireproofing in buildings, and it can still be found in some older buildings. It is also found in its natural state in rock or soil. The inhalation of asbestos fibers into the lungs can result in a variety of adverse health effects, including inflammation of the lungs, respiratory ailments (e.g., asbestosis, which is scarring of lung tissue that results in constricted breathing), and cancer (e.g., lung cancer and mesothelioma, which is cancer of the linings of the lungs and abdomen).

DPM is generated by diesel-fueled equipment and vehicles. Within the Bay Area, BAAQMD has found that of all controlled TACs, emissions of DPM are responsible for about 82 percent of the total ambient cancer risk (EPA 2020b). Short-term exposure to DPM can cause acute irritation (e.g., eye, throat, and bronchial), neurophysiological symptoms (e.g., lightheadedness and nausea), and respiratory symptoms (e.g., cough and phlegm). EPA has determined that diesel exhaust is “likely to be carcinogenic to humans by inhalation” (EPA 2003).

Odors

Offensive odors can be unpleasant and lead to citizen complaints to local governments and air districts. According to CARB’s *Air Quality and Land Use Handbook,* land uses associated with odor complaints typically include sewage treatment plants, landfills, recycling facilities, manufacturing facilities, and agricultural activities (CARB 2005). CARB provides recommended screening distances for siting new receptors near existing odor sources.

Climate and Meteorology

Although the primary factors that determine air quality are the locations of air pollutant sources and the amount of pollutants emitted from those sources, meteorological conditions and topography are also important factors. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients, interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Unique geographic features throughout the state define 15 air basins with distinctive regional climates. The air quality study area is in the Marin County Basin portion of the SFBAAB (BAAQMD 2017a).

Marin County is bounded on the west by the Pacific Ocean, on the east by San Pablo Bay, on the south by the Golden Gate Bridge, and on the north by the Petaluma Gap. Most of Marin County’s population lives in the eastern part of the county, in small, sheltered valleys (BAAQMD 2017a).

Although there are a few mountains above 1,500 feet in height, most of the terrain is only 800 to 1,000 feet high, which usually is not high enough to block the marine layer. Because of the wedge shape of the county, northeast Marin County is farther from the ocean than is the southeastern section. This extra distance from the ocean allows the marine air to be moderated by bayside conditions as it travels to northeastern Marin County. In southern Marin County, the distance from the ocean is short and elevations are lower, resulting in higher incidence of maritime air in that area (BAAQMD 2017a).

Wind speeds are highest along the west coast of Marin County, averaging about 8 to 10 miles per hour. The complex terrain in central Marin County creates sufficient friction to slow the air flow. At Hamilton Air Force Base, in Novato, the annual average wind speeds are only 5 miles per hour. The prevailing wind directions throughout Marin County are generally from the northwest (BAAQMD 2017a).

In the summer months, areas along the coast are usually subject to onshore movement of cool marine air. In the winter, proximity to the ocean keeps the coastal regions relatively warm, with temperatures varying little throughout the year. Coastal temperatures are usually in the high 50s in the winter and the low 60s in the summer. The warmest months are September and October (BAAQMD 2017a).

The eastern side of Marin County has warmer weather than the western side because of its distance from the ocean and because the hills that separate the eastern portion of the county from western portion occasionally block the flow of the marine air. The temperatures of cities next to the Bay are moderated by the cooling effect of the Bay in the summer and the warming effect of the Bay in the winter. For example, San Rafael experiences average maximum summer temperatures in the low 80s and average minimum winter temperatures in the low 40s. Inland towns such as Kentfield experience average maximum temperatures that are 2 degrees cooler in the winter and 2 degrees warmer in the summer (BAAQMD 2017a).

Air pollution potential is highest in eastern Marin County, where most of the population is in semi-sheltered valleys. In the southeast, the influence of marine air keeps pollution levels low. As development moves farther north, there is greater potential for air pollution to build up because the valleys are more sheltered from the sea breeze. While Marin County does not have many polluting industries, the air quality on its eastern side—especially along the U.S. Highway 101 corridor—may be affected by emissions from increasing motor vehicle use within and through the county (BAAQMD 2017a).

Existing Air Quality Conditions

Ambient Criteria Pollutant Concentrations

A number of ambient air quality monitoring stations are in the SFBAAB to monitor progress toward air quality standards attainment of the NAAQS and CAAQS. The NAAQS and CAAQS are discussed further under Section 3.2.1.1, Regulatory Setting. The nearest monitoring station to the proposed project is CARB's San Rafael monitoring station, within 0.10 mile of the project study area. This monitoring station reported data for all pollutants except CO. CO data for Marin County were obtained using EPA monitoring data.

Table 3.2-2 summarizes data for criteria air pollutant levels from the San Rafael Station for 2017–2019 and shows that measured concentrations exceeded federal and state O_3 standards in 2019, state and federal PM_{10} standards in 2017 and 2018, and the federal $PM_{2.5}$ standard in 2017 and 2018. Federal and state standards for other pollutants were not exceeded. These existing O_3 and PM violations of ambient air quality standards indicate that some individuals exposed to these pollutants may experience certain health effects, including increased incidence of cardiovascular and respiratory ailments.

Table 3.2-2. Ambient Air Quality Data at the San Rafael Monitoring Station (2017–2019)

Pollutant and Standards	2017	2018	2019
Ozone (O_3)			
Maximum 1-hour concentration (ppm)	0.088	0.072	0.096
Maximum 8-hour concentration (ppm)	0.063	0.053	0.080
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	0	0	**1**
CAAQS 8-hour (>0.070 ppm)	0	0	**1**
NAAQS 8-hour (>0.070 ppm)	0	0	**1**
Carbon Monoxide (CO)			
Maximum 8-hour concentration (ppm)	1.6	1.6	0.9
Maximum 1-hour concentration (ppm)	2.6	2.0	1.4
Number of days standard exceeded[a]			
NAAQS 8-hour (≥9 ppm)	0	0	0
CAAQS 8-hour (>9.0 ppm)	0	0	0
NAAQS 1-hour (>35 ppm)	0	0	0
CAAQS 1-hour (>20 ppm)	0	0	0
Nitrogen Dioxide (NO_2)			
National maximum 1-hour concentration (ppb)	53.4	55.3	49.9
National second-highest 1-hour concentration (ppb)	52.2	53.9	47.7
State maximum 1-hour concentration (ppb)	53	55	49
State second-highest 1-hour concentration (ppb)	52	53	47
Annual average concentration (ppb)	9	9	8
Number of days standard exceeded[a]			
CAAQS 1-hour (>180 ppb)	0	0	0
CAAQS Annual (>30 ppb)	0	0	0
NAAQS 1-hour (>100 ppb)	0	0	0
NAAQS Annual (>53 ppb)	0	0	0
Particulate Matter (PM_{10})			
National maximum 24-hour concentration (μg/m^3)	91.5	160.0	31.9
National second-highest 24-hour concentration (μg/m^3)	50.5	95.2	30.7
State maximum 24-hour concentration (μg/m^3)	94.0	166.0	33.0
State second-highest 24-hour concentration (μg/m^3)	53.0	99.0	32.0
National annual average concentration (μg/m^3)	16.2	18.4	13.9
State annual average concentration (μg/m^3)	16	19	19
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 μg/m^3)	0	**1**	0
CAAQS 24-hour (>50 μg/m^3)	**2**	**2**	0
CAAQS Annual (>20 μg/m^3)	0	0	0

Pollutant and Standards	2017	2018	2019
Fine Particulate Matter ($PM_{2.5}$)			
National maximum 24-hour concentration (µg/m^3)	74.7	167.6	19.5
National second-highest 24-hour concentration (µg/m^3)	65.6	119.9	18.3
State maximum 24-hour concentration (µg/m^3)	74.7	167.6	19.5
State second-highest 24-hour concentration (µg/m^3)	65.6	119.9	17.3
National annual average concentration (µg/m^3)	9.6	11.0	6.3
State annual average concentration (µg/m^3)	9.7	11.1	6.4
Measured number of days standard exceeded[a]			
NAAQS 24-hour (>35 µg/m^3)	**8**	**13**	0
NAAQS Annual (>12.0 µg/m^3)	0	0	0
CAAQS Annual (>12.0µg/m^3)	0	0	0

Sources: CARB 2020c, 2020d; EPA 2020c, 2020d
[a] An exceedance of a standard is not necessarily a violation because of the regulatory definition of a violation.
[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.
[c] State statistics are based on California approved samplers.
[d] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
ppb = parts per billion; ppm = parts per million; mg/m^3 = milligrams per cubic meter

Existing TAC Sources and Health Risks

BAAQMD maintains an inventory of health risks associated with all permitted stationary sources within the SFBAAB. The inventory was last updated in 2020 and is publicly available online. The existing stationary TAC sources within 1,000 feet of the project area are five gas-dispensing facilities, shown on Figure 3.2-1.

Aside from stationary sources, emissions of TACs around the project area are also generated from mobile sources and railways. BAAQMD considers roadways with greater than 10,000 average daily traffic as “high-volume roadways” and recommends they be included in the analysis of health risks. In addition, there are Sonoma-Marin Area Rail Transit tracks within 1,000 feet of the project area.

Regional Attainment Status

Local monitoring data are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the ambient air quality standards. The four designations are defined below. Table 3.2-3 summarizes the attainment status of Marin County.

- Nonattainment: assigned to areas where monitored pollutant concentrations consistently violate the standard in question
- Maintenance: assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard
- Attainment: assigned to areas where pollutant concentrations meet the standard in question over a designated period of time
- Unclassified: assigned to areas where data are insufficient to determine whether a pollutant is violating the standard in question

Table 3.2-3. Federal and State Attainment Status for Marin County Portion of the SFBAAB

Criteria Pollutant	Federal Designation	State Designation
Ozone (8-hour)	Marginal Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment (P)	Attainment
Particulate Matter (PM_{10})	Attainment	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Attainment	Nonattainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(No Federal Standard)	Attainment
Hydrogen Sulfide	(No Federal Standard)	Unclassified
Visibility-Reducing Particles	(No Federal Standard)	Unclassified

Sources: CARB 2020e; EPA 2020c
P = portion of the county

Locations of Sensitive Receptors

Sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are present and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (i.e., 24-hour, 8-hour, or 1-hour). Per BAAQMD, typical sensitive land uses are residences, hospitals, and schools. Parks and playgrounds, where sensitive receptors (e.g., children and seniors) are present, are also considered sensitive land uses (BAAQMD 2017a).

Places of employment (e.g., commercial/industrial uses) are not considered sensitive land uses because health-sensitive individuals (e.g., children and seniors) are not present. However, there are sensitive receptors, including residential uses, within 1,000 feet of the project area. Figure 3.2-1 illustrates sensitive receptors within 1,000 feet of the project area.

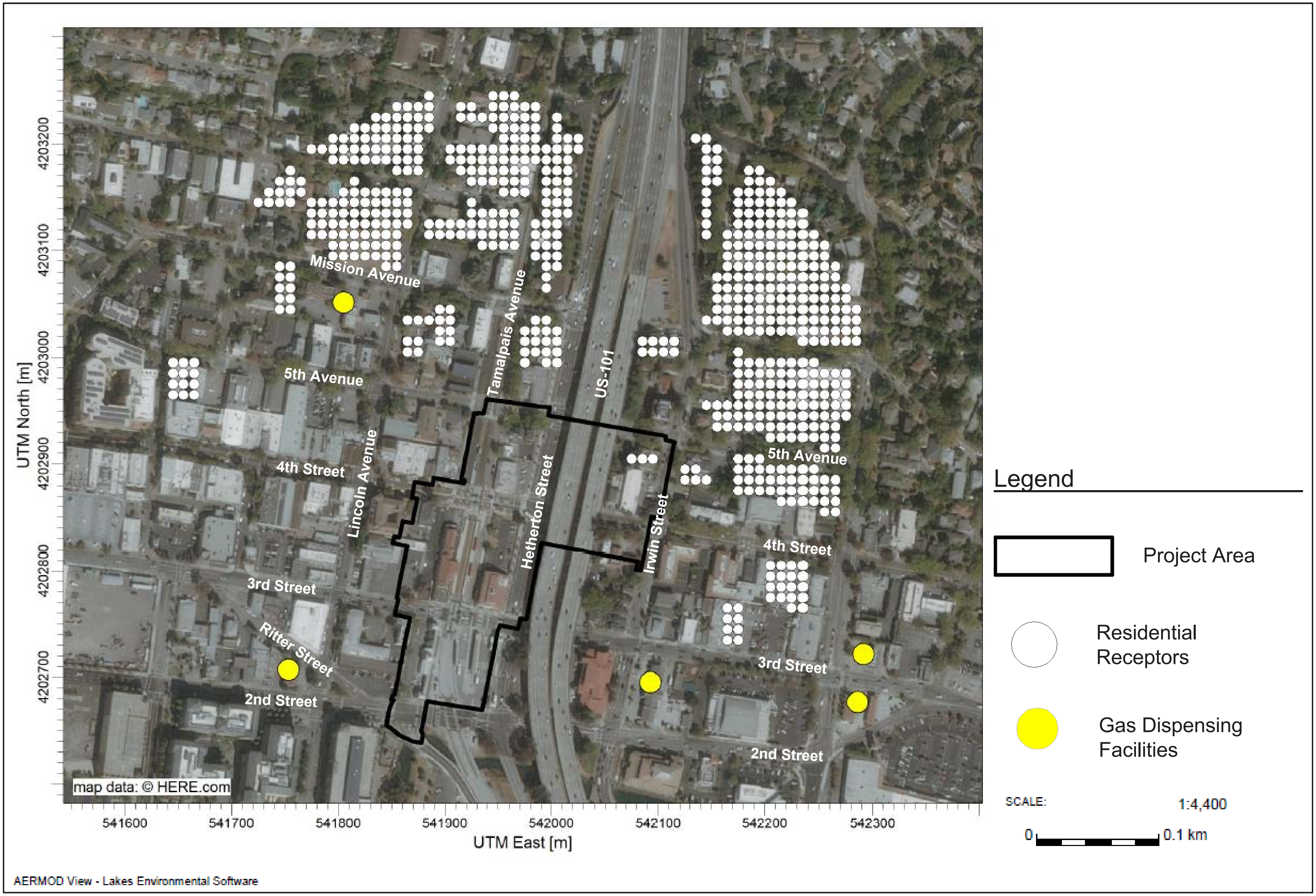

Figure 3.2-1
Existing Air Quality Sensitive Receptors and Emission Sources in the Vicinity of the Project Area

3.2.2 Environmental Impacts

Four different build alternatives, which are all in Downtown San Rafael within 500 feet of the existing transit center, are being evaluated. Air quality impacts were analyzed for the project area rather than specific build alternatives because the location of each build alternative would experience a nearly equivalent impact for each resource considered here. Impacts for the build alternatives are presented together unless they differ substantially among alternatives.

3.2.2.1 Methodology

Regional Construction Emissions

As described above, the air quality study area is in the Marin County Basin portion of the SFBAAB. It was assumed each build alternative would have the same construction schedule and phasing. The BAAQMD regional thresholds for construction only require evaluation of exhaust emissions; however, the air quality analysis also estimated fugitive dust emissions for the $PM_{2.5}$ analysis. Emissions were estimated using a combination of emission factors and methodologies from the California Emissions Estimator Model (CalEEMod), version 2016.3.2; CARB's EMission FACtor 2017 (EMFAC2017) model (CARB 2017); and EPA's AP-42: Compilation of Air Pollutant Emission Factors (EPA 2006) and relied upon a combination of CalEEMod default data values, as well as project-specific information for each alternative provided by the project sponsor. The largest project site among the preferred alternative and other build alternatives is approximately 3 acres. An off-road equipment fleet for the proposed project was generated using default CalEEMod values for a 3-acre site. Because 3 acres is the maximum affected area of any alternative, this off-road fleet was applied to every alternative. The use of the build alternative with the largest site would provide the maximum impact; therefore, impacts of other alternatives would represent the maximum possible impacts. Quantities for demolition, grading, and paving activities were provided by the project sponsor for each build alternative. Emissions from gasoline-fueled light-duty vehicles (e.g., construction workers' vehicles) were adjusted to account for the impact of the implementation of Part 1 of the SAFE Vehicles Rule. The construction modeling files are provided in Appendix D~~B~~ of this ~~Draft~~ Final Environmental Impact Report (EIR).

Regional Operational Emissions

Emissions from the proposed project were estimated using CalEEMod. Based on information in Section 3.14, Transportation, all build alternatives primarily represent a shifting of bus activity from one location to another; the proposed project would not change the amount of bus service provided and new vehicle trips are not assumed to be generated by the proposed project. Although the proposed project would improve the efficiency of bus operations and create operational flexibility for bus movements into and out of the transit center, no future expansion of transit service is currently programmed or planned and thus cannot be reasonably forecasted. Therefore, no mobile emissions at the regional scale were evaluated for project operations. The operations modeling files are provided in Appendix ~~B~~D of this ~~Draft~~ Final EIR.

Health Risk Assessment

Diesel Exhaust Impacts

Given that the proposed project would introduce DPM emissions to an area near existing sensitive receptors, a health risk assessment (HRA) was performed using EPA's most recent dispersion model, AERMOD (version 19191), cancer and chronic risk assessment values presented by OEHHA, and other assumptions for model inputs from the *BAAQMD Health Risk Assessment Modeling Protocol* (BAAQMD 2020). Note that the HRA takes into account OEHHA's most recent guidance and calculation methods from the *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments* (OEHHA 2015).

The HRA analyzes health risks to nearby sensitive receptors from construction and operational activities. The HRA consists of three parts: a DPM inventory, air dispersion modeling, and risk calculations. A description of each of these parts follows.

DPM Inventory

The DPM inventory includes DPM emissions from construction and operations. The construction DPM inventory includes unmitigated and mitigated DPM emissions associated with short-term construction activity and was assumed to be equal to the construction analysis results for diesel $PM_{2.5}$ exhaust per BAAQMD guidance. The construction $PM_{2.5}$ inventory was also assumed to be equal to the construction analysis results for the sum of $PM_{2.5}$ exhaust and fugitive dust.

The operational DPM inventory includes emissions from buses idling in the project area and on-road travel in the project vicinity. Emissions were based on project-specific information provided by the project sponsor, including daily arrivals and departures for each bus route that would serve the proposed project, bus type, and fuel type. Some buses had hybrid or gasoline engines; however, it was conservatively assumed all buses would be diesel powered. For idling emissions, it was assumed a bus would idle for 5 minutes for every arrival and departure.

Air Dispersion Modeling

The HRA uses EPA's AERMOD to model annual average DPM and $PM_{2.5}$ concentrations at nearby receptors. Modeling inputs, including emission rates (in grams of pollutant emitted per second) and source characteristics (e.g., release height, stack diameter, plume width), were based on guidance provided by OEHHA, BAAQMD, and the South Coast Air Quality Management District (SCAQMD). Meteorological data were obtained from CARB for the Gnoss Field Airport location, which is the nearest monitoring station, approximately 13 miles north of the project area.

Onsite construction emissions from off-road equipment and onsite truck travel were characterized as polygon area sources that outlined the footprint of the build alternatives. An emissions release height of 5 meters above the ground represented exhaust emissions and a release height of 0 meters represented onsite fugitive dust emissions (SCAQMD 2008). On-road travel emissions from haul and vendor trucks (as well as worker vehicles for $PM_{2.5}$ analysis) were characterized as line volume sources with release heights of 0.9 meter for fugitive dust emissions and 3.4 meters for exhaust emissions. Emissions from off-road equipment were assumed to be generated throughout the construction footprint. Emissions from offsite trucks were modeled along the road segments adjacent to the construction footprint for each build alternative.

The modeling of emissions from construction activities was based on the construction hours and days (5 days per week and 8 hours per day). To account for plume rise associated with mechanically generated air turbulence from construction emissions sources for the AERMOD run, the initial vertical dimension of the area source was modeled at 1.4 meters; for the line volume sources it was modeled at 3.16 meters. The urban dispersion option was used based on the project area's characteristics.

Offsite sensitive receptors were placed at individual homes in all directions within 1,000 feet of the construction work areas and haul roads using a 10- by 10-meter receptor grid.

Operational emissions from bus idling were characterized as multiple volume sources that covered the project areas where idling could occur. For on-road bus travel, exhaust emissions were assigned a release height of 3.4 meters and fugitive dust emissions were assigned a release height of 0.9 meter. The modeling of emissions from bus travel activities was based on buses operating in the area for 18 hours per day (5 a.m.–11 p.m.) and 365 days per year. Sensitive receptor locations were placed using the same receptor grid for construction. A complete list of dispersion modeling inputs is provided in Appendix ~~B~~D.

Risk Calculations

The risk calculations incorporate OEHHA's age-specific factors that account for increased sensitivity to carcinogens during early-in-life exposure. The approach for estimating cancer risk from long-term inhalation, with exposure to carcinogens, requires calculating a range of potential doses and multiplying by cancer potency factors in units corresponding to the inverse dose to obtain a range of cancer risks. For cancer risk, the risk for each age group is calculated using the appropriate daily breathing rates, age sensitivity factors, and exposure durations. The cancer risks calculated for individual age groups are summed to estimate the cancer risk for each receptor. Chronic cancer and hazard risks were calculated using from OEHHA's 2015 HRA guidance (OEHAA 2015). In accordance with BAAQMD guidance, residential cancer risks assume a 30-year exposure (BAAQMD 2020). Two cancer risk scenarios were evaluated for each build alternative. Scenario 1 evaluates a receptor beginning in the third trimester of pregnancy being exposed to the full construction duration of 1.5 years and then 28.75 years of operations, for a total exposure duration of 30.25 years. Scenario 2 evaluates a receptor beginning in the third trimester of pregnancy being exposed to 30 years of operations. Table 3.2-4 and Table 3.2-5 provide the residential exposure factors for each HRA Scenario.

Table 3.2-4. Scenario 1 Exposure Factors

	Construction (Age Bins)		Operations (Age Bins)		
Parameter	3rd Tri	0<2	0<2	2<16	16<30
Daily Breathing Rate (mg/kg/day)[a]	361	1,090	1,090	572	261
Inhalation Absorption Factor (unitless)	1.0	1.0	1.0	1.0	1.0
Exposure Frequency (unitless)[b]	0.96	0.96	0.96	0.96	0.96
Conversion Factor (μg to mg, L to m^3)	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06
Age Sensitivity Factor (unitless)	10	10	10	3	1
Exposure Duration (years)	0.25	1.25	0.75	14	14
Averaging Time for Lifetime (years)	70.0	70.0	70.0	70.0	70.0
Fraction of Time at Home (unitless)	1.0	1.0	1.0	1.0	1.0

Parameter	Construction (Age Bins) 3rd Tri	0<2	Operations (Age Bins) 0<2	2<16	16<30
Cancer Conversion Factor (unitless)	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
DPM Cancer Potency Factor (mg/kg/day)$^{-1}$	1.1	1.1	1.1	1.1	1.1

Source: OEHHA 2015
[a] 95th percentile daily breathing rate for third trimester and 0<2; 80th percentile for other age groups.
[b] Exposure frequency based on 350 days per year.
1.00E-6 = 0.000001
1.00E+6 = 1,000,000
Tri = trimester; mg/kg/day = milligrams per kilogram per day; µg = microgram; mg = milligram; L = liter; m^3 = square meter

Table 3.2-5. Scenario 2 Exposure Factors

Parameter	3rd Tri	0<2	2<16	16<30
Daily Breathing Rate (mg/kg/day)[1]	361	1,090	572	261
Inhalation Absorption Factor (unitless)	1.0	1.0	1.0	1.0
Exposure Frequency (unitless)[2]	0.96	0.96	0.96	0.96
Conversion Factor (µg to mg, L to m^3)	1.00E-06	1.00E-06	1.00E-06	1.00E-06
Age Sensitivity Factor (unitless)	10	10	3	1
Exposure Duration (years)	0.25	2.0	14	13.75
Averaging Time for Lifetime (years)	70.0	70.0	70.0	70.0
Fraction of Time at Home (unitless)	1.0	1.0	1.0	1.0
Cancer Conversion Factor (unitless)	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Cancer Potency Factor (mg/kg/day)$^{-1}$	1.1	1.1	1.1	1.1

Source: OEHHA 2015
[1] 95th percentile daily breathing rate for third trimester and 0<2; 80th percentile for other age groups.
[2] Exposure frequency based on 350 days per year.
1.00E-6 = 0.000001
1.00E+6 = 1,000,000
Tri = trimester; mg/kg/day = milligrams per kilogram per day; µg = microgram; mg = milligram; L = liter; m^3 = square meter

Carbon Monoxide Hot-Spots Modeling

The analysis of CO impacts was conducted using BAAQMD's CO screening criteria (BAAQMD 2017a) discussed above.

3.2.2.2 Thresholds of Significance

The following State CEQA Guidelines Appendix G thresholds identify significance criteria to be considered for determining whether a project could have significant impacts related to air quality.

Would the proposed project:

- 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 a nonattainment area for an applicable federal or state ambient air quality standard?

- Expose sensitive receptors to substantial pollutant concentrations?
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

As discussed above, all pollutants that would be generated by the proposed project are associated with some form of health risk (e.g., asthma, lower respiratory problems). The primary pollutants of concern generated by the proposed project are O_3 precursors (ROG and NO_X), CO, PM, and TACs (including DPM and asbestos). The following sections discuss thresholds and analysis considerations for regional and local project-generated criteria pollutants with respect to their human health implications. Thresholds and guidance for evaluating potential odors associated with the project area also presented.

Regional Project-Generated Criteria Pollutant Emissions (Ozone Precursors and Regional Particulate Matter)

This analysis evaluates the impacts of regional emissions generated by the proposed project using a two-tiered approach that considers guidance recommended by BAAQMD in its *California Environmental Quality Act Air Quality Guidelines* (BAAQMD 2017a).

First, this analysis considers whether the proposed project would conflict with the most recent air quality plan (BAAQMD 2017b). The impact analysis evaluates whether the proposed project supports the primary goals of the 2017 Clean Air Plan, including applicable control measures from the 2017 Clean Air Plan, and whether it would disrupt or hinder implementation of any 2017 Clean Air Plan control measures.

Second, calculated regional criteria pollutant emissions are compared to BAAQMD's project-level thresholds. BAAQMD's thresholds are summarized in Table 3.2-6 and are recommended by the air district to evaluate the significance of a project's regional criteria pollutant emissions (BAAQMD 2017a). According to BAAQMD, projects with emissions in excess of the thresholds shown in Table 3.2-6 would be expected to have a significant impact on regional air quality, because an exceedance of the thresholds is anticipated to contribute to CAAQS and NAAQS violations.

Table 3.2-6. BAAQMD Project-Level Regional Criteria Pollutant Emission Thresholds

Analysis	Thresholds
Regional Criteria Pollutants (Construction)	• Reactive Organic Gases: 54 pounds/day • Nitrogen Oxides: 54 pounds/day • Particulate Matter: 82 pounds/day (exhaust only); compliance with best management practices (fugitive dust) • Fine Particulate Matter: 54 pounds/day (exhaust only); compliance with best management practices (fugitive dust)
Regional Criteria Pollutants (Operations)	• Reactive Organic Gases: 54 pounds/day • Nitrogen Oxides: 54 pounds/day • Particulate Matter: 82 pounds/day (exhaust + fugitive dust) • Fine Particulate Matter: 54 pounds/day (exhaust +fugitive dust)

Source: BAAQMD 2017a

Health-Based Thresholds for Project-Generated Pollutants of Human Health Concern

The California Supreme Court's decision in *Sierra Club v. County of Fresno* (6 Cal. 5th 502) (hereafter referred to as the Friant Ranch Decision) reviewed the long-term, regional air quality analysis contained in the EIR for the proposed Community Plan Update and Friant Ranch Specific Plan. The Friant Ranch Specific Plan project is a 942-acre master-plan development in unincorporated Fresno County within the San Joaquin Valley Air Basin, an air basin currently in nonattainment under the NAAQS and CAAQS for O_3 and $PM_{2.5}$. The Court found that the EIR's air quality analysis was inadequate because it failed to provide enough detail "for the public to translate the bare [criteria pollutant emissions] numbers provided into adverse health impacts or to understand why such a translation is not possible at this time." The Court's decision clarifies that environmental documents must attempt to connect a project's air quality impacts to specific health effects or explain why it is not technically feasible to perform such an analysis.

Regional Project-Generated Criteria Pollutants (Ozone Precursors and Regional PM)

Adverse health effects induced by regional criteria pollutant emissions generated by the proposed project (O_3 precursors and PM) are highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, the number and character of exposed individuals [e.g., age, gender]). For these reasons, O_3 precursors (ROG and NO_X) contribute to the formation of ground-level O_3 on a regional scale. Emissions of ROG and NO_X generated in one area may not equate to a specific O_3 concentration in that same area. Similarly, some types of particulate pollutant may be transported over long distances or formed through atmospheric reactions. As such, the magnitude and locations of specific health effects from exposure to increased O_3 or regional PM concentrations are the product of emissions generated by numerous sources throughout a region, as opposed to a single individual project.

Models and tools have been developed to correlate regional criteria pollutant emissions to potential community health impacts. While there are models capable of quantifying O_3 and secondary PM formation and associated health effects, these tools were developed to support regional planning and policy analysis and have limited sensitivity to small changes in criteria pollutant concentrations induced by individual projects. Therefore, translating project-generated criteria pollutants to the locations where specific health effects could occur or the resultant number of additional days of nonattainment is not possible with any degree of accuracy.

Technical limitations of existing models to correlate project-level regional emissions to specific health consequences are recognized by air quality management districts throughout the state, including the San Joaquin Valley Air Pollution Control District (SJVAPCD) and SCAQMD, which provided amici curiae briefs for the Friant Ranch legal proceedings.[4] In its brief, SJVAPCD acknowledges that while health risk assessments for localized air toxics, such as DPM, are commonly prepared, "it is not feasible to conduct a similar analysis for criteria air pollutants because currently available computer modeling tools are not equipped for this task" (SJVAPCD 2015). SJVAPCD further notes that emissions solely from the Friant Ranch Specific Plan project (which equate to less than one-tenth of 1 percent of the total NO_X and VOC in the valley) are not likely to yield valid information, and that any such information should not be "accurate when applied at the local level."

[4] The amicus curiae briefs for Friant Ranch are available at: https://www.courts.ca.gov/41312.htm.

SCAQMD (2015) presents similar information in its brief, stating that "it takes a large amount of additional precursor emissions to cause a modeled increase in ambient ozone levels."

As discussed above, air districts develop region-specific CEQA thresholds of significance in consideration of existing air quality concentrations and attainment designations under the NAAQS and CAAQS. The NAAQS and CAAQS are informed by a wide range of scientific evidence that demonstrates there are known safe concentrations of criteria pollutants. While recognizing that air quality is a cumulative problem, air districts typically consider impacts from projects that generate criteria pollutant and O_3 precursor emissions below these thresholds to be minor in nature and to not adversely affect air quality such that the NAAQS or CAAQS would be exceeded. Emissions generated by the proposed project could increase photochemical reactions and the formation of tropospheric O_3 and secondary PM, which, at certain concentrations, could lead to increased incidence of specific health consequences. Although these health effects are associated with O_3 and particulate pollution, the effects are a result of cumulative and regional emissions. Therefore, the proposed project's incremental contribution cannot be traced to specific health outcomes on a regional scale and a quantitative correlation of project-generated regional criteria pollutant emissions to specific human health impacts is not included in this analysis. There are no numerical thresholds related to specific health outcomes from regional emissions; however, project-generated emissions are analyzed below.

Localized Project-Generated Criteria Pollutant Emissions (Carbon Monoxide and Particulate Matter) and Air Toxics (Diesel Particulate Matter)

Localized pollutants generated by a project can potentially affect populations near the emissions source. Because these pollutants dissipate with distance, emissions from individual projects can result in direct and material health impacts on adjacent sensitive receptors. The localized pollutants of concern that would be generated by the proposed project are CO, PM, and DPM. The applicable thresholds for each pollutant are described below.

Carbon Monoxide

Heavy traffic congestion can contribute to high levels of CO, and individuals exposed to such hot spots may have a greater likelihood of developing adverse health effects. BAAQMD has adopted screening criteria that provide a conservative indication of whether project-generated traffic would cause a potential CO hot spot. If the screening criteria are not met, a quantitative analysis through site-specific dispersion modeling of project-related CO concentrations would not be necessary, and the proposed project would not cause localized violations of the CAAQS for CO. BAAQMD's CO screening criteria are summarized below (BAAQMD 2017a).

- Project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- Project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).
- The proposed project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.

BAAQMD does not consider construction-generated CO a significant pollutant of concern because construction activities typically do not generate substantial quantities of this pollutant (BAAQMD 2017a).

Particulate Matter

BAAQMD adopted an incremental $PM_{2.5}$ concentration-based significance threshold in which a "substantial" contribution at the project level for an individual source is defined as total (i.e., exhaust and fugitive) $PM_{2.5}$ concentrations exceeding 0.3 $\mu g/m^3$. In addition, BAAQMD considers projects to have a cumulatively considerate $PM_{2.5}$ impact if sensitive receptors are exposed to $PM_{2.5}$ concentrations from local sources within 1,000 feet, including existing sources, project-related sources, and reasonably foreseeable future sources, that exceed 0.8 $\mu g/m^3$ (BAAQMD 2017a).

BAAQMD has not established PM_{10} thresholds of significance. BAAQMD's $PM_{2.5}$ thresholds apply to both new receptors and new sources. However, BAAQMD considers fugitive PM_{10} from earth-moving activities to be less than significant with application of BAAQMD's Basic Construction Mitigation Measures.

Diesel Particle Matter

DPM has been identified as a TAC and is particularly concerning because long-term exposure can lead to cancer, birth defects, and damage to the brain and nervous systems. BAAQMD has adopted incremental cancer and hazard thresholds to evaluate receptor exposure to single sources of DPM emissions. The "substantial" DPM threshold defined by BAAQMD is exposure of a sensitive receptor to an individual emissions source, resulting in an excess cancer risk level of more than 10 in 1 million or a non-cancer (i.e., chronic or acute) hazard index greater than 1.0 (BAAQMD 2017a). The air district also considers projects to have a cumulatively considerable DPM impact if they contribute to DPM emissions that, when combined with cumulative sources within 1,000 feet of sensitive receptors, result in excess cancer risk levels of more than 100 in 1 million or a hazard index greater than 10.0. BAAQMD considers a project to have a significant cumulative impact if it introduces new receptors at a location where the combined exposure of all cumulative sources within 1,000 feet is in excess of cumulative thresholds (BAAQMD 2017a).

Lead and Asbestos

Based on information in Section 3.8, Hazards and Hazardous Materials, many structures within the project area could contain hazardous building materials such as asbestos-containing materials (ACM) and lead-based paint. BAAQMD considers a project to have a significant impact if it does not comply with the applicable regulatory requirements outlined in BAAQMD's Regulation 11, Rules 1 and 2.

Odors

BAAQMD and CARB have identified several types of land uses as being commonly associated with odors, such as landfills, wastewater treatment facilities, and animal processing centers (BAAQMD 2017a; CARB 2005). BAAQMD's *California Environmental Quality Act Air Quality Guidelines* recommend that project analyses identify the location of existing and planned odor sources and include policies to reduce potential odor impacts in the project area.

3.2.2.3 Impacts

This section includes a discussion of each impact as it corresponds to the thresholds of significance discussed above.

Impact AQ-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan

All Build Alternatives

The CAA requires that a SIP or an air quality control plan be prepared for areas with air quality violating the NAAQS. The SIP sets forth the strategies and pollution-control measures that states will use to attain the NAAQS. The CCAA requires attainment plans to demonstrate a 5-percent-per-year reduction in nonattainment air pollutants or their precursors, averaged every consecutive 3-year period, unless an approved alternative measure of progress is developed. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date. The current air quality attainment plan for the SFBAAB is the 2017 Clean Air Plan (BAAQMD 2017b).

According to BAAQMD's *California Environmental Quality Act Air Quality Guidelines*, the determination of 2017 Clean Air Plan consistency should consider the following for plan-level analyses (BAAQMD 2017a).

- Does the plan support the primary goals of the 2017 Clean Air Plan?
- Does the plan include applicable control measures from the 2017 Clean Air Plan?
- Does the plan disrupt or hinder implementation of any 2017 Clean Air Plan control measure?

Each of these questions is addressed below for the proposed project.

Support of 2017 Clean Air Plan Goals

The primary goals of the 2017 Clean Air Plan are to (1) reduce emissions and decrease concentrations of harmful pollutants, (2) safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, and (3) reduce GHG emissions and protect the climate. The proposed project would redevelop a transportation center in the City. The proposed project is consistent with the Marin Strategic Vision Plan (Transportation Authority of Marin 2017), the regional transportation plans for the Transportation Authority of Marin, and the *San Rafael Downtown Station Area Plan* (City of San Rafael 2012). The proposed project is one of the major projects included in these documents, which serve as the sustainable communities strategies/ regional transportation plans for the respective areas, integrating transportation and land-use strategies to manage GHG emissions and plan for future population growth. On the state level, the proposed project is consistent with the *California Transportation Plan 2050* (Caltrans 2021), which is the state's blueprint for meeting future mobility needs. One of the main policies identified in the regional and local plans of the jurisdictions where the proposed project would be located is the reduction of vehicle miles traveled on roadways. Operation of the proposed project is not expected to increase vehicle miles traveled and would support the shift from automobiles to public transit. Additionally, the proposed project is a transportation project (specifically a transit-supportive project) and by its nature would encourage the use of public transit to reduce single-occupancy vehicle trips and associated criteria pollutants such as O_3 precursors (ROG and NO_X), PM_{10}, and $PM_{2.5}$, which would support improving local and regional air quality.

Based on the above analysis, the proposed project would support the primary goals of the 2017 Clean Air Plan.

Support Applicable Control Measures

To meet the primary goals, the 2017 Clean Air Plan recommends specific control measures and actions. These control measures are grouped into various categories and include stationary-source measures, mobile-source measures, and transportation control measures. The 2017 Clean Air Plan recognizes that community design dictates individual travel modes and that a key long-term control strategy to reduce emissions of criteria pollutants, air toxics, and GHGs from motor vehicles is to channel future Bay Area growth into vibrant urban communities where goods and services are close at hand and people have a range of viable transportation options. To this end, the 2017 Clean Air Plan includes control measures that are aimed at reducing air pollution in the SFBAAB.

The measures most applicable to the proposed project are transportation control measures. These measures include the following:

> **TR3: Local and Regional Bus Service.** Fund local and regional bus projects, including operations and maintenance.
>
> **TR9: Bicycle and Pedestrian Access and Facilities.** Encourage planning for bicycle and pedestrian facilities in local plans, e.g., general and specific plans, fund bike lanes, routes, paths and bicycle parking facilities.

Operation of the proposed project is not expected to increase vehicle miles traveled and would support the shift from automobiles to public transit. Additionally, the proposed project is a transportation project (specifically a transit-supportive project) and by its nature would encourage the use of public transit to reduce single-occupancy vehicle trips and associated criteria pollutants such as O_3 precursors (ROG and NO_X), PM_{10}, and $PM_{2.5}$, which would support improving local and regional air quality. The proposed project would not reduce or minimize access to any bicycle and pedestrian accessways and is intended to enhance or create new multimodal connectivity to transit-oriented services in the region. Such connectivity reduces the need for single-occupancy vehicle trips.

Based on the above analysis, the proposed project would support the applicable control measures identified in the 2017 Clean Air Plan to meet the plan's primary goals.

Disrupt or Hinder Implementation of 2017 Clean Air Plan Control Measures

As discussed above, operation of the proposed project is not expected to increase vehicle miles traveled and would support the shift from automobiles to public transit. Additionally, the proposed project is a transportation project (specifically a transit-supportive project) and by its nature would encourage the use of public transit to reduce single-occupancy vehicle trips and associated criteria pollutants such as O_3 precursors (ROG and NO_X), PM_{10}, $PM_{2.5}$, and GHG emissions, which would support goals of the 2017 Clean Air Plan. The proposed project would not disrupt, delay, or otherwise hinder implementation of any applicable control measure from the 2017 Clean Air Plan. Rather, the proposed project would support and facilitate their implementation.

Based on the above analysis, the proposed project would support implementation of the 2017 Clean Air Plan. Accordingly, the proposed project would not fundamentally conflict with the 2017 Clean Air Plan and its air quality impacts would be ***less than significant***.

Mitigation Measures

No mitigation is required.

Impact AQ-2: Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant for Which the Project Region Is a Nonattainment Area for an Applicable Federal or State Ambient Air Quality Standard

Construction

Construction of the proposed project is scheduled to commence in ~~2023 or 2024~~2025, lasting a period of approximately 18 months. Construction associated with each build alternative would generate criteria pollutant emissions from the following activities: demolition, site preparation, grading, construction workers and heavy-duty trucks traveling to and from the project site, fuel combustion by onsite construction equipment, the application of architectural coatings, and paving activities. These construction activities have the potential to temporarily create emissions of dust, fumes, equipment exhaust, and other air contaminants. The amount of emissions generated on a daily basis would vary depending on the intensity and types of construction activities occurring simultaneously. To provide the most conservative analysis, maximum daily emissions estimates, which are used to assess construction impacts, are based on the day with the greatest intensity of construction activities. The unmitigated criteria air pollutant emissions that would be generated during construction for each alternative are presented in the tables below.

Move Whistlestop Alternative

As shown in Table 3.2-7, construction emissions for the Move Whistlestop Alternative would be below the BAAQMD significance thresholds for all criteria pollutants. Therefore, construction impacts from this alternative would be ***less than significant***. No mitigation is required.

Table 3.2-7. Move Whistlestop Alternative Maximum Daily Construction Emissions: Unmitigated

	Maximum Daily Emissions (lb/day)			
Construction Phase	ROG	NO_X	PM_{10}[a]	$PM_{2.5}$[a]
Utility Relocations/Improvements	1.46	16.47	0.61	0.56
Utility Relocations/Improvements-Paving	1.13	9.39	0.49	0.45
Building Demo & Site Clearing/Grubbing	1.81	18.72	0.86	0.80
Site Grading	1.64	18.00	0.77	0.71
Site Construction	2.22	19.05	0.77	0.74
Site Construction-Paving	1.13	9.39	0.49	0.45
Site Construction-Arch Coating	4.32	1.76	0.09	0.09
Maximum Daily Emissions	**6.54**	**36.72**	**1.63**	**1.51**

Construction Phase	Maximum Daily Emissions (lb/day)			
	ROG	NO_X	PM_{10}[a]	$PM_{2.5}$[a]
BAAQMD Significance Threshold	54	54	82	54
Exceeds Threshold?	**No**	**No**	**No**	**No**

Source: Modeling files provided in Appendix ~~B~~D.
[a] BAAQMD construction thresholds for PM_{10} and $PM_{2.5}$ only evaluate exhaust emissions. Dust emissions would be controlled using best management practices.
lb/day = pounds per day

Adapt Whistlestop Alternative

As shown in Table 3.2-8, construction emissions for the Adapt Whistlestop Alternative would be below the BAAQMD significance thresholds for all criteria pollutants. Therefore, construction impacts from this alternative would be ***less than significant***. No mitigation is required.

Table 3.2-8. Adapt Whistlestop Alternative Maximum Daily Construction Emissions: Unmitigated

Construction Phase	Maximum Daily Emissions (lb/day)			
	ROG	NO_X	PM_{10}[a]	$PM_{2.5}$[a]
Utility Relocations/Improvements	1.46	16.47	0.61	0.56
Utility Relocations/Improvements-Paving	1.08	9.39	0.49	0.45
Building Demo & Site Clearing/Grubbing	1.79	18.22	0.85	0.79
Site Grading	1.64	18.00	0.77	0.71
Site Construction	2.20	18.55	0.77	0.74
Site Construction-Paving	1.08	9.39	0.49	0.45
Site Construction-Arch Coating	3.96	1.76	0.09	0.09
Maximum Daily Emissions	**6.15**	**36.22**	**1.62**	**1.50**
BAAQMD Significance Threshold	54	54	82	54
Exceeds Threshold?	**No**	**No**	**No**	**No**

Source: Modeling files provided in Appendix ~~B~~D.
[a] BAAQMD construction thresholds for PM_{10} and $PM_{2.5}$ only evaluate exhaust emissions. Dust emissions would be controlled using best management practices.
lb/day = pounds per day

4th Street Gateway Alternative

As shown in Table 3.2-9, construction emissions for the 4th Street Gateway Alternative would be below the BAAQMD significance thresholds for all criteria pollutants. Therefore, construction impacts from this alternative would be ***less than significant***. No mitigation is required.

Table 3.2-9. 4th Street Gateway Alternative Maximum Daily Construction Emissions: Unmitigated

Construction Phase	Maximum Daily Emissions (lb/day)			
	ROG	NO_X	PM_{10}[a]	$PM_{2.5}$[a]
Utility Relocations/Improvements	1.46	16.47	0.61	0.56
Utility Relocations/Improvements-Paving	1.21	9.39	0.49	0.45
Building Demo & Site Clearing/Grubbing	1.79	18.22	0.85	0.79
Site Grading	1.64	18.00	0.77	0.71
Site Construction	2.22	19.05	0.77	0.74

	Maximum Daily Emissions (lb/day)			
Construction Phase	ROG	NO_X	PM_{10}[a]	$PM_{2.5}$[a]
Site Construction-Paving	1.21	9.39	0.49	0.45
Site Construction-Arch Coating	4.86	1.76	0.09	0.09
Maximum Daily Emissions	**7.08**	**36.22**	**1.62**	**1.50**
BAAQMD Significance Threshold	54	54	82	54
Exceeds Threshold?	**No**	**No**	**No**	**No**

Source: Modeling files provided in Appendix ~~B~~D.
[a] BAAQMD construction thresholds for PM_{10} and $PM_{2.5}$ only evaluate exhaust emissions. Dust emissions would be controlled using best management practices.
lb/day = pounds per day

Under the Freeway Alternative

As shown in Table 3.2-10, construction emissions for the Under the Freeway Alternative would be below the BAAQMD significance thresholds for all criteria pollutants. Therefore, construction impacts from this alternative would be ***less than significant***. No mitigation is required.

Table 3.2-10. Under the Freeway Alternative Maximum Daily Construction Emissions: Unmitigated

	Maximum Daily Emissions (lb/day)			
Construction Phase	ROG	NO_X	PM_{10}[a]	$PM_{2.5}$[a]
Utility Relocations/Improvements	1.46	16.47	0.61	0.56
Utility Relocations/Improvements-Paving	1.11	9.39	0.49	0.45
Building Demo & Site Clearing/Grubbing	1.81	18.72	0.86	0.80
Site Grading	1.64	18.00	0.77	0.71
Site Construction	2.22	19.05	0.77	0.74
Site Construction-Paving	1.11	9.39	0.49	0.45
Site Construction-Arch Coating	4.14	1.76	0.09	0.09
Maximum Daily Emissions	**6.36**	**36.72**	**1.63**	**1.51**
BAAQMD Significance Threshold	54	54	82	54
Exceeds Threshold?	**No**	**No**	**No**	**No**

Source: Modeling files provided in Appendix ~~B~~D.
[a] BAAQMD construction thresholds for PM_{10} and $PM_{2.5}$ only evaluate exhaust emissions. Dust emissions would be controlled using best management practices.
lb/day = pounds per day

Conclusion

As shown in the tables above, construction of each alternative would not generate ROG, NO_X, or exhaust PM emissions in excess of BAAQMD's significance thresholds. Therefore, construction emissions of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard and impacts would be ***less than significant***.

Operations

All Build Alternatives

Criteria pollutant emissions from the proposed project during operations would be nominal. Each build alternative would operate a 3,000-square-foot building, which would include customer service, public restrooms, driver relief facilities, small retail, maintenance, and security. Building emissions would be associated with energy sources (natural gas consumption) and area sources (architectural coatings and consumer products). As discussed previously, all build alternatives primarily represent a shifting of bus activity. The proposed project would not change the amount of bus service to be provided and would not result in an increase of new vehicle trips or vehicle miles traveled. Based on this, project operations would not increase mobile source emissions. As shown in Table 3.2-11, operational emissions would be well below the BAAQMD significance thresholds. Therefore, each build alternative would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard and project impacts would be ***less than significant***.

Table 3.2-11. Maximum Daily Operations Emissions: Unmitigated

	Maximum Daily Emissions (lb/day)			
Source Category	ROG	NO_X	PM_{10}	$PM_{2.5}$
Area	0.07	<0.01	<0.01	<0.01
Energy	<0.01	<0.01	<0.01	<0.01
Total Operational Emissions	**0.07**	**<0.01**	**<0.01**	**<0.01**
BAAQMD Significance Threshold	54	54	82	54
Exceeds Threshold?	**No**	**No**	**No**	**No**

Source: Modeling files provided in Appendix ~~B~~D.
lb/day = pounds per day

Mitigation Measures

No mitigation is required.

Impact AQ-3: Expose Sensitive Receptors to Substantial Pollutant Concentrations

All Build Alternatives

Carbon Monoxide Hotspots

All build alternatives primarily represent a shifting of bus activity from one location to another; the proposed project would not change the amount of bus service to be provided and new vehicle trips are not assumed to be generated by the proposed project. Based on intersection volumes from the Transportation Summary Report for the proposed project (see Appendix ~~C~~E: Kimley-Horn 2021), the maximum peak-hour intersection volume would be 4,023 vehicles at Irwin Street and 2nd Street (Appendix ~~C~~E). Given this amount is substantially less than BAAQMD's hourly screening level of 44,000 vehicles per hour, the shifting of bus activity would not result in a CO hotspot and impacts would be ***less than significant***.

Toxic Air Contaminants

The primary TACs of concern associated with the proposed project are asbestos, lead, and DPM.

Asbestos and Lead

Demolition of existing structures in the project area may result in the dispersion of ACM and lead-based paint, should they be present, to adjacent sensitive receptor locations. All demolition activities would be subject to EPA's asbestos NESHAP if asbestos is present at any of the existing structures on site. The asbestos NESHAP regulations protect the public by minimizing the release of asbestos fibers during activities involving the processing, handling, and disposal of ACM. The asbestos NESHAP regulations for demolition and renovation are outlined in BAAQMD Regulation 11, Rule 2. In addition to demolition and renovation measures, BAAQMD Regulation Rule 2 includes measures to address ACM during haul truck transport. More specifically, it includes provisions such as treating ACM with water prior to transport and placing such materials in leak-tight containers for haul truck transport to disposal sites. During construction, best management practices relating to the proper handling of hazardous materials would be implemented as part of the proposed project's Construction General Permit. In the event that construction activities encounter these hazardous materials, the appropriate safety procedures would be followed, and relevant agencies notified (e.g., Certified Unified Program Agency notification through the procedures outlined in the Marin County *Hazardous Materials Area Plan* [Marin County 2008]). Overall, regulatory mechanisms exist that would ensure that impacts from ACM and lead, if present during demolition activities within the project site, would be ***less than significant***.

DPM/$PM_{2.5}$

DPM is a carcinogen emitted by diesel internal combustion engines. Construction activities would generate DPM ($PM_{2.5}$ exhaust)[5] that could expose adjacent receptors and onsite receptors (beginning in ~~2023 or 2024~~2025) to significant health risks. However, DPM concentrations would be dramatically reduced, even at distances of 500 feet. As explained in BAAQMD's *California Environmental Quality Act Air Quality Guidelines*:

> Due to the variable nature of construction activity, the generation of TAC emissions in most cases would be temporary, especially considering the short amount of time such equipment is typically within an influential distance that would result in the exposure of sensitive receptors to substantial concentrations. Concentrations of mobile-source diesel PM emissions are typically reduced by 70 percent at a distance of approximately 500 feet…In addition, current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 40, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities. This results in difficulties with producing accurate estimates of health risk.

Health impacts from DPM would include cancer risk and chronic non-cancer risk. The HRA results also included evaluation of annual concentrations of $PM_{2.5}$ from exhaust and fugitive dust sources. As discussed previously, cancer risk was evaluated for two scenarios: (1) construction and operations and (2) operations only. The following tables present the unmitigated health risks for the maximum exposed offsite residential receptor within 1,000 feet of each build alternative.

[5] Per BAAQMD guidance, $PM_{2.5}$ exhaust is used as a surrogate for DPM.

Scenario 1: Construction Plus Operations

As shown in Table 3.2-12, all build alternatives would exceed the cancer risk threshold. Additionally, the Under the Freeway Alternative would exceed the annual $PM_{2.5}$ threshold. Therefore, health risk impacts would be **significant** and mitigation is required.

Table 3.2-12. Unmitigated Health Risk Results: Scenario 1

Build Alternative	Cancer Risk (cases per million)[a]	Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (μg/m^3)
Move Whistlestop	10.6	0.01	0.08
Adapt Whistlestop	10.9	0.01	0.09
4th Street Gateway	28.0	0.02	0.25
Under the Freeway	43.6	0.0	0.44
BAAQMD Significance Threshold	10	1.0	0.3
Exceeds Threshold?	**Yes (all alternatives)**	**No (all alternatives)**	**Yes (Under the Freeway Alternative only)**

[a] Cancer risk scenario evaluated a receptor in the third trimester of pregnancy being exposed to the full construction duration of 1.5 years and then 28.75 years of operations, for a total exposure duration of 30 years.

Table 3.2-13 shows the health risk results for all build alternatives with implementation of Mitigation Measure MM-AQ-CNST-1. As shown in Table 3.2-13, cancer risk and annual $PM_{2.5}$ concentrations would be reduced to levels below BAAQMD health risk thresholds. Therefore, each build alternative would not expose sensitive receptors to substantial pollution concentrations and impacts would be ***less than significant with mitigation***.

Table 3.2-13. Mitigated Health Risk Results: Scenario 1

Build Alternative	Cancer Risk (cases per million)[a]	Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (μg/m^3)
Move Whistlestop	2.91	0.0005	0.05
Adapt Whistlestop	2.92	0.0005	0.05
4th Street Gateway	4.57	0.001	0.15
Under the Freeway	6.03	0.002	0.27
BAAQMD Significance Threshold	10	1.0	0.3
Exceeds Threshold?	**No (all alternatives)**	**No (all alternatives)**	**No (all alternatives)**

[a] Cancer risk scenario evaluated a receptor in the third trimester of pregnancy being exposed to the full construction duration of 1.5 years and then 28.75 years of operations, for a total exposure duration of 30 years.

Scenario 2: Operations Only

As shown in Table 3.2-14, all build alternatives would be below all BAAQMD health risk thresholds. Therefore, operational emissions of each build alternative would not expose sensitive receptors to substantial pollutant concentrations and impacts would be ***less than significant***.

Table 3.2-14. Unmitigated Health Risk Results: Scenario 2

Build Alternative	Cancer Risk (cases per million)[a]	Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration ($\mu g/m^3$)
Move Whistlestop	3.66	0.001	0.13
Adapt Whistlestop	3.66	0.001	0.13
4th Street Gateway	4.65	0.001	0.12
Under the Freeway	5.40	0.001	0.12
BAAQMD Significance Threshold	10	1.0	0.3
Exceeds Threshold?	**No (all alternatives)**	**No (all alternatives)**	**No (all alternatives)**

[a] Cancer risk scenario evaluated a receptor in the third trimester of pregnancy being exposed to 30 years of project operations.

Mitigation Measures

<u>Under any build alternative that is selected and constructed, the following measure would be implemented.</u>

MM-AQ-CNST-1: Use Clean Diesel-Powered Equipment during Construction to Control Construction-Related Emissions

The project sponsor shall ensure that all off-road diesel-powered equipment used during construction is equipped with EPA-approved Tier 4 Final engines to reduce DPM. The construction contractor shall submit evidence of the use of EPA-approved Tier 4 Final engines or cleaner for project construction to the City prior to the commencement of construction activities.

<u>Impact AQ-4: </u>Result in Other Emissions (Such as Those Leading to Odors) Adversely Affecting a Substantial Number of People

All Build Alternatives

BAAQMD and CARB have identified the following types of land uses as being commonly associated with odors. Although this list is not exhaustive, it is intended to help lead agencies recognize the types of facilities where more analysis may be warranted.

- Sewage treatment plants
- Coffee roasters
- Asphalt plants
- Metal smelters
- Landfills
- Recycling facilities
- Waste transfer stations
- Petroleum refineries

- Biomass operations
- Auto body shops
- Coating operations
- Fiberglass manufacturers
- Foundries
- Rendering plants
- Livestock operations

There are sensitive receptors within 1,000 feet of the project area. Potential odor emitters during construction activities include diesel exhaust, asphalt paving, and the use of architectural coatings and solvents. Construction-related activities would be temporary, and construction activities would not be likely to result in nuisance odors that would violate BAAQMD Regulation 7. Odors during operation could emanate from vehicle exhaust and the reapplication of architectural coatings. These odors would be limited to areas adjacent to the project area. Although such brief exhaust- and paint-related odors may be considered adverse, they would not affect a substantial number of people.

Additionally, the proposed project is not associated with any of the land uses listed above and would not result in odorous emissions. Odors from diesel exhaust currently exist in the project area. Because each build alternative would not result in an increase in vehicle trips and would only shift the existing buses to another location, the proposed project would not introduce new sources of odors. Given mandatory compliance with BAAQMD regulations, no construction or operational activities proposed would create a level of objectionable odors that would adversely affect a substantial number of people and impacts would be ***less than significant***. No mitigation is required.

Mitigation Measures

No mitigation is required.