

## 3.4 AIR QUALITY

### 3.4.1 ENVIRONMENTAL SETTING

#### TOPOGRAPHY, CLIMATE, AND METEOROLOGY

Air quality is defined by the concentration of pollutants in relation to their impact on human health. Ambient concentrations of air pollutants are determined by the amount of emissions released by pollutant sources and the ability of the atmosphere to transport and dilute such emissions. Terrain, wind, atmospheric stability, and the presence of sunlight all affect transport and dilution. Therefore, existing air quality conditions in the project area are influenced by topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources (discussed separately below).

The Humboldt Wind Energy Project is located in Humboldt County in the North Coast Air Basin (NCAB). The dominant features of the NCAB are the mountains of the Coast Ranges and proximity to the Pacific Ocean. The Coast Ranges run from north to south in the NCAB and reach heights of approximately 9,000 feet. The Coast Ranges create a barrier to moisture and wind for areas on the east side of the crest.

The climate of the NCAB varies depending on proximity to the Pacific Coast. The inland areas of the NCAB experience hot, dry summers and cool, snowy winters, while coastal areas have cool summers and rainy winters. Winds vary seasonally, with predominant winds from the north to northwest in the summer and from the south in the winter. The average wind speed at the nearest monitoring station to the project site, the Arcata Airport, is 6.5 miles per hour (WRCC 2019a).

The local meteorology of the project site and surrounding area is represented by measurements recorded at the Scotia station. The normal annual precipitation is approximately 48 inches. During January, typically the coldest month of the year, average temperatures range from about 40 degrees Fahrenheit (°F) to 55°F. During August, typically the warmest month, temperatures average about 53°F to 70°F (WRCC 2019b).

#### CRITERIA AIR POLLUTANTS

In accordance with the federal Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) has identified pollutants that are widely distributed and pose a threat to human health (Title 42, Section 7408 of the United States Code [42 USC 7408]; CAA Section 108). These pollutants are commonly called “criteria pollutants.” EPA and the California Air Resources Board (ARB) have identified six criteria pollutants as being indicators of ambient air quality: ozone, carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter with an aerodynamic diameter less than 10 micrometers (PM<sub>10</sub>), particulate matter with an aerodynamic diameter less than 2.5 micrometers (PM<sub>2.5</sub>), and lead. The ambient air quality standards for these air pollutants are regulated using human health and environmentally based criteria (EPA 2019a). In general, the State of California’s standards are more stringent than the federal standards, particularly for ozone and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).

The following section briefly describes criteria air pollutants, including their source types and health effects, and identifies the most current attainment designations and monitoring data for the project area.

## **Ozone**

Ozone is a colorless gas that is odorless at ambient levels. It exists primarily as a beneficial component of the ozone layer in the upper atmosphere (stratosphere), shielding the earth from harmful ultraviolet radiation emitted by the sun, and as a pollutant in the lower atmosphere (troposphere).

Ozone is the primary component of urban smog. It is not emitted directly into the air, but is formed through a series of reactions involving volatile organic compounds (VOC) and oxides of nitrogen (NO<sub>x</sub>) in the presence of sunlight. VOC emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO<sub>x</sub> includes various combinations of nitrogen and oxygen, including nitric oxide (NO), NO<sub>2</sub>, and others, typically resulting from the combustion of fuels.

Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. 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.

Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered the most susceptible subgroups for ozone effects. Short-term ozone exposure (lasting for a few hours) can result in changes in breathing patterns, reduction of breathing capacity, increased susceptibility to infections, inflammation of lung tissue, and some immunological changes. In addition, a correlation has been reported in recent years between elevated ambient levels of ozone and increases in daily hospital admission rates, as well as mortality. An increased risk for asthma has been found in children who participate in multiple sports and live in communities with high ozone levels.

Emissions of the ozone precursors VOC and NO<sub>x</sub> have decreased in the past several years. According to the most recently published ARB Almanac, levels of NO<sub>x</sub> and VOC emissions in Humboldt County are projected to continue to decrease through 2035. This projected trend is largely attributable to more stringent motor vehicle standards and cleaner burning fuels, and to rules for controlling VOC emissions from various industrial coating and solvent operations (ARB 2013).

## **Carbon Monoxide**

CO is a colorless, odorless gas that, in the urban environment, is produced primarily by the incomplete burning of carbon in fuels, mainly from mobile (transportation) sources. In fact, 77 percent of CO emissions nationwide are from mobile sources. The other 23 percent consist of CO emissions from wood-burning stoves, incinerators, and industrial sources. Relatively high concentrations are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under the most severe meteorological and traffic conditions, high CO concentrations are limited to locations within a relatively short distance (300–600 feet) of heavily traveled roadways. Emissions from vehicular traffic can cause localized CO impacts, and severe vehicle congestion at major signalized intersections can generate elevated CO levels called “hot spots,” which can be hazardous to human receptors adjacent to the intersections.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, drastically reducing the amount of oxygen available to the cells. Adverse health effects associated with exposure to high CO concentrations, typically attainable only indoors or within similarly enclosed spaces, include dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2019b).

## **Nitrogen Dioxide**

NO<sub>2</sub> is one of a group of highly reactive gases known as oxides of nitrogen, or NO<sub>x</sub>. NO<sub>2</sub> is formed when ozone reacts with NO in the atmosphere and is listed as a criteria pollutant because NO<sub>2</sub> is the more toxic than NO. The major human-made sources of NO<sub>2</sub> are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. The combined emissions of NO and NO<sub>2</sub> are referred to as NO<sub>x</sub> and reported as equivalent NO<sub>2</sub>. Because NO<sub>2</sub> is formed and depleted by reactions associated with photochemical smog (ozone), the NO<sub>2</sub> concentration in a particular geographical area may not be representative of the local NO<sub>x</sub> emission sources. NO<sub>x</sub> also react with water, oxygen, and other chemicals to form nitric acids, contributing to the formation of acid rain.

Inhalation is the most common route of exposure to NO<sub>2</sub>. Breathing air with a high concentration of NO<sub>2</sub> can lead to respiratory illness. Short-term exposure can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (e.g., coughing, wheezing, or difficulty breathing), visits to emergency rooms, and hospital admissions. Longer exposures to elevated NO<sub>2</sub> concentrations may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these subgroups (EPA 2019c).

## **Sulfur Dioxide**

SO<sub>2</sub> is one component of the larger group of gaseous oxides of sulfur (SO<sub>x</sub>). SO<sub>2</sub> is used as the indicator for the larger group of SO<sub>x</sub>, as it is the component of greatest concern and is found in the atmosphere at much higher concentrations than other gaseous SO<sub>x</sub>. SO<sub>2</sub> is typically produced by such stationary sources as coal and oil combustion facilities, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO<sub>2</sub> exposure pertain to the upper respiratory tract. On contact with the moist mucous membranes, SO<sub>2</sub> produces sulfurous acid, which is a direct irritant. The concentration, rather than the duration of exposure, is an important determinant of respiratory effects. Children, the elderly, and those who suffer from asthma are particularly sensitive to the effects of SO<sub>2</sub> (EPA 2019d).

SO<sub>2</sub> also reacts with water, oxygen, and other chemicals to form sulfuric acids, contributing to the formation of acid rain. SO<sub>2</sub> emissions that lead to high concentrations of SO<sub>2</sub> in the air generally also lead to the formation of other SO<sub>x</sub>, which can react with other compounds in the atmosphere to form small particles, contributing to particulate matter pollution, which can have health effects of its own.

## **Particulate Matter**

Particulate matter is a complex mixture of extremely small particles and liquid droplets. Particulate matter is made up of acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The major

areawide sources of PM<sub>2.5</sub> and PM<sub>10</sub> in the Eureka area are on-road vehicles (engine exhaust and dust from paved and unpaved roads), open burning of vegetation (both residential and commercial), residential wood stoves, and stationary industrial sources (factories) (NCUAQMD 2019). Additional sources of PM can include fugitive dust agricultural operations and construction and demolition, as well as blasting, crushing or grinding operations. Exhaust from mobile sources contributes only a very small portion of direct PM<sub>2.5</sub> and PM<sub>10</sub> emissions, but it is a major source of VOC and NO<sub>x</sub>, which undergo reactions in the atmosphere to form particulate matter, known as secondary particles. These secondary particles make up the majority of particulate matter pollution.

The size of particulate matter is directly linked to the potential for health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller, because these particles generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects, even death. The adverse health effects of PM<sub>10</sub> depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons, and other toxic substances adsorbed onto fine particulate matter (referred to as the “piggybacking effect”), or with fine dust particles of silica or asbestos. The effects of short- and long-term exposure to elevated PM<sub>10</sub> concentrations include respiratory symptoms, aggravation of respiratory and cardiovascular diseases, a weakened immune system, and cancer (WHO 2016). PM<sub>2.5</sub> poses an increased health risk because these very small particles can be inhaled deep in the lungs and may contain substances that are particularly harmful to human health. Emissions of diesel particulate matter (DPM) decreased from 2000 through 2010 because exhaust emissions from diesel mobile sources declined; these emissions are anticipated to continue to decline through 2035 (ARB 2013).

## **Lead**

Lead is a highly toxic metal that may cause a range of human health effects. Lead is found naturally in the environment and is used in manufactured products. The lead previously used in gasoline anti-knock additives represented a major source of lead emissions to the atmosphere. Soon after its inception, EPA began working to reduce lead emissions, issuing the first reduction standards in 1973. Lead emissions have decreased substantially because of the near elimination of leaded gasoline.

Metal processing is currently the primary source of lead emissions. The highest levels of lead in the air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers. Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose “hot spot” problems in some areas. As a result, ARB has identified lead as a toxic air contaminant (TAC).

Fetuses, infants, and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotients. In adults, increased lead levels are associated with increased blood pressure. Lead poisoning can cause anemia, lethargy, seizures, and death, although it appears that there are no direct effects of lead on the respiratory system.

## **MONITORING STATION DATA AND ATTAINMENT AREA DESIGNATIONS**

Several monitoring stations in the NCAB measure concentrations of criteria air pollutants. The nearest monitoring station to the project site with recent data for ozone, NO<sub>x</sub>, and PM<sub>2.5</sub> is the Eureka–Humboldt Hill station located approximately 15 miles north by northwest of the project site. Data for PM<sub>10</sub> are available from the Eureka–

Jacobs monitoring station, also located in Humboldt County. NCAB monitoring stations have not monitored CO or SO<sub>2</sub> levels since 2012. The maximum CO concentration registered in the NCAB in the past 10 years is 1.62 parts per million, which is approximately 20 percent of the 8-hour standard. Therefore, it is highly unlikely that any exceedances of CO have occurred near the project site in the past 3 years. The ambient air quality measurements from these stations are representative of the air quality near the project site. Table 3.4-1 summarizes the air quality data from the last 3 years for which data are available.

**Table 3.4-1. Summary of Annual Ambient Air Quality Data (2015–2017)**

	2015	2016	2017
<b>OZONE</b>			
Standard (ppm) (1-hour/8-hour) (California)	0.09/0.07	0.09/0.07	0.09/0.07
Maximum concentration (ppm) (1-hour/8-hour)	0.06/0.052	0.06/0.051	0.09/0.084
Number of days state standard exceeded (1-hour/8-hour)	0/0	0/0	0/1
Number of days national standard exceeded (1-hour/8-hour)	0/0	0/0	0/1
<b>FINE PARTICULATE MATTER (PM<sub>2.5</sub>)</b>			
Standard (µg/m <sup>3</sup> ) (California/national)	12/12	12/12	12/12
Maximum concentration (µg/m <sup>3</sup> ) (national) <sup>1</sup>	30.3/13.1	22.8/22.8	97.2/166.3
Number of days state/national standard exceeded (measured <sup>2</sup> )	–/0	–/0	–/9
<b>RESPIRABLE PARTICULATE MATTER (PM<sub>10</sub>)</b>			
Standard (µg/m <sup>3</sup> ) (national)	150	150	150
Maximum concentration (µg/m <sup>3</sup> ) (national) <sup>1,3</sup>	54.9	53.6	114.1
Number of days national standard exceeded (measured/estimated) <sup>2</sup>	0/0	0/0	0/0
<b>NITROGEN DIOXIDE (NO<sub>2</sub>)</b>			
Standard (µg/m <sup>3</sup> ) (California/national)	57/100	57/100	57/100
Maximum concentration (µg/m <sup>3</sup> ) (California/national)	9/9.6	9/9.5	18/18.3
Number of days standard exceeded (California/national)	0/0	0/0	0/0
Notes: µg/m <sup>3</sup> = micrograms per cubic meter; ppm = parts per million; – = data not available			
<sup>1</sup> California and national statistics may differ for the following reasons: California statistics are based on California-approved samplers, whereas national statistics are based on samplers using national reference or equivalent methods. State and national statistics may therefore be based on different samplers. California statistics are based on local conditions, while national statistics are based on standard conditions. California criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.			
<sup>2</sup> Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Estimated days are the mathematically derived number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.			
<sup>3</sup> Only national statistics are available for PM <sub>10</sub> and PM <sub>2.5</sub> .			
Source: ARB 2019a			

As required by the federal CAA, EPA has established national ambient air quality standards (NAAQS) for the criteria pollutants at levels that would protect public health within an adequate margin of safety (42 USC 7409; CAA Section 109). Similarly, ARB establishes California ambient air quality standards (CAAQS) to protect the health of the most sensitive groups; ARB defines the CAAQS as “the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without any harmful effects on people or the environment” (ARB 2019b).

EPA and ARB have established health-based air quality standards for criteria pollutants at the national and state levels, respectively. As described, these standards were established to protect the public (with a margin of safety) from adverse health impacts caused by exposure to air pollution. California has also established standards for sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. Table 3.4-2 lists the NAAQS and CAAQS.

EPA sets the NAAQS based on a lengthy process that involves all of the following (EPA 2019e):

- ▶ science policy workshops;
- ▶ a risk/exposure assessment drawing on the information and conclusions of a comprehensive review;
- ▶ synthesis and evaluation of the most relevant science to quantify exposures and associated risks to human health or the environment resulting from air quality conditions; and
- ▶ a policy assessment by EPA staff bridging the gap between these scientific assessments and the judgments required of the EPA administrator, who then takes the proposed standards through the federal rulemaking process.

Similar to the federal process, the standards for the CAAQS are adopted after the ARB staff has reviewed the scientific literature produced by agencies such as the California Office of Environmental Health Hazard Assessment and the Air Quality Advisory Committee, which consists of experts in health sciences, exposure assessment, monitoring methods, and atmospheric sciences who are appointed by the Office of the President of the University of California. The ARB staff also considers the results of public review and comment (ARB 2019b).

These health-based pollutant standards are reviewed with a legally prescribed frequency and are revised as warranted by new data on health and welfare effects. Each standard is based on a specific averaging time over which the concentration is measured. Different averaging times are based on protection of short-term, high-dosage effects or longer term, low-dosage effects. The NAAQS may be exceeded no more than once per year; the CAAQS are not to be exceeded.

Both EPA and ARB use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants, relative to the standards published by the agencies. The purpose of these designations is to identify areas with air quality problems and thereby initiate planning efforts for improvement.

The three basic designation categories are nonattainment, attainment, and unclassified:

- ▶ **Attainment.** An “attainment” designation for an area signifies that pollutant concentrations did not exceed the established standard. In most cases, areas designated or redesignated as attainment must develop and implement maintenance plans, which are designed to ensure continued compliance with the standard.
- ▶ **Nonattainment.** In contrast with attainment, a “nonattainment” designation indicates that a pollutant concentration has exceeded the established standard. Nonattainment may differ in severity. To identify the severity of the problem and the extent of planning and actions required to meet the standard, nonattainment areas are assigned a classification that is commensurate with the severity of their air quality problem (e.g., moderate, serious, severe, extreme).

**Table 3.4-2. National and California Ambient Air Quality Standards**

Pollutant	Averaging Time	California Standards <sup>a</sup>		National Standards <sup>b</sup>	
		Concentration <sup>c</sup>		Primary <sup>c,d</sup>	Secondary <sup>c,e</sup>
Ozone <sup>k</sup>	1 hour	0.09 ppm (180 µg/m <sup>3</sup> )		–	Same as primary standard
	8 hours	0.070 ppm (137 µg/m <sup>3</sup> )		0.070 ppm (147 µg/m <sup>3</sup> )	
Respirable particulate matter (PM <sub>10</sub> ) <sup>f</sup>	24 hours	50 µg/m <sup>3</sup>		150 µg/m <sup>3</sup>	Same as primary standard
	Annual arithmetic mean	20 µg/m <sup>3</sup>		–	
Fine particulate matter (PM <sub>2.5</sub> ) <sup>f</sup>	24 hours	–		35 µg/m <sup>3</sup>	Same as primary standard
	Annual arithmetic mean	12 µg/m <sup>3</sup>		12 µg/m <sup>3</sup>	
Carbon monoxide (CO)	8 hours	9.0 ppm (10 mg/m <sup>3</sup> )		9 ppm (10 mg/m <sup>3</sup> )	None
	1 hour	20 ppm (23 mg/m <sup>3</sup> )		35 ppm (40 mg/m <sup>3</sup> )	
	8 hours (Lake Tahoe)	6 ppm (7 mg/m <sup>3</sup> )		–	
Nitrogen dioxide (NO <sub>2</sub> ) <sup>g</sup>	Annual arithmetic mean	0.030 ppm (57 µg/m <sup>3</sup> )		0.053 ppm (100 µg/m <sup>3</sup> )	Same as primary standard
	1 hour	0.18 ppm (339 µg/m <sup>3</sup> )		100 ppb (188 µg/m <sup>3</sup> )	
Sulfur dioxide (SO <sub>2</sub> ) <sup>h</sup>	Annual Arithmetic Mean	–		0.030 ppm (for certain areas) <sup>h</sup>	–
	24 hours	0.04 ppm (105 µg/m <sup>3</sup> )		0.14 ppm (for certain areas) <sup>h</sup>	–
	3 hours	–		–	0.5 ppm (1,300 µg/m <sup>3</sup> )
	1 hour	0.25 ppm (655 µg/m <sup>3</sup> )		75 ppb (196 µg/m <sup>3</sup> )	–
Lead <sup>i,j</sup>	30-day average	1.5 µg/m <sup>3</sup>		–	–
	Calendar quarter	–		1.5 µg/m <sup>3</sup> (for certain areas) <sup>j</sup>	Same as primary standard
	Rolling 3-month average	–		0.15 µg/m <sup>3</sup>	
Visibility-reducing particles <sup>k</sup>	8 hours	See footnote j		No national standards	
Sulfates	24 hours	25 µg/m <sup>3</sup>			
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m <sup>3</sup> )			
Vinyl chloride <sup>l</sup>	24 hours	0.01 ppm (26 µg/m <sup>3</sup> )			

Notes: mg/m<sup>3</sup> = milligrams per cubic meter; ppb = parts per billion; ppm = parts per million; µg/m<sup>3</sup> = micrograms per cubic meter

<sup>a</sup> California standards for ozone, CO (except 8-hour Lake Tahoe), SO<sub>2</sub> (1- and 24-hour), NO<sub>2</sub>, and particulate matter (PM<sub>10</sub>, PM<sub>2.5</sub>, 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.

<sup>b</sup> National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM<sub>10</sub>, the 24-hour is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m<sup>3</sup> is equal to or less than 1. For PM<sub>2.5</sub>, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standards.

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

<sup>d</sup> National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

<sup>e</sup> National Secondary Standards: The levels of air quality necessary to protect public welfare from any known or anticipated adverse effects of a pollutant.

<sup>f</sup> On December 14, 2012, the national annual PM<sub>2.5</sub> primary standard was lowered from 15 µg/m<sup>3</sup> to 12.0 µg/m<sup>3</sup>. The existing national 24-hour PM<sub>2.5</sub> standards (primary and secondary) were retained at 35 µg/m<sup>3</sup>, as was the annual secondary standard of 15 µg/m<sup>3</sup>. The existing 24-hour PM<sub>10</sub> standards (primary and secondary) of 150 µg/m<sup>3</sup> also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

<sup>g</sup> To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards, the units can be converted

from 100 ppb to 0.100 ppm.

On June 2, 2010, a new 1-hour SO<sub>2</sub> standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO<sub>2</sub> national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. To directly compare the 1-hour national standard to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

<sup>i</sup> The California Air Resources Board (ARB) has identified lead and vinyl chloride as toxic air contaminants with no threshold level 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.

<sup>j</sup> The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m<sup>3</sup> as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standards are approved.

<sup>k</sup> In 1989, ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and the "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

<sup>l</sup> On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

Source: ARB 2019b

- ▶ **Unclassified.** An “unclassified” designation indicates that insufficient data exist to determine attainment or nonattainment.

The California designations also include a subcategory called “nonattainment-transitional,” which is given to nonattainment areas that are progressing and nearing attainment.

With respect to the NAAQS and CAAQS, Humboldt County is considered to be in attainment for all standards except the state 24-hour PM<sub>10</sub> standard (NCUAQMD 2019).

## **TOXIC AIR CONTAMINANTS**

In addition to criteria pollutants, both federal and state air quality regulations focus on TACs. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may otherwise pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their toxicity or health risk may pose a threat to public health even at low concentrations. TACs can be separated into carcinogens and noncarcinogens, based on the nature of the effects caused by exposure to the pollutant. For regulatory purposes, carcinogens are assumed to have no safe threshold below which health impacts would not occur. Noncarcinogens differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur.

According to the *California Almanac of Emissions and Air Quality* (ARB 2009), most of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines (i.e., DPM). Other TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

DPM differs from other TACs because it is not a single substance, but a complex mixture of hundreds of substances. Although DPM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, type of lubricating oil, and presence or absence of an emission control system. Unlike the other TACs, no ambient monitoring data are available for DPM because no routine measurement method currently exists. However, DPM emissions are forecasted to decline; it is estimated that emissions of DPM in 2035 will be less than half those in 2010, further reducing the statewide cancer risk and non-cancer health effects (ARB 2019c).

## **SENSITIVE RECEPTORS**

Some land uses are considered more sensitive to air pollution than others, because of the types of population groups or activities involved. Children, pregnant women, the elderly, people with existing health conditions, and athletes or others who engage in frequent exercise are especially vulnerable to the effects of air pollution. Accordingly, land uses typically considered to be sensitive receptors include schools, daycare centers, parks and playgrounds, and medical facilities.

Residential areas are considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to the pollutants present. Outdoor recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution, even though exposure periods during exercise are

generally short. In addition, noticeable air pollution can detract from the enjoyment of outdoor recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent because most workers tend to stay indoors most of the time.

The project area is rural. The closest residence to a proposed wind turbine generator (WTG) is approximately 900 feet away and the closest residence to the proposed expansion of the Bridgeville Substation is approximately 450 feet away.

## **ODORS**

The ability to detect odors varies considerably among the population and is subjective. Some individuals can smell minute quantities of specific substances, while 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 (e.g., from a fast-food restaurant or bakery) may be perfectly acceptable to another. Unfamiliar odors may be detected more easily and are more likely to cause complaints than familiar ones.

Several common land use types that generate substantial odors are wastewater treatment plants, landfills, composting/green waste facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting/coating operations, rendering plants, and food packaging plants. In addition, odors can be generated by agricultural activities, such as dairy operations; horse, cattle, or sheep (livestock) grazing; fertilizer use; and aerial crop spraying.

Offensive odors can affect human health in several ways. First, odorant compounds can irritate the eye, nose, and throat, which can reduce respiratory volume. Second, the VOCs that cause odors can stimulate sensory nerves to cause neurochemical changes that might influence health, for instance, by compromising the immune system. Finally, unpleasant odors can trigger memories or attitudes linked to unpleasant odors, causing cognitive and emotional effects, such as stress.

There are no major odor sources (e.g., wastewater treatment plants, pulp mills, landfills, and confined animal operations) within 2 miles of the project site.

### **3.4.2 REGULATORY SETTING**

EPA, ARB, and NCUAQMD all promulgate rules and regulations related to air quality. NCUAQMD is the local agency that regulates sources of air pollution in Humboldt, Trinity, and Del Norte counties. NCUAQMD's main purpose is to enforce federal, state, and local air quality laws and regulations. Although EPA regulations may not be superseded, both state and local regulations may be more stringent.

#### **FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS**

EPA, ARB, and NCUAQMD are responsible for regulating air quality in the vicinity of the project site. Each agency develops rules, regulations, policies, and/or goals to comply with applicable legislation. The regulatory frameworks for criteria air pollutants, TACs, and odor emissions are described separately below.

## **Criteria Air Pollutants**

The primary legislation that governs federal air quality regulations is the CAA, first enacted in 1970 and most recently amended by Congress in 1990. The act delegates primary responsibility for clean air to EPA. EPA develops rules and regulations to preserve and improve air quality and delegates specific responsibilities to state and local agencies. Under the CAA, EPA has established the NAAQS for seven potential air pollutants: CO, ozone, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>, SO<sub>2</sub>, and lead (as shown above in Table 3.4-1). The purpose of the NAAQS is two-tiered: primarily to protect public health, and secondarily to prevent degradation to the environment (impairment of visibility, damage to vegetation and property).

The CAA also requires 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 reviews SIPs to determine whether they conform to the mandates of the CAA and its amendments and whether implementing the SIPs will achieve the ambient air quality standards. If EPA determines a SIP to be inadequate, a federal implementation plan that imposes additional control measures may be prepared for the nonattainment area.

## **Hazardous Air Pollutants**

Air quality regulations also focus on TACs, or in federal terminology, hazardous air pollutants (HAPs). In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and ambient standards have been established. Instead, EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics to limit emissions.

The CAA requires EPA to identify and set national emissions standards for HAPs to protect public health and welfare. Emissions standards are set for “major sources” and “area sources.” Major sources are defined as stationary sources with the potential to emit more than 10 tons per year (tpy) of any HAP or more than 25 tpy of any combination of HAPs; all other sources are considered area sources.

There are two types of emissions standards: those that require application of maximum achievable control technology (MACT), and those that are health risk-based and deemed necessary to address the risks that remain after MACT has been implemented. For area sources, the MACT standards may be different because of differences in generally available control technology. The CAA also requires EPA to issue vehicle or fuel standards containing reasonable requirements that control toxic emissions of, at a minimum, benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics.

## **STATE PLANS, POLICIES, REGULATIONS, AND LAWS**

### **Criteria Air Pollutants**

ARB is responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act. The act, adopted in 1988, required ARB to establish CAAQS

(as shown above in Table 3.4-1). ARB has also established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulate matter, in addition to the above-mentioned criteria air pollutants regulated by EPA. In most cases, the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The California Clean Air Act requires all local air districts in the state to endeavor to achieve and maintain the CAAQS by the earliest practicable date. 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.

ARB is the lead agency for developing the SIP in California. Local air districts and other agencies prepare air quality attainment plans or air quality management plans and submit them to ARB for review, approval, and incorporation into the applicable SIP. ARB also maintains air quality monitoring stations throughout the state in conjunction with local air districts. The data collected at these stations are used by ARB to classify air basins as being in attainment or nonattainment with respect to each pollutant and to monitor progress in attaining air quality standards.

ARB has established emission standards for vehicles sold in California and for various types of equipment. California gasoline specifications are governed by both federal and state agencies. During the past 15 years, federal and state agencies have imposed numerous requirements on the production and sale of gasoline in California. In December 2004, ARB adopted a fourth phase of emission standards (Tier 4) in the Clean Air Non-road Diesel Rule that are nearly identical to those finalized by EPA on May 11, 2004. These standards required engine manufacturers to meet after-treatment–based exhaust standards for NO<sub>x</sub> and PM starting in 2011 that would be more than 90 percent lower than previous levels, putting emissions from off-road engines virtually on par with those from on-road, heavy-duty diesel engines. ARB has also adopted control measures for DPM 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).

California's adopted *2007 State Strategy for California's SIP for federal PM<sub>2.5</sub> and 8-Hour Ozone Standards* (2007 SIP) was submitted to EPA as a revision to the SIP in November 2007 (ARB 2017a). In July 2011, ARB approved revisions to the 2007 SIP that updated the ARB rulemaking calendar; adjusted transportation conformity budgets; revised reasonable-further-progress tables and made associated reductions for contingency purposes; and updated actions to identify advanced emission control technologies (ARB 2017a). In 2008, EPA strengthened the 8-hour ozone standard to 75 parts per billion. Sixteen areas in California were designated nonattainment in 2012. In 2012, EPA also strengthened the annual PM<sub>2.5</sub> standard to 12 micrograms per cubic meter. EPA designated four areas in California as nonattainment for this standard. ARB released the *Revised Proposed 2016 State Strategy for the State Implementation Plan*, also known as the State SIP Strategy, which describes the proposed commitment to achieve the reductions necessary from mobile sources, fuels, and consumer products to meet the federal ozone and PM<sub>2.5</sub> standards over the next 15 years (ARB 2017a).

## **Toxic Air Contaminants**

TACs in California are regulated primarily through the Tanner Air Toxics Act (Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act (Chapter 1252, Statutes of 1987). A total of 243 substances have been designated as TACs under California law; they include the 189 (federal) HAPs adopted in

accordance with Assembly Bill (AB) 2728, which required the State of California to identify the federal HAPs as TACs to make use of the time and cost EPA had already invested in evaluating and identifying hazardous/toxic substances. The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risks from air toxics sources; however, AB 2588 does not regulate air toxics emissions. TAC emissions from individual facilities are quantified and prioritized. “High-priority” facilities must perform a health risk assessment and, if specific thresholds are violated, must communicate the results to the public in the form of notices and public meetings. The regulation of TACs generally occurs through statutes and rules that require the use of the maximum or best available control technology to limit TAC emissions.

According to the *California Almanac of Emissions and Air Quality* (ARB 2013), most of the estimated health risk from TACs is attributed to relatively few compounds, the most dominant being particulate matter exhaust from DPM. In 2000, ARB approved a comprehensive diesel risk reduction plan to reduce emissions from both new and existing diesel-fueled vehicles and engines. The regulation anticipated an 85 percent decrease in the statewide diesel health risk by 2020 relative to the diesel health risk year in the year 2000 (ARB 2000). Since 2010, DPM ambient concentration levels have decreased by approximately 50 percent and are expected to continue declining as additional controls are adopted and new technology for diesel vehicles increases. In fact, despite the increase in number of diesel vehicle miles traveled and increases in statewide population and gross domestic product, ARB regulatory programs resulted in a decline in statewide cancer risk attributable to DPM (ARB 2019c). ARB estimates that DPM emissions in 2035 will be less than half those in 2010 (ARB 2019c). Additional regulations apply to new trucks and diesel fuel. Subsequent ARB regulations on diesel emissions include the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression Ignition Diesel Engines and Equipment Program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment.

In addition, the *Air Quality and Land Use Handbook: A Community Health Perspective*, published by ARB, provides guidance on the compatibility of land uses with sources of TACs (ARB 2005). The handbook is not a law or adopted policy but offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities.

Since the 2005 publication of the handbook, ARB has published a technical advisory as a supplement to the handbook, providing information on scientifically based strategies for reducing exposure to traffic emissions near high-volume roadways to protect public health (ARB 2017b). This technical advisory demonstrates that reduced exposure to traffic-related pollution can also be achieved while pursuing infill development that independently provides public health benefits, such as reduce vehicle miles travelled and increased physical activity. This technical advisory does not negate the ARB handbook, but offers multiple variables for consideration when planning development and proximity of receptors.

Senate Bill (SB) 352 (Education Code Section 17213, Public Resources Code Section 21151.8) expands on the previous requirements for the review of TAC sources near school sites. Accordingly, SB 352 requires that any school site located within 500 feet of the edge of the closest travel lane of a freeway or other busy traffic corridor be reviewed for potential health risks.

## REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

### North Coast Unified Air Quality Management District

At the local level, air pollution control or management districts may adopt and enforce ARB control measures. NCUAQMD attains and maintains air quality conditions in Humboldt County through public education, enforcement of air quality regulations, and promotion of clean air programs. NCUAQMD administers a series of air pollution reduction programs including regulation of open burning, grants, permitting of stationary sources, emission inventories and air quality monitoring, and planning and rule development.

#### ***Rules and Regulations***

All projects are subject to NCUAQMD rules and regulations in effect at the time of construction. The following specific rules may be applicable to construction of the proposed project (NCUAQMD 2015):

- ▶ **Rule 102: Required Permits.** Under Rule 102, any project that is a new source of air contaminants, including an indirect source, may be required to obtain an Authority to Construct Permit from the Air Pollution Control Officer (APCO), which specifies the location and design of such new source and incorporates necessary permit conditions to ensure compliance with applicable Rules and Regulations and State and Federal Ambient Air Quality Standards.
- ▶ **Rule 104: Prohibitions.** Rule 104 states that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the health, comfort, repose or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property.” Specifically, Section D of Rule 104 limits fugitive dust emission from handling, transporting, or open storage of materials and requires reasonable precautions to prevent particulate matter from becoming airborne.
- ▶ **Rule 110: New Source Review (NSR) and Prevention of Significant Deterioration (PSD).** Rule 110 establishes preconstruction review requirements for new and modified stationary sources of air pollution for use of best available control technology, analysis of air quality impacts, and to ensure that the operation of such sources does not interfere with the attainment or maintenance of the CAAQS or NAAQS. NCUAQMD does not have CEQA guidelines and recommends using the NSR thresholds in CEQA analyses.

#### ***Air Quality Plans***

Air quality plans describe air pollution control strategies to be implemented by a city, county, or region. The primary purpose of an air quality plan is to bring an area that does not attain federal and state air quality standards into compliance with CAA and California Clean Air Act requirements.

NCUAQMD adopted a particulate matter PM<sub>10</sub> attainment plan in May 1995. The plan includes a number of strategies for achieving PM<sub>10</sub> reductions, including transportation control measures, guidelines for general plans, regulation of open burning, and restrictions on residential burning (NCUAQMD 2019).

## ***Naturally Occurring Asbestos***

NCUAQMD operates a registration program for all construction, grading, quarrying, and surface mining operations within its jurisdiction. An applicant must register with NCUAQMD before engaging in specific activities covered by the airborne toxics control measure regulation for naturally occurring asbestos. As part of the registration process, the applicant may be required to submit a dust control plan. However, projects are exempt if they are located in an area not designated as an ultramafic rock unit area by the California Geological Survey. The project site is not within an area of mapped ultramafic rock, and there are no mapped ultramafic rock unit areas in the vicinity (USGS and CGS 2011). Therefore, the proposed project is exempt from NCUAQMD's registration program.

## **Humboldt County Policies and Ordinances**

As part of the impact evaluation for the proposed project under CEQA, the project is evaluated for consistency with the *Humboldt County General Plan* (General Plan). The Air Quality Element of the General Plan contains the following air quality policies and standards that would apply to the proposed project:

- ▶ **Policy AQ-P2: Reduce Localized Concentrated Air Pollution.** Reduce or minimize the creation of “hot spots” or localized places of concentrated automobile emissions.
- ▶ **Policy AQ-P4: Construction and Grading Dust Control.** Dust control practices on construction and grading sites shall achieve compliance with NC[U]AQMD fugitive dust emission standards.
- ▶ **Policy AQ-P5: Air Quality Impacts from New Development.** During environmental review of discretionary permits, reduce emissions of air pollutants from new commercial and industrial development by requiring feasible mitigation measures to achieve the standards of the NC[U]AQMD.
- ▶ **Policy AQ-P6: Buffering Land Uses.** During environmental review of discretionary commercial and industrial projects, consider the use of buffers between new sources of emissions and adjacent land uses to minimize exposure to air pollution.
  - **Standard AQ-S1: Construction and Grading Dust Control.** Ground disturbing construction and grading shall employ fugitive dust control strategies to prevent visible emissions from exceeding NC[U]AQMD regulations and prevent public nuisance.
  - **Standard AQ-S3: Evaluate Air Quality Impacts.** During environmental review of discretionary projects, evaluate new commercial and industrial sources of emissions using analytical methods and significance criteria used, or recommended by, the NC[U]AQMD.

### **3.4.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

#### **THRESHOLDS OF SIGNIFICANCE**

The following thresholds of significance are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. Implementing the proposed project would result in a 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 adversely affecting a substantial number of people).

As stated in Appendix G of the State CEQA Guidelines, the significance criteria established by the applicable air quality management district may be relied on to make the above determinations. NCUAQMD has not established CEQA significance criteria to determine the significance of impacts that would result from projects such as the Humboldt Wind Energy Project. However, NCUAQMD does have criteria pollutant significance thresholds for new or modified stationary-source projects proposed within its jurisdiction. NCUAQMD has indicated that it is appropriate for lead agencies to compare emissions from proposed projects to the thresholds listed in Rule 110 (NCUAQMD 2019), which are as follows:

- ▶ *NO<sub>x</sub>*: 50 pounds per day (lb/day); 40 tpy
- ▶ *ROG*: 50 lb/day; 40 tpy
- ▶ *PM<sub>10</sub>*: 80 lb/day; 15 tpy
- ▶ *PM<sub>10</sub>*: 50 lb/day; 10 tpy
- ▶ *Lead*: 3.2 lb/day; 0.6 tpy
- ▶ *SO<sub>x</sub>*: 80 lb/day; 40 tpy

These thresholds were developed to evaluate long-term stationary source emissions, not temporary emissions, such as those generated during construction; however, to provide a conservative approach to the analysis, this analysis compares the proposed project's construction-related and operational emissions to the thresholds listed above. If an individual project's construction-related or operational emissions of a particular criteria pollutant would be less than the thresholds outlined above, the project's effects relative to that pollutant are considered less than significant.

## **ANALYSIS METHODOLOGY**

The NCAB is an attainment area for the federal and state standards for all criteria air pollutants except PM<sub>10</sub>, for which Humboldt County is a nonattainment area for the state PM<sub>10</sub> standards. This analysis does not directly evaluate SO<sub>2</sub> and lead because the proposed project would generate few to no quantifiable and foreseeable emissions of these substances. Although there would be quantifiable CO emissions, the principal concern for CO emissions is localized concentrations of CO resulting from congested traffic conditions, which is not an issue for the proposed project. The CO emitted by the project during construction and operations (from mobile sources) would not be enough to create a significant impact, and there are insufficient CO emissions from other past, existing, and reasonably foreseeable sources for the project's emissions to combine with those emissions to create a cumulative impact. Therefore, no adverse CO impact would occur, and traffic-generated CO hotspots are not evaluated further in this EIR.

Construction-related and operational emissions of criteria air pollutants were compared with the applicable thresholds of significance (described above) to determine potential impacts. NCUAQMD's significance

thresholds serve as a proxy for determining whether the project could violate air quality standards, cause a substantial contribution to an existing or projected air quality violation, and/or conflict with any applicable air quality plan. Please see Appendix B of this EIR for modeling details, assumptions, inputs, and outputs.

Construction-related emissions were modeled using the California Emissions Estimator Model (CalEEMod), Version 2016.3.2 (CAPCOA 2017). Project-specific construction parameters (e.g., total acres disturbed, construction equipment details, and workforce estimates) were used as inputs for each model. Emissions from truck trips to support each construction activity (e.g., roadway improvements, foundations, turbines, substations, and operations and maintenance [O&M] building) were based on model defaults except where otherwise known, such as WTG deliveries and material (rock, water, cement, sand) deliveries for foundations, as detailed in Table 2-2 in Chapter 2, "Project Description." Emissions from truck trips for environmental work in Phase 1 were estimated using EMFAC 2014 emissions rates, as this is the most recent EPA-approved version of this model.

Overlapping construction activities were based on practical implementation of the phasing required to complete construction, as described in Section 2.3, "Construction and Phasing."

In addition to the construction emissions calculated using CalEEMod and EMFAC, additional emission sources were accounted for in support of the various phases of construction. Blasting may be required during the construction of foundations. Emissions associated with this activity were calculated using EPA AP-42 emission factors and added to the construction emissions associated with the other foundation construction activities. WTG delivery would also require the use of barges. Emissions were calculated for barge activity in the port area and out to the state water line. The vessels would use Tier 4 diesel engines. Emissions calculations used emission factors based on EPA emission standards for harbor craft emissions. A temporary cement batch plant would operate throughout the 18-month construction period. The 250-kilowatt generator used to power the batch plant was captured as equipment modeled in CalEEMod for the individual construction activities during each phase of construction. Particulate matter emissions generated from operation of the batch plant were calculated using EPA AP-42 emission factors and added to each phase of construction.

For grading purposes, the site is anticipated to be a balanced site, not requiring the export or import of material. Particulate matter emissions generated by the stockpiling and movement of material throughout the site were estimated using EPA AP-42 emission factors and added to each construction phase. It was assumed that material movement would take place primarily during Phases 1 and 2 of construction.

Modeled construction-related emissions are compared with the applicable NCUAQMD thresholds to determine significance levels.

After construction, operations would generate air pollutant emissions from mobile, area, and energy sources. CalEEMod was used to estimate these long-term operational emissions. Operational emissions from day-to-day activities of the proposed project would be generated by use of the O&M facility, by emergency generators if used, use of heavy-duty equipment for intermittent maintenance of the WTGs and access roads, and operation of maintenance staff vehicles (estimated at three round trips daily). Operation of the WTGs would not release emissions that would pollute the air. Use of energy generated by the WTGs also likely would reduce the amount of electricity generated by fossil fuels, which would otherwise generate air pollutant emissions. However, it is important to note that to be conservative, these emissions savings were not factored in to the quantitative analysis of emissions estimates.

The impact analysis does not directly evaluate airborne lead. Neither construction nor future operations would generate quantifiable lead emissions because of regulations that require unleaded fuel and prohibit lead in new building materials.

TAC emissions associated with project construction that could affect surrounding areas are evaluated qualitatively. NCUAQMD has not adopted any thresholds of significance for TAC emissions but recommends using the latest version of the California Air Pollution Control Officers Association’s “Health Risk Assessments for Proposed Land Use Projects” to evaluate and reduce air pollution impacts from new development.

**IMPACTS AND MITIGATION MEASURES**

<p><b>IMPACT</b> 3.4-1</p>	<p>Short-Term, Construction-Generated Emissions of ROG, NO<sub>x</sub>, and PM<sub>10</sub>. <i>Short-term, construction-generated emissions would exceed NCUAQMD’s significance threshold for NO<sub>x</sub>. This impact would be significant.</i></p>
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Construction emissions are described as “short-term” or temporary but have the potential to adversely affect air quality. Project construction would emit criteria air pollutants (e.g., particulate matter) and precursors (e.g., ROG and NO<sub>x</sub>) during site preparation activities such as excavation, grading, and clearing. Exhaust from off-road equipment, material delivery, and worker commute vehicles would also emit criteria pollutants, as would construction of the O&M building, trenching for utility installation, and operation of the temporary cement batch plant.

ROG and NO<sub>x</sub> emissions are generated primarily by exhaust from off-road construction equipment. Worker commute trips and other construction-related activities also contribute to short-term increases in ozone precursors. Emissions of fugitive dust (e.g., PM<sub>10</sub> and PM<sub>2.5</sub>) occur primarily with ground-disturbing activities during site preparation and vary as a function of such factors as soil silt content, soil moisture, wind speed, acreage of disturbance, and vehicle miles traveled. During typical construction projects, particulate matter emissions are generated primarily in the form of fugitive dust during ground disturbance activities, mostly during the grading phase. Particulate matter emissions are also generated in the form of equipment exhaust and reentrained road dust from vehicle travel on paved and unpaved surfaces.

Construction of the proposed project would involve multiple steps: improving roadways, constructing new access roads, constructing foundations and installing the WTGs, and constructing the collection system. These activities would not all occur simultaneously; rather, they would be phased. It is anticipated that the roadway improvements and access road construction would be completed first, followed by the construction of foundations; delivery, assembly, and erection of the WTGs; and construction of the collection system, including transmission interconnection lines. The final phase would involve installing an on-site project substation and constructing improvements at the existing Bridgeville Substation. In addition, as discussed in Chapter 2, “Project Description,” a temporary concrete batch plant may need to be constructed within the generation area to allow the contractor to pour the concrete within 90 minutes of mixing it. If deemed necessary, the temporary concrete batch plant would be located on-site at a central location within the confines of the staging area and would require an area of approximately 5 acres. Emissions estimates for the batch plant include PM emissions from the cement production process and stock piling, as well as emissions associated with operations of the generator to power the temporary plant. Truck trips associated with delivery of materials (e.g., aggregate, sand, and cement) and on-site

transportation are assumed to be captured within the truck trips associated with each construction activity, and not added specifically for the batch plant, in order to not duplicate estimation of mobile emissions associated with these trips.

In accordance with NCUAQMD Rule 104, Fugitive Dust Emissions Reduction Measures, fugitive dust reduction measures as identified in Rule 104 or updated in the future would be implemented throughout the construction period. This would reduce emissions of PM<sub>10</sub> and PM<sub>2.5</sub>. The emissions associated with these reductions, while implemented as part of the proposed project in accordance with regulations, are shown in Table 3.4-4 with the other mitigated emissions calculations.

Tables 3.4-3 and 3.4-4 summarize the modeled daily and annual emissions, respectively, of ROG, NO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> associated with construction of the proposed project. See Appendix B for modeling input and output parameters, detailed assumptions, and construction emissions estimates.

**Table 3.4-3. Summary of Modeled Maximum Daily Construction-Related Emissions**

	Emissions (pounds per day)				
	Phase	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Environmental Work	1	0.02	0.11	0.03	0.01
Roadway Improvements and Pads	1	9.10	98.29	27.40	9.97
Foundations	2	7.97	100.96	12.28	6.70
Collection System and Transmission Interconnection	2	19.02	145.64	24.18	9.65
Turbines	2	8.20	74.83	3.43	2.26
Substations	3	7.98	83.80	4.38	3.42
O&M Facility	3	14.13	40.63	20.26	11.85
<b>Maximum Daily Emissions</b>		35.20	321.42	39.90	18.60
<b>NCUAQMD Emissions Thresholds</b>		<b>50.00</b>	<b>50.00</b>	<b>80.00</b>	<b>50.00</b>
<b>Exceed Maximum Daily Threshold?</b>		<b>No</b>	<b>Yes</b>	<b>No</b>	<b>No</b>
Notes:					
NCUAQMD = North Coast Unified Air Quality Management District; NO <sub>x</sub> = oxides of nitrogen; O&M = operations and maintenance; PM <sub>2.5</sub> = particulate matter with an aerodynamic diameter less than 2.5 micrometers; PM <sub>10</sub> = particulate matter with an aerodynamic diameter less than 10 micrometers; ROG = reactive organic gases					
See Appendix B for modeling assumptions and results.					
Source: Modeled by AECOM in 2019.					

As shown in Table 3.4-3, emissions associated with construction of the proposed project would exceed the NCUAQMD maximum daily thresholds of significance for NO<sub>x</sub>. Therefore, construction of the proposed project could result in the short-term generation of a substantial level of emissions of criteria air pollutants and precursors. This impact would be **significant**.

**Table 3.4-4. Summary of Modeled Annual Construction-Related Emissions**

	Emissions (tons per year)				
	Phase	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Environmental Work	1	0.0003	0.002	0.0005	0.0001
Roadways	1	0.63	6.87	1.92	0.70
Foundations	2	0.24	2.45	0.32	0.20
Collection System and Transmission Interconnection	2	1.89	14.55	2.03	0.91
Turbines	2	0.18	1.68	0.09	0.06
Substations	3	0.33	3.52	0.19	0.14
O&M Facility	3	0.13	0.55	0.10	0.07
<b>Maximum Annual Emissions</b>		<b>2.77</b>	<b>22.75</b>	<b>2.74</b>	<b>1.37</b>
<b>NCUAQMD Emissions Thresholds</b>		<b>40.00</b>	<b>40.00</b>	<b>15.00</b>	<b>10.00</b>
<b>Exceed Maximum Annual Threshold?</b>		<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>
Notes:					
NCUAQMD = North Coast Unified Air Quality Management District; NO <sub>x</sub> = oxides of nitrogen; O&M = operations and maintenance; PM <sub>2.5</sub> = particulate matter with an aerodynamic diameter less than 2.5 micrometers; PM <sub>10</sub> = particulate matter with an aerodynamic diameter less than 10 micrometers; ROG = reactive organic gases					
See Appendix B for modeling assumptions and results.					
Source: Modeled by AECOM in 2019.					

**Mitigation Measure 3.4-1: Use Current-Phase Equipment for all Construction Off-Road Vehicles and Equipment.**

The construction contractor shall use current-phase off-road construction vehicles and equipment (currently Tier 4 final) for construction activities. This requirement shall be shown in all construction plans and implemented through the issuance of construction permits. Alternatively, if there is insufficient availability of equipment that meets or exceeds ARB’s standard (currently Tier 4) for heavy-duty diesel engines, an emissions reduction plan shall be prepared to identify other emission reduction measures to reduce NO<sub>x</sub> emissions equivalent to what would be achieved through using current-phase equipment. The plan shall identify requirements to be implemented during construction, such as limiting the simultaneous operation of construction equipment on any given day to reduce maximum daily emissions, and shall quantify the maximum daily and total annual emissions with implementation of the identified measures. This plan shall be approved by NCUAQMD before any construction permits are issued.

Implementing Mitigation Measure 3.4-1 would reduce construction-related emissions of ROG and NO<sub>x</sub>. As shown in Tables 3.4-5 and 3.4-6, maximum daily emissions of NO<sub>x</sub> would still exceed NCUAQMD threshold of significance. Therefore, this impact would be **significant and unavoidable**.

Expansion of the Bridgeville Substation would incrementally contribute to this impact. The Bridgeville Substation is located approximately 25 miles from the wind generation component of the project (where most of the construction activities would occur) and expansion of the substation would require very minor grading. A single residence is located approximately 1,000 feet away, so there are no sensitive receptors close to the substation expansion area.

**Table 3.4-5. Summary of Modeled Maximum Daily Construction-Related Emissions after Mitigation**

	Emissions (pounds per day)				
	Phase	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Environmental Work	1	0.02	0.11	0.03	0.01
Roadways	1	2.28	16.97	18.52	4.22
Foundations	2	2.23	33.58	5.71	2.07
Collection System and Transmission Interconnection	2	12.80	71.42	18.04	5.18
Turbines	2	6.69	57.43	2.45	1.36
Substations	3	2.42	15.82	1.32	0.56
O&M Facility	3	13.94	2.38	8.34	4.57
<b>Maximum Daily Emissions</b>		<b>21.72</b>	<b>162.43</b>	<b>26.20</b>	<b>8.61</b>
<b>NCUAQMD Emissions Thresholds</b>		<b>50.00</b>	<b>50.00</b>	<b>80.00</b>	<b>50.00</b>
<b>Exceed Maximum Daily Threshold?</b>		<b>No</b>	<b>Yes</b>	<b>No</b>	<b>No</b>
Notes:					
NCUAQMD = North Coast Unified Air Quality Management District; NO <sub>x</sub> = oxides of nitrogen; O&M = operations and maintenance; PM <sub>2.5</sub> = particulate matter with an aerodynamic diameter less than 2.5 micrometers; PM <sub>10</sub> = particulate matter with an aerodynamic diameter less than 10 micrometers; ROG = reactive organic gases					
See Appendix B for modeling assumptions and results.					
Source: Modeled by AECOM in 2019.					

**Table 3.4-6. Summary of Modeled Annual Construction-Related Emissions after Mitigation**

	Emissions (tons per year)				
	Phase	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Environmental Work	1	0.0003	0.002	0.0005	0.0001
Roadways	1	0.16	1.18	1.30	0.30
Foundations	2	0.06	0.43	0.12	0.06
Collection System and Transmission Interconnection	2	1.27	7.13	1.46	1.85
Turbines	2	0.13	1.11	0.06	0.03
Substations	3	0.10	0.66	0.06	0.03
O&M Facility	3	0.08	0.06	0.04	0.02
<b>Maximum Annual Emissions</b>		<b>1.64</b>	<b>9.39</b>	<b>1.75</b>	<b>1.99</b>
<b>NCUAQMD Emissions Thresholds</b>		<b>40.00</b>	<b>40.00</b>	<b>15.00</b>	<b>10.00</b>
<b>Exceed Maximum Annual Threshold?</b>		<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>
Notes:					
NCUAQMD = North Coast Unified Air Quality Management District; NO <sub>x</sub> = oxides of nitrogen; O&M = operations and maintenance; PM <sub>2.5</sub> = particulate matter with an aerodynamic diameter less than 2.5 micrometers; PM <sub>10</sub> = particulate matter with an aerodynamic diameter less than 10 micrometers; ROG = reactive organic gases					
See Appendix B for modeling assumptions and results.					
Source: Modeled by AECOM in 2019.					

## Health Impacts

Construction of the proposed project would result in emissions that would exceed NCUAQMD's daily emissions thresholds for NO<sub>x</sub>, even with implementation of mitigation. Project construction would not exceed annual emissions thresholds. The exceedance of the daily emissions threshold would occur during a maximum daily emissions scenario for construction of foundations, the collection system, and the transmission line and the delivery, assembly, and erection of the WTGs.

As described in Section 3.4.1, “Environmental Setting,” exposure to criteria pollutant emissions can cause human health effects. Potential health effects vary depending primarily on the pollutant type, the concentration of pollutants during exposure, and the duration of exposure. Air pollution does not affect every individual in the population in the same way, and some groups are more sensitive than others to adverse health effects. Land uses such as residences, schools, daycare centers, hospitals, and nursing and convalescent homes are considered most sensitive to poor air quality because the population groups associated with these uses are more susceptible to respiratory distress, or for residential receptors, because their exposure time is greater than that of other land uses. Therefore, these groups are referred to as sensitive receptors. The closest sensitive receptors to the proposed construction activities are a residence approximately 450 feet from the proposed expansion of the Bridgeville Substation and a residence approximately 900 feet from a proposed WTG site.

As described in Section 3.4.1, “Environmental Setting,” VOCs and NO<sub>x</sub> are precursors to ozone, increased concentrations of which can cause health effects generally associated with reduced lung function. The contribution of VOCs and NO<sub>x</sub> 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 NO<sub>x</sub> emissions to result in a quantifiable increase in ambient ozone levels over a region; a project emitting only 10 pounds per year of NO<sub>x</sub> or VOCs 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 the NO<sub>x</sub> emissions associated with project construction would be high during a potential maximum daily emissions scenario, potential emissions at this level would be intermittent and short-term. The peak daily emissions are not expected to occur every day during construction. These simply represent the maximum emissions one might expect during a day of construction. It is anticipated that only a fraction of the total number of working days would have peak daily emissions. Over the entire construction duration of about 18 months, a total of approximately 10.5 tons of NO<sub>x</sub> could be emitted. 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, it is expected that their contribution to regional ozone concentrations and the associated health impacts would be minimal. Because the project’s emissions contribution would be minimal during construction, the project would not exceed state or national thresholds, and it is not reasonably foreseeable to conclude that the project would result in significant health impacts.

Regarding NO<sub>2</sub>, for analysis purposes, NO<sub>x</sub> emissions were assumed to be NO<sub>2</sub> emissions. NO<sub>2</sub> and NO<sub>x</sub> health impacts are associated with respiratory irritation. NO<sub>x</sub> emissions would exceed daily thresholds, but these emissions would be intermittent and short-term.

The VOC and NO<sub>x</sub> emissions would make a minimal contribution to regional ozone concentrations and associated health effects. In addition to ozone, NO<sub>x</sub> emissions would not contribute to potential exceedances of the NAAQS and CAAQS for NO<sub>2</sub>. As shown in Table 3.4-1, existing NO<sub>2</sub> concentrations in the area are well below the NAAQS and CAAQS. Thus, it is not expected that the proposed project’s construction-related NO<sub>x</sub> emissions would result in exceedances of the NO<sub>2</sub> standards or contribute to the associated health effects.

The peak daily emissions exceed the daily significance thresholds for NO<sub>x</sub>, but the annual emissions over the 18-month construction period do not exceed the annual significance thresholds. In addition, the primary source of these NO<sub>x</sub> emissions is exhaust from construction equipment and vehicles that would operate throughout the project area and would not be concentrated in any single location. For example, to identify potential maximum daily emissions, it was assumed that barges may deliver WTG components concurrently with construction of foundations and assembly and erection of a WTG, all while the maximum potential number of workers and support personnel are on-site. Each of these activities would occur in a distinct location, and emissions would be distributed throughout the region, not concentrated in the immediate vicinity of sensitive receptors. Therefore, project construction would not expose a sensitive receptor to the totality of related air pollutant emissions, so significant health impacts are not expected to occur.

Construction of the proposed project would not exceed thresholds for PM<sub>10</sub> or PM<sub>2.5</sub> and would not contribute to exceedances of the NAAQS and CAAQS for particulate matter. Implementing measures to reduce fugitive dust emissions, in accordance with NCUAQMD Rule 104, would minimize particulate matter emissions associated with fugitive dust. In addition, using Tier 4 final equipment would minimize DPM emissions during construction. Potential impacts of DPM emissions are discussed further in Impact 3.4-4, which analyzes DPM exposure and related health effects. The analysis finds that construction activities would result in less-than-significant impacts related to health effects from DPM exposure. The emissions shown would be generated by activities occurring throughout the project area: delivery of project components at Fields Landing, roadway improvements and component transport along the transportation route from Fields Landing to Monument and Bear River ridges where the WTGs would to be placed; and construction of the various components at the site of the WTGs and along the collection system and generation transmission line route. Thus, although some emissions would be generated in the vicinity of sensitive receptors, overall particulate matter emissions would be dispersed throughout the project area, and not concentrated at a single location in the immediate vicinity of a sensitive receptor. Because the project-related particulate matter experienced at any single location during construction would be minimal, project construction would not result in a significant impact on human health related to particulate emissions.

CO tends to be a localized impact associated with congested intersections. As discussed previously, the proposed project would not create any CO hotspots, and CO impacts would be less than significant. Thus, the project's CO emissions would not contribute to significant health effects associated with this pollutant.

<p><b>IMPACT 3.4-2</b></p>	<p><b>Long-Term, Operational (Regional) Emissions of Criteria Air Pollutants.</b> <i>Operations and maintenance of the proposed project would generate criteria air pollutants and precursors in the long term, from mobile sources used daily by staff and intermittently for maintenance activities, and potentially from periodic operation of off-road equipment and emergency generators throughout the year. Off-road equipment and emergency generators would operate intermittently, and such operations would not likely all occur on the same days. Emissions from these O&amp;M activities would not exceed NCUAQMD maximum annual thresholds of significance. This impact would be less than significant.</i></p>
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In contrast with construction emissions, which are considered short-term and temporary, operational emissions are considered long-term and would occur for the lifetime of the project. Therefore, operational emissions have greater potential to affect the attainment status of an air basin.

Long-term operation of the proposed project would result in increased regional emissions of ROG, NO<sub>x</sub>, and PM<sub>10</sub> from area, mobile, off-road, and stationary sources (i.e., emergency generators). Operation of the WTGs would require a negligible increase in vehicular trips from existing conditions—assumed to be up to three round trips per day—for staffing and maintenance activities at the O&M facility and maintenance at the WTG sites. Up to 15 employees would work on the project on a permanent basis. The proposed WTGs would not require extensive landscape maintenance or other activities that would cause a substantial net increase in emissions relative to existing conditions. Intermittent maintenance of access roads and the WTGs may be required; this would include the use of off-road vehicles and equipment, assumed to occur on a quarterly basis. Implementing the proposed project would not require the operation of any new major stationary emissions sources, although a backup diesel generator would be available for use in emergencies.

Table 3.4-7 shows estimates of long-term operational emissions. Because operational emissions would be intermittent, and because equipment and vehicles would not all be operated on the same day, daily emissions thresholds are not used. Instead, emissions are compared to NCUAQMD total annual thresholds of significance.

**Table 3.4-7. Summary of Modeled Maximum Annual Operational Emissions**

	Emissions (pounds per day)			
	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Area Sources	0.03	0.00	0.00	0.00
Energy Sources	0.00	0.00	0.00	0.00
Mobile Source	0.00	0.01	0.00	0.00
Off-road Sources	0.01	0.10	0.00	0.00
Stationary Sources	0.10	0.29	0.02	0.02
<b>Total Daily Emissions*</b>	<b>0.15</b>	<b>0.40</b>	<b>0.02</b>	<b>0.02</b>
<b>NCUAQMD Thresholds</b>	<b>40</b>	<b>40</b>	<b>15</b>	<b>10</b>
<b>Exceed Thresholds?</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>
Notes: NCUAQMD = North Coast Unified Air Quality Management District; NO <sub>x</sub> = oxides of nitrogen; O&M = operations and maintenance; PM <sub>2.5</sub> = particulate matter with an aerodynamic diameter less than 2.5 micrometers; PM <sub>10</sub> = particulate matter with an aerodynamic diameter less than 10 micrometers; ROG = reactive organic gases * Totals do not add due to rounding. See Appendix B for modeling assumptions and results. Source: Modeled by AECOM in 2019.				

As indicated in Table 3.4-7, operational emissions from O&M activities would not exceed the NCUAQMD thresholds of significance. Therefore, this impact, including the impact on human health, would be **less than significant**.

Expansion of the Bridgeville Substation is included in this analysis. This impact of substation expansion would be **less than significant**.

## Health Impacts

Operation of the proposed project would not result in emissions that exceed Humboldt County's (County's) emission thresholds for any criteria air pollutants. Regarding VOCs, some VOCs would be associated with motor vehicles. Other VOCs would be associated with architectural coatings, the emissions of which would not result in

exceedances of the state and national thresholds. Generally, the VOCs in architectural coatings are of relatively low toxicity.

In addition, as described in Section 3.4.1, “Environmental Setting,” VOCs and NO<sub>x</sub> are precursors to ozone, increased concentrations of which can cause health effects generally associated with reduced lung function. The contribution of VOCs and NO<sub>x</sub> to regional ambient ozone concentrations is the result of complex photochemistry. The increases in ozone concentrations in the NCAB caused by ozone precursor emissions tend to be found somewhat away from the source location to allow time for the photochemical reactions to occur. The VOC and NO<sub>x</sub> emissions associated with project operation could make a minimal contribution to regional ozone concentrations and the associated health impacts. Because the project’s emissions contribution during operation would be minimal, the project would not exceed state or national thresholds, and would not result in significant health impacts.

Similar to the ozone impact, operation of the proposed project would not exceed thresholds for PM<sub>10</sub> or PM<sub>2.5</sub> and would not contribute to exceedances of the NAAQS and CAAQS for particulate matter. The proposed project would also not result in substantial DPM emissions during operation, and therefore, would not result in significant health effects related to DPM exposure. Because the project’s contribution of particulate matter during operation would be minimal, the project would not result in significant health impacts from particulate matter emissions.

Regarding NO<sub>2</sub>, according to the analysis of operational emissions, the proposed project would not contribute to exceedances of the NAAQS and CAAQS for NO<sub>2</sub> (for analysis purposes, NO<sub>x</sub> emissions were assumed to be NO<sub>2</sub> emissions). NO<sub>2</sub> and NO<sub>x</sub> health impacts are associated with respiratory irritation. However, these NO<sub>x</sub> emissions during operation would be minimal and infrequent. Therefore, the proposed project would not result in significant health impacts.

The VOC and NO<sub>x</sub> emissions, as described previously, would make a minimal contribution to regional ozone concentrations and associated health effects. In addition to ozone, NO<sub>x</sub> emissions would not contribute to potential exceedances of the NAAQS and CAAQS for NO<sub>2</sub>. As shown in Table 3.4-1, existing NO<sub>2</sub> concentrations in the area are well below the NAAQS and CAAQS. Thus, it is not expected that the proposed project’s operational NO<sub>x</sub> emissions would result in exceedances of the NO<sub>2</sub> standards or contribute to the associated health effects.

CO tends to be a localized impact associated with congested intersections. As discussed previously, the proposed project would not create any CO hotspots, and CO impacts would be less than significant. Thus, the project’s CO emissions would not contribute to significant health effects associated with this pollutant.

<b>IMPACT</b> 3.4-3	<b>Inconsistency of the Project with Air Quality Planning Efforts.</b> <i>Construction and operation of the project would not exceed NCUAQMD thresholds of significance and would not conflict with or obstruct implementation of the plans and policies in place to achieve attainment of the CAAQS for PM<sub>10</sub>. This impact would be less than significant.</i>
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There are no applicable air quality plans related to attainment of the NAAQS. The NCUAQMD Particulate Matter PM<sub>10</sub> Attainment Plan (adopted in 1995), described previously, includes strategies for achieving PM<sub>10</sub> reductions. According to the attainment plan, the following activities associated with the proposed project could generate fugitive dust:

- ▶ Grading, excavation, road building, and other earthmoving activities
- ▶ Travel by construction equipment and employee vehicles, especially on unpaved surfaces
- ▶ Exhaust from on-site construction equipment

The plan includes strategies for achieving PM<sub>10</sub> reductions, including transportation control measures, guidelines for general plans, regulation of open burning, and residential burning.

More recently, in the General Plan, the County laid out air quality policies and strategies to reduce and minimize the generation of air pollutants, including PM<sub>10</sub>. These policies and strategies, as detailed in Section 3.4.2, “Regulatory Setting,” include required implementation of fugitive dust control strategies to prevent visible emissions from exceeding NCAQMD regulations, per Rule 104. Fugitive dust reduction measures identified in Rule 104 would be implemented throughout project construction and would reduce construction-related emissions of PM<sub>10</sub> and PM<sub>2.5</sub> to levels that are below adopted thresholds (see Table 3.4-3 and Table 3.4-4). During operations, additional on-road trips would be minimal and potential particulate matter emissions would not exceed thresholds (see Table 3.4-7). O&M activities for the project would require approximately three round trips per day using pickups or other light-duty trucks. In addition, roadway improvements associated with the proposed project would include improvements from existing dirt logging roads to a graded and graveled surface with stormwater management features. These roadway improvements would be consistent with the Humboldt Redwood Company Management Plan, which is designed to reduce erosion. Therefore, roadway use would not lead to increased particulate matter emissions from on-road activities.

Therefore, implementation of the proposed project would not conflict with or obstruct implementation of the plans and policies in place to achieve attainment of the CAAQS for PM<sub>10</sub>. This impact would be **less than significant**.

Expansion of the Bridgeville Substation is included in this analysis. This impact of substation expansion would be **less than significant**.

<p><b>IMPACT</b> 3.4-4</p>	<p><i>Exposure of Sensitive Receptors to Toxic Air Contaminants. Construction of the proposed project would generate localized air pollutant emissions, including emissions of DPM and other TACs, that could affect sensitive receptors. Operations are not anticipated to include substantial use of any TACs. Existing regulations, policies, and implementation programs would reduce potential exposure to substantial pollutant concentrations. This impact would be less than significant.</i></p>
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**Construction-Related Toxic Air Contaminant Emissions**

Project construction activities would generate DPM in the short term. DPM emissions would come from exhaust generated by off-road use of heavy-duty diesel equipment for site preparation (e.g., excavation, grading, and clearing); paving; application of architectural coatings; and other miscellaneous activities. ARB identified DPM as a TAC in 1998. The potential cancer risk from the inhalation of DPM, as discussed below, outweighs the potential for all other health impacts (ARB 2000). In addition, construction activities would include a temporary cement batch plant on Monument Ridge, which would emit TACs.

Construction activities for the proposed project and related emissions would vary by construction phase (e.g., grading, building construction); therefore, the emissions to which nearby receptors would be exposed would also

vary throughout the construction period. However, during even the most intensive construction phases, there would not be substantial pollutant concentrations, except in the immediate vicinity of the active construction site, because concentrations of mobile-source DPM disperse rapidly with distance. Concentrations of mobile-source emissions of DPM are typically reduced by 60 percent at a distance of approximately 300 feet (Zhu et al. 2002) and 70 percent at a distance of approximately 500 feet (ARB 2005). In addition, wind has been shown to be an important determining factor in the distribution of DPM. In the region of the proposed project, the prevailing winds are toward the northeast, so the wind would typically carry DPM away from nearby residences west of the project site. Because construction activities would take place throughout the entire construction site, the concentration of DPM in any one location would be limited.

The use of newer off-road equipment is also effective in reducing particulate matter emissions from off-road equipment used during construction. These vehicles are increasingly in use in construction equipment fleets. In January 2001, EPA promulgated a final rule to reduce emissions standards for heavy-duty diesel engines in 2007 and subsequent model years. These emissions standards represent emissions reductions of 90 percent for NO<sub>x</sub>, 72 percent for nonmethane hydrocarbons, and 90 percent for particulate matter, compared to the standards for the 2004 model year. In December 2004, in the Clean Air Non-road Diesel Rule, ARB adopted a fourth phase of emission standards (Tier 4) that are nearly identical to the standards finalized by EPA on May 11, 2004. The Tier 4 emission standards required engine manufacturers to meet after-treatment-based exhaust standards for NO<sub>x</sub> and particulate matter starting in 2011 that were more than 90 percent lower than the previous levels, putting emissions from off-road engines virtually on par with those from on-road heavy-duty diesel engines. The proposed project must use Tier 4 final equipment or, should such equipment be unavailable, a mix of equipment and other measures that would result in an equivalent reduction of NO<sub>x</sub>, as required by Mitigation Measure 3.4-1.

Project construction is projected to require approximately 18 months. During this time, construction would take place in phases. For example, access roads would be constructed before the foundations or the transmission line. Therefore, any single construction activity in a single location would last for far less than 18 months. As a result, exposure of sensitive receptors to construction emissions would be short-term, intermittent, and temporary. The dose to which receptors are exposed to TAC emissions is the primary factor used to determine health risk. Dose is positively correlated with time, meaning that a longer exposure period to a fixed amount of emissions would result in higher health risks for the maximally exposed individual. According to the California Office of Environmental Health Hazard Assessment, health risk assessments used to determine the exposure of sensitive receptors to TAC emissions should be based on a 30-year exposure period. However, such assessments should also be limited to the period/duration associated with construction activities. The Office of Environmental Health Hazard Assessment recommends evaluating construction activities for individual projects longer than 2 months for their potential cancer risks (OEHHA 2015). If the construction activities near a sensitive receptor were to continue for the entire 18-month construction period—a scenario that is not anticipated—then the exposure would be 5 percent of the total exposure period used for typical health risk calculations (i.e., 30 years).

The project site is in a relatively rural area. The closest residence to a proposed WTG is approximately 900 feet away and the closest residence to the proposed expansion of the Bridgeville Substation is approximately 450 feet away. Construction activities that could result in TAC emissions would be temporary. Although trucks would travel along U.S. Highway 101 to deliver materials to and from the site, these truck trips would not occur at a level that would substantially affect the level of traffic along the highway. Truck transport of large WTG parts that could disrupt traffic would take place during the nighttime and would not exceed 10 trips per day. In addition,

concentrations of mobile-source DPM emissions are typically reduced by approximately 60 percent at a distance of around 300 feet (100 meters) (Zhu et al. 2002).

Because of the limited and intermittent nature of construction trips, and because of the dispersive properties of DPM and the distance of the project site from sensitive receptors (approximately 450 feet to the nearest residence), project construction activities would not expose sensitive receptors to TAC levels that would result in a health hazard. Therefore, this impact would be **less than significant**.

Expansion of the Bridgeville Substation is included in this analysis. This construction-related impact of substation expansion would be **less than significant**.

### Operational Toxic Air Contaminant Emissions

Long-term project operation would not result in any nonpermitted sources of TAC emissions. A diesel-fueled emergency backup generator would likely be installed as part of the proposed project. Diesel-fueled generators are considered stationary sources of TACs and are subject to NCUAQMD's permitting process. Stationary sources must be fitted with applicable best available control technology for TACs and must comply with ARB's Portable Diesel-Fueled Engine Airborne Toxic Control Measure to reduce emissions. However, the site is in a remote, rural location, where there are few sensitive receptors. One rural residential building is located about 800 feet from the site. The primary TAC generated by a diesel-fueled emergency backup generator would be DPM, emissions of which are typically reduced by approximately 60 percent at a distance of around 300 feet (100 meters) (Zhu et al. 2002).

Because of the limited use of TAC sources during operations, the distance from sensitive receptors (approximately 450 feet to the nearest residence), and the application of best available control technology, project operations would not expose sensitive receptors to TAC levels that would result in a health hazard. Therefore, this impact would be **less than significant**.

Expansion of the Bridgeville Substation is included in this analysis. This operational impact of substation impact would be less than significant.

IMPACT 3.4-5	Exposure of Sensitive Receptors to Odorous Emissions. <i>Temporary, short-term construction and long-term operation of the proposed project would not result in the frequent exposure of sensitive receptors to substantial objectionable odor emissions. This impact would be less than significant.</i>
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The human response to odors is subjective, and sensitivity to odors varies greatly among the public. Minor odor sources, such as exhaust from mobile sources, garbage collection areas, and commercially used charbroilers, do not typically generate numerous complaints, but they are known to have some temporary, less concentrated odorous emissions. The following land use types are widely considered major sources of odors: wastewater treatment and pumping facilities, chemical manufacturing facilities, sanitary landfills, fiberglass manufacturing facilities, transfer stations, painting/coating operations (e.g., auto body shops), composting facilities, food processing facilities, confined-animal facilities, asphalt batch plants, rendering plants, metal smelting plants, and coffee roasters. This list is meant not to be entirely inclusive, but to act as general guidance.

Minor sources of odors would be used during construction and installation of the WTGs. Diesel engines would be the predominant power source for construction equipment. Some individuals may consider odors from diesel engine exhaust, asphalt paving, and application of architectural coatings to be offensive. Similarly, diesel-fueled trucks traveling on local roadways would produce diesel exhaust fumes. However, because odors from diesel fumes would be temporary, would disperse rapidly with distance from the source, and would not be generated close to receptors, construction activities and mobile sources would not frequently expose receptors to objectionable odors.

Operation of the proposed project would not include any typical sources of odors. Intermittent maintenance activities may require using off-road equipment with diesel engines that would generate exhaust odors. However, these activities would be infrequent and intermittent, and would not frequently expose receptors to objectionable odors. Therefore, this impact would be **less than significant**.

Expansion of the Bridgeville Substation is included in this analysis. This impact of substation expansion would be **less than significant**.