3.2. Air Quality

This section describes the project area’s existing air quality conditions and applicable regulations, and analyzes potential short- and long-term impacts of the project on air quality.

Air quality influences public health and welfare, the economy, and quality of life. Air pollutants have the potential to adversely affect public health, the production and quality of agricultural crops, visibility, native vegetation, and buildings and structures.

Criteria pollutants are those that are regulated by either the federal or California Clean Air Act. Noncriteria pollutants are not regulated by these acts, but are a concern as precursors to criteria pollutants and/or for their potential for harm or nuisance.

The criteria pollutants of most interest in the project area are ozone and particulates (dust). Ozone is not emitted directly into the environment; rather, it is generated from complex chemical reactions in the presence of sunlight between reactive organic gases (ROG) (or nonmethane hydrocarbons) and oxides of nitrogen (NOₓ). Ozone is a powerful respiratory irritant. Particulate matter (PM) is classified as respirable particulate matter (PM₁₀) and fine particulate matter (PM₂.₅). Exposure to elevated PM levels causes irritation of the eyes and respiratory system, and exposure is implicated in increased levels of disease and death.

Important noncriteria pollutants include air toxics. Air toxics are generated from industrial processes (e.g., gas stations, dry cleaners, or car repairs), mobile sources using diesel engines, and agricultural sources.

3.2.1. Regulatory Setting

The project area is located at the boundary of the San Francisco Bay Area Air Basin (SFBAAB) and the Sacramento Valley Air Basin (SVAB). Air quality in Solano County is regulated by the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (ARB), and both the Bay Area Air Quality Management District (BAAQMD) and Yolo-Solano Air Quality Management District (YSAQMD). These agencies develop rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, state and local regulations may be more stringent.

Federal

EPA is responsible for enforcing the many federal environmental and hazardous waste laws, including the federal Clean Air Act (CAA). California is under the jurisdiction of EPA Region IX, with offices in San Francisco. The CAA, established in 1963, was substantially...
modified in 1970 and again amended in 1990 to authorize the establishment of national health-based air quality standards, set deadlines for their attainment, and establish actions required by areas of the nation that exceeded these standards.

**Criteria Air Pollutants**

The CAA required EPA to establish national ambient air quality standards (NAAQS). EPA has established primary and secondary NAAQS for the following criteria air pollutants: photochemical smog (ozone), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), respirable and fine particulate matter (PM_{10} and PM_{2.5}, respectively), and lead (Table 3.2-1). The primary standards protect public health and the secondary standards protect public welfare.

The CAA also required each state to prepare an air quality control plan referred to as a state implementation plan (SIP). The federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a federal implementation plan that imposes additional control measures may be prepared for the nonattainment area. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basin.

**Toxic Air Contaminants/Hazardous Air Pollutants**

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

A wide range of sources, from industrial plants to motor vehicles, emits TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage; or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.
Table 3.2-1  Federal and State Ambient Air Quality Standards

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Time</th>
<th>California 1,2</th>
<th>National 1,3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Primary 3</td>
<td>Secondary 3</td>
</tr>
<tr>
<td></td>
<td>1-hour</td>
<td>0.09 ppm (180 μg/m³)</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td></td>
<td>8-hour</td>
<td>0.070 ppm (137 μg/m³)</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
<td>1-hour</td>
<td>9.0 ppm (10 mg/m³)</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td></td>
<td>8-hour</td>
<td>6 ppm (7 mg/m³)</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td>Nitrogen dioxide (NO₂)</td>
<td>Annual</td>
<td>0.030 ppm (57 μg/m³)</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td></td>
<td>arithmetic mean</td>
<td>0.18 ppm (339 μg/m³)</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td></td>
<td>1-hour</td>
<td>100 ppb (188 μg/m³)</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td>Sulfur dioxide (SO₂)</td>
<td>24-hour</td>
<td>0.04 ppm (105 μg/m³)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>3-hour</td>
<td>–</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td></td>
<td>1-hour</td>
<td>0.25 ppm (655 μg/m³)</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td>Respirable particulate matter (PM₁₀)</td>
<td>Annual arithmetic mean</td>
<td>20 μg/m³</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>50 μg/m³</td>
<td>150 μg/m³</td>
</tr>
<tr>
<td>Fine particulate matter (PM₂.₅)</td>
<td>Annual arithmetic mean</td>
<td>12 μg/m³</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>–</td>
<td>35 μg/m³</td>
</tr>
<tr>
<td>Lead 4</td>
<td>Calendar quarter</td>
<td>–</td>
<td>Same as primary standard</td>
</tr>
<tr>
<td></td>
<td>30-day average</td>
<td>1.5 μg/m³</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Rolling 3-month average</td>
<td>–</td>
<td>0.15 μg/m³</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>1-hour</td>
<td>0.03 ppm (42 μg/m³)</td>
<td>No national standards</td>
</tr>
<tr>
<td>Sulfates</td>
<td>24-hour</td>
<td>25 μg/m³</td>
<td></td>
</tr>
<tr>
<td>Vinyl chloride 4</td>
<td>24-hour</td>
<td>0.01 ppm (26 μg/m³)</td>
<td></td>
</tr>
<tr>
<td>Visibility-reducing particulate matter</td>
<td>8-hour</td>
<td>Extinction coefficient of 0.23 per km—visibility of 10 miles or more</td>
<td></td>
</tr>
</tbody>
</table>

Notes:  μg/m³ = micrograms per cubic meter; ARB = California Air Resources Board; km = kilometers; ppb = parts per billion; ppm = parts per million.
1 National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM₁₀ 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The PM₂.₅ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.
2 California standards for ozone, CO (except in the Lake Tahoe Basin), SO₂ (1 and 24-hour), NO₂, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
3 Concentration expressed first in units in which it was promulgated (i.e., parts per million [ppm] or micrograms per cubic meter [μg/m³]). Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; “ppm” in this table refers to ppm by volume, or micromoles of pollutant per mole of gas. Secondary national standards are also available from EPA.
4 ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
Sources: ARB 2016a; EPA 2016a.
For evaluation purposes, TACs are separated into carcinogens and noncarcinogens, based on the nature of the physiological effects of exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with criteria air pollutants, for which acceptable levels of exposure can be determined and ambient standards have been established (Table 3.2-1). Cancer risk from TACs is expressed as excess cancer cases per million exposed individuals, typically over a lifetime of exposure.

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

**State**

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act. California law authorizes ARB to set ambient (outdoor) air pollution standards (California Health and Safety Code, Section 39606) in consideration of public health, safety, and welfare (the California ambient air quality standards [CAAQS]) (Table 3.2-1).

**Criteria Air Pollutants**

ARB is responsible for preparing and enforcing the federally required SIP in an effort to achieve and maintain the NAAQS and CAAQS, which were developed as part of the California Clean Air Act adopted in 1988. The CAAQS for criteria pollutants equal or surpass the NAAQS, and include other pollutants for which there are no NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The California Clean Air Act requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest date practical. The act specifies that local air districts should focus particular attention on reducing emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Among ARB’s other responsibilities are overseeing local air districts’ compliance with federal and state laws; approving local air quality plans; submitting SIPs to EPA; monitoring air quality; determining and updating area designations and maps; and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

**Toxic Air Contaminants**

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

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

ARB has adopted diesel exhaust control measures and more stringent emissions standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). Recent milestones included the low-sulfur diesel fuel requirement and tighter emissions standards for heavy-duty diesel trucks (effective in 2007 and subsequent model years) and off-road diesel equipment (2011).

Over time, replacing older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) in California have been reduced substantially over the last decade; such emissions will be reduced further through a progression of regulatory measures (e.g., low emission vehicle/clean fuels and Phase II reformulated-gasoline regulations) and control technologies.

Regional and Local

ARB is the oversight agency responsible for regulating statewide air quality, but implementation and administration of the NAAQS and CAAQS is delegated to several regional air pollution control districts and air quality management districts. These districts have been created for specific air basins, and have principal responsibility for:

- developing plans to meet the NAAQS and CAAQS;
- developing control measures for nonvehicular sources of air pollution necessary to achieve and maintain the NAAQS and CAAQS;
- implementing permit programs established for construction, modification, and operation of air pollution sources;
- enforcing air pollution statutes and regulations governing nonvehicular sources; and
- developing employer-based trip reduction programs.

To regulate air pollutant emissions in California, the state has been divided into 15 air basins based on similar meteorological and geographic conditions, and consideration of political boundary lines whenever practicable. Solano County is situated on the
boundary of two air basins, under the jurisdiction of two different air quality management districts (Exhibit 3.2-1). YSAQMD attains and maintains air quality conditions in northeastern Solano County and BAAQMD regulates air pollutant emissions in the southwestern portion of the county. Both districts prepare plans and programs for the attainment of ambient air quality standards, adopt and enforce rules and regulations, and issue permits for stationary sources.

Yolo-Solano Air Quality Management District

The YSAQMD staff has produced the Handbook for Assessing and Mitigating Air Quality Impacts (YSAQMD 2007) to guide lead agencies, consultants, and project applicants on how to accurately assess and mitigate project-related impacts on air quality.

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

- **District Rule 2.3, Ringelmann Chart**: Visible emissions from stationary diesel-powered equipment are not allowed to exceed 40 percent opacity for more than 3 minutes in any 1 hour.

- **District Rule 2.5, Nuisance**: Dust emissions must be prevented from creating a nuisance to surrounding properties.

- **Rule 2.11, Particulate Matter Concentrations**: The purpose of this rule is to protect ambient air quality by establishing a PM emission standard.

- **District Rule 2.14, Architectural Coatings**: Architectural coatings and solvents used at the project shall be compliant with volatile organic compound (VOC) limits.

- **District Rule 2.28, Cutback and Emulsified Asphalt Paving Materials**: This rule regulates cutback and emulsified asphalt application.

- **District Rule 9.9, Asbestos**: In the event that demolition, renovation, or removal of asbestos-containing materials is involved, this rule requires district consultation and a permit before the start of demolition or renovation work.

- Portable equipment greater than 50 horsepower, other than vehicles, must be registered with either the ARB Portable Equipment Registration Program ([http://www.arb.ca.gov/perm/newreg.html](http://www.arb.ca.gov/perm/newreg.html)) or with the district.

- All stationary equipment, other than internal combustion engines less than 50 horsepower, emitting air pollutants controlled under District rules and regulations require an Authority to Construct and Permit to Operate from the district.
Exhibit 3.2-1 Air District Boundaries
Air Quality Plans

YSAQMD is the primary agency responsible for planning to meet the NAAQS and CAAQS in northeastern Solano County. YSAQMD is considered to be part of a regional nonattainment area for ozone and PM$_{2.5}$. As set forth by YSAQMD, ozone levels in the district are in the healthy range on most days. However, ozone and its precursors do not respect political boundaries, and emissions in Yolo and Solano counties do affect neighboring communities, especially those in the greater Sacramento region. Therefore, EPA has included YSAQMD in the Sacramento Federal Nonattainment Area.

YSAQMD works with other local air districts in the Sacramento region to maintain the region’s portion of the SIP for ozone. The SIP is a compilation of plans and regulations that govern how the region and state will comply with the federal CAA requirements to attain and maintain the NAAQS for ozone. The Sacramento region was classified as a severe nonattainment area for the 1997 8-hour NAAQS of 84 parts per billion. In 2013, the regional air districts developed the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan to address how the region would attain the 1997 8-hour standard. EPA approved this plan effective March 2, 2015 (80 Federal Register [FR] 4795).

YSAQMD is nonattainment for PM$_{2.5}$. Most of the time, fine particulate pollution levels in the district are in the healthy range. However, there are typically several days a year when air quality is considered unhealthy for sensitive groups because of increased particulate pollution. Although the district generally does not experience unhealthy levels of particulates, EPA has included YSAQMD in the Sacramento Federal Nonattainment Area. To show attainment of the 24-hour fine particulate standard, an area must demonstrate that it has met the standard during 3 consecutive years. The Sacramento PM$_{2.5}$ planning region was classified as attainment for the 2012 annual average PM$_{2.5}$ NAAQS of 12 micrograms per cubic meter (μg/m$^3$), and classified as nonattainment in 2009 for the 2006 24-hour PM$_{2.5}$ NAAQS of 35 μg/m$^3$. The region prepared the PM$_{2.5}$ Maintenance Plan and Redesignation Request (2013) to address how the region attained and would continue to attain the 24-hour PM$_{2.5}$ standard. The region attained the standard based on 2009–2011 monitoring data, but postponed submittal of the plan because high concentrations in 2012 caused exceedances.

On May 10, 2017, EPA found that the area attained the 2006 24-hour PM$_{2.5}$ NAAQS by the attainment date of December 31, 2015 (82 FR 21711). This finding was based on complete, quality-assured and certified PM$_{2.5}$ monitoring data for 2013–2015. The PM$_{2.5}$ Maintenance Plan and Redesignation Request will be updated and submitted in the future based on the clean data finding made by EPA.

EPA has determined that the Sacramento Federal Nonattainment Area is required to develop a mitigation plan to minimize public exposure from PM$_{2.5}$ emissions generated during wildfire events. The air districts in the Sacramento Federal Nonattainment Area for PM$_{2.5}$ have jointly prepared the draft Wildfire Mitigation Plan for the Sacramento Federal
Nonattainment Area for PM$_{2.5}$ as required by Title 40, Part 51.930 of the Code of Federal Regulations.

**Bay Area Air Quality Management District**

In May 2017, BAAQMD released a revision to its 2010 CEQA guidelines, which serves the same function and contains similar components as the YSAQMD guidance document discussed above. BAAQMD has been updating its CEQA guidelines and thresholds of significance based on substantive changes to the data and assumptions underlying the analytical methodologies, thresholds, and mitigation strategies since the last update of the CEQA Guidelines in June 2010 (revised May 2017).

All projects in southwestern Solano County are subject to BAAQMD rules and regulations in effect at the time of construction. Specific rules applicable to construction of the project may include but are not limited to the following:

- **Regulation 2, Rule 1: General Permit Requirements.** Includes criteria for issuance or denial of permits, exemptions, appeals against decisions of the Air Pollution Control Officer and district actions on applications.

- **Regulation 6: Particulate Matter and Visible Emissions.** This regulation provides definitions and test methods for particulate matter rules.

- **Regulation 7: Odorous Substances.** Establishes general limitations on odorous substances and specific emissions limitations on certain odorous compounds.

- **Regulation 8, Rule 3: Architectural Coatings.** Limits the quantity of VOCs in architectural coatings.

- **Regulation 8, Rule 15: Emulsified and Liquid Asphalts.** Limits the emissions of volatile organic compounds caused by the use of emulsified and liquid asphalt in paving materials and paving and maintenance operations.

- **Regulation 11, Rule 2: Asbestos.** Controls emissions of asbestos to the atmosphere during demolition, renovation, milling, and manufacturing and establishes appropriate waste disposal procedures.

**Air Quality Plans**

The 2017 Bay Area Clean Air Plan provides a regional strategy for protecting public health and the climate. To protect public health, the plan describes how BAAQMD will continue progress toward attaining all federal and state air quality standards and eliminating health risk disparities from exposure to air pollution among Bay Area communities. To protect the climate, the plan defines a vision for transitioning the region to a post-carbon economy needed to achieve ambitious greenhouse gas (GHG) reduction targets for 2030 and 2050.
The plan also provides a regional climate protection strategy that will put the Bay Area on a pathway to achieve those GHG reduction targets.

The 2017 plan includes a wide range of control measures designed to decrease emissions of the air pollutants that are most harmful to Bay Area residents, such as PM, ozone, and TACs; to reduce emissions of methane and other “super-GHGs” that are potent climate pollutants in the near term; and to decrease emissions of carbon dioxide by reducing fossil fuel combustion.

The 2010 Multi-Pollutant Clean Air Plan was adopted in September 2010. The Bay Area 2010 Clean Air Plan provides a comprehensive plan to improve Bay Area air quality and protect public health. The 2010 Clean Air Plan has been prepared in close collaboration with the BAAQMD regional agency partners, and has been informed by extensive outreach to the public and interested stakeholders.

BAAQMD and its partners have been working to reduce PM emissions in the Bay Area and to meet state and national standards and to protect public health. Although the Bay Area is in attainment for annual PM$_{2.5}$ state and national standards, the Bay Area is not in attainment of the 24-hour PM$_{2.5}$ national standard.

**Toxic Air Contaminants**

At the local level, air pollution control or air quality management districts may adopt and enforce ARB control measures. YSAQMD’s Air Toxics Hot Spots Program requires certain facilities with the potential to emit certain amounts of toxic air pollutants to submit emissions inventories to the district and, in some cases, pursue risk reduction strategies. Under YSAQMD Rule 3-1 (“General Permit Requirements”), Rule 3-4 (“New Source Review”), and Rule 3-8 (“Federal Operating Permit”), all sources with the potential to emit TACs must obtain permits from the district. Similarly, permits under BAAQMD Regulation 2 (“Permits”) may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source-review standards and air toxics control measures.

YSAQMD and BAAQMD limit emissions and public exposure to TACs through a number of programs and prioritize TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.²

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² For the purpose of this document, “receptors” are defined as people—children, adults, and seniors—occupying or residing in residential dwellings, schools, daycare centers, hospitals, or senior-care facilities. “Sensitive receptors” are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and designated residential areas are examples of sensitive receptors. “Sensitive uses” include jails, public parks, federally or state-owned and managed wildlife areas, in addition to sensitive receptors listed above.
Solano County General Plan

As discussed in Section 1.2, construction of facilities for generation of electrical energy by a local agency like SMUD is exempt from County zoning and building ordinances (CA Government Code Section 53091, subdivisions (d) and (e). The following summary of County Policy is provided in the interest of full disclosure and to support informed decisionmaking.

The following are the air quality policies and implementation programs from the Solano County General Plan (General Plan) (Solano County 2008):

- **Policy HS.P-43**: Support land use, transportation management, infrastructure and environmental planning programs that reduce vehicle emissions and improve air quality.

- **Policy HS.P-47**: Promote GHG emission reductions by supporting carbon-efficient farming methods (e.g., methane capture systems, no-till farming, crop rotation, cover cropping, residue farming); installation of renewable energy technologies; protection of grasslands, open space, and farmlands from conversion to other uses; and encouraging development of energy-efficient structures.

Environmental Setting

The project site is located in Solano County, California, which is in a geographically unique situation because of its orientation across two air basins. Northeastern Solano County lies within the Sacramento Valley Air Basin. The SVAB also makes up all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba counties and western Placer County. Southwestern Solano County is located in the San Francisco Bay Area Air Basin, which also comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties and southern Sonoma County.

Ambient concentrations of air pollutant emissions are determined by the amount of emissions released by the sources of air pollutants and the atmosphere’s ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

Climate, Meteorology, and Topography

The SVAB is a relatively flat area bordered by the north Coast Ranges to the west and the northern Sierra Nevada to the east. In contrast, the SFBAAB is characterized by complex terrain consisting of the Coast Ranges, inland valleys, and bays, which distorts normal wind flow patterns. In this area, the Coast Ranges split, allowing air to flow out of the SFBAAB and carry pollution into the SVAB.
The climate of the project area is influenced by cool air that flows from the Pacific Ocean and San Francisco Bay through the Carquinez Strait (the only breach in the western mountain barrier) into the SVAB, where it mixes with the warmer valley air. The temperature and atmospheric surface pressure differences result in high winds in the project area. In addition to predominant high winds, the climatic transition results in hot, dry summers and cool, rainy winters, which are typical of most of California (Solano County 2008).

The local meteorology of eastern Solano County is represented by measurements recorded at the Davis station. The normal annual precipitation is approximately 18 inches. January temperatures range from a normal minimum of 37 degrees Fahrenheit (°F) to a normal maximum of 54°F. July temperatures range from a normal minimum of 55°F to a normal maximum of 94°F (Solano County 2008; WRCC 2019). The predominant wind direction is from the north-northwest (Solano County 2008).

The local meteorology of western Solano County is represented by measurements recorded at the Fairfield station. The normal annual precipitation, which occurs primarily from November through March, is approximately 23 inches. January temperatures range from a normal minimum of 38°F to a normal maximum of 55°F. July temperatures range from a normal minimum of 56°F to a normal maximum of 89°F (Solano County 2008; WRCC 2019). The predominant wind direction is from the southwest (Solano County 2008).

**Criteria Air Pollutants**

Concentrations of emissions from criteria air pollutants are used to indicate the quality of the ambient air. Key criteria air pollutants in the SFBAAB and SVAB and their health effects are described briefly below. Criteria air pollutants include ozone, CO, NO2, SO2, PM10, PM2.5, and lead. However, for the purposes of this analysis, the criteria air pollutants that are of primary concern because of their nonattainment status include ozone (and ozone precursors) and PM. Table 3.2-2 provides monitoring data applicable to the project site, and Table 3.2-3 shows Solano County’s attainment status for the CAAQS and NAAQS.

**Ozone**

Ozone is a photochemical oxidant (a substance whose oxygen combines chemically with another substance in the presence of sunlight) and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of ROG and NOx in the presence of sunlight. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem. ROG are VOCs that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NOx are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels.
Emissions of the ozone precursors ROG and NOX have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. ROG and NOX emissions decreased from 2000 to 2010 and are projected to continue decreasing from 2010 to 2035 (ARB 2013:Table 3-1). In Solano County, only 4 days in 2014–2016 were rated as a high-ozone days (American Lung Association 2018).

Ozone is a respiratory irritant that increases susceptibility to respiratory infections. It is also an oxidant that can cause substantial damage to vegetation and other materials. Acute health effects of ozone exposure include increased respiratory and pulmonary resistance, cough, pain, shortness of breath, and lung inflammation. Long-term health effects include chronic bronchitis and chronic obstructive pulmonary disease (EPA 2018a).

**Oxides of Nitrogen**

NOX are a family of highly reactive gases that are primary precursors to the formation of ground-level ozone and include NO2 and nitric oxide (NO). Oxides of nitrogen are produced from natural sources, motor vehicles, and other fuel combustion processes. NOX are critical components of photochemical smog. NO2 produces the yellowish-brown color of smog. Because NO2 is formed and depleted by reactions associated with ozone, the NO2 concentration in a particular geographical area may not be representative of the local sources of NOX emissions (EPA 2016b, 2018b).

NOX can irritate the lungs, cause lung damage, and lower resistance to respiratory infections such as influenza. The effects of short-term exposure are still unclear, but continued or frequent exposure to elevated concentrations may cause an increased incidence of acute respiratory illness in children. Health effects associated with NOX are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO2 may lead to aggravation of the eyes and mucous membranes along with pulmonary dysfunction. NOX can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals through the production of particulate nitrates. Airborne NOX can impair visibility.

**Particulate Matter**

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM10. PM10 consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (ARB 2013:1-20).

PM2.5 is a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. Direct emissions of PM2.5 in both the SFBAAB and the SVAB declined between 2000 and 2010 and are projected to increase slightly through 2035. Direct emissions of PM10 are projected to remain relatively constant through 2035. PM emissions are dominated by emissions from area sources, primarily fugitive dust from
vehicle travel on unpaved and paved roads, farming operations, construction and
demolition, and particles from residential fuel combustion (ARB 2013:4-17 and 4-47).

The size of PM particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into the lungs, and some may even get into the bloodstream. Exposure to such particles can affect both the lungs and the heart. Numerous scientific studies have linked particle pollution exposure to a variety of problems: premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing. People with heart or lung disease, children, and older adults are most likely to be affected by exposure to particle pollution (EPA 2018c).

Monitoring Station Data and Attainment Area Designations

Concentrations of criteria air pollutants are measured at several monitoring stations in Solano County. The Fairfield–Chadbourne Road station is the closest station to the project site with recent data for ozone. Where data were not available at the Fairfield station, data for PM_{2.5} and PM_{10} were taken from the Vallejo–304 Tuolumne Street and Vacaville–Merchant Street stations, respectively. Table 3.2-2 summarizes the air quality data from the last 3 years for which data are available (2015–2017).

<table>
<thead>
<tr>
<th>Table 3.2-2</th>
<th>Summary of Annual Data on Ambient Air Quality (2015–2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2015</td>
</tr>
<tr>
<td><strong>Ozone</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum concentration (1-hr/8-hr avg, ppm)</td>
<td>0.084/0.072</td>
</tr>
<tr>
<td>Number of days state standard exceeded (1-hr/8-hr)</td>
<td>0/1</td>
</tr>
<tr>
<td>Number of days national standard exceeded (8-hr)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Fine Particulate Matter (PM_{2.5})</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum concentration(^1) (24-hour μg/m(^3))</td>
<td>41.4</td>
</tr>
<tr>
<td>Number of days national standard exceeded(^1) (24-hour measured)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Respirable Particulate Matter (PM_{10})</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum concentration(^2) (μg/m(^3))</td>
<td>42.5</td>
</tr>
<tr>
<td>Number of days state standard exceeded(^2)</td>
<td>*</td>
</tr>
<tr>
<td>Number of days national standard exceeded(^2)</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes: μg/m\(^3\) = micrograms per cubic meter; avg = average; hr = hour; ppm = parts per million; * = insufficient data available
\(^1\) Data unavailable for Fairfield station; the next closest station with available data was Vallejo.
\(^2\) Data unavailable for Fairfield station; the next closest station with available data was Vacaville.

Source: ARB 2019

EPA and ARB use this type of monitoring data to designate areas according to attainment status for criteria air pollutants established by the agencies. Air basins are designated as
being in attainment if the levels of a criteria air pollutant meet the NAAQS or CAAQS for the pollutant. Basins are designated as being in nonattainment if the level of a criteria air pollutant is higher than the corresponding NAAQS or CAAQS. “Unclassified” is used in areas that cannot be classified on the basis of available information as meeting or not meeting the standards. The purpose of these designations is to identify areas with air quality problems and thereby initiate planning efforts for improvement. Table 3.2-3 shows the current national and state attainment designations for the Solano County portion of the SVAB and SFBAAB for each criteria air pollutant.

### Emissions Inventory

ARB provides estimates for Solano County’s 2012 air pollutant inventory, the most recent available inventory, for various source categories. According to this inventory, mobile sources are the largest contributor to the estimated annual average for air pollutant levels of ROG and NOx, accounting for approximately 44 percent and 80 percent of these emissions, respectively. Areawide sources, which include solvent evaporation (e.g., consumer products and architectural coatings) and miscellaneous processes (e.g., residential fuel combustion and farming operations), account for approximately 81 percent and 59 percent of Solano County’s PM10 and PM2.5 emissions, respectively (ARB 2016b).

<table>
<thead>
<tr>
<th>Table 3.2-3</th>
<th>Attainment Status Designations for the Yolo-Solano Air Quality Management District and Bay Area Air Quality Management District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollutant</td>
<td>Federal Standard</td>
</tr>
<tr>
<td>Ozone</td>
<td>1-hour Attainment ¹</td>
</tr>
<tr>
<td>Respirable particulate matter (PM10)</td>
<td>Nonattainment (Marginal) / Nonattainment (Moderate)</td>
</tr>
<tr>
<td>24-hour</td>
<td>Unclassified/Attainment</td>
</tr>
<tr>
<td>Annual</td>
<td>–</td>
</tr>
<tr>
<td>Fine particulate matter (PM2.5)</td>
<td>24-hour Nonattainment</td>
</tr>
<tr>
<td></td>
<td>Annual Attainment</td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
<td>Attainment</td>
</tr>
<tr>
<td>Nitrogen dioxide (NO2)</td>
<td>1-hour –</td>
</tr>
<tr>
<td></td>
<td>Annual Unclassified/Attainment</td>
</tr>
<tr>
<td>Sulfur dioxide (SO2)</td>
<td>Attainment</td>
</tr>
<tr>
<td>Lead (Particulate)</td>
<td>Attainment</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>Attainment</td>
</tr>
<tr>
<td>Sulfates</td>
<td>No Federal Standard</td>
</tr>
<tr>
<td>Visibility-Reducing Particles</td>
<td>–</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>Unattainment</td>
</tr>
</tbody>
</table>

Notes:
¹ The national 1-hour ozone standard was revoked by the U.S. Environmental Protection Agency on June 15, 2005, but some associated requirements still apply. Standards still apply in the northeastern and southwestern portions of Solano County.

Sources: BAAQMD 2018; YSAQMD 2019; EPA 2019.
Toxic Air Contaminants

Concentrations of TACs are also used to indicate the quality of ambient air. A TAC is an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or may pose a hazard to human health. TACs are usually present in trace quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

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

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

Diesel PM poses the greatest health risk among these 10 TACs mentioned. Based on receptor modeling techniques, ARB estimated the health risk of diesel PM to be 360 excess cancer cases per million people in the SVAB and 480 excess cases in the SFBAAB in the year 2000. Since 1990, the health risk associated with diesel PM has been reduced by 52 percent in the SVAB and 36 percent in the SFBAAB. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (Solano County 2008).

Area sources of TAC emissions in Solano County include Travis Air Force Base (use of jet fuel) and the Western Electric railyard located along the Sacramento Northern Rail Road line between Rio Vista and Fairfield (Solano County 2008). There are no major sources of TACs in the vicinity of the project site.

Naturally Occurring Asbestos

Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. Naturally occurring asbestos, which ARB identified as a TAC in 1986, is located in many parts of California and is commonly associated with serpentine soils and rocks.
According to a 2011 U.S. Geological Survey study, ultramafic rocks or serpentine rocks have only been identified in a small area of southwestern Solano County on the border with Napa County. Based on this map, asbestos would not likely occur on the project site or in the project vicinity (Van Gosen and Clinkenbeard 2011).

**Odors**

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person’s reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals can smell minute quantities of specific substances; others may not have the same sensitivity but may be sensitive to odors from other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant).

It is important to note that an unfamiliar odor is more easily detected and more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition occurs only with a change in the intensity.

**Sensitive Land Uses**

Sensitive land uses are generally considered to include those uses where exposure to pollutants could result in health-related risks to individuals. Residential dwellings and places where people recreate or congregate for extended periods of time, such as parks or schools, are of primary concern because of the potential for increased and prolonged exposure of individuals to pollutants.

The project area is designated for agricultural use and leased for dryland farming and grazing. There are no sensitive receptors near the project area. A few rural residences are located outside of the project area along rural roads that would be used to bring materials to the project site.

3.2.2.  **Environmental Impacts and Mitigation Measures**

**Methods and Assumptions**

Air quality modeling was based on project-specific construction information for each phase of the construction period. Short-term construction-related emissions of criteria air pollutants and precursors were estimated using the Sacramento Metropolitan Air Quality Management District’s Roadway Construction Emissions Model (Version 9.0) computer program. Specific information used in the construction modeling included a typical list of
construction equipment by construction phase and a set of reasonable assumptions based on provided materials and information.\textsuperscript{3}

Emissions calculations were calculated for identified phases of project construction. These estimates were then summed to generate maximum daily emissions during overlapping phases of construction. Project construction was assumed to begin in 2021 and conclude in 2022, and to occur over a period of approximately 14 months. For a detailed description of model input and output parameters and assumptions, see Appendix C.

Regional and local criteria air pollutant emissions and associated impacts, as well as impacts from TACs, were assessed in accordance with YSAQMD- and BAAQMD-recommended methodologies. The project’s emissions were compared to YSAQMD and BAAQMD significance thresholds for construction-phase emissions.

**Thresholds of Significance**

Based on Appendix G of the State CEQA Guidelines, the project would result in a potentially significant impact on air quality if it would:

- conflict with or obstruct implementation of the applicable air quality plan;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard;
- expose sensitive receptors to substantial pollutant concentrations; or
- result in other emissions (such as those leading to odors affecting a substantial number of people).

In addition to these criteria, YSAQMD (2007) and BAAQMD (2017) have established thresholds for certain criteria pollutants to determine whether a project would have a significant air quality impact. Construction-related and operational emissions are calculated separately. The significance thresholds are presented in Table 3.2-4.

\textsuperscript{3} Because project-specific information such as the duration and type of equipment to be used was not available, minimal off-model calculations were possible.
### Table 3.2-4 Yolo-Solano Air Quality Management District and Bay Area Air Quality Management District Thresholds of Significance

<table>
<thead>
<tr>
<th>Criteria Air Pollutant</th>
<th>Construction Thresholds</th>
<th>Operational Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Daily Emissions (lb/day)</td>
<td>Average Daily Emissions (lb/day)</td>
</tr>
<tr>
<td>ROG</td>
<td>54 (B)</td>
<td>54 (B)</td>
</tr>
<tr>
<td>NOX</td>
<td>54 (B)</td>
<td>54 (B)</td>
</tr>
<tr>
<td>PM&lt;sub&gt;10&lt;/sub&gt;</td>
<td>80(Y)/82(B)(Exhaust)*</td>
<td>80(Y)/82(B)*</td>
</tr>
<tr>
<td>PM&lt;sub&gt;2.5&lt;/sub&gt;</td>
<td>54(B)(Exhaust)</td>
<td>54 (B)</td>
</tr>
<tr>
<td>Fugitive Dust</td>
<td>Best Management Practices</td>
<td>None</td>
</tr>
<tr>
<td>CO</td>
<td>Not Applicable</td>
<td>9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)</td>
</tr>
</tbody>
</table>

* YSAQMD threshold of significance for construction and operation PM<sub>10</sub> is 80 lb/day, while BAAQMD threshold of significance for PM<sub>10</sub> exhaust only is 82 lb/day. YSAQMD threshold of significance for construction-related and operational NOX and ROG emissions is 10 tons/year.

Note: (Y) = Yolo-Solano Air Quality Management District; (B) = Bay Area Air Quality Management District; NOX = oxides of nitrogen, PM<sub>2.5</sub> = fine particulate matter or particulates with an aerodynamic diameter of 2.5 micrometers (µm) or less; PM<sub>10</sub> = coarse particulate matter or particulates with an aerodynamic diameter of 10 µm or less, ROG = reactive organic gases.

Sources: YSAQMD 2007; BAAQMD 2017.

Toxic air emissions would be considered significant if the project would expose sensitive receptors to a substantial incremental increase in health risks associated with TAC emissions that would exceed 10 in 1 million for carcinogenic risk (i.e., the risk of contracting cancer) and/or a noncarcinogenic hazard index of 1.0 or greater.

**Issues Not Discussed Further**

The “Impact Analysis” section will not further analyze the proposed project against thresholds of significance for which no significant impacts have been identified. Therefore, the following issue is not discussed further in the impact analysis:

- **Project-generated ROG, NOX, and PM<sub>10</sub> emissions during long-term project operation that would exceed the applicable thresholds of significance**

Project operation would require five full-time employees for periodic maintenance and monitoring of the proposed facilities. Routine maintenance of each wind turbine generator would occur every 6 or 12 months, requiring an average of 40–50 hours of scheduled mechanical and electrical work per year. Routine maintenance would include periodically replacing lubricating fluids and checking parts for wear. In addition to mechanical maintenance, all roads, pads, and trenched areas would be inspected and maintained regularly to minimize erosion. Because the project’s maintenance and operational activities would be limited, emissions of criteria pollutants or fugitive dust from mobile sources, such as vehicles and equipment, would not be substantial.
Project implementation, which would involve installing a renewable-energy generation facility, would also result in a reduction in criteria air pollutants by reducing the overall emissions associated with electricity generated and/or purchased by SMUD for delivery to customers. Generation of electricity through traditional fossil fuel–based power plants emits criteria air pollutants at rates that depend on the applied technologies and fuel sources used to generate electricity. For example, in power plants that use natural gas to generate electricity, NOx, SO2, and PM are emitted as byproducts of the electricity generation process (Union of Concerned Scientists 2019). The emissions rates for power purchased from electricity utilities depend largely on the power mix and percent renewable sources in electricity generation by each utility. The project would generate approximately 290,800 megawatt-hours per year of emissions-free energy, serving to reduce emissions of criteria air pollutants associated with electricity generation in the area served by CAISO. Based on general rates of criteria air pollutant emissions during electricity generation, project implementation would result in "avoided" emissions of approximately 7.97 pounds per day (lb/day) of ROG, 159.34 lb/day of CO, 451.74 lb/day of NOx, 3.19 lb/day of N2O, 49.95 lb/day of PM10, and 31.87 lb/day of PM2.5 (see Appendix C for calculations).

It is not anticipated that mobile sources, such as vehicles and equipment, would emit substantial amounts of criteria pollutants or fugitive dust during project operation, because maintenance and operational activities for the wind energy generation facility would be limited. Further, long-term operation of the wind turbines would result in a net emissions benefit, as operation would reduce emissions from conventional electrical generation sources that use fossil fuels. Therefore, the beneficial properties of the proposed project would offset the project’s minimal operational emissions. This issue will not be discussed further.

- **Exposure of sensitive receptors to substantial TAC concentrations during short-term construction or long-term project operation**

Project construction would result in short-term emissions of diesel exhaust from heavy-duty on- and off-road equipment. Diesel exhaust could result in health and nuisance impacts on nearby receptors. ARB identified particulate exhaust emissions from diesel PM as a TAC in 1998.

Construction vehicles would be required to limit idling time in compliance with ARB guidelines. The dose to which receptors are exposed is the primary factor used to determine the health risk from TACs (i.e., potential exposure to TAC emissions at levels that exceed applicable standards). Dose is a function of the concentration of the substance(s) in the environment and the duration of exposure to the substance. Dose is positively correlated with time: A longer exposure period would result in a higher level of exposure. Thus, an exposed individual faces a higher estimated health risk if a fixed exposure occurs over a longer period of time. According to the California Office of Environmental Health and Assessment’s *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, a 30-year exposure duration is used for estimating cancer risk at residential land uses (OEHHA 2015). Project construction
activities that would emit fugitive dust and diesel PM would be temporary, short-term, and intermittent.

Construction equipment would be the project’s primary source of diesel PM. There are no sensitive receptors near the project area. Given the highly dispersive properties of diesel PM (Zhu et al. 2002), temporary and intermittent duration of construction activity, and lack of sensitive receptors, project-related TAC emissions are not expected to result in an incremental increase in cancer risk at the nearest receptors that would exceed YSAQMD and BAAQMD thresholds of 10 in 1 million.

Because off-road construction equipment would be used only temporarily, diesel PM has highly dispersive properties, and no sensitive receptors are near the project site, short-term construction activities would not expose sensitive receptors to significant TAC emissions. Measures included in Mitigation Measure 3.2-1 that focus on reducing exhaust emissions, particularly those requiring alternative fuels and fuel-efficient construction equipment, would also serve to reduce diesel PM exhaust emissions and the overall cancer risk associated with these pollutants. Long-term operation and maintenance activities would be minimal and would not generate substantial TAC emissions. This issue will not be discussed further.

**Exposure of sensitive receptors to substantial odor emissions during short-term construction and long-term operation**

The proposed project would not involve the development of any new odor sources, and no sensitive receptors are present near the project area. Therefore, the project would not create objectionable odors at nearby sensitive receptors. In addition, construction activities would be temporary, and any generation of objectionable odors (such as from diesel exhaust) would occur only temporarily when construction activities take place near residences. Therefore, odor impacts of the project will not be analyzed further.

**Impact Analysis**

*Impact 3.2-1: Construction-related exceedance of thresholds of significance established by the air districts for criteria air pollutants.*

Project construction activities would emit NOX and PM_{10} at levels that could exceed YSAQMD and BAAQMD daily emissions thresholds for these pollutants. Construction would occur over a 17 to 20-month period, with several construction phases occurring simultaneously at several points. In addition, given the size and characteristics of the project, which would involve substantial grading activity, fugitive dust emissions would contribute to an exceedance of these thresholds and could violate applicable air quality standards. This impact would be significant.

Project construction would result in short-term emissions (present in exhaust and fugitive dust) of NOX, PM_{10}, and PM_{2.5}, the pollutants for which YSAQMD and BAAQMD are currently not in attainment. These pollutants would be emitted during the use of heavy-
duty equipment for the various construction phases, truck trips transporting materials, and worker commute trips to and from the project site.

Construction of the proposed project is anticipated to occur over approximately 17 to 20 months. Various construction phases are anticipated to overlap, resulting in the potential for simultaneous use of heavy-duty construction equipment for more than one construction phase. In addition, some or all workers from various construction phases could be commuting at the same time. Emissions were modeled based on the activities expected to occur during each construction phase, and Table 3.2-5 identifies the maximum daily emissions during the overlapping phases. See Appendix C for a detailed summary of the construction schedule and modeling inputs and assumptions. Table 3.2-5 shows estimated construction emissions.

As shown in Table 3.2-5, construction-related emissions of NOx and PM10 would exceed YSAQMD and BAAQMD daily significance thresholds for these pollutants for overlapping phases of project construction. For example, during months 4 and 5 of construction, four construction phases would occur simultaneously, resulting in the highest levels of daily emissions (i.e., 191 lb/day of NOx and 150 lb/day of PM10). Thus, construction-related emissions of ozone precursors could exceed adopted standards and contribute substantially to an existing or projected air quality violation. This would be a significant effect.

For all proposed projects, BAAQMD recommends implementing all Basic Construction Mitigation Measures whether or not construction-related emissions would exceed the applicable thresholds of significance (BAAQMD 2017). YSAQMD recommends that all projects implement best management practices to reduce dust emissions and avoid localized health impacts (YSAQMD 2007). YSAQMD best management practices mostly overlap with the BAAQMD Basic Construction Mitigation Measures (BAAQMD 2017:Table 8-2), which are included in Mitigation Measure 3.2-1 below.

As directed by BAAQMD, if implementing the BAAQMD-recommended Basic Construction Mitigation Measures would not reduce all construction-related emissions of criteria air pollutants and precursors to levels below the applicable thresholds of significance, the impact on air quality would be significant. BAAQMD recommends that proposed projects with construction-related emissions that would exceed the applicable thresholds of significance implement the Additional Construction Mitigation Measures (BAAQMD 2017:Table 8-3). See Table 3.2-5 above for calculated reductions from construction mitigation measures.

As shown in Table 3.2-5, construction of the proposed project would result in emissions that would exceed YSAQMD and BAAQMD daily emissions thresholds for NOx, even with mitigation implemented. As described in Section 3.2.2, “Environmental Setting,” exposure to criteria pollutant emissions can affect human health. Potential health effects vary depending primarily on the pollutant type, concentration of pollutants during exposure, and duration of exposure. Air pollution does not affect every individual in the same way,
and some groups are more sensitive than others to adverse health effects. However, there are no sensitive receptors near the project area.

<table>
<thead>
<tr>
<th>Construction Phase</th>
<th>Active Construction Phases</th>
<th>NOx Emissions (lb/day)</th>
<th>PM10 Exhaust Emissions (lb/day)</th>
<th>Total PM10 Emissions (lb/day)</th>
<th>PM2.5 Exhaust Emissions (lb/day)</th>
<th>Total PM2.5 Emissions (lb/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Demolition</td>
<td></td>
<td>58</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>2 Road Construction</td>
<td></td>
<td>47</td>
<td>2</td>
<td>32</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3 Home Run Collection Construction</td>
<td></td>
<td>24</td>
<td>1</td>
<td>41</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>4 Foundation Construction</td>
<td></td>
<td>62</td>
<td>3</td>
<td>23</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>5 WTG Delivery and Erection</td>
<td></td>
<td>60</td>
<td>1</td>
<td>15</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Total Max in Overlapping Phases</td>
<td>191</td>
<td>9</td>
<td>105</td>
<td>8</td>
<td>28</td>
</tr>
</tbody>
</table>

YSAQMD/BAAQMD Significance Threshold

- YSAQMD = Yolo-Solano Air Quality Management District
- BAAQMD = Bay Area Air Quality Management District
- CEQA = California Environmental Quality Act
- lb/day = pounds per day
- Max = maximum
- NOx = oxides of nitrogen
- PM2.5 = particulate matter smaller than or equal to 2.5 micrometers in diameter
- PM10 = particulate matter smaller than or equal to 10 micrometers in diameter
- WTG = wind turbine generator
- NOX = wind turbine generator
- YSAQMD = Yolo-Solano Air Quality Management District

Summation may not equal totals because of rounding. Areas in grey represent overlapping phases.

* The YSAQMD threshold of significance for construction and operation PM10 is 80 lb/day, while the BAAQMD threshold of significance is 82 lb/day. The YSAQMD threshold of significance for construction and operation NOx is 10 tons/year. For the purposes of this analysis, the BAAQMD maximum daily threshold is used.

Source: Modeling conducted by Planning Partners in March 2019. See Appendix C.

As described in Section 3.2.2, “Environmental Setting,” ROG and NOx are precursors to ozone, increased concentrations of which can cause health effects generally associated with reduced lung function. The contribution of VOCs and NOX to a region’s ambient ozone concentrations is the result of complex photochemistry. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry. It takes a large amount of additional ROG and NOx emissions to result in a quantifiable increase in ambient ozone levels over a region; a project emitting only 10 tons per year of NOx or ROG is small enough that its regional impact on ambient ozone levels may not
be detected in the regional air quality models used to determine ozone levels (SCAQMD 2014:21–22).

Although construction-related NOX emissions would be high during a potential maximum daily emissions scenario, potential emissions at this level would be intermittent and short-term. Over the entire construction period, the project could emit a total of approximately 10.23 tons of NOX following implementation of mitigation measures. These increased emissions would end after construction is completed. Because construction-related emissions would be of short duration and relatively low on a regional scale, their contribution to regional ozone concentrations and the associated health impacts is expected to be minimal. For this reason, and because emissions would not be concentrated in the immediate vicinity of sensitive receptors, it is reasonably foreseeable to conclude that the project would not result in significant health impacts.

However, given that uncontrolled daily emissions during project construction activities would exceed YSAQMD and BAAQMD thresholds for NOX, PM10, and PM2.5, this impact would be significant.

**Mitigation Measure 3.2-1: Reduce construction-related exhaust and dust emissions.**

The construction contractor shall prepare a fugitive dust control plan for the project’s construction phases. Before the start of construction, the plan shall be submitted to YSAQMD and BAAQMD for review and approval. The fugitive dust control plan shall include but not be limited to the following measures for all construction phases to reduce fugitive dust emissions and emissions of PM and NOX exhaust:

**Fugitive Dust Control Plan**

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent (at least two times per day). Moisture content can be verified by lab samples or moisture probe.

- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.

- All roadways, driveways, and wind turbine generator foundations and work areas to be paved or graveled shall be completed as soon as possible. These areas shall be paved or graveled as soon as possible after grading unless seeding or soil binders are used. No recycled concrete will be utilized on the roadways.
• Idling times shall be minimized either by shutting equipment off when not in use or by reducing the maximum idling time to 2 minutes. Clear signage shall be provided for construction workers at all access points.

• All construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition before operation.

• A publicly visible sign shall be posted identifying the name and telephone number of the person to contact at SMUD regarding dust complaints. This person shall respond and take corrective action within 48 hours. The air districts’ phone numbers shall also be visible to ensure compliance with applicable regulations.

• All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 miles per hour.

• Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.

• The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the surface area disturbed at any one time.

• All trucks and equipment, including their tires, shall be washed off before leaving the site.

• Site access areas shall be covered with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel to a distance of 100 feet from the paved road.

• Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.

• The project shall develop a plan demonstrating that off-road equipment exceeding 50 horsepower) to be used in the construction project (owned, leased, and subcontractor vehicles) would achieve project-wide, fleet-average emissions reductions of 20 percent for NOx and 45 percent for PM, compared to the most recent ARB fleet average. Acceptable options for reducing emissions include the use of late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as they become available.

• Low-VOC (i.e., ROG) coatings shall be used beyond local requirements (Regulation 8, Rule 3, “Architectural Coatings”).
• All construction equipment, diesel trucks, and generators shall be equipped with best available control technology for reduction of NO\textsubscript{X} and PM emissions.

• All contractors shall use equipment that meets ARB’s most recent certification standard for off-road heavy-duty diesel engines (BAAQMD 2017:Tables 8-2 and 8-3).

**Significance after Mitigation**

Project construction activities would result in NO\textsubscript{X}, PM\textsubscript{10}, and PM\textsubscript{2.5} emissions that would exceed YSAQMD and BAAQMD daily significance thresholds for these pollutants. Mitigation Measure 3.2-1 includes emissions control practices for NO\textsubscript{X}, PM\textsubscript{10}, and PM\textsubscript{2.5} for emissions of both exhaust and fugitive dust. Mitigation Measure 3.2-1 requires that emissions reductions of 20 percent for NO\textsubscript{X} and 45 percent for particulate matter (exhaust) be achieved using late-model year engines, alternative fuels, or other applicable engine retrofits. Additional reductions may be achieved depending on daily construction activity levels, the specific composition of the construction equipment fleet, and the type of diesel fuel used. However, the specific equipment to be used (e.g., horsepower, engine model year) and day-to-day construction activity levels are not known at this time. Therefore, the analysis of mitigation emissions conservatively assumed that implementing the appropriate Basic Construction Mitigation Measures would reduce the project’s NO\textsubscript{X}, PM\textsubscript{10}, and PM\textsubscript{2.5} emissions by 5 percent, and that implementing the Additional Construction Mitigation Measures would reduce emissions by an additional 20 percent for NO\textsubscript{X} and 45 percent for diesel exhaust. Incorporating all dust control measures included in the fugitive dust control plan would reduce fugitive dust emissions by 75 percent.

As shown in Table 3.2-5 above, implementing these mitigation measures would reduce NO\textsubscript{X}, PM\textsubscript{10}, and PM\textsubscript{2.5} emissions associated with project construction. However, even with these mitigation measures, the project’s construction emissions of NO\textsubscript{X} would exceed applicable thresholds during certain months of construction. Therefore, this short-term construction impact would be **significant and unavoidable**.

**Impact 3.2-2: Potential for conflict with or obstruction of implementation of the applicable air quality plan.**

Implementing the proposed project would not conflict with or obstruct implementation of any YSAQMD or BAAQMD air quality attainment plans. For this reason, this impact would be **less than significant**.

As stated above in Section 3.2.1, “Regulatory Setting,” YSAQMD and BAAQMD have attainment plans in place for nonattainment criteria pollutants that identify strategies to bring regional emissions into compliance with federal and state air quality standards. Projects and uses that are consistent with the assumptions used to develop the plans, and implement strategies to implement the plans, would not jeopardize attainment of the air quality levels identified in the plans.
Implementing the project would not conflict with the assumptions and emissions estimates included in the plans as approved by ARB and EPA. Further, the project would generate energy with a minimal impact on air quality when compared to traditional sources of energy generation.

Project construction activities would comply with applicable YSAQMD and BAAQMD rules and regulations. In addition, project operation would reduce criteria air pollutant emissions from conventional electrical generation sources. Therefore, the proposed project would not conflict with or obstruct implementation of any YSAQMD or BAAQMD attainment plan or the SIP. This impact would be less than significant.

No mitigation is required.