Appendix A

Air Quality, Greenhouse Gas, and Health Risk Analyses

ESA

Appendix A.1

Air Quality/Greenhouse Gas/Health Risk Assessment Technical Report

ESA

WORLD LOGISTICS CENTER

Air Quality, Greenhouse Gas Emissions, and Health Risk Assessment Report

Prepared for
City of Moreno Valley
14177 Frederick Street
Moreno Valley, California 92552

November 2019

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Acronyms and Abbreviations

AB 32	California Global Warming Solutions Act of 2006
AQMP	Air Quality Management Plan
ATCM	Air Toxics Control Measure
BACT	Best Available Control Technology
Basin	South Coast Air Basin
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BAU	Business as Usual
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen Code	California Green Building Standards Code
CAFE	Corporate Average Fuel Economy
CAPCOA	California Air Pollution Control Officer's Association
CARB	California Air Resources Board
CBSC	California Building Standards Commission
CCAT	California Climate Action Team
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CEUS	Commercial End-Use Survey
CH_4	Methane
City	City of Los Angeles
CO	carbon monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalents
CPUC	California Public Utilities Commission
DPM	Diesel Particulate Matter
EMFAC	on-road vehicle emissions factor model
GHG	Greenhouse Gas
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
hp	horsepower
HVAC	Heating, Ventilating and Air Conditioning
IPCC	Intergovernmental Panel on Climate Change
LADWP	Los Angeles Department of Water and Power
LAGBC	Los Angeles Green Building Code

LCFS	Low Carbon Fuel Standard
LOS	Level of Service
LST	localized significance threshold
MATES IV	Multiple Air Toxics Exposure Study, May 2015
MPO	Metropolitan Planning Organization
$MTCO_2e$	Metric ton of carbon dioxide equivalent
$MMTCO_2e$	Million metric tons of carbon dioxide equivalent
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
N_2O	Nitrous Oxide
OPR	California Office of Planning and Research
Pb	lead
$PM_{2.5}$	fine particulate matter
PM_{10}	respirable particulate matter
ppm	parts per million
PFCs	Perfluorocarbons
RTIP	Regional Transportation Improvement Program
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RPS	Renewable Portfolio Standard
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SO_2	sulfur dioxide
SF_6	Sulfur Hexafluoride
TAC	toxic air contaminant
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USGBC	United States Green Building Code
VDECS	Verified Diesel Emission Control Strategies
VMT	Vehicle miles travelled
VOC	volatile organic compounds
WLCSP	World Logistics Center Specific Plan
$\mu g/m^3$	micrograms per cubic meter
µm	micrometers

EXECUTIVE SUMMARY

The World Logistics Center Specific Plan (project) proposes 40.6 million square feet of logistics warehouse uses. These uses comprise a maximum of 40.4 million square feet of "high-cube logistics" warehouse distribution uses classified as "Logistics Development" (LD) and 200,000 square feet (approximately 0.5%) of warehousing-related uses classified as "Light Logistics" (LL). In addition, the LD designation includes land for two special use areas; a fire station and a "logistics support" facility for vehicle fueling and sale of convenience goods (3,000 square feet is assumed for planning purposes for the "logistics support")**.**

In accordance with the requirements under the California Environmental Quality Act (CEQA), this Technical Report provides an estimate of air quality and GHG emissions for the project and predicts the potential impacts from construction and operation activities. The report includes the categories and types of emission sources resulting from the Project, the calculation procedures used in the analysis, and any assumptions or limitations.

This report summarizes the potential for the project to conflict with an applicable air quality plan, to violate an air quality standard or threshold, to result in a cumulatively net increase of criteria pollutant emissions, or to expose sensitive receptors to substantial pollutant concentrations, and to generate GHG emissions that may have a significant impact on the environment and its potential to conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs. The findings of the analyses are as follows:

- The incremental increase in emissions from construction and operation of the project would exceed the regional daily emission thresholds set forth by the South Coast Air Quality Management District (SCAQMD) for VOC, NO_X, CO, PM_{10}, and $PM_{2.5}$ even with the implementation of mitigation.

- The incremental increase in onsite emissions from construction and operation of the project would exceed the localized significance thresholds for PM_{10} set forth by the SCAQMD even with implementation of mitigation.

- Emissions from the increase in traffic due to operation of the project would not have a significant impact upon 1-hour or 8-hour local carbon monoxide (CO) concentrations due to mobile source emissions.

- Project construction and operations would not expose off- or on-site receptors to significant levels of toxic air contaminants causing significant health risk with implementation of mitigation.

- The project would result in significant cumulative air quality impacts during construction and operations of the Project even with implementation of mitigation.
- Greenhouse gas emissions associated with the project would not exceed applicable thresholds and the project would be consistent with greenhouse gas reduction plans, policies, and regulations.

SECTION 1
Introduction

1.1 Existing Conditions

The project area is largely vacant undeveloped marginal agricultural land, with six occupied single-family homes and associated ranch/farm buildings in various locations on the property. In the 1920s, several farm buildings and related houses were constructed on the property and, in the 1940s, a stock farm operated on a portion of the site that was later expanded into a commercial horse farm and training facility that operated until the mid-1990s. The overall project site has been farmed by a variety of owners since the early 1900s and has supported dry (non-irrigated) farming, livestock grazing, and limited citrus groves. Much of the site continues to be used for dry farming today.

San Diego Gas & Electric (SDG&E) operates a natural gas compressor plant, known as the Moreno Compressor Station, on 19 acres south of the site. The Southern California Gas Company (SCGC) operates a metering and pipe cleaning station on two separate parcels (totaling 1.5 acres) south of the site south of Alessandro Boulevard along existing Virginia Street. The site contains a variety of overhead and underground utility lines associated with oil, natural gas, and electrical service.

Metropolitan Water District owns property and owns and operates facilities within the World Logistics Center Specific Plan (WLCSP) area. As shown on the attached map, Metropolitan's irregularly shaped fee-owned property (APN 422-040-009 and 422-040-015), Inland Feeder Tunnel, and appurtenant tunnel access structure are located within the WLCSP area. In addition, Metropolitan's Inland Feeder pipeline and appurtenant structures extend through the specific plan area in the street rights-of-way for Eucalyptus Avenue, World Logistics Center Parkway, and Davis Road. Metropolitan also has a 110-foot-wide easement along Davis Road.

At present, the project site contains a number of unimproved drainage features, but it does not contain any improved flood control facilities. The project area is largely vacant marginal agricultural land with six rural residential properties.

1.2 Project Description

The project proposes a maximum of 40.4 million square feet of “high-cube logistics” warehouse distribution uses classified as “Logistics Development” (LD) and 200,000 square feet (approximately 0.5%) of warehousing-related uses classified as “Light Logistics” (LL). In addition, the LD designation includes land for two special use areas; a fire station and a “logistics support”

facility for vehicle fueling and sale of convenience goods (3,000 square feet is assumed for planning purposes for the "logistics support").

1.3 Project Location

The project is located in "Rancho Belago," the eastern portion of the City of Moreno Valley, in northwestern Riverside County. The project site is immediately south of SR-60, between Redlands Boulevard and Gilman Springs Road (the easterly city limit), extending to the southerly city limit. **Figure 1** depicts the location of the project within the region and the City of Moreno Valley. The major roads that currently provide access to the project site are Redlands Boulevard, Theodore Street, World Logistics Center Parkway, Alessandro Boulevard, and Gilman Springs Road.

The World Logistics Center (WLC) project area is located in portions of Sections 1, 12, and 13 of Township 3 South, Range 3 West; and portions of Sections 6, 7, 8, 9, 16, 17, 18, 19, 20, and 21 of Township 3 South, Range 2 West, as depicted on the U.S. Geological Survey (USGS) 7.5-minute series Sunnymead and El Casco, California quadrangles.

SOURCE: ESRI

World Logistics Center

Figure 1
Regional Location

ESA

1.4 Existing Air Quality Conditions

Existing Setting

The project site is located in the South Coast Air Basin (Basin), a geographic area that encompasses the coastal plain and connecting broad inland valleys and low hills. The Pacific Ocean forms the southwestern border of the Basin, with mountain ranges forming the remainder of the border. The Basin includes Orange County and the non-desert portions of Los Angeles County, Riverside County, and San Bernardino County. The Basin is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

The air quality in the air basin has been steadily improving over the last couple of decades as measured in air pollutant concentrations by the SCAQMD. A concentration of a pollutant is a measure of the amount of a pollutant in the air. Some pollutants are measured in parts per million (ppm) and some are measured in micrograms per cubic meter ($\mu g/m^3$).

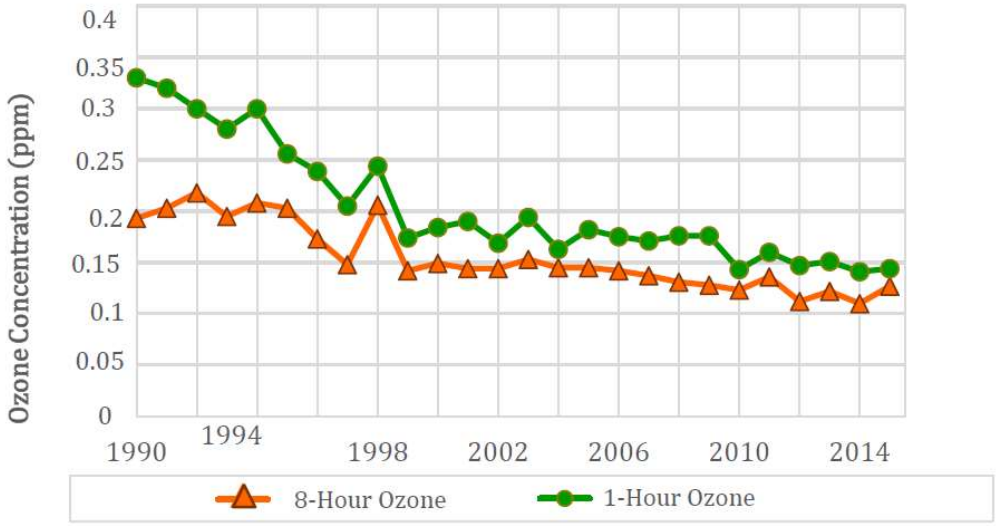
When sensitive people, such as children, pregnant women, and the elderly, breathe in air pollutants, they can experience health effects. These health effects differ based on the type of pollutant, the length of time someone is exposed, pre-existing health conditions, and the concentration of the pollutant. In general, health effects can include coughing, sore throat, chest pain, difficulty breathing, eye irritation, reduced lung function, asthma aggravation, chronic lung diseases, cancer, and lung damage.

Federal, state, and local agencies enact rules and regulations to reduce air pollutant emissions to protect the health of sensitive individuals. The EPA sets federal ambient air quality standards and the CARB sets state ambient air quality standards. When concentrations of pollutants exceed the standards, sensitive individuals may experience health effects.

Ozone is a pollutant formed in the air when emissions of volatile organic compounds (VOC) and nitrogen oxides (NO_x) combine in the presence of sunlight. Ozone is a pollutant of concern in the Basin because ozone levels exceed the ozone standards.

As shown in **Figure 2**, *Ozone Concentration Trends in the South Coast Air Basin,* ozone concentrations in the basin have generally decreased over the past twenty years for 1-hour and 8-hour averaging time periods as defined by the State and/or federal ambient air quality standards. The 1-hour and 8-hour concentration refers to the average of the concentration over a 1-hour and 8-hour time period, respectively.

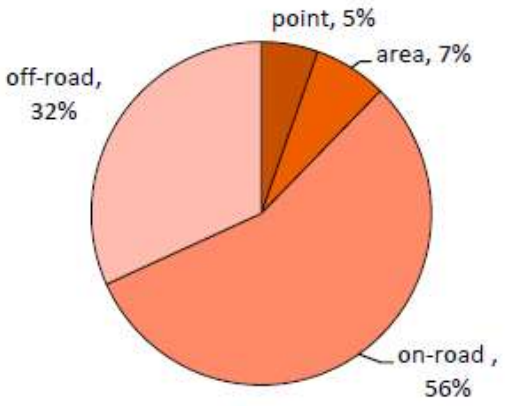
Figure 2: Ozone Concentration Trends in the South Coast Air Basin



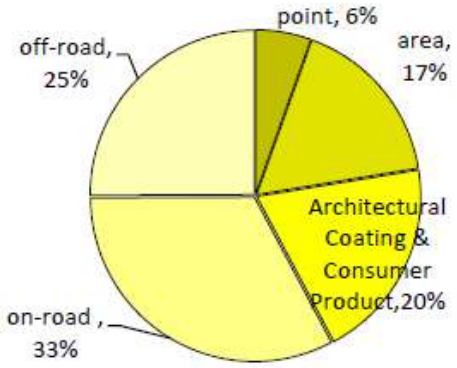
Sources of air pollution are typically categorized into one of three groups: area, mobile, or point. Area sources include small pollution sources like dry cleaners, gas stations, commercial buildings (heating and cooling units; surface coatings), and residential buildings (fire places; surface coatings). Mobile sources include both on-road vehicles (such as cars, trucks and buses) and off-road equipment (such as ships, airplanes, agricultural and construction equipment). Point sources include major industrial facilities like chemical plants, steel mills, oil refineries, power plants, and hazardous waste incinerators. As shown in **Figure 3**, *Ozone Precursor Emissions (VOC and NO_X) in the South Coast Air Basin,* the main source of NO_x and VOC emissions in the basin are from on-road motor vehicles, not from the operation of buildings. Although vehicle miles traveled in the basin continue to increase, ozone concentrations are decreasing because of the mandated controls on motor vehicles and the replacement of older polluting vehicles with cleaner and lower-emitting vehicles. VOC and NO_x are ozone precursors; therefore, if those emissions decrease, it follows that ozone concentrations would also decrease.

Emissions of NO_x in the air basin are expected to decrease in the future despite future growth in population, and vehicle miles traveled, as shown in **Figure 4**, *NO_X Emissions Forecast in the South Coast Air Basin*.

Figure 3: Ozone Precursor Emissions (VOC and NO_x) in the South Coast Air Basin

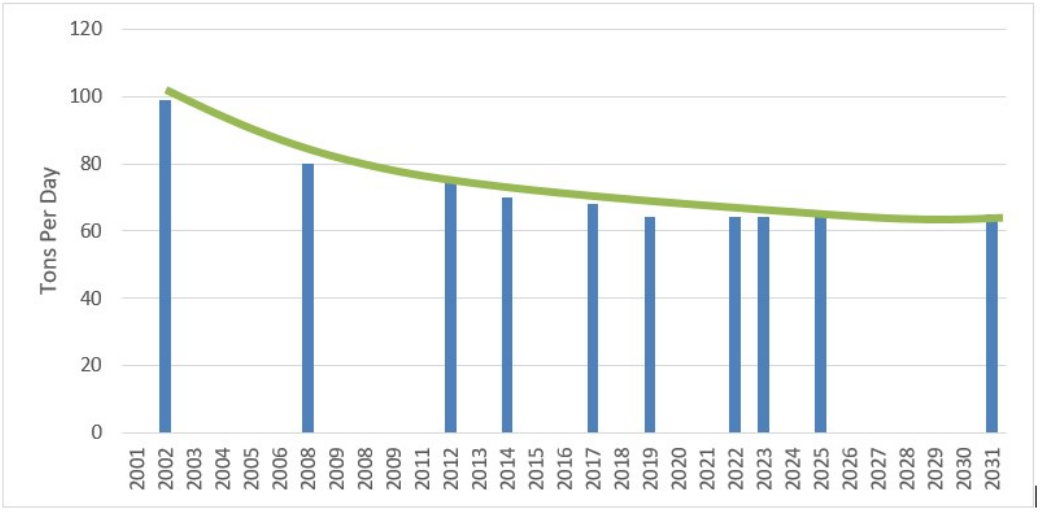


NO_X Emissions Sources in South Coast Air Basin



VOC Emissions Sources in South Coast Air Basin

Figure 4: NO_x Emissions Forecast in the South Coast Air Basin



Another pollutant of concern is particulate matter (PM). PM is a mixture of small particles and liquid droplets suspended in the air. It is made up of components such as chemicals, metals, soil, or dust particles. The size of these particulates is linked to their potential for causing health problems. Ultrafine particles are less than 0.1 in micron in diameter, fine particles are less than 2.5 microns in diameter ($PM_{2.5}$), and coarse particles are larger than 2.5 microns and smaller than 10 microns in diameter (PM_{10}). The CARB and EPA have established standards for $PM_{2.5}$ and PM_{10} but not for ultrafine particles. $PM_{2.5}$ and PM_{10} are a concern in the air basin because sometimes the concentrations exceed the standards. $PM_{2.5}$ is often used as a marker for toxic air pollutants such as diesel PM.

As shown in **Figure 5**, *$PM_{2.5}$ Emissions Forecast in the South Coast Air Basin*, $PM_{2.5}$ emissions are expected to decrease in the Basin and then level out after the year 2014.

As shown in **Figure 6**, *Particulate Matter Concentration Trends in the South Coast Air Basin,* PM_{10} and $PM_{2.5}$ annual concentrations have continued to decrease since 1990 within the air basin as a whole.

Figure 7, *$PM_{2.5}$ Concentration Trends in the Inland Empire,* provides an additional view of $PM_{2.5}$ trends specifically in the Inland Empire. As shown, there is a marked decreasing trend in $PM_{2.5}$ concentrations in Riverside-Rubidoux, Fontana, and San Bernardino from 2001 to 2016 and at Mira Loma from 2006 to 2016. This decreasing trend in the Inland Empire PM_{10} concentration continues despite simultaneous increases in urban development including the development of large warehouse complexes since 2001.

Figure 5: $PM_{2.5}$ Emissions Forecast in the South Coast Air Basin

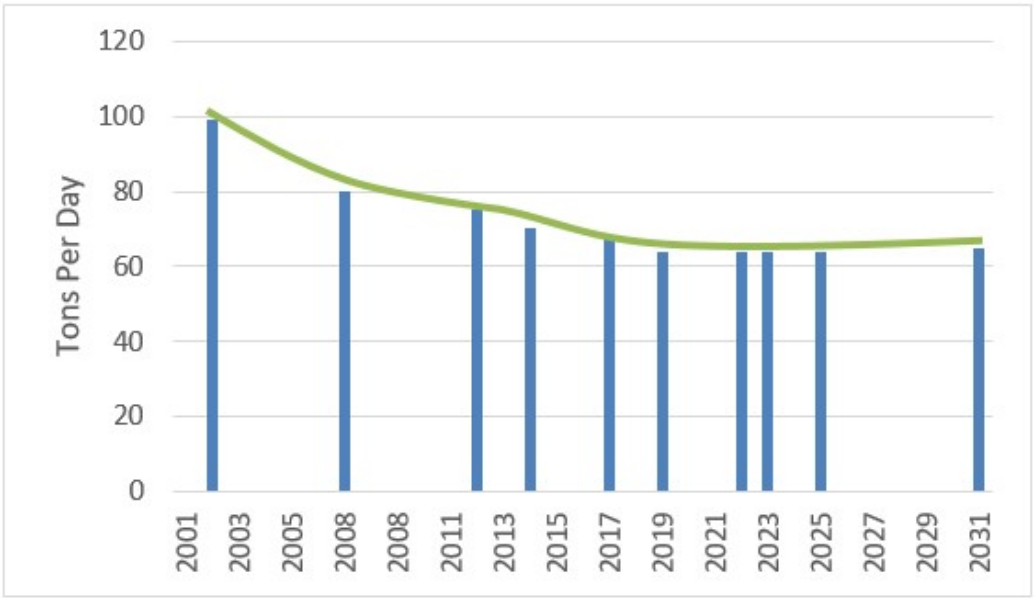


Figure 6: Particulate Matter Concentration Trends in the South Coast Air Basin

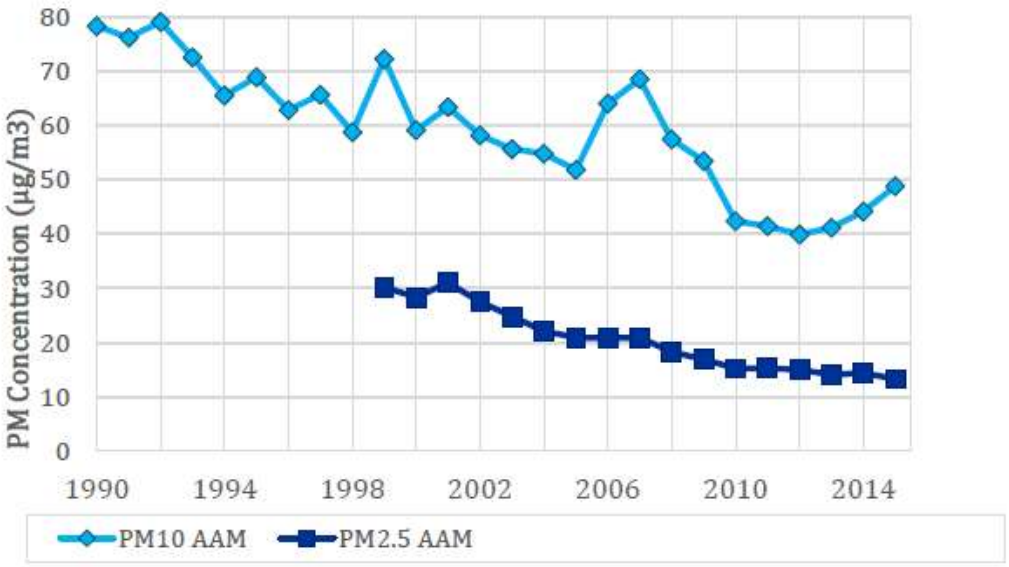
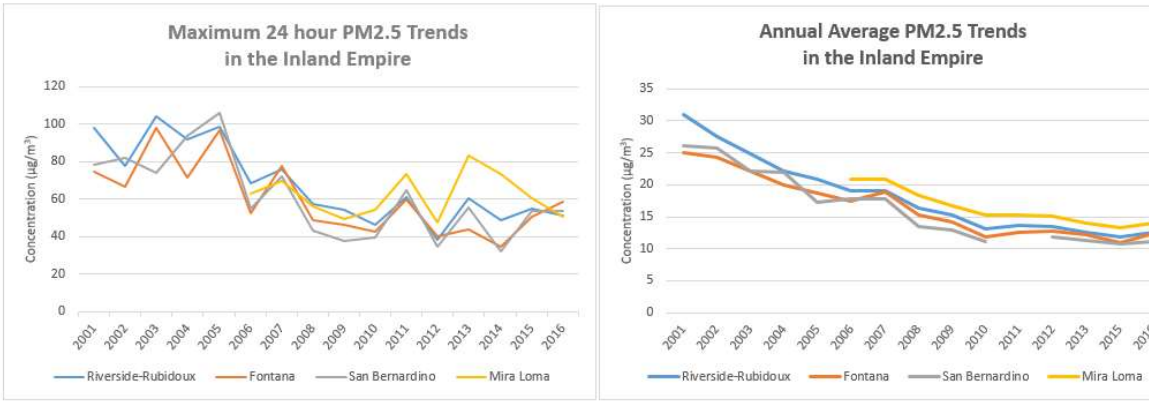
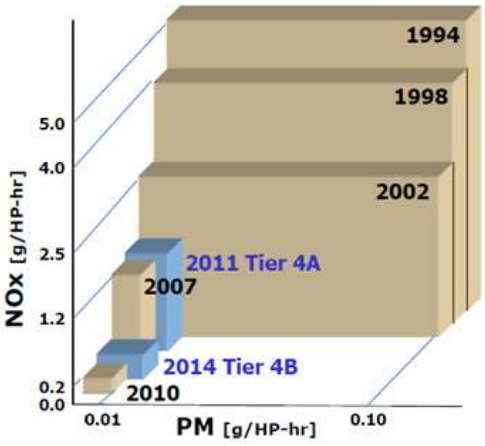


Figure 7: $PM_{2.5}$ Concentration Trends in the Inland Empire



Part of the success in the decreasing NO_x and PM emissions are increasingly stringent standards placed on motor vehicles. **Figure 8**, *Changes in U.S. Heavy-Duty Diesel NO_X and PM Emission Standards Over Time,* demonstrates the changes in U.S. heavy duty diesel emission standards for NO_x and PM over the last twenty-five years. The project would incorporate mitigation that would require that all diesel trucks accessing the project be model 2010 or younger. As shown below, emissions from 2010 trucks are only a fraction of emissions from an older vehicle, at 0.2 grams per horsepower hour (g/HP-hr) of NO_x and 0.01 g/HP-hr of PM. The text in blue represents the off-road construction standards; 2011 model vehicles incorporate Tier 4 Interim standards and 2014 models incorporate Tier 4 Final standards. The project will incorporate mitigation that requires use of only Tier 4 models of equipment.

Figure 8: Changes in U.S. Heavy-Duty Diesel NO_x and PM Emission Standards Over Time



Climate and Meteorology

Air quality in the project area is not only affected by various emission sources (mobile, industry, etc.), but also by atmospheric conditions such as wind speed, wind direction, temperature, rainfall, and amount of sunshine. The combination of topography, low atmospheric mixing height, abundant sunshine, and emissions from the second largest urban area in the United States combine to give the Basin one of the worst air pollution problems in the nation.

Winds in the Basin are predominantly of relatively low velocities, averaging about 4.0 miles per hour (mph). These low average wind speeds, together with a persistent temperature inversion, limit the vertical dispersion of air pollutants throughout the Basin. Strong, dry, north or northeasterly winds, known as Santa Ana winds, occur during the fall and winter months, dispersing air contaminants. These conditions tend to last for several days at a time.

During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas of Los Angeles County are transported predominantly inland into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are increased concentrations of carbon monoxide (CO) and oxides of nitrogen (NO_X), due to extremely low inversions and air stagnation during the night and early morning hours that trap emissions principally from mobile sources at ground level. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

Regional Air Quality

Both the State of California and the Federal government have established health-based ambient air quality standards (AAQS) for six air pollutants. These pollutants are known as “criteria pollutants.”

- Carbon monoxide (CO)
- Lead (Pb)
- Ozone (O3)

- Nitrogen Dioxide (NO2)
- Particulate matter with a diameter of 10 microns or less (PM_{10})
- Sulfur dioxide (SO_2)

Federal standards for 8-hour ozone and for fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) have also been adopted. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety and are listed in **Table 1**, *Ambient Air Quality Standards*. **Table 2**, *Summary of Health Effects of the Major Criteria Air Pollutants,* lists the health effects of these criteria pollutants and their potential sources.

The Air Quality Index is metric index developed by the United States EPA for reporting daily air quality. It indicates how clean or polluted the air is and what associated health effects might be a concern. The Air Quality Index focuses on health effects that may be experienced within a few hours or days after breathing polluted air. Descriptions for the various pollutant levels in the Air Quality Index are shown in **Table 3**, *Air Quality Index Descriptions*.

The federal and California 8-hour ambient air quality standard for ozone is 70 ppb. The California 1-hour standard for ozone is 90 ppb (there is no federal 1-hour standard). As shown in the table, in order to achieve the federal ambient air quality standard for ozone, the Air Quality Index would need to be below 101. In order to achieve the state 8-hour ambient air quality standard for ozone, the Air Quality Index would need to be below 84.

In the Moreno Valley area during 2016 and 2017, the air quality index was greater than 150 one day each year. That means the air was unhealthy for one day in 2016 and one day in 2017. Although the main source of NO_X and VOC emissions are from on-road motor vehicles, NO_X and VOC emissions during project construction could contribute to unhealthy air days. Therefore, the project will incorporate mitigation that prohibits grading on days when an Air Quality Index is greater than 150 for particulates or ozone. If future years follow that trend, there would one day during each of the construction years when construction activities would need to be suspended.

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)[8]	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM_{10})[9]	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter ($PM_{2.5}$)[9]	24-Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15.0 µg/m^3	
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm(40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)[10]	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	53 ppb (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 µg/m^3)		100 ppb (188 µg/m^3)	None	
Sulfur Dioxide (SO_2)[11]	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (for certain areas)[11]	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	—	
	3-Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		75 ppb (196 µg/m^3)	—	
Lead[12, 13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average[11]	—		0.15 µg/m^3		

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Visibility-Reducing Particles[14]	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.	Beta Attenuation and Transmittance through Filter Tape	**No Federal Standards**		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]

[1] California standards for ozone; carbon monoxide (except 8-hour Lake Tahoe); sulfur dioxide (1- and 24-hour); nitrogen dioxide; particulate matter (PM_{10} and $PM_{2.5}$ 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.

[2] 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 eight-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current federal policies.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent measurement method which can be shown to the satisfaction of the CARB to give equivalent results at or near the level of the air quality standard may be used.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

[8] On October 1, 2015, the natural eight-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[9] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[10] To attain the 1-hour national standard, the 3-year average of the 98th percentile of the daily maximum concentrations at each site must not exceed 0.100 ppm. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[11] On June 2, 2010, a new 1-hour SO_2 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 0.75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one 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. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm).

[12] The CARB 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.

[13] The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard remains in effect until one 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 standard are approved.

°C = degrees Celsius
EPA = United States Environmental Protection Agency
µg/m^3 = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
ppm = parts per million
ppb = parts per billion

Source: California Air Resources Board, 2016 (https://www.arb.ca.gov/research/aaqs/aaqs2.pdf).

Table 2
Summary of Health Effects of the Major Criteria Air Pollutants

Pollutants	*Sources*	*Primary Effects*
Ozone (O_3)	▪ Atmospheric reaction of organic gases (ROG or VOC) with nitrogen oxides in the presence of sunlight.	▪ Breathing difficulty. ▪ Lung tissue damage. ▪ Damage to rubber and some plastics.
Nitrogen Dioxide (NO_2)	▪ Motor vehicle exhaust. ▪ Heavy construction equipment exhaust. ▪ Farming equipment exhaust. ▪ Residential heating.	▪ Lung irritation and damage. ▪ Formation of acid rain.
Carbon Monoxide (CO)	▪ Motor vehicle exhaust. ▪ Heavy construction equipment exhaust. ▪ Farming equipment exhaust. ▪ Residential heating.	▪ Reduced tolerance for exercise. ▪ Impairment of mental function. ▪ Impairment of fetal development. ▪ Death at high levels of exposure. ▪ Aggravation of some heart diseases (angina).
Suspended Particulate Matter ($PM_{2.5}$ and PM_{10})	▪ Motor vehicle exhaust ($PM_{2.5}$). ▪ Equipment and industrial sources ($PM_{2.5}$). ▪ Residential and agricultural burning ($PM_{2.5}$ and PM_{10}). ▪ Atmospheric chemical reactions ($PM_{2.5}$ and PM_{10}). ▪ Road dust (PM_{10}). ▪ Windblown dust (Agriculture [PM_{10}]) ▪ Construction (Fireplaces [PM_{10}])	▪ Reduced lung function. ▪ Aggravation of the effects of gaseous pollutants. ▪ Aggravation of respiratory and cardiorespiratory diseases. ▪ Increased cough and chest discomfort. ▪ Soiling. ▪ Reduced visibility.
Sulfur Dioxide (SO_2)	▪ Coal/oil- burning power plants. ▪ Industries, refineries, and diesel engines.	▪ Increased lung disease. ▪ Breathing problems for asthmatics. ▪ Formation of acid rain.
Lead (Pb)	▪ Metal smelters. ▪ Resource recovery. ▪ Leaded gasoline. ▪ Deterioration of lead paint.	▪ Learning disabilities. ▪ Brain and kidney damage.

Source: California Air Resources Board 2009 (http://www.arb.ca.gov/research/health/fs/fs2/fs2.htm).

Table 3
Air Quality Index Descriptions

Air Quality Index Levels of Health Concern	Air Quality Index Numerical Range	Ozone Concentration for Air Quality Index (ppb)		Meaning
		8-Hour	1-Hour	
Good	Low: 0 High: 50	—	—	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	Low: 51 Std: 84* High: 100	Low: 59 Std: 70*	Low: 85	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	Low: 101 High: 150	Low: 75 (also the federal standard)	Low: 125	Members of sensitive groups may experience health effects. The general public is not likely to be affected. People with heart or lung disease, children, and older adults are considered sensitive and are at greater risk. For ozone, people who are active outdoors are also considered sensitive.
Unhealthy	Low: 151 High: 200	Low: 95	Low: 165	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	Low: 201 High: 300	Low: 115	Low: 205	Health alert: everyone may experience more serious health effects
Hazardous	Low: 301 High: 500	Low: 374	Low: 405	Health warnings of emergency conditions. The entire population is more likely to be affected.

ppb = parts per billion (a measure of concentration) * Std = 8-hour California ozone ambient air quality standard

Source: Environmental Protection Agency (https://airnow.gov/index.cfm?action=aqibasics.aqi); MBA-FCS 2015

Indirect sources of pollution are generated when minor sources collectively emit a substantial amount of pollution. An example of indirect source contribution would be the motor vehicles at intersections, malls, and on highways. The California Clean Air Act (CCAA) provides the SCAQMD with the authority to manage transportation activities at indirect sources. The SCAQMD also regulates stationary sources of pollution throughout its jurisdictional area. Direct emissions from motor vehicles are regulated by the CARB.

The narrative below describes the pollutant characteristics, mechanisms of pollutant origination, and health effects each of the criteria pollutants (i.e., pollutants specifically regulated under the Federal Clean Air Act [CAA] and/or the California Clean Air Act [CCAA]) and other pollutants of concern. Because the concentration levels of the AAQS were set with an adequate margin to protect public health and safety, these health effects will not occur unless the standards are exceeded by a large margin or for a prolonged period of time. State AAQS are more stringent than Federal AAQS.

- *Carbon Monoxide*

    - Description and Properties: CO is colorless, odorless toxic gas produce by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and

biomass). CO is a primary pollutant, meaning it is emitted directly into the air (unlike secondary pollutants such as ozone that are formed by the reactions of other pollutants). CO levels tend to be highest during the winter months when the meteorological conditions support the accumulation of the pollutants. This occurs when relatively low inversion levels trap pollutants near the ground and concentrated the CO. Because CO is somewhat soluble in water, normal winter conditions of rainfall and fog can suppress CO conditions.

- Health Effects: CO is essentially inert to plants and materials but can have significant effects on human health. CO gas enters the body through the lungs, dissolves in the blood, and replaces oxygen as an attached hemoglobin. This binding reduces available oxygen in the blood and; therefore, reduces oxygen delivery to the body's organs and tissues. Effects on humans range from slight headaches to nausea to death. Elevated levels of CO can also cause visual impairments, reduced manual dexterity, poor learning ability, reduced work capacity, and trouble performing complex tasks.

- Sources: The major sources of CO are on-road vehicles, aircraft, and off-road equipment, or any source that burns fuel including residential heaters and stoves. Since most of the CO sources are the indirect result of urban development, most emissions and unhealthy CO levels occur in major urban areas.

- *Ozone*

  - Description and Physical Properties: O_3 is known as a photochemical pollutant. Ozone is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between reactive organic gases (ROG) or volatile organic compounds (VOC), NO_X, and sunlight. ROG and NO_X are emitted from automobiles, solvents and fuel combustion, the sources of which are widespread throughout the SCAQMD. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. The conditions conducive to the formation of ozone include extended periods of daylight (solar radiation) and hot temperatures. These conditions are prevalent during the summer when thermal inversions are most likely to occur. As a result, summertime conditions of long periods of daylight and hot temperatures form ozone in the greatest qualities. During the summer, thermal inversions trap ozone from dispersing vertically, high concentrations of this pollutant are prevalent.

  - Health Effects: Health effects of ozone can include respiratory system irritation, reduction of lung capacity, asthma aggravation, inflammation and damage to lung cells, aggravated cardiovascular disease, and permanent lung damage. The greatest health risk is to those who are more active outdoors during smoggy periods, such as children, athletes, and outdoor workers. Ozone also damages natural ecosystems such as forests, foothill communities, and damages

agricultural crops and some man-made materials such as rubber, paint, and plastics.

- Sources: Ozone is a secondary pollutant, thus is not emitted directly in the lower level of the atmosphere. The sources of ozone precursors (ROG and NO_X) are discussed above in the description of ozone.

- *Oxides of Nitrogen*

  - Description and Physical Properties: During combustion of fossil fuels, oxygen reacts with nitrogen to produce NO_X (NO, NO_2, NO_3, N_2O, N_2O_3, N_2O_4, and N_2O_5). Atmospheric deposition of NO_X occurs when atmospheric or airborne nitrogen is transferred to water, vegetation, soil, or other materials. Acid deposition involves the deposition of nitrogen and/or sulfur acidic compounds that can harm natural resources and materials. NO_X is also an ozone precursor. When NO_X and ROG are released in the atmosphere, they can also be a precursor to PM_{10} and $PM_{2.5}$.

  - Health Effects: The EPA has concluded that the only form of NO_X that exists at a level high enough to cause public health concerns is nitrogen dioxide (NO_2). Nitrogen dioxide is a brown gas with a strong odor. NO_X can react with moisture, ammonia, and other compounds to form nitric acid and related particles. The main human health concerns of nitrogen dioxide include lung damage, increased incidence of chronic bronchitis, eye and mucus membrane damage, negative effects on the respiratory system, pulmonary dysfunction, and premature death. Small particles can penetrate deeply into the sensitive tissue of the lungs and can cause or worsen respiratory disease such as emphysema, asthma, and bronchitis, and can also aggravate existing heart disease. Because NO_X is an ozone precursor, the health effects associated with ozone are also indirect health effects associated with unhealthful levels of NO_X emissions.

  - Sources: A major source of NO_X includes stationary source fuel combustion (i.e. manufacturing and industrial, food and agricultural processing, and service commercial uses). Additionally, NO_X emission sources include motor vehicles internal combustion engines and electric utility and industrial boilers powered by fossil fuel combustion. Natural sources of NO_X include lightning, soils, wildfires, stratospheric intrusion, and the oceans. Natural sources accounted for approximately seven percent of 1990 emissions of NO_X for the United States. On-road vehicles also contribute to NO_X emissions.

- *Sulfur Dioxide*

  - Description and Physical Properties: Sulfur dioxide (SO_2) is a colorless, pungent gas. At levels greater than 0.5 ppm, the gas has a strong odor, similar to rotten eggs. Sulfuric acid is formed from sulfur dioxide, which is an aerosol particle component that affects acid deposition. Sulfur oxides (SO_X) include sulfur

dioxide and sulfur trioxide (SO_3). The gas can also be produced in the air by dimethylsulfide and hydrogen sulfide. Sulfur dioxide is removed from the air by dissolution in water, chemical reactions, and transfer to soils and ice caps. Historically, sulfur dioxide was a pollutant of concern. However, with the successful application of regulations at the State and local level, the levels of sulfur dioxide have been reduced dramatically in the past several decades. The CARB, the State regulatory agency charged with regulating air pollution in the State, demonstrates that sulfur dioxide levels in the State are well below the maximum standards. Although sulfur dioxide concentrations have been reduced to levels well below State and Federal standards, further reductions are desirable because sulfur dioxide is a precursor to sulfate and PM_{10}. Sulfates are a particulate formed through the photochemical oxidation of sulfur dioxide.

- Health Effects: Sulfur dioxide is a soluble gas; therefore, it can be absorbed in the mucous membranes of the respiratory tract and nose. Long-term exposure of high levels of sulfur dioxide can cause irritation of existing cardiovascular disease, respiratory illness, and changes in the defenses in the lungs. When people with asthma are exposed to high levels of sulfur dioxide for short periods of time during moderate activity, effects may include wheezing, chest tightness, or shortness of breath.

- Sources: Anthropogenic, or human caused, sources include fossil-fuel combustion, mineral ore processing, and chemical manufacturing. Volcanic emissions are a natural source of sulfur dioxide.

- *Lead*

  - Description and Physical Properties: Lead (Pb) is a solid heavy metal that can exist in air pollution as an aerosol particle component. An aerosol is a collection of solid, liquid, or mixed-phase particles suspended in the air. Lead was first regulated as an air pollutant in 1976. Leaded gasoline was first marketed in 1923 and was used in motor vehicles until around 1970. The exclusion of lead from gasoline helped to decrease emissions of lead in the United States from 219,000 to 4,000 short tons per year between 1970 and 1997. Even though leaded gasoline has been phased out in most countries, some still use leaded gasoline. The mechanisms by which lead can be removed from the atmosphere (sinks) include deposition to soils, ice caps, and oceans, and inhalation.

  - Health Effects: Lead accumulates in bones, soft tissue, and blood and can affect the kidneys, liver, and nervous system. The more serious effects of lead poisoning include behavior disorders, mental retardation, and neurological impairment. Low levels of lead in fetuses and young children can result in nervous system damage, which can cause learning deficiencies and low IQs. Lead may also contribute to high blood pressure and heart disease.

- Sources: Lead-ore crushing, lead-ore smelting, and battery manufacturing are currently the largest sources of lead in the atmosphere in the United States. Other sources include dust from soils contaminated with lead-based paint, soil waste disposal, and crustal physical weathering.

- *Particulate Matter (PM_{10} and $PM_{2.5}$)*

  - Description and Physical Properties: Particulate matter is a generic term that defines a broad group of chemically and physically different particles (either liquid droplets or solids) that can exist over a wide range of sizes. Examples of atmosphere particles include those produced from combustion (diesel soot or fly ash), light produced (urban haze), sea spray produced (salt particles), and soil-like particles from re-suspended dust. In discussions of air pollution, particulate matter is typically divided up into two size categories: PM_{10} and $PM_{2.5}$ because of the adverse health effects associated with the smaller-sized particles. PM_{10} refers to particulate matter that is 10 microns or less in diameter (1 micron is one-millionth of a meter, also known as a micrometer [µm]). $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in a diameter. Soil dust consists of the minerals and organic material found in soil being lifted up into the air by winds (e.g., fugitive dust).

  - Health Effects: Particulate matter can be inhaled directly into the lungs where it can be absorbed into the bloodstream. It is a respiratory irritant and can cause direct pulmonary effects such as coughing, bronchitis, lung disease, respiratory illnesses, increased airway reactivity, and exacerbation of asthma. Relatively recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non-health related effects include reduced visibility and soiling of property.

  - Sources: Particulate matter originates from a variety of stationary and mobile sources. Stationary sources include fuel combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal and recycling. Mobile or transportation-related sources include particulate matter from highway vehicles and non-road vehicles and fugitive dust from paved and unpaved roads. Secondary particulate matter is formed in the atmosphere through chemical reactions that can involve ROG, SO_X, NO_X, and ammonia.

- *Diesel Particulate Matter*

  - Description and Physical Properties: Diesel particulate matter (DPM) is a source of $PM_{2.5}$ as the size of diesel particles are typically 2.5 microns and smaller. In 1998, DPM made up about 6 percent of the total $PM_{2.5}$ inventory nationwide. Diesel exhaust is a complex mixture of thousands of particles and gases that is produced when an engine burns diesel fuel. DPM includes the particles-phase

constituents in diesel exhaust. Organic compounds account for 80 percent of the total particulate matter mass, which is composed of compounds such as hydrocarbons and their derivatives, and polycyclic aromatic hydrocarbons (PAHs) and their derivatives. Fifteen PAHs have been confirmed for carcinogenicity, a number of which are found in diesel exhaust. The chemical composition and particle sizes of diesel PM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), expected load, engine emission controls, fuel formulations (high/low sulfur fuel), and the year of the engine.

- Cancer Health Effects: Human studies on the carcinogenicity of diesel particulate matter demonstrate an increased risk of lung cancer, although the increased risk cannot be clearly attributed to diesel exhaust exposure. Several occupational and ambient studies have documented the health effects due to exposure to diesel PM. The California Office of Environmental Health Hazards Assessment (OEHHA), in its role in assessing risk from environmental factors reviews such studies and makes recommendations on how environmental risk should be evaluated through programs like the AB2588 Hot Spots Program. In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, 1950's era railroad workers, and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provided strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. However, all of these studies were based on exposure to exhaust from traditional diesel engines and prior to the advent of highly efficient emissions controls like the diesel particulate filter. Based on these studies, CARB identified diesel exhaust a toxic air contaminant in 1998.

- Non-Cancer Health Effects: Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and can cause coughs, headaches, light-headedness, and nausea. Diesel exhaust is a major source of ambient particulate matter pollution as well, and numerous studies have linked elevated particle levels in the air to increase hospital admission, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems.

- Sources: Diesel exhaust.

- *Visibility-Reducing Particles*

  - Description and Physical Properties: Visibility-reducing particles (VRP) are suspended particulate matter that reduces visibility. Visibility is the distance through the air that can be seen without the use of instrumental assistance. The distance that can be seen is limited by the amount of gases and aerosol particles

in the way. The EPA implemented a Regional Haze Rule in 1999 to attempt to protect visibility in 156 national parks and wilderness areas in the United States. The regulation requires states to establish goals for improving their areas and to work together with other states as the pollution is often transported over long distances.

- Health Effects: The human health effects of VRP are those of pollution (particulate matter, oxides of nitrogen, and sulfur dioxide) discussed above.

- Sources: The sources are other pollutants (particulate matter, oxides of nitrogen, and sulfur dioxide) as discussed above.

- *Vinyl Chloride*

  - Description and Physical Properties: Vinyl chloride, or chloroethene, is a chlorinated hydrocarbon and colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products, including pipes, wire and cable coatings, and packaging materials. Vinyl chloride is formed when other substances such as trichloroethylene and tetrachloroethylene are broken down. This can occur when plastics containing these substances are left to decompose in solid waste landfills. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites due to microbial breakdown of chlorinated solvents. In 1978, the CARB established a State ambient air quality standard for vinyl chloride. The standard was set at 0.01 ppm for a 24-hour duration because that was the lowest level that could be detected at that time. In 1990, the CARB identified vinyl chloride as a toxic air contaminant and estimated a cancer unit risk factor.

  - Health Effects: Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers.

  - Sources: Manufacturing of PVC plastic and vinyl products.

- *Hydrogen Sulfide*

  - Description and Physical Properties: Hydrogen sulfide (H_2S) is a flammable, colorless, poisonous gas that smells like rotten eggs.

  - Health Effects: High levels of hydrogen sulfide can cause immediate respiratory arrest. It can irritate the eyes and respiratory tract and cause symptoms like headache, nausea, vomiting, and cough. Long exposure to hydrogen sulfide can cause pulmonary edema.

- Sources: Hydrogen sulfide and other reduced sulfur compounds form by the anaerobic decomposition of manure some types of bacteria found in animal and human by-products produce hydrogen sulfide during reduction of sulfur-containing compounds, such as proteins. Manure, storage tanks, ponds, anaerobic lagoons, and land application sites are the primary sources of hydrogen sulfide emissions. Anthropogenic sources include the combustion of sulfur containing fuels (oil and coal) and organic matter that undergoes putrefaction. It is used in the production of heavy water for nuclear reactors, the manufacture of chemicals, in metallurgy, and as an analytical reagent.

- *Reactive Organic Gases and Volatile Organic Compounds*

  - Description and Physical Properties: Reactive organic gases (ROG), or volatile organic compounds (VOC), are defined as any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. ROG consist of nonmethane hydrocarbons and oxygenated hydrocarbons. Hydrocarbons are organic compounds that contain only hydrogen and carbon atoms. Nonmethane hydrocarbons are hydrocarbons that do not contain the unreactive hydrocarbon, methane. Oxygenated hydrocarbons are hydrocarbons with oxygenated functional groups attached.

  - It should be noted that there are no State or Federal ambient air quality standard for ROG because they are not classified as criteria pollutants. They are regulated, however, because a reduction in ROG emissions reduces certain chemicals reactions that contribute to the formulation of ozone. ROG are also transformed into organic aerosols in the atmosphere, which contribute to higher PM_{10} and lower visibility.

  - Health Effects: Although health-based standards have not been established for ROG, health effects can occur from exposures to high concentrations because of interference with oxygen uptake. In general, concentrations of ROG are suspected to cause eye, nose, and throat irritation; headaches, loss of coordination, nausea, damage to liver, kidney, and the central nervous system. There are many ROG that have been classified as toxic air contaminates. A particular ROG of concern is benzene, which is described in more detail below. The EPA maintains a list of all air substances that have been classified as hazardous to humans and/or animals, and includes ROG, pesticides, herbicides, and radionuclides.

  - Sources: The major sources of ROG are on-road motor vehicles and solvent evaporation.

- *Benzene*

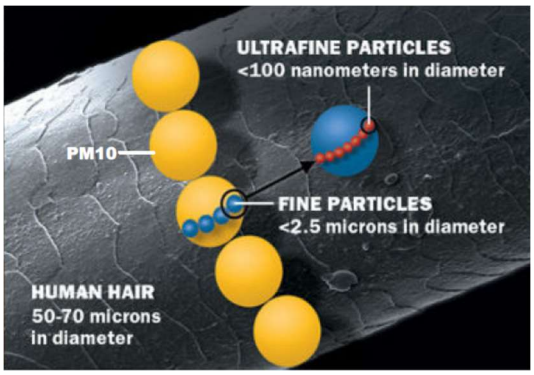
- Description and Physical Properties: Benzene is an ROG. It is a clear or colorless light-yellow, volatile, highly flammable liquid with a gasoline-like odor. The EPA has classified benzene as a "Group A" (human) carcinogen.

- Health Effects: Short-term (acute) exposure of high doses from inhalation of benzene may cause dizziness, drowsiness, headaches, eye irritation, skin irritation, and respiratory tract irritation, and at higher levels, unconsciousness can occur. Long-term (chronic) occupational exposure of high dose by inhalation has caused blood disorders, including aplastic anemia and lower levels or red blood cells. Occupational exposure to benzene has been shown to cause leukemia (mainly acute myelogenous leukemia). Studies have also found that benzene exposure increased the risks of lymphatic and hematopoietic cancer (cancers of lymphatic system and of organs and tissues involved in the production of blood), total leukemia, and specific histologic types of leukemia.

- Sources: Benzene is emitted into the air from gasoline services station (fuel evaporation), motor vehicle exhaust, tobacco smoke, and from burning oil and coal. Benzene is also used as a solvent for paints, inks, oils, waxes, plastic, and rubber. It is used in the extraction of oils from seeds and nuts. It is also used in manufacturing detergents, explosives, dyestuffs, and pharmaceuticals.

Ultrafine Particles. Ultrafine particles are particulate matter (PM) that exists in the ambient air and are less than 0.1 micrometer (µm or microns) in diameter. Ultrafine particles (UFP or PM0.1) are included in the group called $PM_{2.5}$, particulate matter less than 2.5 micrometers in diameter.

The picture to the right displays the relative size of the particles compared with a human hair, with PM_{10} (particulate matter less than 10 micrometers in diameter) indicated as yellow circles, $PM_{2.5}$ shown as blue circles, and ultrafine particles shown as red circles.



The CARB or the EPA have not set an ambient air quality standard for ultrafine particles because health effect evidence and measurements are currently limited. In its recent revisions to the national ambient air quality standards for particulate matter, the EPA states, "In considering both the currently available health effects evidence and the air quality data, the Policy Assessment concluded that this information was still too limited to provide support for consideration of a distinct PM standard for ultrafine particles".[1]

The EPA indicates that evidence and research regarding health effects from short-term and long-term exposure to ultrafine particles are still too limited to establish a standard for ultrafine particles. In addition, the EPA reports that the studies that do exist have reported inconsistent and mixed results. The following is an excerpt from the Federal Register illustrating this point:

[1] U.S. Environmental Protection Agency. 2013. Federal Register. National Ambient Air Quality Standards for Particulate Matter. Website: http://www.gpo.gov/fdsys/pkg/FR-2013-01-15/pdf/2012-30946.pdf. Accessed May 2018.

> *"New evidence, primarily from controlled human exposure and toxicological studies, expands our understanding of cardiovascular and respiratory effects related to short-term ultrafine particle exposures. However, the Policy Assessment concluded that this evidence was still very limited and largely focused on exposure to diesel exhaust, for which the Integrated Science Assessment concluded it was unclear whether the effects observed are due to ultrafine particles, larger particles within the $PM_{2.5}$ mixture, or the gaseous components of diesel exhaust. In addition, the Integrated Science Assessment noted uncertainties associated with the controlled human exposure studies using concentrated ambient particle systems, which have been shown to modify the composition of ultrafine particles.*
>
> *The Policy Assessment recognized that there are relatively few epidemiological studies that have examined potential cardiovascular and respiratory effects associated with short-term exposures to ultrafine particles. These studies have reported inconsistent and mixed results.*
>
> *Collectively, in considering the body of scientific evidence available in this review, the Integrated Science Assessment concluded that the currently available evidence was suggestive of a causal relationship between short-term exposures to ultrafine particles and cardiovascular and respiratory effects. Furthermore, the Integrated Science Assessment concluded that evidence was inadequate to infer a causal relationship between short-term exposure to ultrafine particles and mortality as well as long-term exposure to ultrafine particles and all outcomes evaluated".* [2]

The Integrated Science Assessment for Particulate Matter concluded that evidence is inadequate to determine a causal relationship between short-term exposures of ultrafine particles to mortality or central nervous system effects, but that the evidence suggests short-term (24-hour) exposures cause cardiovascular and respiratory effects. The assessment also concluded that there is inadequate evidence linking long-term exposure (typically measured in terms of an annual concentration) of ultrafine particles to health effects, including respiratory, developmental, cancer, and mortality. Overall, epidemiological studies of atmospheric PM suggest that cardiovascular effects are associated with smaller particles, but there are few reports that make a clear link between ultrafine particle exposures and increased mortality. In January 2015, a new study[3] on the relationship of mortality to long-term exposure to fine and ultra-fine particles was released. The study found there was a relationship between mortality and both fine and ultra-fine particles exposure.

In its Quantitative Health Risk Assessment for Particulate Matter, the EPA did not assess ultrafine particles, stating "that there was insufficient data to support a quantitative risk assessment for other size fractions (e.g., ultrafine particles)."[4]

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2 U.S. Environmental Protection Agency. 2013. Federal Register. National Ambient Air Quality Standards for Particulate Matter. Website: http://www.gpo.gov/fdsys/pkg/FR-2013-01-15/pdf/2012-30946.pdf. Accessed May 2018.

3 Environmental Health Perspectives, January 2015. Associations of Mortality with Long-Term Exposures to Fine and Ultrafine Particles, Species and Sources: Results from the California Teachers Study Cohort

4 U.S. Environmental Protection Agency. 2010. Quantitative Health Risk Assessment for Particulate Matter. EPA-452/R-10-005. Website: http://www.epa.gov/nscep/index.html. (Search for the document.)

The availability of measurements of ultrafine particles to support health studies is also limited:

> *With respect to our understanding of ambient ultrafine particle concentrations, at present, there is no national network of ultrafine particle samplers; thus, only episodic and/or site-specific data sets exist. Therefore, the Policy Assessment recognized a national characterization of concentrations, temporal and spatial patterns, and trends was not possible at this time, and the availability of ambient ultrafine measurements to support health studies was extremely limited. In general, measurements of ultrafine particles are highly dependent on monitor location and, therefore, more subject to exposure error than accumulation mode particles. Furthermore, the number of ultrafine particles generally decreases sharply downwind from sources, as ultrafine particles may grow into the accumulation mode by coagulation or condensation. Limited studies of ambient ultrafine particle measurements have suggested that these particles exhibit a high degree of spatial and temporal heterogeneity driven primarily by differences in nearby source characteristics. Internal combustion engines and, therefore, roadways are a notable source of ultrafine particles, so concentrations of these particles near roadways are generally expected to be elevated. Concentrations of ultrafine particles have been reported to drop off much more quickly with distance from roadways than fine particles.* [5]

In addition, it was hypothesized that chemical composition of PM may be a better predictor of health effects than particle size:

> *In addressing the issue of particle composition, the Integrated Science Assessment concluded that, '[f]rom a mechanistic perspective, it is highly plausible that the chemical composition of PM would be a better predictor of health effects than particle size.' Heterogeneity of ambient concentrations of $PM_{2.5}$ constituents (e.g., elemental carbon, organic carbon, sulfates, nitrates) observed in different geographical regions as well as regional heterogeneity in $PM_{2.5}$-related health effects reported in a number of epidemiological studies are consistent with this hypothesis.* [6]

The SCAQMD's Multiple Air Toxics Exposure Study (MATES-IV) states, "the health impact caused by exposure to UFPs [ultrafine particles] is still not well-understood." MATES-IV presents measurements of black carbon and ultrafine particles at 10 fixed sites within the Basin. The results indicate that the highest black carbon levels were at more urban sites located near major roadways. Black carbon was not measured in the previous MATES-III; however, elemental carbon levels decreased about 35 percent during from 2005 to 2012. Black carbon is a term used for elemental and graphitic components of soot.

The SCAQMD's 2016 Air Quality Management Plan (AQMP), discusses its progress in implementing the 2012 AQMP which contains a detailed chapter on near roadway exposure and ultrafine particles. The 2012 AQMP summarizes current health effect research on ultrafine particles. The potential health effects from ultrafine particle exposure are similar to those of $PM_{2.5}$

5 U.S. Environmental Protection Agency. 2013. Federal Register. National Ambient Air Quality Standards for Particulate Matter. Website: http://www.gpo.gov/fdsys/pkg/FR-2013-01-15/pdf/2012-30946.pdf. Accessed May 2018.

6 U.S. Environmental Protection Agency. 2013. Federal Register. National Ambient Air Quality Standards for Particulate Matter. Website: http://www.gpo.gov/fdsys/pkg/FR-2013-01-15/pdf/2012-30946.pdf. Accessed May 2018.

and PM_{10}: such as adverse cardio-respiratory responses including elevated blood pressure, and mild inflammatory and prothrombotic (obstruction of circulation) responses. The AQMP indicated that future research and assessment is needed in the following areas:

- Chemical Composition. Chemical composition of ultrafine particles depends on many factors, including vehicle technology, fuel, and atmospheric chemical reactions after being emitted. Particle composition may be a factor determining particle toxicity; therefore, knowledge regarding the chemistry is important.

- Formation. More research is needed regarding the processes leading to ultrafine particle formation.

- Standardized Measurement Methods and Procedures. Currently, there is no standard method for conducting size-classified or particle-number measurements. Characteristics measured in ambient and emission-testing studies are highly dependent on the measurement instrument/protocol used and its setting.

- Measurements at Hot Spot Locations. More measurements should be taken at "hot spots" where large numbers of vehicles are operated.

- Emissions Inventories. Vehicle emission factors for different particle size ranges and for particle numbers are highly uncertain, and there are no emission inventories for ultrafine particles from motor vehicles. New estimations of ultrafine particle levels should not be derived solely from vehicle emission factors (i.e., EMFAC), but have to include predictions for formation near the tailpipe and in the atmosphere.

- Air Quality Modeling. Modeling tools will need to be developed to simulate the formation and transport over a wide range of atmospheric conditions and emissions scenarios. The dispersion near the first few hundred meters of the roadway needs to be better understood.

- Health Effects. New toxicological and epidemiological studies targeting exposure to controlled and uncontrolled emissions from gasoline and diesel vehicles are needed to better characterize the exposure-response relationships to ultrafine particles and to help develop health guidelines and potential regulations. The health effects of inorganic ultrafine particle emissions from vehicles are only now starting to receive significant attention.

- Other Sources. More work is needed to better understand size, composition, and health impact of particles near stationary sources and other processes (rather than just motor vehicles).

Children and Air Pollution. Numerous studies have shown strong links between air pollution exposures and a range of health outcomes. One particular study was carried out over a 10-year experimental time period by the University of Southern California, the Children's Health Study.[7] The Children's Health Study, which began in 1992, is a large, long-term, study of the effects of chronic air pollution exposures on the health of children living in Southern California. Children

[7] Gauderman, W, et. al. Peters: Association between Air Pollution and Lung Function Growth in Southern California Children. American Journal of Respiratory and Critical Medicine. Vol 162. Page 1383. 2000.

may be more strongly affected by air pollution because their lungs and their bodies are still developing. Children are also exposed to more air pollution than adults since they breathe faster and spend more time outdoors in strenuous activities. About 5,500 children in twelve communities were enrolled in the study; two-thirds of them were enrolled as fourth-graders. Data on the children's health, their exposures to air pollution, and many factors that affected their responses to air pollution were gathered annually until they graduated from high school. The major conclusions reached in the University of Southern California's Children's Health Study are shown below. Note however, that the conclusions provided below were developed based on measurements made in the 1990's when levels of air pollution in the Basin were substantially higher than current levels.

- Children exposed to higher levels of particulate matter, nitrogen dioxide, acid vapor and elemental carbon, had significantly lower lung function at age 18, an age when the lungs are nearly mature and lung function deficits are unlikely to be reversed.

- Children who were exposed to current levels of air pollution had significantly reduced lung growth and development when exposed to higher levels of acid vapor, ozone, nitrogen dioxide, and particulate matter, which is made up of very small particles that can be breathed deeply into the lungs.

- Children living in communities with higher concentrations of nitrogen dioxide, particulate matter, and acid vapor had lungs that both developed and grew more slowly and were less able to move air through them. This decreased lung development may have permanent adverse effects in adulthood.

- Children who moved away from study communities had increased lung development if the new communities had lower particulate matter levels, and had decreased lung development if the new communities had higher particulate matter levels.

- Days with higher ozone levels resulted in significantly higher school absences due to respiratory illness. Children with asthma who were exposed to higher concentrations of particulate matter were much more likely to develop bronchitis.

- In the most recent update to the Children's Health Study, researchers discovered that improvements in regional air quality contributed to improved children's lung function. Specifically, combined exposure to two harmful pollutants, nitrogen dioxide (NO_2) and fine particulate matter, fell approximately 40 percent for children in the third study group (2007-2011) compared to the first study group (1994-98). The study followed children from Long Beach, Mira Loma, Riverside, San Dimas and Upland.

- Children's lungs grew faster as air quality improved. Lung growth from age 11 to 15 was more than 10 percent greater for children breathing the lower levels of NO_2 from 2007 to 2011 compared to those breathing higher levels from 1994 to 1998.

- The percentage of children in the study with abnormally low lung function at age 15 dropped from nearly 8 percent for the 1994-98 group, to 6.3 percent in 1997-2001, to just 3.6 percent for children followed between 2007 and 2011.

Air Pollution Constituents and Attainment Status

The CARB has many responsibilities with respect to air quality, including the following:

- Coordination and oversight of State and Federal air pollution control programs in California;
- Oversight activities of local air quality management agencies (e.g., the SCAQMD);
- Responsibility for incorporating air quality management plans for local air basins into a State Implementation Plan (SIP) for EPA approval; and
- Maintaining air quality monitoring stations throughout the State in conjunction with local air districts.

The CARB has divided the State into 15 air basins based on meteorological and topographical factors that affect air pollution. An air basin generally has similar meteorological and geographic conditions throughout. The CARB and EPA use the data collected at monitoring stations to classify air basins as attainment, nonattainment, nonattainment transitional, or unclassified, based on air quality data for the most recent three calendar years compared with the AAQS. Nonattainment areas are imposed with additional restrictions, as required by the EPA to attain and maintain air quality standards. The air quality data are also used to monitor progress in attaining and maintaining air quality standards.

Significant authority for air quality control within the various air basins has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans. **Table 4,** *Attainment Status of Criteria Pollutants in the South Coast Air Basin,* identifies the attainment status for the criteria pollutants in the Basin. The State AAQS are more stringent than the Federal AAQS.

Table 4
Attainment Status of Criteria Pollutants in the South Coast Air Basin

Pollutant	State	Federal
O_3 1-hour	Nonattainment	N/A
O_3 8-hour	Nonattainment	Extreme Nonattainment
PM_{10}	Nonattainment	Maintenance – serious (San Bernardino County is in nonattainment)
$PM_{2.5}$	Nonattainment	Moderate Nonattainment
CO	Attainment	Serious Maintenance
NO_2	Attainment	Attainment/Maintenance
SO_2	Attainment	Attainment
Pb	Attainment	Attainment
All others	Attainment/Unclassified	Attainment/Unclassified

Unclassified designation: a pollutant that is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
Attainment designation: a pollutant is designated attainment if the State standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment: a pollutant is designated nonattainment if there was at least one violation at any site in the area during a 3-year period.
Source: California Air Resources Board (https://www.arb.ca.gov/desig/adm/adm.htm), 2018; Environmental Protection Agency (https://www.epa.gov/green-book), 2018

Regional Air Quality Improvements

The SCAQMD website (aqmd.gov) contains historical air quality data dating back to 1994; the year after air pollution emissions thresholds were established. As described on the SCAQMD website,[8] in 1994 pollutant concentrations in the Basin exceeded three of the six Federal ambient air quality standards. The state sulfate standard was exceeded in some Basin areas. The state lead standard was exceeded in one localized area immediately adjacent to a source of lead emissions. No areas of the Basin exceeded standards for nitrogen dioxide or sulfur dioxide. The Los Angeles and Riverside County areas of the Southeast Desert Air Basin (SEDAB) served by the District exceeded standards for ozone and PM_{10}. No other standards were exceeded in the District SEDAB areas. The Federal standards were exceeded at one or more locations in the Basin during 142 days in 1994.

The American Lung Association website (lung.org) includes data collected from State air quality monitors that are used to compile an annual *State of the Air* report. These reports have been published over the last 13 years. The latest *State of the Air Report* compiled for the Basin was in 2017.[9] As noted in this report, air quality in the Basin has significantly improved in terms of both pollution levels and high pollution days over the past three decades. Riverside County's average number of unhealthy ozone days dropped from 203 days per year in the initial 2000 State of the Air report to 122 in 2017 report and San Bernardino County's number of unhealthy ozone days dropped from 230 in 2000 to 142 in 2017. Both Counties has seen dramatic reduction in particle pollution since the initial State of the Air report (2000). While the 2017 *State of the Air Report* shows a slight uptick in the number of days of unhealthy particle pollution for both counties since

8 Historical Air Quality, Summary of 1994 Air Quality, http://aqmd.gov/smog/AirQualityStandardsComplianceReport/AirQualitySummary94.html, website accessed December 17, 2012.

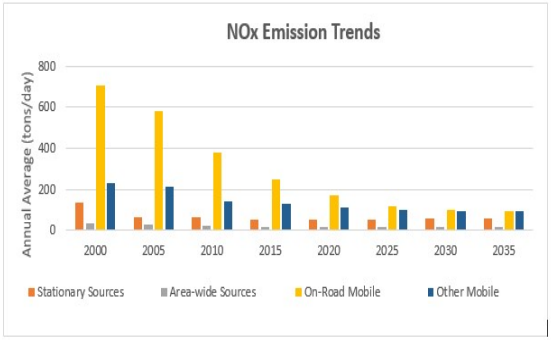
9 *State of the Air 2017,* American Lung Association, *http://www.lung.org/associations/states/california/assets/pdfs/sota/south-coast-fact-sheet.pdf,* website accessed April 2018.

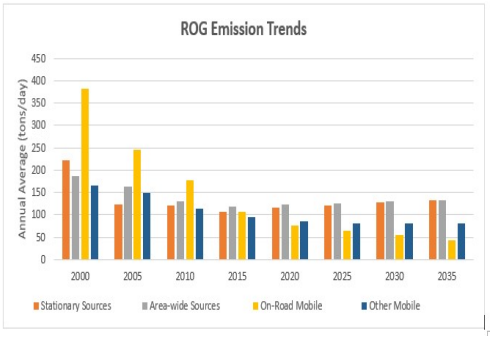
the 2016 report, it is important to note that pollution levels measured in this latter report were affected by fluctuations in weather conditions.

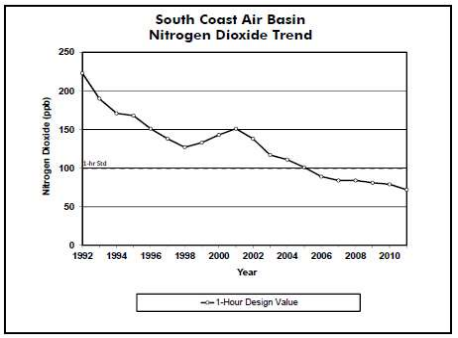
The 2016 Air Quality Management Plan 2016 AQMP outlines a comprehensive control strategy that meets the requirement for expeditious progress towards an attainment date for the five National Ambient Air Quality Standards (NAAQS) being analyzed. As stated in the 2016 AQMP, "The ozone and PM levels continue to trend downward as the economy and population increase, demonstrating that it is possible to maintain a healthy economy while improving public health through air quality improvements" (South Coast Air Quality Management District 2016). As shown in **Figure 9**, *NO_X, VOC, CO, and Ozone Trends in the South Coast Air Basin*, NO_X, VOC, PM, NH_3, have been decreasing in the Basin since 2000 and are projected to continue to decrease through 2035.[10] These decreases result primarily from motor vehicle controls and reductions in evaporative emissions. Although vehicle miles traveled in the Basin continue to increase, NO_X and VOC levels are decreasing because of the mandated controls on motor vehicles and the replacement of older polluting vehicles with lower-emitting vehicles. NO_X emissions from electric utilities have also decreased due to use of cleaner fuels and renewable energy.

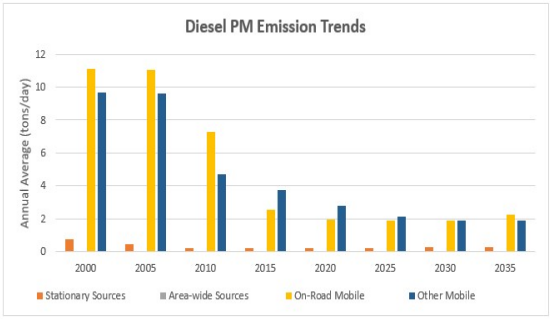
[10] CARB, California Almanac of Emissions and Air Quality, 2013 Edition

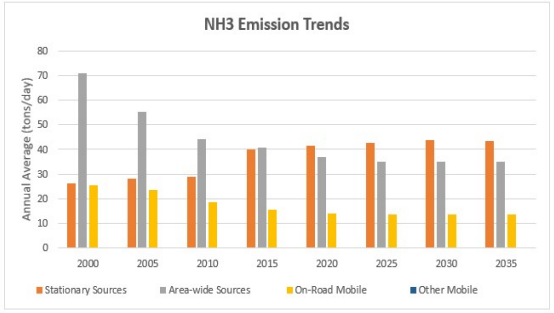
Figure 9: NOx, VOC, CO, and Ozone Trends in the South Coast Air Basin

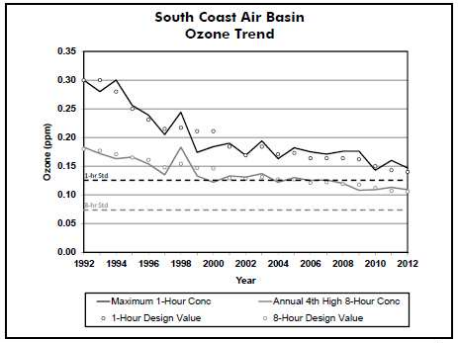


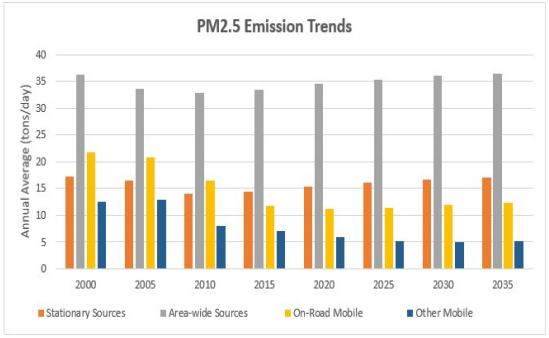




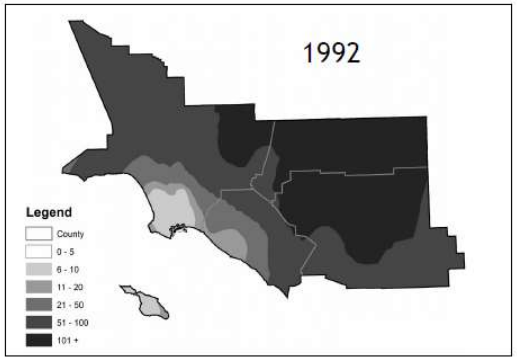


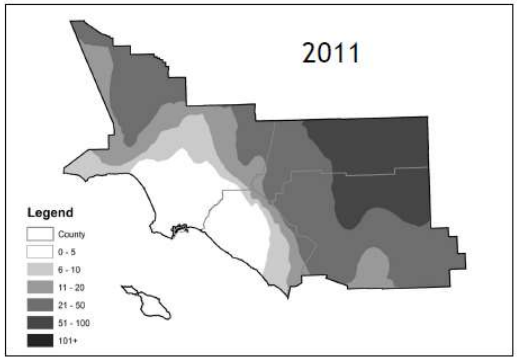






Source: CARB, California Almanac of Emissions and Air Quality, 2013 Edition.



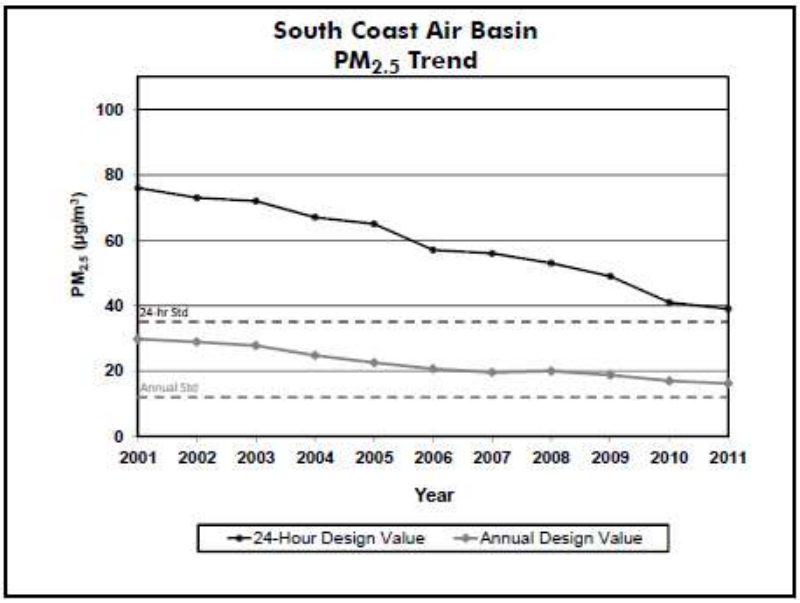


Ozone Contour Maps – 3 year Average of National 8-hour Exceedance Days

Figure 9 also displays ozone contour maps, which show that the number of days exceeding the national 8-hour standard has decreased between 1992 and 2011. During the 1992 time period, nearly all of the South Coast had more than 50 exceedance days, with more than 100 days in nearly one-third of the Basin. This is equivalent to more than three months during a year with ozone concentrations above the level of the standard. The 2011 map now shows a large area with less than ten exceedance days. Much of this area currently meets the national standard, including about two-thirds of Orange County and one-third of Los Angeles County, where the majority of the Basin population lives and works.[11]

As shown in the top portion of **Figure 10**, *Particulate Matter Trends in the South Coast Air Basin*, the overall trends of $PM_{2.5}$ in the air (not emissions) show an overall improvement since 2001. Area-wide sources (fugitive dust from roads, dust from construction and demolition, and other sources) contribute the greatest amount of direct particulate matter emissions.

Figure 10: Particulate Matter Trends in the South Coast Air Basin



Source: CARB, California Almanac of Emissions and Air Quality, 2013 Edition.

The reduction in air pollution levels experienced in the Basin is attributable to multiple factors. First, Federal and State regulatory strategies requiring the use of cleaner fuels and use of emissions control technology in the transportation and energy production industries have proven to greatly reduce the amount of tailpipe emission (vehicles) and point source (power plants) pollutants (e.g., NO_X and ROG). Second, the SCAQMD's rules and regulatory programs have proven to be instrumental in improving the air quality in the Basin. As an example, the SCAQMD has adopted multiple rules regarding fugitive dust (PM_{10} and $PM_{2.5}$) and construction emissions that have resulted in reduced emission levels. Third, the SCAQMD's creation of the 1993 CEQA review handbook has resulted in lead agencies throughout the air basin employing uniform

[11] CARB. The California Almanac of Emissions and Air Quality, 2013 Edition. https://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm. Accessed April 2018

CEQA analyses and methodologies. The use of uniform CEQA review has allowed the SCAQMD and lead agencies that rely on the 1993 SCAQMD Air Quality Handbook to perform CEQA analysis to better track progress and to employ uniform mitigation and design feature strategies. Fourth, the use of the SCAQMD thresholds of significance to determine a project's direct and cumulative impact has allowed the SCAQMD to make tremendous progress toward achieving air quality attainment. The discussion above (pertaining to the air quality improvements achieved over the past 20 years) demonstrates that the SCAQMD's rules and procedures, including the uniform utilization of the thresholds of significance recommended in the SCAQMD *CEQA Air Quality Handbook* are contributing toward the achievement of improved air quality in the Basin.

It is for this reason the City have chosen to rely on the thresholds of significance established by the SCAQMD in its 1993 CEQA Handbook and subsequent additions to the Handbook. These thresholds of significance (which serve as both direct and cumulative thresholds) have been uniformly utilized by lead agencies throughout the Basin for the past 20 years and the improvement of air quality within the Basin throughout this time period has demonstrated the efficacy of these thresholds, along with the other regional and statewide regional programs discussed above, in improving air quality throughout the Basin.

Local Air Quality

The SCAQMD, together with the CARB, maintains ambient air quality monitoring stations in the Basin. The air quality monitoring station most representative of the project site is the Riverside-Rubidoux station. This station monitors CO, SO_2, NO_2, O_3, PM_{10}, and $PM_{2.5}$. Some monitoring data for SO_2 has been omitted as attainment is regularly met for this pollutant within the Basin. This station characterizes the air quality representative of the ambient air quality in the project area. The ambient air quality data in **Table 5**, *Ambient Air Quality Monitored in the Project Vicinity,* identify that CO and NO_2 levels are consistently below the relevant State and Federal standards in the project vicinity. O_3, PM_{10}, and $PM_{2.5}$ levels all exceed State and/or Federal standards regularly. **Figure 11**, *Air Quality Monitoring Station,* identifies the location of the monitoring station relative to the project site.

Sensitive Land Uses in the Project Vicinity

Sensitive receptors include residences, schools, medical offices, convalescent facilities, and similar uses where people sensitive to air pollutants may be located (i.e., the ill, elderly, pregnant women, and children). There are currently six occupied single-family homes and associated ranch/farm buildings in various locations on the project site. These residences are existing on-site sensitive receptors. The nearest off-site existing sensitive receptors in the vicinity of the project site are the residences located along Bay Avenue, Merwin Street, west of Redlands Boulevard, and scattered residences along Gilman Springs Road north of Alessandro Boulevard. Nearby sensitive land uses are depicted in **Figure 12,** *Existing Sensitive Receptors*.

Existing Project Area Emissions

The project area is largely vacant undeveloped marginal agricultural land, with six occupied single-family homes and associated ranch/farm buildings in various locations on the property.

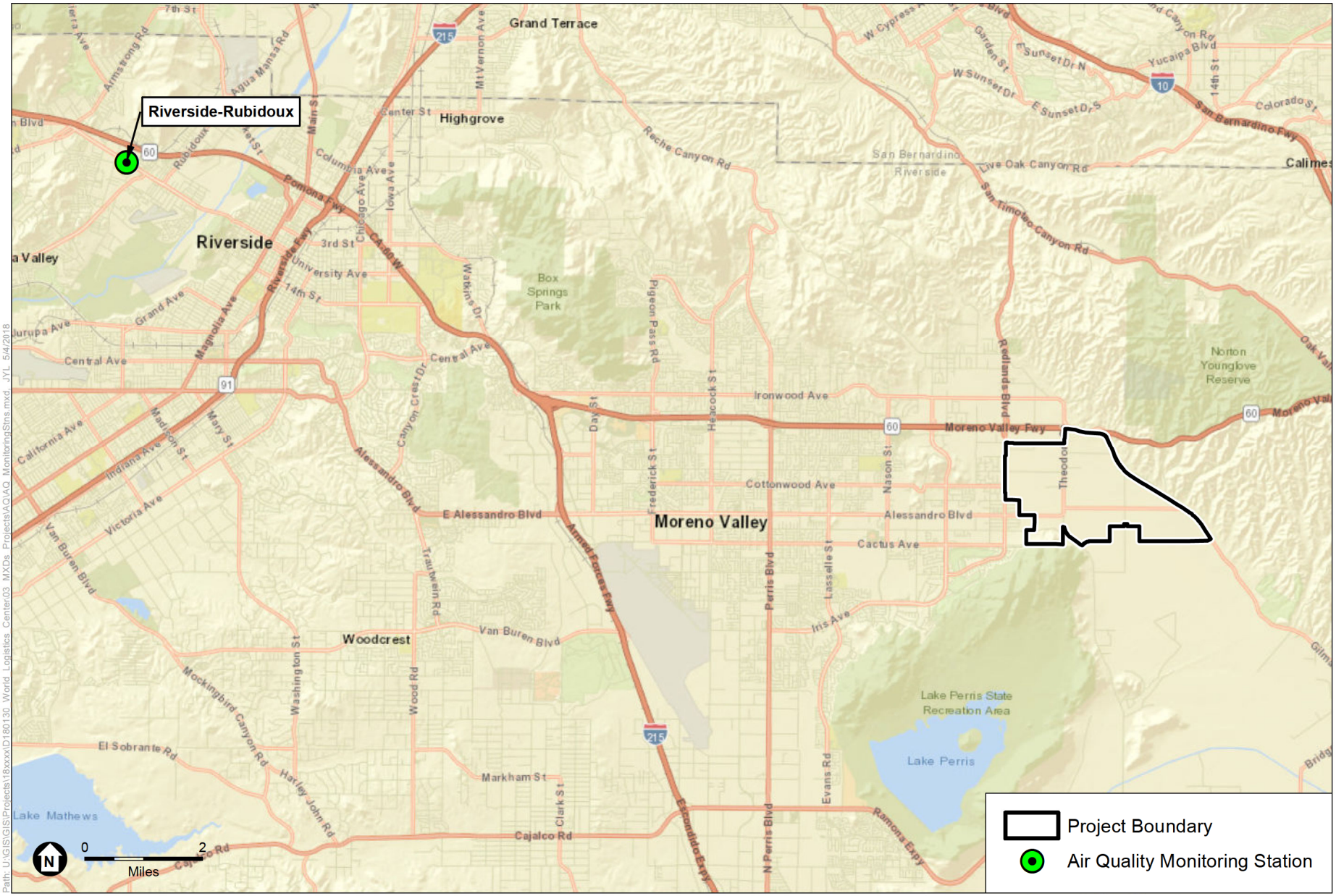
Much of the site is currently used for dry farming generating criteria pollutant and dust emissions. San Diego Gas & Electric (SDG&E) operates a natural gas compressor plant, known as the Moreno Compressor Station, on 19 acres south of the site. The Southern California Gas Company (SCGC) also operates a metering and pipe cleaning station on two separate parcels (totaling 1.5 acres) south of the site south of Alessandro Boulevard along existing Virginia Street. Existing air quality conditions at the project site reflect ambient[12] monitored conditions as presented in **Table 5**.

[12] Ambient: of or related to the immediate surroundings of something; in this context it means "in the air"

Table 5
Ambient Air Quality Monitored in the Project Vicinity

Pollutant	Standard	2014	2015	2016	2017
Carbon Monoxide (CO)					
Maximum 1-hr concentration (ppm)		2.4	2.5	1.6	2.4
Number of days exceeded:	State: > 20 ppm	0	0	0	0
	Federal: > 35 ppm	0	0	0	0
Maximum 8-hr concentration (ppm)		1.9	1.7	1.3	1.8
Number of days exceeded:	State: ≥ 9.0 ppm	0	0	0	0
	Federal: ≥ 9 ppm	0	0	0	0
Ozone (O_3)					
Maximum 1-hr concentration (ppm)		0.141	0.132	0.142	0.145
Number of days exceeded:	State: > 0.09 ppm	29	31	33	ND
Maximum 8-hr concentration (ppm)		0.105	0.106	0.105	0.118
Number of days exceeded:	State: > 0.070 ppm	69	59	71	ND
	Federal: > 0.075 ppm	41	39	47	84
Coarse Particulates (PM_{10})					
Maximum 24-hr concentration (µg/m^3)		100	69	84	92
Number of days exceeded:	State: > 50 µg/m^3	125	92	ND	ND
	Federal: > 150 µg/m^3	0	0	0	0
Annual arithmetic mean concentration (µg/m^3)		44.8	40.0	ND	ND
Exceeded for the year	State: > 20 µg/m^3	Yes	Yes	ND	ND
Fine Particulates ($PM_{2.5}$)					
Maximum 24-hr concentration (µg/m^3)		50.6	61.1	60.8	50.3
Number of days exceeded:	Federal: > 35 µg/m^3	ND	10	5	ND
Annual arithmetic mean (µg/m^3)		16.8	15.3	12.6	12.2
	State: > 12 µg/m^3	Yes	Yes	Yes	Yes
Exceeded for the year	Federal: > 12.0 µg/m^3	Yes	Yes	Yes	Yes
Nitrogen Dioxide (NO_2)					
Maximum 1-hr concentration (ppm)		0.0600	0.057	0.073	0.063
Number of days exceeded:	State: > 0.18 ppm	0	0	0	0
Annual arithmetic mean concentration (ppm)		0.015	0.0144	0.015	0.015
Exceeded for the year	State: > 0.030 ppm Federal: > 0.053 ppm	No No	No No	ND	ND
Sulfur Dioxide (SO_2)					
Maximum 24-hr concentration (ppm)		1.3	1.0	1.2	1.2
Number of days exceeded:	State: > 0.04 ppm	ND	ND	ND	ND
Annual arithmetic average concentration (ppm)		0.26	0.27	0.23	0.29
Exceeded for the year:	Federal: > 0.030 ppm	No	No	No	No

µg/m^3 = micrograms per cubic meter
EPA = United States Environmental Protection Agency
ID = Insufficient data
ND = No data
ppm = parts per million
Source: CARB, iADAM: Air Quality Data Statistics. Available at https://www.arb.ca.gov/adam for the SCAQMD Riverside-Rubidoux air monitoring station.



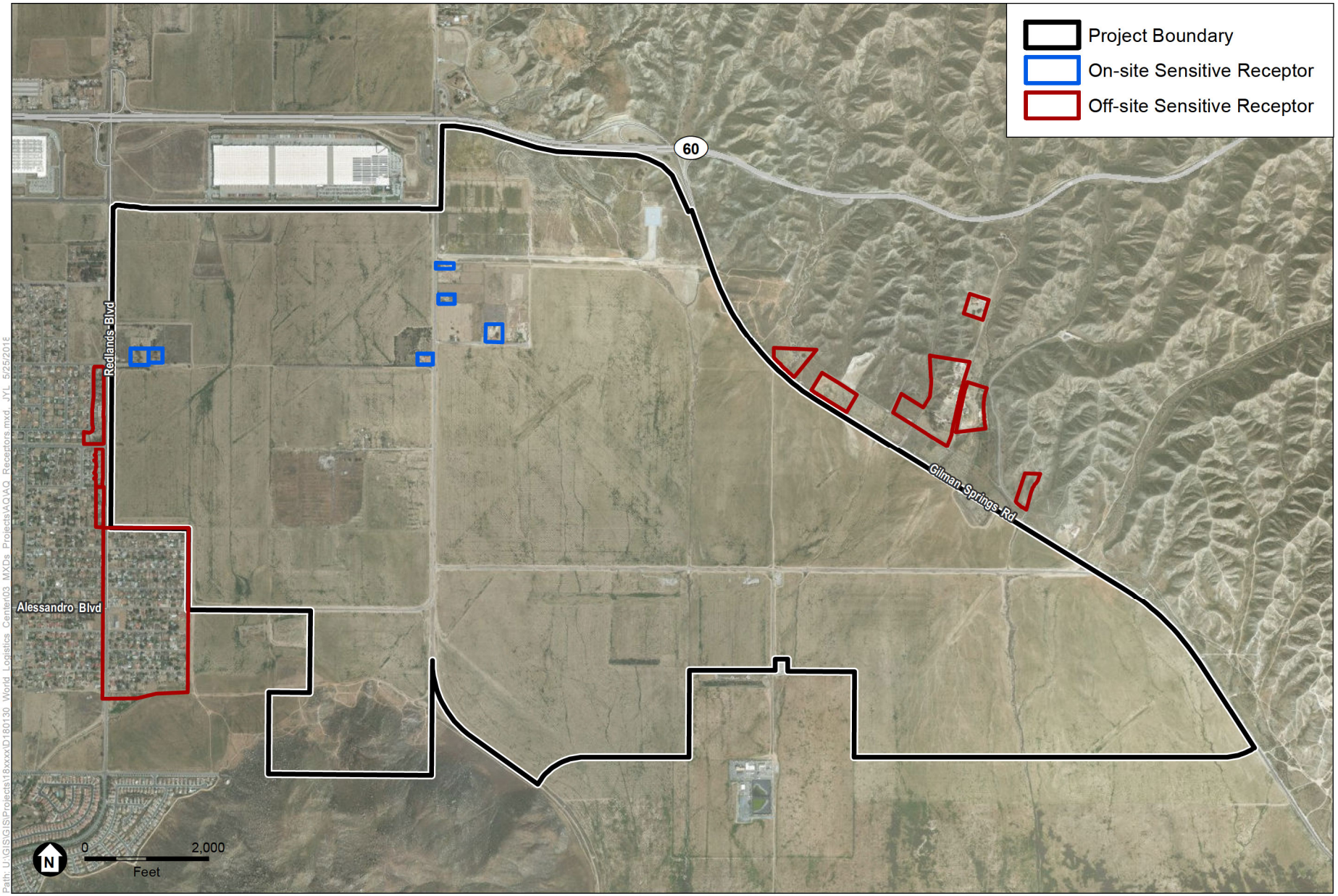
SOURCE: ESRI

World Logistics Center

Figure 11

Air Quality Monitoring Station

ESA



SOURCE: ESRI 2016; County of Riverside 2017

World Logistics Center

Figure 12

Existing Sensitive Receptors

ESA

1.5 Existing Greenhouse Gas Environment

Global Climate Change

Global climate change is the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred by some scientists and policy makers to "global warming" because it helps convey the notion that there are other changes in addition to rising temperatures.

Climate change refers to any significant change in measures of climate such as temperature, precipitation, or wind, lasting for decades or longer. Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation); and/or
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, and desertification).

The primary observed effect of global climate change has been a rise in the average global tropospheric[13] temperature of 0.36 degrees Fahrenheit (°F) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include higher sea levels, drier or wetter weather, changes in ocean salinity, changes in wind patterns or more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold and increased intensity of tropical cyclones (hurricanes). Specific effects in California might include a decline in the Sierra Nevada snowpack, erosion of California's coastline, and seawater intrusion in the Delta.

Human activities, such as fossil fuel combustion and land use changes release carbon dioxide (CO_2) and other compounds, cumulatively termed greenhouse gases (GHGs). GHGs are effective in trapping infrared radiation that otherwise would have escaped the atmosphere, thereby warming the atmosphere, the oceans, and earth's surface.[14] Many scientists believe that "most of the warming observed over the last 50 years is attributable to human activities."[15] The increased amounts of CO_2 and other GHGs are alleged to be the primary causes of the human-induced component of warming.

[13] The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

[14] U.S. Environmental Protection Agency (EPA). *Climate Change: Basic Information*. Available at https://archive.epa.gov/epa/climatechange/climate-change-basic-information.html. Website accessed June 2018.

[15] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Physical Science Basis*, http://www.ipcc.ch.

GHGs are present in the atmosphere naturally, released by natural sources, or formed from secondary reactions taking place in the atmosphere. They include CO_2, methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). In the last 200 years, substantial quantities of GHGs have been released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, enhancing the natural greenhouse effect, which is believed to be causing global climate change. While human-made GHGs include CO_2, CH_4, and N_2O, some (like chlorofluorocarbons [CFCs]) are completely new to the atmosphere.

GHGs vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The global warming potential is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to CO_2, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of metric tons of "CO_2 equivalents" (mt CO_2e or $MTCO_2e$).

Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Human-made sources include the mining and burning of fossil fuels; digestive processes in ruminant animals such as cattle; rice paddies; and the burying of waste in landfills. As for CO_2, the major removal process of atmospheric CH_4—chemical breakdown in the atmosphere—cannot keep pace with source emissions, and CH_4 concentrations in the atmosphere are increasing.

Worldwide emissions of GHGs in 2010 were approximately 47,351 million mt CO_2e[16] Emissions from the top five countries and the European Union accounted for approximately 57 percent of the total global GHG emissions, according to the most recently available data. The United States was the number two producer of GHG emissions, contributing 13 percent of the emissions. The primary GHG emitted by human activities in the United States was CO_2, representing approximately 82 percent of total GHG emissions. CO_2 from fossil fuel combustion, the largest source of GHG emissions, accounted for approximately 85 percent of the GHG emissions.[17]

In 2016, the United States emitted approximately 5.3 billion mt CO_2e or approximately 16.5 tons per year (tpy) per person. Of the six major sectors nationwide (electric power industry, transportation, industry, agriculture, commercial, and residential), the electric power industry and transportation sectors combined account for approximately 72 percent of the GHG emissions; the majority of the electrical power industry and all of the transportation emissions are generated

16 World Resources Institute, CAIT. 2018. Climate Analysis Indicators Tool: WRI's Climate Data Explorer. Washington, DC. Available at: http://cait2.wri.org. Accessed April 6, 2018.

17 Ibid.

from direct fossil fuel combustion. Between 1990 and 2016, total United States GHG emissions rose approximately 2.8 percent.[18]

World carbon dioxide emissions[19] are expected to increase by 1.9 percent annually between 2001 and 2025. Much of the increase in these emissions is expected to occur in the developing world where emerging economies, such as China and India, fuel economic development with fossil energy. Developing countries' emissions are expected to grow above the world average at 2.7 percent annually between 2001 and 2025; and surpass emissions of industrialized countries near 2018.

The California Air Resources Board (CARB) is responsible for developing the California Greenhouse Gas Emission Inventory. This inventory estimates the amount of GHGs emitted into and removed from the atmosphere by human activities within the State of California and supports the Assembly Bill (AB) 32 Climate Change Program. The most recent inventory of GHG emissions in California estimated 440.4 million mt CO_2e in 2015.[20] This is a 2.2 percent increase in GHG emissions from 1990. The top contributor of emissions in 2015 was transportation, which contributed 37 percent of the emissions. The second highest sector was industrial (21 percent), which includes sources from refineries, general fuel use, oil and gas extraction, and cement plants. According to CARB, California is on track to meet the 2020 GHG reduction target codified in California Health and Safety Code (HSC), Division 25.5, also known as The Global Warming Solutions Act of 2006 (AB 32).[21]

Effects of Global Climate Change

Climate change is a change in the average weather of the earth that is measured by alterations in wind patterns, storms, precipitation, and temperature. These changes are assessed using historical records of temperature changes occurring in the past, such as during previous ice ages. Many of the concerns regarding climate change use these data to extrapolate a level of statistical significance specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

The International Panel on Climate Change (IPCC) constructed several emission trajectories of greenhouse gases needed to stabilize global temperatures and climate change impacts. In its Fourth Assessment Report, the IPCC predicted that the global mean surface temperature change for 2081-2100 relative to the period from 1986 to 2005, given six scenarios, could range from 0.3 degrees Celsius (°C) to 4.8 °C. Regardless of analytical methodology, global average temperatures and sea levels are expected to rise under all scenarios (IPCC 2014). The IPCC concluded that global climate change was largely the result of human activity, mainly the burning

18 U.S. Environmental Protection Agency (EPA). 2018. *Inventory of U.S. Greenhouse Gas Emissions And Sinks: 1990 – 2016*. http://www.epa.gov/climatechange/emissions/usinventoryreport.html. Accessed April 6, 2018.

19 http://www.eia.gov/oiaf/1605/ggccebro/chapter1.html.

20 California Air Resources Board. California Greenhouse Gas Inventory: 2000-2015. 2017 edition. http://www.arb.ca.gov/cc/inventory/data/data.htm

21 California Air Resources Board, Frequently Asked Questions for the 2016 Edition California Greenhouse Gas Emission Inventory, (2016). Available at: https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2014/ghg_inventory_faq_20160617.pdf. Accessed April 2018.

of fossil fuels. However, the scientific literature is not consistent regarding many of the aspects of global warming or climate change, including actual temperature changes during the 20th century, the accuracy of the IPCC report, and contributions of human versus non-human activities.

Effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme weather events, and degradation of air quality. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems. Heat-related problems include heat rash and heat stroke. In addition, climate-sensitive diseases may increase, such as those spread by mosquitoes and other disease-carrying insects. Such diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding and hurricanes can displace people and agriculture. Global warming may also contribute to air quality problems from increased frequency of smog and particulate air pollution.

Additionally, the following climate change effects, which are based on trends established by the IPCC, can be expected in California over the course of the next century:

- A diminishing Sierra snowpack declining by 70 percent to 90 percent, threatening the State's water supply. If GHG emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier.

- A rise in sea levels resulting in the displacement of coastal businesses and residences. During the past century, sea levels along California's coast have risen about seven inches. If emissions continue unabated and temperatures rise into the higher anticipated warming range, sea level is expected to rise an additional 22 to 35 inches by the end of the century. Elevations of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats. (Note: This condition would not affect the project area as it is a significant distance away from coastal areas.)

- An increase in temperature and extreme weather events. Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in California. More heat waves can exacerbate chronic disease or heat-related illness.

- Increased risk of large wildfires if rain increases as temperatures rise. Precipitation, winds, temperature, and vegetation influence wildfire risk; therefore, wildfire risk is not uniform throughout the state. Changes in current precipitation patterns could influence that risk. As an example, wildfires in the grasslands and chaparral ecosystems of southern California are estimated to increase by approximately 30 percent toward the end of the 21st century because more winter rain will stimulate the growth of more plant fuel available to burn in the fall. In contrast, a hotter, drier climate could promote up to 90 percent more northern California fires by the end of the century by drying out and increasing the flammability of forest vegetation.

- Increasing temperatures from 8 to 10.4°F under the higher emission scenarios, leading to a 25 percent to 35 percent increase in the number of days ozone pollution levels are exceeded in most urban areas (see below).

- Increased vulnerability of forests due to forest fires, pest infestation, and increased temperatures.

- Reductions in the quality and quantity of certain agricultural products. The crops and products likely to be adversely affected include wine grapes, fruit, nuts, and milk.

- Exacerbation of air quality problems. If temperatures rise to the medium warming range, there could be 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions. This is more than twice the increase expected if rising temperatures remain in the lower warming range. This increase in air quality problems could result in an increase in asthma and other health-related problems.

- A decrease in the health and productivity of California's forests. Climate change can cause an increase in wildfires, an enhanced insect population, and establishment of non-native species.

- Increased electricity demand, particularly in the hot summer months.

- Increased ground-level ozone formation due to higher reaction rates of ozone precursors.

Consequences of Climate Change in Moreno Valley

Figure 13, *Observed and Projected Temperatures,* below, displays a chart of measured historical and projected annual average temperatures in the Moreno Valley area. As shown in Figure 13, temperatures are expected to rise in the low and high GHG emissions scenarios.

Water for the project would be provided by the Eastern Municipal Water Department (EMWD). The EMWD 2015 Urban Water Management Plan considered the impact of climate change on water supplies as part of its long-term strategic planning. One of the outcomes of climate change could be more frequent limitations on imported supplies. To limit the impact of climate change, EMWD's long-term planning focuses on the development of reliable local resources and the implementation of water use efficiency. This includes the full utilization of recycled water and the recharge of local groundwater basins to increase supply reliability during periods of water shortage. EMWD is also focused on reducing demand for water supplies, especially outdoors. Increasing the use of local resource and reducing the need for imported water has the dual benefit of not only improving water quality reliability, but reducing the energy required to import water to EMWD's service area.

Figure 13: Observed and Projected Temperatures

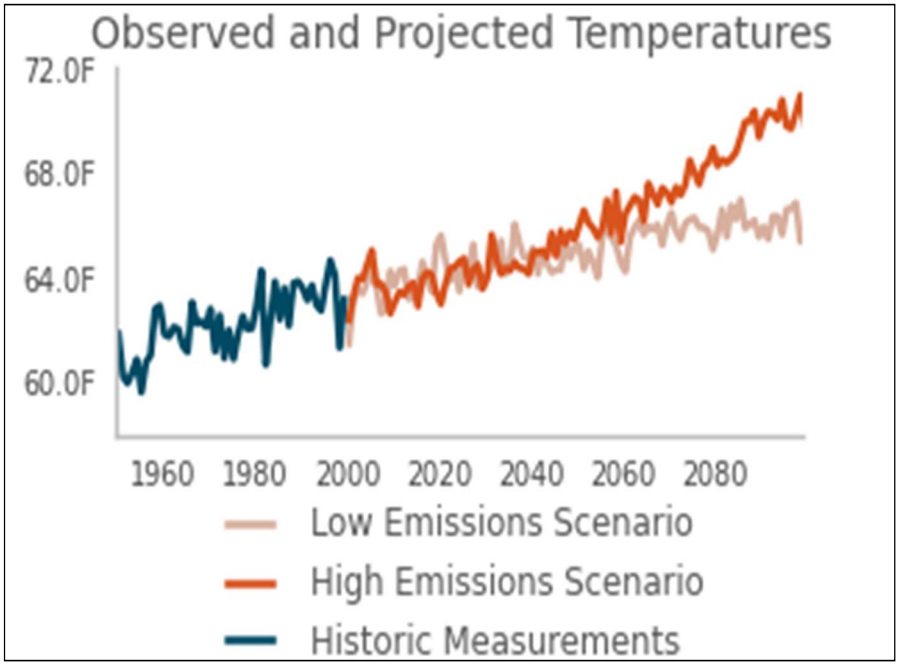
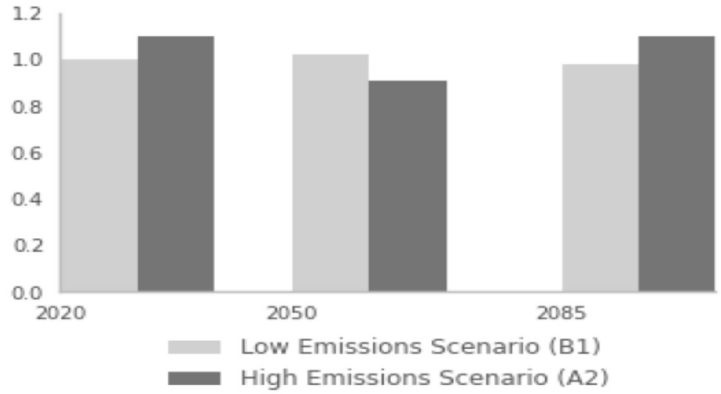


Figure 14, *Wildfire Risk in Moreno Valley,* displays the fire risk in Moreno Valley relative to 2010 levels. Figure 14 displays the projected increase in potential area burned given three different 30-year averaging periods ending in 2020, 2050, and 2085 and two different scenarios (A2, B1). The data are modeled solely on climate projections and do not take landscape and fuel sources into account (there is very little combustible material in the project area). The data modeled the ratio of additional fire risk for an area as compared to the expected burned area. The data are shown in Figure 14 and indicate that under the low-emissions scenario, the additional wildfire risk is about 1, which means that wildfire risk is expected to remain about the same. Under the high-emission scenario, additional risk is variable with a slight increase.

Figure 14: Wildfire Risk in Moreno Valley



1.6 Greenhouse Gases

The most common greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxides, chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols. Greenhouse gases defined by AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Natural processes and human activities emit greenhouse gases. The presence of greenhouse gases in the atmosphere affects the earth's temperature. Many scientists believe that emissions from human activities, such as electricity production and vehicle use, have led to elevated concentrations of these gases in the atmosphere beyond the level of naturally occurring concentrations. Greenhouse gases, the effects of each greenhouse gas, and some of the sources for each of the greenhouse gases are listed below.

- *Water Vapor*
    - Description and Physical Properties: Water vapor (H_2O) is the most abundant, important, and variable greenhouse gas in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization.
    - Health Effects: There are no health effects from water vapor. When some pollutants come in contact with water vapor, they can dissolve and then the water vapor can be a transport mechanism to enter the human body.
    - Source: The main source of water vapor is evaporation from the oceans (approximately 85%). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.
- *Carbon Dioxide*
    - Description and Physical Properties: Carbon dioxide (CO_2) is an odorless, colorless natural greenhouse gas.
    - Health Effects: Outdoor levels of carbon dioxide are not high enough to result in negative health effects.
    - Sources: Carbon dioxide is emitted from natural and anthropocentric (human) sources. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic out gassing. Anthropogenic sources are from burning coal, oil, natural gas, and wood.

- *Methane*

    - Description and Physical Properties: Methane (CH_4) is an extremely effective GHG with a global warming potential of 21, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10–12 years) compared to other greenhouse gases.

    - Health Effects: There are no health effects from methane.

    - Sources: Methane has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

- *Nitrous Oxide*

    - Description and Physical Properties: Nitrous oxide (N_2O), also known as laughing gas, is a colorless greenhouse gas. It has a lifetime of 114 years. Its global warming potential is 310.

    - Health Effects: Nitrous oxide can cause dizziness, euphoria, and sometimes slight hallucinations. In small doses it is harmless. In some cases, heavy and extended use can cause Olney's Lesions (brain damage).

    - Sources: Concentrations of nitrous oxide also began to rise at the beginning of the Industrial Revolution. In 1998, the global concentration was 314 ppb. Nitrous oxide is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant, e.g., in whipped cream bottles. It is also used in potato chip bags to keep chips fresh. It is used in rocket engines and in race cars.

- *Chlorofluorocarbons*

    - Description and Physical Properties: Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). Global warming potentials range from 3,800 to 8,100.

- Health Effects: In confirmed indoor locations, working with CFC-113 or other CFCs is thought to have resulted in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.

- Sources: CFCs have no natural source, but were first synthesized in 1928. They were used for refrigerants, aerosol propellants, and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs are now remaining level or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

- *Hydrofluorocarbons*

  - Description and Physical Properties: Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs. Out of all the greenhouse gases, they are one of three groups with the highest global warming potential (depending on the gas, ranges from 140 to 11,700). Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a refrigerant.

  - Health Effects: There are no health effects from HFCs.

  - Sources: HFCs are man-made for applications such as automobile air conditioners and refrigerants.

- *Perfluorocarbons*

  - Description and Physical Properties: Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). Global warming potentials range from 6,500 to 9,200.

  - Health Effects: There are no health effects from PFCs.

  - Sources: The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

- *Sulfur Hexafluoride*

  - Description and Physical Properties: Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas evaluated, 23,900. Concentrations in the 1990s were about 4 ppt. It has a lifetime of 3,200 years.

- Health Effects: In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

- Sources: Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

- *Aerosols*

  - Description and Physical Properties: Aerosols are particles emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols.

  - Health Effects: See health effects associated with particulate matter, above.

  - Sources: Sulfate aerosols are emitted when fuel containing sulfur is burned. Another source of aerosols (in the form of black carbon or soot) is the result of incomplete combustion or the incomplete burning of fossil fuels. Although particulate matter regulation has been lowering aerosol concentrations in the United States, global concentrations are likely increasing as a result of other sources around the world.

  - *Black Carbon.* A specific aerosol of concern is black carbon. Black carbon is a light absorbing component of particulate matter and is formed by the incomplete combustion of fossil fuels, biofuels, and biomass. The following is additional information on black carbon:

    - Black carbon is emitted directly into the atmosphere in the form of fine particles ($PM_{2.5}$).

    - Black carbon contributes to the adverse impacts on human health, ecosystems, and visibility associated with $PM_{2.5}$.

    - Black carbon influences climate by: 1) directly absorbing light, 2) reducing the reflectivity ("albedo") of snow and ice through deposition, and 3) interacting with clouds.

    The direct and snow/ice albedo effects of black carbon are widely understood to lead to climate warming. However, the globally averaged net climate effect of black carbon also includes the effects associated with cloud interactions, which are not well quantified and may cause either warming or cooling. Therefore, though most estimates indicate that black carbon has a net warming influence, a net cooling effect cannot be ruled out.

    - Sensitive regions such as the Arctic and the Himalayas are particularly vulnerable to the warming and melting effects of black carbon.

- Black carbon is emitted with other particles and gases, many of which exert a cooling influence on climate. Therefore, estimates of the net effect of black carbon emissions sources on climate should include the offsetting effects of these co-emitted pollutants. This is particularly important for evaluating mitigation options.

- Black carbon's short atmospheric lifetime (days to weeks), combined with its strong warming potential, means that targeted strategies to reduce black carbon emissions can be expected to provide climate benefits within the next several decades.

- The different climate attributes of black carbon and long-lived GHGs make it difficult to interpret comparisons of their relative climate impacts based on common metrics.

- Based on recent emissions inventories, the majority of global black carbon emissions come from Asia, Latin America, and Africa. Emissions patterns and trends across regions, countries and sources vary significantly.

- Control technologies are available to reduce black carbon emissions from a number of source categories.

- Black carbon mitigation strategies, which lead to reductions in $PM_{2.5}$, can provide substantial public health and environmental benefits.

Climate change is driven by radiative forcings and feedbacks. Radiative forcing is the difference between the incoming energy and outgoing energy in the climate system. In other terms, radiative forcing is the energy absorbed by the greenhouse gas that would otherwise be lost to space. Positive forcing tends to warm the surface while negative forcing tends to cool it. A feedback is a climate process that can strengthen or weaken a forcing. For example, when ice or snow melts, it reveals darker land underneath, which absorbs more radiation and causes more warming.

In order to attempt to quantify the impact of greenhouse gases, the gases are assigned global warming potentials. Individual greenhouse gas compounds have varying global warming potential and atmospheric lifetimes. Carbon dioxide, the reference gas for global warming potential, has a global warming potential of one. The global warming potential of a greenhouse gas is a potential of a gas or aerosol to trap heat in the atmosphere compared to the reference gas, carbon dioxide, and is a measurement of the radiative forcing of a gas. There are positive (warming) and negative (cooling) forcings. To describe how much global warming a given type and amount of greenhouse gas may cause, the carbon dioxide equivalent is used. The calculation of the carbon dioxide equivalent is a consistent methodology for comparing greenhouse gas emissions since it normalizes various greenhouse gas emissions to a consistent reference gas, carbon dioxide. Carbon dioxide as a molecule has a certain potential for warming; other molecules have a different potential. For example, methane's warming potential of 21 indicates that methane has 21 times greater warming effect than carbon dioxide on a molecule per molecule basis. A carbon dioxide equivalent is the mass emissions of an individual greenhouse gas multiplied by its global warming potential.

SECTION 2
Regulatory Setting

2.1 International Regulation of Climate Change

Intergovernmental Panel on Climate Change

In 1988, the United Nations created the IPCC to provide independent scientific information regarding climate change to policymakers. The IPCC does not conduct research itself, but rather compiles information from a variety of sources into reports regarding climate change and its impacts. The IPCC has thereafter periodically released reports on climate change, and in 2007 released its Fourth Assessment Report which concluded most global climate change was the result of human activity, mainly the burning of fossil fuels.

United Nations Framework Convention on Climate Change

On March 21, 1994, the United States joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change (Convention). Under the Convention, governments gather and share information on greenhouse gas emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas emissions at average of five percent against 1990 levels over the five-year period 2008-2012. The Convention (discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities." The United States has not entered into force of the Kyoto Protocol.

Moreover, since the United States declined to ratify the Kyoto Protocol in 1995, it has become increasingly clear that global climate change cannot be addressed without limiting GHG emissions from developing, as well as developed, countries. According to many sources, China has already surpassed the United States as the world's largest GHG emitter and is building new coal-fired power plants at a rate of approximately one per week. A recent study conducted by

economists at the UC Berkeley and UC San Diego estimated that China's CO_2 emissions are growing by as much as 11 percent annually. In 2007, China released its first national plan on climate change, which includes goals related to increasing energy efficiency and increasing use of renewable resources. The plan, however, makes no commitments regarding reduction of GHG emissions.

Like China, India is already one of the top emitters of GHGs and continues to grow rapidly. India has recently pledged to take more action to fight global warming, for example, by pursuing solar energy, urging energy efficiency, and conservation, but it has not set any concrete goals in these areas, let alone pledged to reduce its carbon emissions. To the contrary, India's emissions are projected to increase fourfold by 2030 (see "Melting Asia," The Economist, June 5, 2008). Similarly, Brazil, the largest economy in South America, and another rapidly developing country, has no national policy requiring it to reduce carbon emissions. Brazil's carbon emissions increased by more than 60 percent between 1990 and 2004, and are projected to continue to rise at a similar pace (see International Energy Agency, World Energy Outlook 2006).

The Kyoto Protocol expired in 2012. Formal negotiations to replace the protocol officially began in December 2007 at the UNFCCC Climate Change Conference in Bali, Indonesia (http://unfccc.int/.php). Whether a workable agreement can be reached, however, remains to be seen, as the United States continues to press for an agreement that requires firm commitments from developing nations, and countries like China and India continue to oppose binding targets (see http://news.bbc.co.uk/////.stm).

In addition, it should be noted that most mitigation measures that address greenhouse gas reduction typically parallel those that reduce the consumption of energy (i.e., electricity and natural gas). Reducing energy use in a market economy typically reduces the cost of energy. However, a reduced cost of energy can release pent-up demand (latent demand) for energy use, particularly in less developed portions of the world, such as Africa and Asia. As such, it is not clear how much energy use reduction in California or the U.S. would actually reduce worldwide energy use. The same would apply to measures to reduce greenhouse gas emissions.

2.2 Federal

Federal Clean Air Act

Pursuant to the Federal Clean Air Act (CAA) of 1970, the EPA established national ambient air quality standards (NAAQS). The NAAQS were established for six major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the Federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health.

The EPA established national air quality standards for ground-level O_3 and $PM_{2.5}$ in 1997. On May 14, 1999, the Court of Appeals for the District of Columbia Circuit issued a decision ruling that the CAA, as applied in setting the new public health standards for O_3 and particulate matter, was unconstitutional as an improper delegation of legislative authority to the EPA. On February 27, 2001, the U.S. Supreme Court upheld the way that the government sets air quality standards

under the CAA. The Court unanimously rejected industry arguments that the EPA must consider financial cost as well as health benefits in writing standards. The Justices also rejected arguments that the EPA took too much lawmaking power from Congress when it set tougher standards for O_3 and soot in 1997. Nevertheless, the Court threw out the EPA's policy for implementing new O_3 rules, stating that the EPA ignored a section of the law that restricts its authority to enforce such rules.

In April 2003, the EPA was cleared by the White House Office of Management and Budget (OMB) to implement the eight-hour ground-level O_3 standard. The EPA issued the proposed rule implementing the eight-hour O_3 standard in April 2003. The EPA completed final eight-hour nonattainment status on April 15, 2004. The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004. The EPA issued final designations on December 14, 2004.

Effective January 22, 2010, the EPA strengthened the standard for NO_2 by setting a new 1-hour standard at the level of 100 parts per billion (ppb). This standard defines the maximum allowable concentration anywhere in an area and will protect against adverse health effects associated with short-term exposure to NO_2. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb. On January 25, 2010, the EPA issued the final rule setting the one-hour maximum standard for NO_2 at 100 ppb. The agency retained the annual standard of 53 ppb.

Effective June 2, 2010, the EPA revised the primary standard for SO_2 by establishing a new 1-hour standard at a level of 75 ppb. The EPA revoked the two existing primary standards of 140 ppb evaluated over 24 hours and 30 ppb evaluated over an entire year as they would not provide additional public health protection given a 1-hour standard at 75 ppb. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Effective December 14, 2012, the national annual $PM_{2.5}$ standard was lowered from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ but the existing 24-hour and annual secondary standards were retained.

On October 1, 2015, the national eight-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm, respectively.

Greenhouse Gas Endangerment

Massachusetts v. EPA (Supreme Court Case 05-1120) was argued before the United States Supreme Court on November 29, 2006, in which it was petitioned that the EPA regulate four greenhouse gases, including carbon dioxide, under Section 202(a)(1) of the Clean Air Act. A decision was made on April 2, 2007, in which the Supreme Court found that greenhouse gases are air pollutants covered by the Clean Air Act. The Court held that the EPA Administrator must determine whether emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

- *Endangerment Finding:* The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.

- *Cause or Contribution Finding:* The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing greenhouse gas emissions standards for vehicles, as discussed in the section "Clean Vehicles" below.

In September 2011, the EPA Office of Inspector General evaluated the EPA's compliance with established policy and procedures in the development of the endangerment finding, including processes for ensuring information quality. The evaluation concluded that the technical support document should have had more rigorous EPA peer review.

In June 2012, a Federal appeals court rejected a lawsuit against the EPA. The suit alleged that the EPA violated the law by relying almost exclusively on data from the United Nations IPCC rather than doing its own research or testing data according to Federal standards. The U.S. Chamber of Commerce and the National Association of Manufacturers (with others) filed petitions to the U.S. Court of Appeals – D.C. Circuit to rehear the case. The EPA and Department of Justice provided a response on October 12, 2012.

Clean Vehicles

Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the United States. On April 1, 2010, the EPA and the Department of Transportation's Highway Traffic and Safety Administration (NHTSA) announced a joint final rule establishing a national program that would reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the United States.

The first phase of the national program applied to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The vehicles had to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this carbon dioxide level solely through fuel economy improvements. Together, these standards were designed to cut carbon dioxide emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). In August 2012, standards were adopted for model year 2017 through 2025 for passenger cars and light-duty trucks. By 2025, vehicles are required to achieve 54.5 mpg (if GHG reductions are achieved exclusively through fuel economy improvements) and 163 grams of CO_2 per mile. According to

the USEPA, a model year 2025 vehicle would emit one-half of the GHG emissions from a model year 2010 vehicle.[22]

On October 25, 2010, the EPA and the U.S. Department of Transportation proposed the first national standards to reduce greenhouse gas emissions and improve fuel efficiency of heavy-duty trucks and buses (also known as "Phase 1"). For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20 percent reduction in carbon dioxide emissions and fuel consumption by the 2018 model year. For heavy-duty pickup trucks and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10 percent reduction for gasoline vehicles and up to a 15 percent reduction for diesel vehicles by 2018 model year (12% and 17% respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles (includes other vehicles like buses, refuse trucks, concrete mixers; everything except for combination tractors and heavy-duty pickups and vans), the agencies are proposing engine and vehicle standards starting in the 2014 model year, which would achieve up to a 10 percent reduction in fuel consumption and carbon dioxide emissions by the 2018 model year. Building on the success of the standards, the EPA and U.S. Department of Transportation jointly finalized additional standards (called "Phase 2") for medium- and heavy-duty vehicles through model year 2027 that will improve fuel efficiency and cut carbon pollution. The final standards are expected to lower CO_2 emissions by approximately 1.1 billion metric tons.

Mandatory Reporting of GHG

The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory GHG reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases rule. The rule requires reporting of GHG emissions from large sources and suppliers in the United States, and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions, are required to submit annual reports to the EPA.

This rule does not apply to high cube logistics developers within the WLC Project because, although the project would emit more than 25,000 mt CO_2e per year of GHGs, the rule only applies to the following categories: fossil fuel suppliers and industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and engines. The EPA's Applicability Tool was used to determine if the project developer would need to report the GHG emissions. The source categories that are required to report GHG emissions (i.e., production, manufacturing, electricity generation, and industrial waste landfills) did not apply to the project.

[22] United States Environmental Protection Agency, EPA and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017-2025 Cars and Light Trucks, (August 2012). Available at: http://www.epa.gov/oms/climate/documents/420f12051.pdf. Accessed March 2017.

New Source Review Prevention of Significant Deterioration (GHG Tailoring Rule)

The EPA issued a final rule on May 13, 2010, that establishes thresholds for greenhouse gases that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. Operating permits are legally enforceable documents that permitting authorities issue to air pollution sources after the source has begun to operate. Title V Operating Permits are required from Title V of the Clean Air Act. This final rule "tailors" the requirements of these Clean Air Act permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. In the preamble to the revisions to the Federal Code of Regulations, the EPA states:

> *This rulemaking is necessary because without it the Prevention of Significant Deterioration and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the Clean Air Act, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to greenhouse gas sources, starting with the largest greenhouse gas emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources, but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for greenhouse gas emissions until at least April 30, 2016.*

EPA estimates that facilities responsible for nearly 70 percent of the national greenhouse gas emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest greenhouse gas emitters—power plants, refineries, and cement production facilities.

On December 23, 2010, the EPA issued a series of rules that put the necessary regulatory framework in place to ensure that 1) industrial facilities can get Clean Air Act permits covering their GHG emissions when needed and 2) facilities emitting GHGs at levels below those established in the Tailoring Rule do not need to obtain Clean Air Act permits.

Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units.

As required by a settlement agreement, the EPA proposed new performance standards for emissions of carbon dioxide for new affected fossil fuel-fired electric utility generating units on March 27, 2012. New sources greater than 25 megawatt would be required to meet an output based standard of 1,000 pounds of carbon dioxide per megawatt-hour.

Cap and Trade

Cap and trade refers to a policy tool where emissions are limited to a certain amount and can be traded, or provides flexibility on how the emitter can comply. Successful examples in the United States include the Acid Rain Program and the NO_X Budget Trading Program in the northeast. There is no Federal cap and trade program currently and no pending legislation exists to establish a national cap and trade program.

Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the U.S. Pursuant to the Act, the National Highway Traffic and Safety Administration (NHTSA), which is part of the U.S. Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and for revising existing standards. Since 1990, the fuel economy standard for new passenger cars has been 27.5 miles per gallon (mpg). Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg. The Corporate Average Fuel Economy (CAFE) program, administered by the EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. The EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the USDOT is authorized to assess penalties for noncompliance. Please also refer to the subsection, "Clean Vehicles," above.

Energy Policy Act of 1992

The Energy Policy Act (EPAct) of 1992 was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain Federal, State, and local governments and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are also included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the Act to consider a variety of incentive programs to help promote AFVs.

Energy Policy Act of 2005

The Energy Policy Act of 2005 includes provisions for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a Federal purchase requirement for renewable energy.

2.3 State of California

Mulford-Carrell Act

The State began to set California Ambient Air Quality Standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The CAAQS are generally more stringent than the NAAQS. In addition to the six criteria pollutants covered by the NAAQS, there are CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

Originally, there were no attainment deadlines for CAAQS; however, the CCAA of 1988 provided a time frame and a planning structure to promote their attainment. The CCAA required nonattainment areas in the State to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan, as follows: moderate, if CAAQS attainment could not occur before December 31, 1994; serious, if CAAQS attainment could not occur before December 31, 1997; and severe, if CAAQS attainment could not be conclusively demonstrated at all. The attainment plans are required to achieve a minimum 5 percent annual reduction in the emissions of nonattainment pollutants unless all feasible measures have been implemented. The EPA has designated the Southern California Association of Governments (SCAG) as the Metropolitan Planning Organization (MPO) responsible for ensuring compliance with the requirements of the CAA for the Basin.

California Clean Air Act

The CCAA was passed into law in 1988. The CCAA provides the basis for air quality planning and regulation independent of federal regulations. A major element of the CCAA is the requirement that local air districts in violation of the CAAQS must prepare attainment plans that identify air quality problems, causes, trends and actions to be taken to attain and maintain California's air quality standards by the earliest practicable date. The CCAA provides air districts with the authority to manage transportation activities at indirect sources that individually are minor but collectively emit a substantial amount of pollution such as motor vehicles at intersections, malls, and on highways. The SCAQMD also regulates stationary sources of pollution throughout its jurisdictional area. Direct emissions from motor vehicles are regulated by the CARB.

CARB Airborne Toxic Control Measure/Asbestos

Asbestos is listed as a toxic air contaminant by CARB and as a Hazardous Air Pollutant by the EPA. Asbestos occurs naturally in surface deposits of several types of rock formations. Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysotile asbestos. In addition, another form of asbestos, tremolite, can be found associated with ultramafic rock, particularly near faults. Crushing or breaking these rocks, through construction or other means, can release asbestoform fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. The risk of disease is dependent upon the intensity and duration of exposure. When inhaled, asbestos fibers may remain in the lungs and with time may be linked to such diseases as asbestosis, lung cancer,

and mesothelioma. In July 2001, the CARB approved an Air Toxic Control Measure for construction, grading, quarrying and surface mining operations to minimize emissions of naturally occurring asbestos. The regulation requires application of best management practices (BMPs) to control fugitive dust in areas known to have naturally occurring asbestos and requires notification to the local air district prior to commencement of ground-disturbing activities. The measure establishes specific testing, notification and engineering controls prior to grading, quarrying or surface mining in construction zones where naturally occurring asbestos is located on projects of any size. There are additional notification and engineering controls at work sites larger than one acre in size. These projects require the submittal of a "Dust Mitigation Plan" and approval by the air district prior to the start of a project. There is no asbestos in the project area.[23]

California Code of Regulations Title 24, Part 6

The California Energy Code (Title 24, Section 6) was created as part of the California Building Standards Code (Title 24 of the California Code of Regulations) by the California Building Standards Commission in 1978 to establish statewide building energy efficiency standards to reduce California's energy consumption. These standards include provisions applicable to all buildings, residential and nonresidential, which describe requirements for documentation and certificates that the building meets the standards. These provisions include mandatory requirements for efficiency and design of energy systems, including space conditioning (cooling and heating), water heating, and indoor and outdoor lighting systems and equipment, and appliances. California's Building Energy Efficiency Standards are updated on an approximately three-year cycle as technology and methods have evolved. The 2016 Standards, effective January 1, 2017, focus on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings, and include requirements that will enable both demand reductions during critical peak periods and future solar electric and thermal system installations.

California Code of Regulations Title 24, Part 11

The California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), commonly referred to as the CALGreen Code, is a statewide mandatory construction code that was developed and adopted by the California Building Standards Commission and the California Department of Housing and Community Development in 2008. CALGreen standards require new residential and commercial buildings to comply with mandatory measures under five topical areas: planning and design; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; and environmental quality. CALGreen also provides voluntary tiers and measures that local governments may adopt which encourage or require additional measures in the five green building topics. The most recent update to the CALGreen Code went into effect January 1, 2017.

The CALGreen Code is not intended to substitute for or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California

[23] U.S. Geological Survey. 2011. Van Gosen, B.S., and Clinken beard, J.P. California Geological Survey Map Sheet 59. Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California. Open-File Report 2011-1188

Building Standards Commission (CBSC). Key provisions of the CALGreen Code that apply to the type of new non-residential development proposed for the project site are as follows:

Division 5.1—Planning and Design

Section 5.106 Site Development

5.106.4 Bicycle Parking and Changing Rooms:

Short-term bicycle parking. If the new project or an addition or alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack (5.106.4.1).

Long-term bicycle parking. For buildings with over 10 tenant-occupants or alterations that add 10 or more tenant vehicular parking spaces, provide secure bicycle parking for 5 percent of tenant vehicular parking spaces being added, with a minimum of one space. Acceptable parking facilities shall be convenient from the street and shall meet the following: 1. Covered, lockable enclosures with permanently anchored racks for bicycles; 2. Lockable bicycle rooms with permanently anchored racks; or 3. Lockable, permanently anchored bicycle lockers (5.106.4.2).

5.106.5 Clean Air Vehicle Parking: For new projects or additions or alterations that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles [201 spaces and over require at least 8 percent] (5.106.5.2).

5.106.8 Light Pollution Reduction (specific backlight, uplight, and glare ratings)

5.106.10 Grading and Paving: Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings.

Division 5.2—Energy Efficiency

Section 5.201.1 Energy Efficiency (Mandatory energy efficiency standards through California Code of Regulations, Title 24, Part 6)

Division 5.3—Water Efficiency and Conservation

Section 5.303 Indoor Water Use

5.303.1 Meters: Separate water meters for buildings in excess of 50,000 sq. ft or buildings projected to consume more than 1,000 gallons per day.

5.303.2 Twenty Percent Savings: Use of plumbing fixtures and fittings that will reduce the overall use of potable water within the building by 20 percent, based on the maximum allowable water use per fixture and fitting as required by the California Building Code (California Code of Regulations, Title 24, Part 2)

5.304.3 Irrigation design: Automatic irrigation system controllers installed at the time of final inspection shall be weather- or soil moisture-based controllers that adjust irrigation in response to changes in plant needs; weather-based controllers.

5.303.4 Wastewater Reduction: Each building shall reduce by 20 percent wastewater by one of the following methods: 1. The installation of water-conserving fixtures or 2. Use of non-potable water systems (5.303.4).

5.303.6 Plumbing Fixtures and Fittings

Section 5.304 Outdoor Water Use

5.304.1 Water Budget: A water budget shall be developed for landscape irrigation use that conforms to the local water efficient landscape ordinance or to the California Department of Water Resources Model Water Efficient Landscape Ordinance where no local ordinance is applicable.

5.304.2 Outdoor Water Use (separate submeters or metering devices)

5.304.3 Irrigation Design (irrigation controllers and sensors)

Division 5.4—Material Conservation and Resource Efficiency

Section 5.407 Water Resistance and Moisture Management

Section 5.408 Construction Waste Reduction, Disposal and Recycling

5.408.1 and 5.408.3 Construction Waste Diversion: Recycle and/or salvage for reuse a minimum 50 percent of the nonhazardous construction and demolition waste. 100 percent of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled.

5.408.2 Construction Waste Management Plan

Section 5.410 Building Maintenance and Operation

5.410.1 and 5.713.10 Recycling by Occupants: Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling.

Division 5.5—Environmental Quality

Section 5.504 Pollutant Control

5.504.3 Covering of Duct Openings and Protection of Mechanical Equipment During Construction

5.504.4 Finish Material Pollutant Control: Low-pollutant emitting interior finish materials such as adhesives, paints, carpet, and flooring

5.404.5.3 Filters: Minimum Efficiency Reporting Value (MERV) of 8 or higher in mechanically ventilated buildings.

California Code of Regulations Titles 14 and 27

These parts of the California Code require energy-efficient practices as part of solid and hazardous waste handling and disposal.

Pavley Regulations and Fuel Efficiency Standards

California AB 1493, enacted on July 22, 2002, required the CARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. The regulation was stalled by automaker lawsuits and by the EPA's denial of an implementation waiver. On January 21, 2009, the CARB requested that the EPA reconsider its previous waiver denial. On January 26, 2009, President Obama directed that the EPA assess whether the denial of the waiver was appropriate. On June 30, 2009, the EPA granted the waiver request. On September 8, 2009, the U.S. Chamber of Commerce and the National Automobile Dealers Association sued the EPA to challenge its granting of the waiver to California for its standards. California assisted the EPA in defending the waiver decision. The U.S. District Court for the District of Columbia denied the Chamber's petition on April 29, 2011.

The standards phased in during the 2009 through 2016 model years. The near term (2009–2012) standards were expected to result in about a 22 percent reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards were expected to result in about a 30 percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

In January 2012, CARB approved the Advanced Clean Cars program, a new emissions-control program for model years 2015 through 2025. The program includes components to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars. The zero emissions vehicle (ZEV) program will act as the focused technology of the

Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles (PHEV) in the 2018 to 2025 model years.[24]

In May 2016, CARB released the updated Mobile Source Strategy that demonstrates how the State can simultaneously meet air quality standards, achieve GHG emission reduction targets, decrease health risk from transportation emissions, and reduce petroleum consumption over the next fifteen years, through a transition to zero-emission vehicles (ZEVs), cleaner transit systems and reduction of vehicle miles traveled. The Mobile Source Strategy calls for 1.5 million ZEVs (including plug-in hybrid electric, battery-electric, and hydrogen fuel cell vehicles) by 2025 and 4.2 million ZEVs by 2030. It also calls for more stringent GHG requirements for light-duty vehicles beyond 2025 as well as GHG reductions from medium-duty and heavy-duty vehicles and increased deployment of zero-emission trucks primarily for class 3 – 7 "last mile" delivery trucks in California. Statewide, the Mobile Source Strategy would result in a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels.[25]

Low Carbon Fuel Standard, Executive Order S-01-07

The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the executive order established a Low Carbon Fuel Standard and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission (CEC), the CARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. The CARB adopted the Low Carbon Fuel Standard on April 23, 2009. The Low Carbon Fuel Standard requires producers of petroleum based fuels to reduce the carbon intensity of their products, beginning with a quarter of a percent in 2011, ending in a 10 percent total reduction in 2020. Petroleum importers, refiners and wholesalers can either develop their own low carbon fuel products, or buy LCFS Credits from other companies that develop and sell low carbon alternative fuels, such as biofuels, electricity, natural gas or hydrogen. The Low Carbon Fuel Standard was challenged in the United States District Court in Fresno in 2011. The court's ruling issued on December 29, 2011, included a preliminary injunction against the CARB's implementation of the rule. The Ninth Circuit Court of Appeals stayed the injunction on April 23, 2012 pending final ruling on appeal, allowing the CARB to continue to implement and enforce the regulation and vacated the injunction on September 18, 2013, and remanded the case to the district court for further consideration.

Senate Bill 1383

This bill creates goals for short-lived climate pollutant (SLCP) reductions in various industry sectors. The SLCPs included under this bill – including methane, fluorinated gases, and black carbon – are GHGs that are much more potent than carbon dioxide and can have detrimental effects on human health and climate change. SB 1383 requires the CARB to adopt a strategy to

[24] California Air Resources Board (CARB). *The Advanced Clean Cars Program,* 2017. Available at https://www.arb.ca.gov/msprog/acc/acc.htm. Website accessed June 2018

[25] California Air Resources Board (CARB). *Mobile Source Strategy*, 2016. Available at https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm. Website accessed June 2018

reduce methane by 40%, hydrofluorocarbon gases by 40%, and anthropogenic black carbon by 50% below 2013 levels by 2030. The methane emission reduction goals include a 75% reduction in the level of statewide disposal of organic waste from 2014 levels by 2025.

Senate Bill 1368

In 2006, the State Legislature adopted SB 1368, which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission (CPUC) to adopt a performance standard for greenhouse gas emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as combined cycle natural gas power plants. Accordingly, the new law will effectively prevent California's utilities from investing in, financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower greenhouse gas emissions associated with California's energy demand, as SB 1368 will effectively prohibit California utilities from purchasing power from out-of-state producers that cannot satisfy the performance standard for greenhouse gas emissions required by SB 1368. The CPUC adopted the regulations required by SB 1368 on August 29, 2007.

Senate Bill 97 and the CEQA Guidelines Update

Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code states "(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the California Governor's Office of Planning and Research (OPR) pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code. It provided CEQA protection until January 1, 2010, for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, in stating that the failure to analyze adequately the effects of greenhouse gases would not violate CEQA.

On April 13, 2009, the OPR submitted to the Secretary for Natural Resources its recommended amendments to the CEQA Guidelines for addressing greenhouse gas emissions. On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting these amendments pursuant to Public Resources Code section 21083.05. Following a 55-day public comment period and two public hearings, the Natural Resources Agency proposed revisions to the text of the CEQA Guidelines amendments. The Natural Resources Agency transmitted the adopted amendments and the entire rulemaking file to the Office of Administrative Law on December 31, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for

inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of greenhouse gas emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

A new section, CEQA Guidelines Section 15064.4, was added to assist agencies in determining the significance of GHG emissions. The new section allows agencies the discretion to determine whether a quantitative or qualitative analysis is best for a particular project. However, the CEQA Guidelines offer little guidance on the crucial next step in this assessment process—how to determine whether the project's estimated greenhouse gas emissions are significant or cumulatively considerable.

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts respectively. Greenhouse gas mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze greenhouse gas emissions in an EIR when a project's incremental contribution of emissions may be cumulatively considerable; however, it does not answer the question of how to determine whether emissions are cumulatively considerable.

Section 15183.5 permits programmatic greenhouse gas analysis and later project-specific tiering. A tiered project is a project that was addressed in a certified program document, such as an EIR or Mitigated Negative Declaration. The CEQA Guidelines state the following:

> *Lead agencies may analyze and mitigate the significant effects of greenhouse gas emissions at a programmatic level, such as in a general plan, a long range development plan, or a separate plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review. Project-specific environmental documents may rely on an EIR containing a programmatic analysis of greenhouse gas emissions (Section 15183.5(a)).*

Compliance with plans for the reduction of GHG emissions can support a determination that a project's cumulative effect is not cumulatively considerable, according to proposed Section 15183.5(b).

In addition, the amendments revised Appendix F of the CEQA Guidelines, which focuses on energy conservation. The sample environmental checklist in the CEQA Guidelines' Appendix G was amended to include greenhouse gas impact questions, which are used in this analysis.

Executive Order S-3-05

Executive Order S-3-05 was signed by Governor Schwarzenegger in 2005 proclaiming California is vulnerable to the impacts of climate change. It states that increased temperatures could reduce

the Sierra Nevada's snowpack, worsen California's air quality problems, and potentially cause a rise in sea levels. The Executive Order establishes total GHG emission targets including emissions reductions to the 2000 level by 2010, and the 1990 level by 2020, and to 80 percent below the 1990 level by 2050. The 2050 reduction goal represents what scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be an aggressive, but achievable, mid-term target.

Assembly Bill 32

California's major initiative for reducing GHG emissions is outlined in AB 32, the "Global Warming Solutions Act," passed by the California State legislature on August 31, 2006. This effort aims at reducing GHG emissions to 1990 levels by 2020. The original 2020 GHG emissions limit was 427 million mt CO_2e. The current 2020 GHG emissions limit is 431 million mt CO_2e. AB 32 requires the CARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change.

The Scoping Plan was approved by the CARB on December 11, 2008, and includes measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures.[26] The Scoping Plan includes a range of GHG reduction actions that may include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. The Scoping Plan, even after Board approval, remains a recommendation. The measures in the Scoping Plan will not be binding until after they are adopted through the normal rulemaking process. The CARB rule-making process includes preparation and release of each of the draft measures, public input through workshops and a public comment period, followed by a CARB hearing and rule adoption.

Pursuant to AB 32, the CARB and the Climate Action Team (CAT)[27] did the following:

- Adopted a list of discrete early action measures;
- Established a statewide GHG emissions cap for 2020 based on 1990 emissions and adopted mandatory reporting rules for significant sources of GHG;
- Indicated how emission reductions will be achieved from significant GHG sources via regulations, market mechanisms and other actions; and
- Adopted regulations to achieve the maximum technologically feasible and cost-effective reductions in GHG, including provisions for using both market mechanisms and alternative compliance mechanisms.

In June 2007, the CARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on High Global Warming

26 CARB, *Climate Change Proposed Scoping Plan: a Framework for Change,* October 2008.

27 CAT is a consortium of representatives from State agencies who have been charged with coordinating and implementing GHG emission reduction programs that fall outside of CARB's jurisdiction.

Potential Refrigerants, and Landfill Methane Capture). Discrete early action measures are measures that were required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code (HSC) Section 38560.5. The CARB adopted additional early action measures in October 2007[28] that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of perfluorocarbons from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and sulfur hexafluoride (SF_6) reductions from the non-electricity sector. The combination of early action measures was estimated to reduce statewide GHG emissions by nearly 16 million mt CO_2e.[29]

AB 32 codifies Executive Order S-3-05's[30] year 2020 goal by requiring that statewide GHG emissions be reduced to 1990 levels by the year 2020.

The first AB 32 Scoping Plan, published in 2008, identified a future cap-and-trade program covering refineries, power plants, industrial facilities, and transportation fuels as a central element of California's overall strategy to reduce GHG emissions to 1990 levels. More information on the Scoping Plan and California's Cap and Trade program is provided below.

Amendments to California Global Warming Solutions Act of 2006: Emission Limit (SB 32)

Signed into law on September 8, 2016, Senate Bill (SB) 32 (Amendments to California Global Warming Solutions Act of 2006: Emission Limit) amends HSC Division 25.5 and codifies the 2030 target in the recent Executive Order B-30-15 (40 percent below 1990 levels by 2030). The 2030 target is intended to ensure that California remains on track to achieve the goal set forth by Executive Order B-30-15 to reduce statewide GHG emissions by 2050 to 80 percent below 1990 levels. SB 32 states the intent of the legislature to continue to reduce GHGs for the protection of all areas of the state and especially the state's most disadvantaged communities, which are disproportionately impacted by the deleterious effects of climate change on public health (California Legislative Information Website 2017). SB 32 was passed with companion legislation AB 197, which provides additional direction for developing the Scoping Plan. In 2016, the California State Legislature adopted SB 32 and its companion bill AB 197, and both were signed by Governor Brown. SB 32 amends HSC Division 25.5 and establishes a new climate pollution reduction target of 40 percent below 1990 levels by 2030, while AB 197 includes provisions to ensure the benefits of state climate policies reach into disadvantaged communities.

California Cap and Trade Program

Authorized by the California Global Warming Solutions Act of 2006 (AB 32), the cap-and-trade program is a core strategy that California is using to meet its statewide GHG reduction targets for 2020 and 2030, and ultimately achieve an 80 percent reduction from 1990 levels by 2050.

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28 CARB. 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October.

29 CARB. 2007. "ARB approves tripling of early action measures required under AB 32." News Release 07-46. http://www.arb.ca.gov/newsrel/nr102507.htm. October 25.

30 Executive Order S-3-05 establishes greenhouse gas emission reduction targets for California.

Pursuant to its authority under AB 32, CARB has designed and adopted a California Cap-and-Trade Program to reduce GHG emissions from major sources (deemed "covered entities") by setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve AB 32's emission-reduction mandate of returning to 1990 levels of emissions by 2020.[31] Under the Cap-and-Trade program, an overall limit is established for GHG emissions from capped sectors (e.g., electricity generation, petroleum refining, cement production, fuel suppliers, and large industrial facilities that emit more than 25,000 metric tons CO_2e per year) and declines over time, and facilities subject to the cap can trade permits to emit GHGs. The statewide cap for GHG emissions from the capped sectors commenced in 2013 and declines over time, achieving GHG emission reductions throughout the Program's duration.[32] On July 17, 2017 the California legislature passed Assembly Bill 398, extending the Cap-and-Trade program through 2030.

The Cap-and-Trade Regulation provides a firm cap, ensuring that the 2020 and 2030 statewide emission limits will not be exceeded. An inherent feature of the Cap-and-Trade Program is that it does not direct GHG emissions reductions in any discrete location or by any particular source. Rather, GHG emissions reductions are assured on a State-wide basis.

Since 2015, fuels, such as gasoline, diesel, and natural gas, have been covered under the Cap-and-Trade Program. Fuel suppliers are required to reduce GHG emissions by supplying low carbon fuels or purchasing pollution permits, called "allowances," to cover the GHGs produced when the conventional petroleum-based fuel they supply is combusted.

2008 Scoping Plan

The California State Legislature adopted AB 32 in 2006 which focuses on reducing greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) to 1990 levels by the year 2020. Pursuant to the requirements in AB 32, the CARB adopted the Climate Change Scoping Plan (Scoping Plan) in 2008, which outlines actions recommended to obtain that goal. The Scoping Plan calls for an "ambitious but achievable" reduction in California's greenhouse gas emissions, cutting approximately 30 percent from BAU emission levels projected for 2020, or about 10 percent from today's levels. On a per-capita basis, that means reducing annual emissions of 14 tons of carbon dioxide for every man, woman, and child in California down to about 10 tons per person by 2020.

The Scoping Plan[33] contains the following 18 strategies to reduce the State's emissions:

1. California Cap-and-Trade Program Linked to Western Climate Initiative. Implement a broad-based California Cap-and-Trade program to provide a firm limit on emissions. Link the California cap-and-trade program with other Western Climate Initiative Partner programs to create a regional market system to achieve greater environmental and economic benefits for California. Ensure California's program meets all applicable AB 32 requirements for market-based mechanisms.

31 17 CCR §§ 95800 to 96023.

32 See generally 17 CCR §§ 95811, 95812.

33 Scoping Plan Reduction Measures from California Air Resources Board 2008.

2. California Light-Duty Vehicle Greenhouse Gas Standards. Implement adopted standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.
3. Energy Efficiency. Maximize energy efficiency building and appliance standards; pursue additional efficiency including new technologies, policy, and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California.
4. Renewable Portfolio Standard. Achieve 33 percent renewable energy mix statewide. Renewable energy sources include (but are not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas.
5. Low Carbon Fuel Standard. Develop and adopt the Low Carbon Fuel Standard.
6. Regional Transportation-Related Greenhouse Gas Targets. Develop regional greenhouse gas emissions reduction targets for passenger vehicles. This measure refers to SB 375.
7. Vehicle Efficiency Measures. Implement light-duty vehicle efficiency measures.
8. Goods Movement. Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.
9. Million Solar Roofs Program. Install 3,000 MW of solar-electric capacity under California's existing solar programs.
10. Medium/Heavy-Duty Vehicles. Adopt medium and heavy-duty vehicle efficiency measures.
11. Industrial Emissions. Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions and provide other pollution reduction co-benefits. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.
12. High Speed Rail. Support implementation of a high-speed rail system.
13. Green Building Strategy. Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.
14. High Global Warming Potential Gases. Adopt measures to reduce high global warming potential gases.
15. Recycling and Waste. Reduce methane emissions at landfills. Increase waste diversion, composting, and commercial recycling. Move toward zero-waste.
16. Sustainable Forests. Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation.
17. Water. Continue efficiency programs and use cleaner energy sources to move and treat water.

18. Agriculture. In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020.

2014 Scoping Plan Update

This First Update to California's Climate Change Scoping Plan (2014 Scoping Plan Update) was developed by the CARB in collaboration with the Climate Action Team and reflects the input and expertise of a range of state and local government agencies. The Update reflects public input and recommendations from business, environmental, environmental justice, utilities and community-based organizations provided in response to the release of prior drafts of the Update, a Discussion Draft in October 2013, and a draft Proposed Update in February 2014.

This report highlights California's success to date in reducing its GHG emissions and lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. The First Update includes recommendations for establishing a mid-term emissions limit that aligns with the State's long-term goal of an emissions limit 80 percent below 1990 levels by 2050 and sector-specific discussions covering issues, technologies, needs, and ongoing State activities to significantly reduce emissions throughout California's economy through 2050. The focus areas include energy, transportation, agriculture, water, waste management, and natural and working lands.[34] With respect to the transportation sector, California has outlined several steps in the State's zero emission vehicle (ZEV) Action Plan to further support the market and accelerate its growth. Committed implementation of the actions described in the plan will help meet Governor Brown's 2012 Executive Order (EO) B-16-2012, which—in addition to establishing a more specific 2050 GHG target for the transportation sector of 80 percent from 1990 levels—called for 1.5 million ZEVs on California's roadways by 2025.

Achieving such an aggressive 2050 target will require innovation and unprecedented advancements in energy demand and supply.[35] Emissions from 2020 to 2050 will have to decline at more than twice the rate of that which is needed to reach the 2020 statewide emissions limit. In addition to our climate objectives, California also must meet federal clean air standards. Emissions of criteria air pollutants, including ozone precursors (primarily oxides of nitrogen, or NO_X) and particulate matter, must be reduced by an estimated 90 percent by 2032 to comply with federal air quality standards. The scope and scale of emission reductions necessary to improve air quality is similar to that needed to meet long-term climate targets. Achieving both objectives will align programs and investments to leverage limited resources for maximum benefit.

2017 Scoping Plan Update

On December 14, 2017, CARB approved the final version of California's 2017 Climate Change Scoping Plan (2017 Scoping Plan Update), which outlines the proposed framework of action for achieving the 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990

34 California Air Resources Board, *First Update to the Climate Change Scoping Plan,* http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf, May 2014, Accessed September 12, 2016.

35 Ibid.

levels.[36] The 2017 Scoping Plan Update identifies key sectors of the implementation strategy, which includes improvements in low carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. Through a combination of data synthesis and modeling, CARB determined that the target Statewide 2030 emissions limit is 260 $MMTCO_2e$, and that further commitments will need to be made to achieve an additional reduction of 50 $MMTCO_2e$ beyond current policies and programs. The cornerstone of the 2017 Scoping Plan Update is an expansion of the Cap-and-Trade program to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2050 limit set forth by E.O. B-30-15.

The 2017 Scoping Plan Update's strategy for meeting the 2030 GHG target incorporates the full range of legislative actions and state-developed plans that have relevance to the year 2030. These include:

- Extending the low carbon fuel standard (LCFS) beyond 2020 and increasing the carbon intensity reduction requirement to 18 percent by 2030;
- SB 350, which increase renewables portfolio standard (RPS) to 50 percent and requires a doubling of energy efficiency for existing buildings by 2030;
- The 2016 Mobile Source Strategy is estimated to reduce emissions from mobile sources including an 80 percent reduction in smog-forming emissions and a 45 percent reduction in diesel particulate matter from 2016 level in the South Coast Air Basin, a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels;
- The Sustainable Freight Action Plan to improve freight efficiency and transition to zero emission freight handling technologies (described in more detail below);
- SB 1383, which requires a 50 percent reduction in anthropogenic black carbon and a 40 percent reduction in hydrofluorocarbon and methane emissions below 2013 levels by 2030; and
- Assembly Bill 398, which extends the state Cap-and-Trade Program through 2030.

With respect to project-level GHG reduction actions and thresholds for individual development projects, the 2017 Scoping Plan Update Indicates,

> *Beyond plan-level goals and actions, local governments can also support climate action when considering discretionary approvals and entitlements of individual projects through CEQA. Absent conformity with an adequate geographically-specific GHG reduction plan as described in the preceding section above, CARB recommends that projects incorporate design features and GHG reduction measures, to the degree feasible, to minimize GHG emissions. Achieving no net*

36 CARB, *California's 2017 Climate Change Scoping Plan: The strategy for achieving California's 2030 greenhouse gas target*, November, 2017, https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf; accessed December 18, 2017.

additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development.[37]

Mobile Source Strategy

Implementing CARB's Mobile Source Strategy includes measures to reduce total light-duty VMT by 15 percent from the business-as-usual in 2050. The Mobile Source Strategy includes an expansion of the Advanced Clean Cars program (which further increases the stringency of GHG emissions for all light-duty vehicles, and 4.2 million zero-emission and plug-in hybrid light-duty vehicles by 2030). It also calls for more stringent GHG requirements for light-duty vehicles beyond 2025 as well as GHG reductions from medium-duty and heavy-duty vehicles and increased deployment of zero-emission trucks primarily for class 3 – 7 "last mile" delivery trucks in California. Statewide, the Mobile Source Strategy would result in a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels.[38]

Sustainable Freight Action Plan

Executive Order B-32-15 directed the State to establish targets to improve freight efficiency, transition to zero emission technologies, and increase the competitiveness of California's freight transport system. The targets are not mandates, but rather aspirational measures of progress towards sustainability for the State to meet and try to exceed. The targets include:

- System Efficiency Target: Improve freight system efficiency by 25 percent by increasing the value of goods and services produced from the freight sector, relative to the amount of carbon that it produces by 2030.

- Transition to Zero Emission Technology Target: Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030.

- Increased Competitiveness and Economic Growth Targets: Establish a target or targets for increased State competitiveness and future economic growth within the freight and goods movement industry based on a suite of common-sense economic competitiveness and growth metrics and models developed by a working group comprised of economists, experts, and industry. These targets and tools will support flexibility, efficiency, investment, and best business practices through State policies and programs that create a positive environment for growing freight volumes and jobs, while working with industry to mitigate potential negative economic impacts. The targets and tools will also help evaluate the strategies proposed under the Action Plan to ensure consideration of the impacts of actions on economic growth and competitiveness throughout the development and implementation process.

37 *Id.* at 101.

38 California Air Resources Board (CARB). *Mobile Source Strategy*, 2016. Available at https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm. Website accessed June 2018.

California Transportation Plan 2040

The California Transportation Plan (CTP) 2040 provides a long-range policy framework to meet future mobility needs and reduce GHG emissions. The CTP defines goals, performance-based policies, and strategies to achieve maximum feasible emission reductions in order to attain a statewide reduction in GHG emissions.

The CTP 2040 recognizes that the Governor is committed to reduce by one-half current petroleum use in cars and trucks; increase from one-third to one-half the electricity derived from renewable sources; double the efficiency savings of existing buildings and make heating fuels cleaner; reduce the release of methane, black carbon, and other short-lived climate pollutants; and manage farm and rangelands, forests, and wetlands to store more carbon.

Transportation GHG reduction strategies within the CTP 2040 include demand management (including telecommuting/working at home, increased carpoolers, and increase car sharing), mode shift (including transit service improvements, high-speed rail, bus rapid transit, expanded bike and pedestrian facilities, carpool land occupancy requirements, and increased HOV lanes), travel cost (implement expanded pricing policies), and operational efficiency (incident/emergency management, Caltrans' Master Plan, ITS/TSM, and eco-driving).

Executive Order B-16-2012 (Zero-Emission Vehicles)

This executive order indicates that all State entities under the Governor's control support and facilitate the rapid commercialization of zero-emission vehicles. The order contains a target similar to Executive Order S-3-05, but for the transportation sector instead of all sectors: that California target for 2050 a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels. Executive order B-16-2012 also indicates that the CARB, the California Energy Commission, the Public Utilities Commission and other relevant agencies are ordered to work with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to help achieve the following:

- By 2015: The State's major metropolitan areas able to accommodate zero-emission vehicles, each with infrastructure plans and streamlined permitting; the State's manufacturing sector expend zero-emission vehicle and component manufacturing; an increase in the private sector's investment in zero-emission vehicle infrastructure; and the State's academic and research institutions contributing to zero-emission vehicle research, innovation and education.

- By 2020: The State's zero-emission vehicle infrastructure ability to support up to one million vehicles; the costs of zero-emission vehicles competitive with conventional combustion vehicles; zero-emission vehicles accessible to mainstream consumers; widespread use of zero-emission vehicles for public transportation and freight transport; and a decrease in transportation sector GHG emissions as a result of the switch to zero-emission vehicles; electric vehicle charging integrated into the electricity grid.

- By 2025: over 1.5 million zero-emission vehicles on California roads; easy access to zero-emission vehicle infrastructure in California; the zero-emission vehicle industry

strong and sustainable part of California's economy; and California's vehicles displace at least 1.5 billion gallons of petroleum fuels per year.

Greenhouse Gas Emissions Performance Standard for Power Plants

On January 25, 2007, the CPUC adopted an interim GHG emissions performance standard. This standard is a facility-based emissions standard requiring all new long-term commitments for baseload generation to serve California consumers with power plants that have emissions no greater than a combined cycle gas turbine plant. The established level is 1,100 pounds of CO_2 per megawatt-hour.

Senate Bill 375

SB 375 was signed into law on October 1, 2008. SB 375 provides emissions-reduction goals around which regions can plan, integrates disjointed planning activities, and provides incentives for local governments and developers to implement "smart growth" planning and development strategies, including reducing the average VMT to reduce commuting distances and reduce criteria and greenhouse gas air pollutant emissions. SB 375 has three major components:

- Using the regional transportation planning process to achieve reductions in GHG emissions consistent with AB 32's goals;
- Offering CEQA incentives to encourage projects that are consistent with a regional plan that achieves GHG emission reductions; and
- Coordinating the regional housing needs allocation process with the regional transportation process while maintaining local authority over land use decisions.

SB 375 requires each Metropolitan Planning Organization (MPO) to include a Sustainable Communities Strategy (SCS) in the regional transportation plan that demonstrates how the region will meet the greenhouse gas emission targets and creates CEQA streamlining incentives for projects that are consistent with the regional SCS. The focus of SB 375 is on placement of new residential projects and coordinated transportation planning.

Renewable Electricity Standards

There have been several renewable electricity senate bills in California. On September 12, 2002, Governor Gray Davis signed SB 1078 requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 changed the due date to 2010 instead of 2017. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewables Portfolio Standard (RPS) target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020. Governor Schwarzenegger also directed the CARB (Executive Order S-21-09) to adopt a regulation by July 31, 2010, requiring the state's load serving entities to meet a 33 percent renewable energy target by 2020. The CARB approved the Renewable Electricity Standard on September 23, 2010, by Resolution 10-23. Senate Bill X1-2 (2011) codifies the Renewable Electricity Standard into law.

Senate Bill 350

The Clean Energy and Pollution Reduction Act of 2015 (Chapter 547, Statutes of 2015) was approved by Governor Brown on October 7, 2015. SB 350 (1) increases the standards of the California RPS program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030; (2) requires the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030; (3) provides for the evolution of the Independent System Operator (ISO) into a regional organization; and (4) requires the state to reimburse local agencies and school districts for certain costs mandated by the state through procedures established by statutory provisions. Among other objectives, the Legislature intends to double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.

Senate Bill 100

On September 10, 2018, Governor Brown signed SB 100, establishing that 100 percent of all electricity in California must be obtained from renewable and zero-carbon energy resources by December 31, 2045. SB 100 also creates new standards for the RPS, increasing required energy from renewable sources for both investor-owned utilities and publicly owned utilities from 50 percent to 60 percent by December 31, 2030. Incrementally, these energy providers must also have a renewable energy supply of 44 percent by December 31, 2024, and 52 percent by December 31, 2027. The updated RPS goals are considered achievable, since many California energy providers are already meeting or exceeding the RPS goals established by SB 350.

SmartWay Partners

SmartWay effectively refers to aerodynamic and rolling resistance requirements geared toward reducing fuel consumption. Most large trucking fleets driving newer vehicles are compliant with SmartWay design requirements. CARB's Tractor-Trailer Greenhouse Gas Regulation requires that all 2010 and older model year tractors that pull 53-foot or longer box type trailers must use SmartWay verified low rolling resistance tires beginning January 1, 2013.

The EPA has evaluated the fuel saving benefits of various devices through emissions and fuel economy testing, demonstration projects and technical literature review. As a result, EPA has determined the following types of technologies provide fuel saving and/or emission reducing benefits when used properly in their designed applications:

- **Idle Reduction Technologies** allow engine operators to refrain from long-duration idling of the main propulsion engine by using an alternative technology. An idle reduction technology is generally defined as the installation of a technology or device that:
    - Reduces unnecessary main engine idling of the vehicle or equipment; and/or

  - Is designed to provide services (e.g., heat, air conditioning, and/or electricity) to the vehicle or equipment that would otherwise require the operation of the main drive engine while the vehicle or equipment is temporarily parked or remains stationary.

- **Aerodynamic Technologies** minimize drag and improve airflow over the entire tractor-trailer vehicle. Aerodynamic technologies include gap fairings that reduce turbulence between the tractor and trailer, side skirts that minimize wind under the trailer, and rear fairings that reduce turbulence and pressure drop at the rear of the trailer.

- **Low Rolling Resistance Tires:** Certain tire models can reduce NO_X emissions and fuel use by 3 percent or more, relative to the best-selling new tires for line haul class 8 tractor trailers. These improvements are achieved under the following conditions:

  - Tires are used on the axle positions stated on the list below.

  - Verified low rolling resistance tires are installed on all of the axle positions of the tractor and trailer.

  - All tires must be properly inflated according to the manufacturer's specifications.

- **Retrofit Technologies:** Diesel retrofit technologies that the EPA has approved or conditionally approved, such as:

  - Diesel Particulate Filter (DPF);

  - CMX Catalyst Muffler;

  - Selective Catalytic Reduction (SCR) System;

  - Diesel Oxidation Catalyst (DOC); and

  - Diesel Oxidation Catalyst (DOC) plus CDTi Closed Crankcase Ventilation (CCV) System.

Within each of these categories, the EPA has verified specific products and continues to evaluate and verify new products. Although the EPA has verified the fuel saving and/or emission reducing benefits of the listed products, it does not endorse the purchase of products or services from any specific vendor.

2.4 Regional

Lewis Air Quality Management Act

The 1976 Lewis Air Quality Management Act established the SCAQMD and other air districts throughout the State. The Federal CAA Amendments of 1977 required that each state adopt an

implementation plan outlining pollution control measures to attain the Federal standards in nonattainment areas of the State.

The CARB is responsible for incorporating air quality management plans for local air basins into an SIP for EPA approval. Significant authority for air quality control within them has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans.

Carl Moyer Memorial Air Quality Standards Attainment Program

Since 1998, the Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) has provided funding to encourage the voluntary purchase of cleaner engines, equipment, and emission reduction technologies. The Carl Moyer Program plays a complementary role to California's regulatory program by funding emission reductions that are surplus, i.e., early and/or in excess of what is required by regulation. The Carl Moyer Program accelerates the turnover of old highly-polluting engines, speeds the commercialization of advanced emission controls, and reduces air pollution impacts on environmental justice communities. Emission reductions achieved through the Carl Moyer Program are an important component of the California State Implementation Plan.

Regional Air Quality Management Plan

The SCAQMD and the SCAG are responsible for formulating and implementing the Air Quality Management Plan (AQMP), which has a 20-year horizon for the Basin. An AQMP is a plan prepared and implemented by an air pollution district for a county or region designated as nonattainment of the Federal and/or California ambient air quality standards. The SCAQMD and SCAG must update the AQMP every three years.

2012 AQMP

The 2012 AQMP was adopted December 7, 2012.[39] The purpose of the 2012 AQMP for the Basin was to set forth a program that would lead the Basin into compliance with the Federal 24-hour $PM_{2.5}$ air quality standard, and to provide an update of the Basin's projections in meeting the Federal 8-hour ozone standards. The AQMP was adopted by the SCAQMD Board; therefore, it was submitted to the EPA as the State Implementation Plan (SIP). Specifically, the AQMP served as the official SIP submittal for the Federal 2006 24-hour $PM_{2.5}$ standard. In addition, the AQMP updated specific elements of the previously approved 8-hour ozone SIP: 1) an updated emissions inventory, and 2) new control measures and commitments for emissions reductions to help fulfill the Section 182(e)(5) portion of the 8-hour ozone SIP.

[39] South Coast Air Quality Management District. *2012 Air Quality Management Plan*, February 2013. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/main-document-final-2012.pdf

The 2012 AQMP states, "The remarkable historical improvement in air quality since the 1970's is the direct result of Southern California's comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its AQMPs."

The 2012 AQMP proposed Basin-wide $PM_{2.5}$ measures that would be implemented by the 2014 attainment date, episodic control measures to achieve air quality improvements (would only apply during high $PM_{2.5}$ days), Section 182(e)(5) implementation measures (to maintain progress toward meeting the 2023 8-hour ozone national standard), and transportation control measures. Most of the control measures focused on incentives, outreach, and education.

Proposed $PM_{2.5}$ reduction measures in the 2012 AQMP included the following:

- Further NO_X reductions from the SCAQMD's Regional Clean Air Incentives Market (RECLAIM) program. The RECLAIM program was adopted by the SCAQMD in October 1993 and set an emissions cap and declining balance for many of the largest facilities emitting NO_x and SO_x in the South Coast Air Basin. RECLAIM includes over 350 participants in its NO_x market and about 40 participants in its SO_x market. RECLAIM has the longest history and practical experience of any locally designed and implemented air emissions cap and trade program. RECLAIM allows participating facilities to trade air pollution while meeting clean air goals.
- Further reductions from residential wood-burning devices.
- Further reductions from open burning.
- Emission reductions from under-fired char broilers.
- Further ammonia reductions from livestock waste.
- Backstop measures for indirect sources of emissions from ports and port-related sources.
- Further criteria pollutant reductions from education, outreach, and incentives.

There were multiple VOC and NO_X reductions in the 2012 AQMP to attempt to reduce ozone formation, including further VOC reductions from architectural coatings, miscellaneous coatings, adhesives, solvents, lubricants, and mold release products.

The 2012 AQMP also contained proposed mobile source implementation measures for the deployment of zero and near-zero emission on-road heavy-duty vehicles, locomotives, and cargo handling equipment. There were measures for the deployment of cleaner commercial harbor craft, cleaner ocean-going marine vessels, cleaner off-road equipment, and cleaner aircraft engines.

The 2012 AQMP proposed the following mobile source implementation measures:

- On-road mobile sources:
    - Accelerated penetration of partial zero-emission and zero-emission vehicles. This measure proposed to continue incentives for the purchase of zero-emission

vehicles and hybrid vehicles with a portion of their operation in an all-electric range mode. The state Clean Vehicle Rebate Pilot program was proposed to continue from 2015 to 2023 with a proposed funding for up to $5,000 per vehicle. The measure seeks to provide funding assistance for up to 1,000 zero-emission or partial-zero emission vehicles per year.

- Accelerated penetration of partial zero-emission and zero-emission light-heavy and medium-heavy duty vehicles through funding assistance for purchasing the vehicles. The objective of the proposed action was to accelerate the introduction of advanced hybrid and zero-emission technologies for Class 4 through 6 heavy-duty vehicles. The state is currently implementing a Hybrid Vehicle Incentives Project program to promote zero-emission and hybrid heavy-duty vehicles. The proposed measure aimed to continue the program from 2015 to 2023 to deploy up to 1,000 zero- and partial-zero emission vehicles per year with up to $25,000 funding assistance per vehicle. Zero-emission vehicles and hybrid vehicles with a portion of their operation in an all-electric range mode would be given the highest priority.

- Accelerated retirement of older light-, medium-, and heavy-duty vehicles through funding incentives.

- Further emission reductions from heavy-duty vehicles serving near-dock rail yards This proposed control measure called for a requirement that any cargo container moved between the ports of Los Angeles and Long Beach to the nearby rail yards be with zero-emission technologies. The measure would be fully implemented by 2020 through the deployment of zero-emission trucks or any alternative zero-emission container movement system such as a fixed guideway system. The measure called for the CARB to either adopt a new regulation or amend an existing regulation to require such deployment by 2020.

- Off-road mobile sources:

  - Extension of the Surplus Off-Road Opt-In for NO_x (SOON) provision for construction/industrial equipment, which provides funding to repower or replace older Tier 0 and Tier 1 equipment.

  - Further emission reductions from freight and passenger locomotives called for an accelerated use of Tier 4 locomotives in the Basin.

  - Further emission reductions from ocean-going marine vessels while at berth.

  - Emission reductions from ocean-going marine vessels.

The 2012 AQMP also relied upon the SCAG regional transportation strategy, which is in its adopted 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and 2011 Federal Transportation Improvement Program, which contains the following sections:

1. Linking regional transportation planning to air quality planning and making sure that the regional transportation plan supports the goals and objectives of the AQMP/SIP.

2. Regional transportation strategy and transportation control measures: The RTP/SCS contains improvements to the regional multimodal transportation system including the following: active transportation (non-motorized transportation, e.g., biking and walking); transportation demand management; transportation system management; transit; passenger and high-speed rail; goods movement; aviation and airport ground access; highways; arterials; and operations and maintenance.

3. Reasonably available control measure analysis.

2016 AQMP

On March 3, 2017, SCAQMD approved the Final 2016 Air Quality Management Plan (AQMP) that demonstrates attainment of the 1-hr and 8-hr ozone NAAQS as well as the latest 24-hr and annual $PM_{2.5}$ standards. Currently, the 2016 AQMP is being reviewed by the U.S. EPA and CARB. Until the approval of the EPA and CARB, the current regional air quality plan is the Final 2012 Air Quality Management Plan (AQMP) adopted by the SCAQMD on December 7, 2012.The Final 2016 AQMP includes the integrated strategies and measures needed to meet the NAAQS.

The 2016 AQMP seeks to achieve multiple goals in partnership with other entities promoting reductions in criteria pollutant, greenhouse gases, and toxic risk, as well as efficiencies in energy use, transportation, and goods movement. The most effective way to reduce air pollution impacts on the health of our nearly 17 million residents, including those in disproportionally impacted and environmental justice communities that are concentrated along our transportation corridors and goods movement facilities, is to reduce emissions from mobile sources, the principal contributor to our air quality challenges. For that reason, the SCAQMD worked closely with CARB and the U.S. EPA who have primary responsibility for these sources. The Plan recognized the critical importance of working with other agencies to develop new regulations, as well as secure funding and other incentives that encourage the accelerated transition of vehicles, buildings, and industrial facilities to cleaner technologies in a manner that benefits not only air quality, but also local businesses and the regional economy. These “win-win” scenarios will be key to implementation of this Plan with broad support from a wide range of stakeholders. The 2016 AQMP also includes transportation control measures (TCMs) developed by SCAG from the 2016 RTP/SCS.

The RTP/SCS and Federal Transportation Improvement Program (FTIP) were developed in consultation with federal, state and local transportation and air quality planning agencies and other stakeholders. The four County Transportation Commissions (CTCs) in the South Coast Air Basin, namely Los Angeles County Metropolitan Transportation Authority, Riverside County Transportation Commission, Orange County Transportation Authority and the San Bernardino Associated Governments, were actively involved in the development of the regional transportation measures. In the South Coast Air Basin, TCMs include the following three main categories of transportation improvement projects and programs that have funding programmed for right-of-way and/or construction in the first two years of the 2015 FTIP:

- Transit, Intermodal Transfer, and Active Transportation Measures;
- High Occupancy Vehicle (HOV) Lanes, High Occupancy Toll (HOT) Lanes, and their pricing alternatives; and
- Information-based Transportation Strategies.

South Coast Air Quality Management District Proposed Indirect Sources Rules for Warehouse

In order to obtain the 80 ppb and 75 ppb 8-hour ozone standards by the 2023 and 2031 attainment dates, respectively, and in support of the 2016 AQMP, the SCAQMD is formulating Facility Based Mobile Sources Rules to reduce NO_X emissions from indirect sources (e.g., mobile sources generated by, or attracted to facilities). This proposed rule or set of rules would reduce emissions associated with emissions sources operating in and out of warehouse and distribution centers, consistent with Control Measures MOB 03 from the 2016 AQMP, and is anticipated to be brought before the Board for consideration in the second quarter of 2020 (SCAQMD, 2019a).[40] The SCAQMD is looking at a variety of options which could include voluntary reduction strategies, as well as, regulations to limit emissions. The voluntary emission reduction strategies for warehouses and distribution centers could include: (1) development of a SCAQMD administered CEQA air quality mitigation fund, for warehouse projects to opt into, which would be used to reduce project emissions by funding financial incentives for fleet owners to purchase cleaner trucks; (2) development of updated guidance for warehouse siting and operations; (3) development of the necessary fueling/charging infrastructure by working with utilities and regulatory agencies; and (4) development of "green delivery options" which could involve a small, voluntary, opt-in surcharge for consumers when purchasing goods online with the funds generated used towards reducing truck fleet emissions (SCAQMD, 2018).[41] A regulatory approach is being proposed as well, since the recommended voluntary measures would only result in limited emissions reductions. The proposed Warehouse Indirect Source Rule is aimed at reducing trucking emissions and could provide several compliance options that facilities could choose including: (1) requirements for warehouses to ensure that construction fleets and truck fleets that serve their facility during operations are cleaner than required by CARB regulations (verified through a voluntary fleet certification program); (2) facility emission caps that would require warehouses to directly control the emissions associated with trucks visiting the facility; (3) mitigation fees if the facilities emissions exceed cap levels set in the Indirect Source Rule, (4) crediting options for other activities like installation of charging/fueling infrastructure for cleaner trucks and transportation refrigeration units, conversion of cargo handling equipment to zero emission technologies, etc.; (5) requiring facilities to utilize zero emission trucks and build the infrastructure to support them; and (6) a points based system for the warehouse Indirect

40 South Coast Air Quality Management District, 2019a. General Board Meeting November 1, 2019 Agenda No. 1. Attached Minutes of the October 4 2019 Meeting. Available online: http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2019/2019-nov1-001.pdf?sfvrsn=6 Accessed November 6, 2015.

41 South Coast Air Quality Management District, 2018. Board Meeting, March 2, 2018. Agenda No. 32. Available online: http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2018/2018-mar2-032.pdf?sfvrsn=7. Accessed November 3, 2019.

Source Rule (SCAQMD, 2019a, SCAQMD, 2019b,[42] SJVAPCD, 2017[43]). This proposed rule would further reduce air quality emissions, beyond those calculated in this analysis, as future operations of the WLC would be subject to this rule once it is proposed and approved.

Greenhouse Gases

In April 2008, the SCAQMD, in order to provide guidance to local lead agencies on determining the significance of GHG emissions identified in CEQA documents, convened a "GHG CEQA Significance Threshold Working Group."[44] The goal of the working group is to develop and reach consensus on an acceptable CEQA significance threshold for GHG emissions that would be utilized on an interim basis until the CARB (or some other State agency) develops statewide guidance on assessing the significance of GHG emissions under CEQA.

Initially, SCAQMD staff presented the working group with a significance threshold that could be applied to various types of projects—residential, non-residential, industrial, etc. However, the threshold is still under development. In December 2008, staff presented the SCAQMD Governing Board with a significance threshold for stationary source projects in which it is the lead agency. This threshold uses a tiered approach to determine a project's significance, with 10,000 metric tons (mt) of carbon dioxide equivalent (CO_2e) as a screening numerical threshold.

In September 2010, the Working Group released additional revisions, which recommended a project-level efficiency target of 4.8 mt CO_2e per service population (SP) as a 2020 target and 3.0 mt CO_2e, per SP as a 2035 target. The recommended plan-level target for 2020 was 6.6 mt CO_2e and the plan level target for 2035 was 4.1 mt CO_2e. The SCAQMD has not announced when staff is expecting to present a finalized version of these thresholds to the Governing Board.

The SCAQMD has also adopted Rules 2700, 2701, and 2702 to establish a voluntary program to encourage, quantify, and certify voluntary GHG emission reductions in the SCAQMD's jurisdiction. The CARB adopted a resolution regarding the adoption of GHG accounting protocols that distinguishes between the offset certification programs that were developed for the voluntary market, and the program that must be developed to certify offsets to be used under CARB's cap-and-trade rule. This resolution withdrew CARB approval of voluntary protocols but would not impact the use of these protocols for voluntary purposes. Protocols in Rules 2701 and 2702 are voluntary protocols, which no longer have CARB's approval.

Diesel Regulations

The Ports of Long Beach and Los Angeles and the CARB have adopted regulations aimed at reducing the amount of diesel particulate. These programs are the Ports of Los Angeles and Long

42 South Coast Air Quality Management District General Board Meeting March 1, 2019 Agenda No. 25. Mobile Source Committee Meeting February 15, 2019. Available online: http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2019/2019-mar1-025.pdf?sfvrsn=6. Accessed November 6, 2019.

43 San Joaquin Valley Air Pollution Control District, 2017. Rule 9510 Indirect Source Review (ISR) (Adopted December 15, 2005, Amended December 21, 2017, but not in effect until March 21, 2018). Available online: http://www.valleyair.org/rules/currntrules/r9510-a.pdf. Accessed November 6, 2015.

44 For more information see: http://www.aqmd.gov/ceqa/handbook/GHG/GHG.html.

Beach "Clean Truck Program,[45] the CARB Drayage Truck Regulation,[46] and the CARB statewide On-road Truck and Bus Regulation.[47] Each of these regulatory programs will require an accelerated introduction of "clean trucks" into the statewide truck fleet that will result in substantially lower diesel emissions during the 2008 to 2020 timeframe. Additionally, the Ports of Long Beach and Los Angeles updated the Clean Air Action Plan in 2017, providing new strategies and emission targets supporting zero-emissions and freight efficiency targets.[48]

- Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines Rated at 50 horsepower and Greater. Effective February 19, 2011, each fleet shall comply with weighted reduced particulate matter emission fleet averages by compliance dates listed in the regulation.

- CARB Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling adopts new Section 2485 within Chapter 10, Article 1, Division 3, Title 13 in the California Code of Regulations. The measure limits the idling of diesel vehicles (i.e., commercial trucks over 10,000 pounds) to reduce emissions of toxics and criteria pollutants. The driver of any vehicle subject to this section: (1) shall not idle the vehicle's primary diesel engine for greater than five minutes at any location; and (2) shall not idle a diesel-fueled auxiliary power system for more than five minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle if it has a sleeper berth and the truck is located within 100 feet of a restricted area (homes and schools).

- CARB Final Regulation Order, Requirements to Reduce Idling Emissions from New and In-Use Trucks, requires that new 2008 and subsequent model-year heavy-duty diesel engines be equipped with an engine shutdown system that automatically shuts down the engine after 300 seconds of continuous idling operation once the vehicle is stopped, the transmission is set to 'neutral' or 'park,' and the parking brake is engaged. If the parking brake is not engaged, then the engine shutdown system shall shut down the engine after 900 seconds of continuous idling operation once the vehicle is stopped and the transmission is set to neutral or park." There are a few conditions where the engine shutdown system can be overridden to prevent engine damage. Any project trucks manufactured after 2008 would be consistent with this rule, which would ultimately reduce air emissions.

- CARB Regulation for In-Use Off-Road Diesel Vehicles. On July 26, 2007, the CARB adopted a regulation to reduce diesel particulate matter and NO_X emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. All self-propelled off-road diesel vehicles over 25 horsepower (hp) used in California and most two-engine vehicles (except on-road two-engine sweepers) are subject to this regulation. This includes vehicles that are rented or leased (rental or leased fleets). Such vehicles are used in construction, mining, and industrial operations. The regulation:

    - imposes limits on idling to no more than five consecutive minutes,

45 http://www.portoflosangeles.org/ctp/idx_ctp.asp.

46 http://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm.

47 http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm.

48 http://www.cleanairactionplan.org/2017-clean-air-action-plan-update/

- restricts adding of older equipment (such as Tier 0 and Tier 1) into fleets,
- requires reporting and labeling, and
- requires disclosure of the regulation upon vehicle sale.

The CARB is enforcing that with fines up to $10,000 per day for each vehicle in violation. Performance requirements of the rule are based on a fleet's average NO_X emissions, which can be met by replacing older vehicles with newer, cleaner vehicles or by applying exhaust retrofits. The regulation was amended in 2010 to delay the original timeline of the performance requirements making the first compliance deadline January 1, 2014 for large fleets (over 5,000 horsepower), 2017 for medium fleets (2,501-5,000 horsepower), and 2019 for small fleets (2,500 horsepower or less).

Toxic Air Contaminants

A toxic air contaminant (TAC) is defined as an air pollutant that may cause or contribute to an increase in mortality (death) or serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. Hazardous Air Pollutants (HAPs) and TACs are used interchangeably in this discussion. HAPs are regulated by the EPA under the Federal Clean Air Act. TAC is the term used under the California Clean Air Act to regulate the same hazardous pollutants. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for periods of several years. Many of these contaminants originate from human activities, such as fuel combustion and solvent use.

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 are not expected to occur. This contrasts with the criteria pollutants carbon dioxide, nitrogen dioxide, particulate matter, and ozone for which acceptable levels of exposure can be determined and for which the State and federal governments have set ambient air quality standards. For this reason, thresholds for TAC impacts for regulatory purposes and for CEQA thresholds have been set based on the increase in risk of cancer of a specific amount at sensitive receptors located near the source of TAC emissions.

The California Almanac of Emissions and Air Quality presents the relevant concentration and cancer risk data for the ten TACs that pose the most substantial health risk in California based on available data. These TACs are as follows: acetaldehyde, benzene, 1.3-butadiene, carbon tetrachloride, hexavalent chromium, paradichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel particulate matter (diesel PM).

TAC measurements, available at the SCAQMD Riverside Rubidoux monitoring station (14 miles northwest of the project site) can be used to characterize the "background" health risks from regional TAC emission sources. **Table 6,** *Toxic Air Contaminant Concentration Levels and Associated Health Effects,* provides this summary of TAC levels in the project area and health risk information. This table lists the air concentration levels and associated health cancer risks for

eight of the nine TACs reported by the CARB in its Almanac as measured at the Riverside-Rubidoux air monitoring station. Note that since diesel PM cannot be measured directly, the table does not provide estimates of either measured diesel PM or the cancer risk associated with diesel PM.

Past studies have indicated that diesel PM poses the greatest health risk among the TACs listed in Table 6. The principal concern regarding exposures to diesel PM lies in its small size and thus its ability to penetrate deep into lung tissues when inhaled. Diesel exhaust has been found to cause health effects from short-term or acute exposures and from long-term chronic exposures, such as repeated occupational exposures. The type and severity of health effects depends upon several factors including the amount of chemical you are exposed to and the length of time you are exposed. Individuals also react differently to different levels of exposure. There is limited information on exposure to just diesel PM but there is enough evidence to indicate that inhalation exposure to diesel exhaust causes acute and chronic health effects.

Long-term (chronic) exposure to diesel exhaust is likely to occur when a person works in a field where diesel is used regularly or experiences repeated exposure to diesel fumes over a long period of time. Human health studies demonstrate a correlation between exposure to diesel exhaust and increased lung cancer rates in occupational settings. Experimental animal inhalation studies of chronic exposure to diesel exhaust have shown that a range of doses causes varying levels of inflammation and cellular changes in the lungs. Human and laboratory studies have also provided considerable evidence that diesel exhaust is a likely carcinogen.

Several occupational and ambient studies have documented the health effects due to exposure to diesel PM. The California Office of Environmental Health Hazards Assessment (OEHHA), in its role in assessing risk from environmental factors reviews such studies and makes recommendations on the way environmental risk should be evaluated through programs like the AB2588 Hot Spot Program. In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, 1950's era railroad workers, and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. However, all of these studies were based on exposure to exhaust from traditional diesel engines and prior to the advent of highly efficient emissions controls like the diesel particulate filter. Based on these studies, CARB identified diesel exhaust a toxic air contaminant in 1998.

In 2008, the SCAQMD released the third iteration of the Multiple Air Toxics Exposure Study (MATES-III). The MATES-III report includes monitoring of various air toxic compounds in the Basin, establishes and updates existing baseline toxic air contaminants, and simulates cancer risk in the Basin. The study focuses on the carcinogenic risk from exposure to air toxics. It does not estimate mortality or other health effects from particulate exposures. The SCAQMD MATES-III report indicates that overall in the Basin, diesel PM contributes 83.6 percent of the risk.

In 2014, the SCAQMD released the fourth iteration of the Multiple Air Toxics Exposure Study (MATES-IV). The MATES-IV is a follow up to the previous MATES studies and included an updated toxics air emission inventory, new air toxics air dispersion modeling, and enhanced air toxics monitoring. A key conclusion reached in the MATES-IV study was that the population weighted cancer risk in the Basin decreased by 57 percent from the MATES-III period in 2005 to the MATES-IV period in 2012 indicating that overall, cancer risks are declining in the Basin as a result of the implementation of emission controls principally on large diesel trucks. The MATES-IV study also concluded that diesel PM contributed 68 percent to the total cancer risk in the Basin with benzene and 1.3 Butadiene also making important contributions to cancer risk. **Figure 15,** *Summary of MATES IV Cancer risks,* summarizes the basin-wide cancer risks as derived from the MATES-IV study.

Figure 15: Summary of MATES IV Cancer Risks

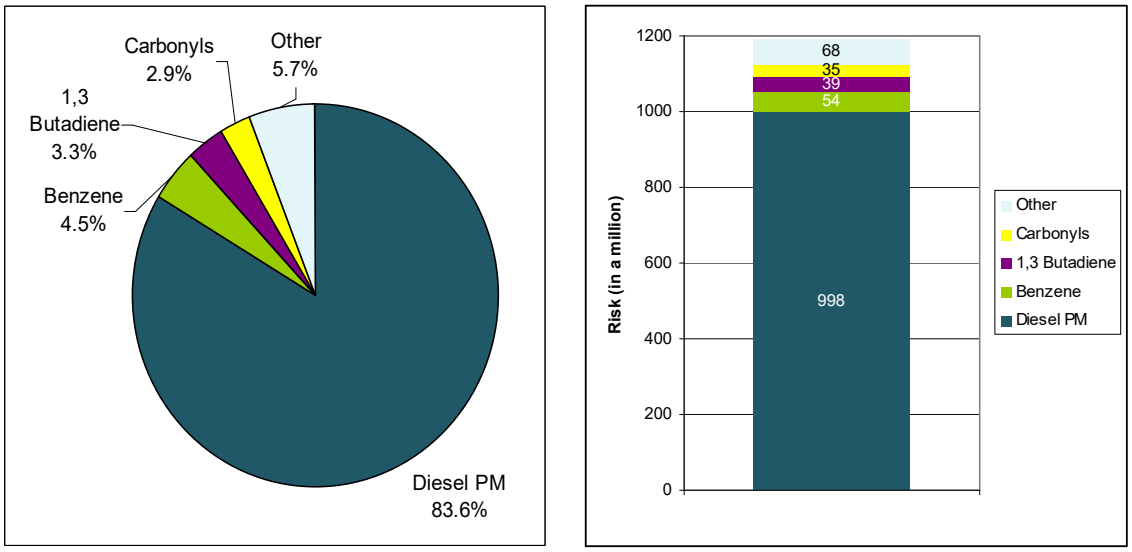


Table 6
Toxic Air Contaminant Concentration Levels and Associated Health Effects (Riverside, California)

TAC	Concentration[A] / Health Risk[B]	2015	2016	2017	Health Effects
Acetaldehyde	Mean	1.48	1.44	1.08	Acetaldehyde is a carcinogen that also causes chronic non-cancer toxicity in the respiratory system. Symptoms of chronic intoxication of acetaldehyde in humans resemble those of alcoholism. The primary acute effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans. At higher exposure levels, erythema, coughing, pulmonary edema, and necrosis may also occur. Acute inhalation of acetaldehyde resulted in a depressed respiratory rate and elevated blood pressure in experimental animals.
	Health Risk	22	21	16	

Table 6
Toxic Air Contaminant Concentration Levels and Associated Health Effects (Riverside, California)

TAC	Concentration[A] / Health Risk[B]	2015	2016	2017	Health Effects
Benzene	Mean	ID	0.27	0.271	Benzene is highly carcinogenic and occurs throughout California. Benzene also has non-cancer health effects. Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness. Neurological symptoms of inhalation exposure to benzene include drowsiness, dizziness, headaches, and unconsciousness in humans. Ingestion of large amounts of benzene may result in vomiting, dizziness, and convulsions in humans. Exposure to liquid and vapor may irritate the skin, eyes, and upper respiratory tract in humans. Redness and blisters may result from dermal exposure to benzene. Chronic inhalation of certain levels of benzene causes disorders in the blood in humans. Benzene specifically affects bone marrow (the tissues that produce blood cells). Aplastic anemia, excessive bleeding, and damage to the immune system (by changes in blood levels of antibodies and loss of white blood cells) may develop. Increased incidence of leukemia (cancer of the tissues that form white blood cells) has been observed in humans occupationally exposed to benzene.
	Health Risk	ID	85	70	
Chromium Hex	Mean	0.083	0.045	ID	In California, hexavalent chromium has been identified as a carcinogen. There is epidemiological evidence that exposure to inhaled hexavalent chromium may result in lung cancer. The principal acute effects are renal toxicity, gastrointestinal hemorrhage, and intravascular hemolysis. The respiratory tract is the major target organ for chromium (VI) following inhalation exposure in humans. Other effects noted from acute inhalation exposure to very high concentrations of chromium (VI) include gastrointestinal and neurological effects, while dermal exposure causes skin burns in humans. Chronic inhalation exposure to chromium (VI) in humans results in effects on the respiratory tract, with perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, asthma, and nasal itching and soreness reported. Chronic human exposure to high levels of chromium (VI) by inhalation or oral exposure may produce effects on the liver, kidneys, gastrointestinal and immune systems, and possibly the blood.
	Health Risk	34	19	ID	
Para-Dichlorobenzene	Mean	ID	ID	ID	In California, para-dichlorobenzene has been identified as a carcinogen. Acute exposure to 1,4-dichlorobenzene via inhalation results in irritation to the eyes, skin, and throat in humans. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans (e.g., cerebellar ataxia, dysarthria, weakness in limbs, and hyporeflexia).
	Health Risk	ID	ID	ID	
Formaldehyde	Mean	3.52	3.64	3.35	The major toxic effects caused by acute formaldehyde exposure via inhalation are eye, nose, and throat irritation and effects on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains, and bronchitis. Chronic exposure to formaldehyde by inhalation in humans has been associated with
	Health Risk	70	76	70	

Table 6
Toxic Air Contaminant Concentration Levels and Associated Health Effects (Riverside, California)

TAC	Concentration[A] / Health Risk[B]	2015	2016	2017	Health Effects
					respiratory symptoms and eye, nose, and throat irritation. Animal studies have reported effects on the nasal respiratory epithelium and lesions in the respiratory system from chronic inhalation exposure to formaldehyde. Occupational studies have noted statistically significant associations between exposure to formaldehyde and increased incidence of lung and nasopharyngeal cancer. This evidence is considered "limited" rather than "sufficient" due to possible exposure to other agents that may have contributed to the excess cancers. EPA considers formaldehyde to be a probable human carcinogen (cancer-causing agent) and has ranked it in EPA's Group B1. In California, formaldehyde has been identified as a carcinogen.
Methylene Chloride	Mean	ID	48.2	12.3	Case studies of methylene chloride poisoning during paint-stripping operations have demonstrated that inhalation exposure to extremely high levels can be fatal to humans. Acute inhalation exposure to high levels of methylene chloride in humans has resulted in effects on the central nervous system, including decreased visual, auditory, and psychomotor functions, but these effects are reversible once exposure ceases. Methylene chloride also irritates the nose and throat at high concentrations. The major effects from chronic inhalation exposure to methylene chloride in humans are effects on the central nervous system, such as headaches, dizziness, nausea, and memory loss. In addition, chronic exposure can lead to bone marrow, hepatic, and renal toxicity. EPA considers methylene chloride to be a probable human carcinogen and has ranked it in EPA's Group B2. California considers methylene chloride to be carcinogenic.
	Health Risk	ID	477	122	
Perchloroethylene	Mean	ID	0.018	0.013	In California, perchloroethylene has been identified as a carcinogen. Perchloroethylene vapors are irritating to the eyes and respiratory tract. Following chronic exposure, workers have shown signs of liver toxicity, as well as kidney dysfunction and neurological disorders.
	Health Risk	ID	2	2	
Diesel PM	Mean	No Monitoring Data Available			In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers, and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provided strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. This research was based on studies prior to the advent of modern diesel engines with high efficiency emissions controls.
	Health Risk				

ID = Insufficient data

Table 6
Toxic Air Contaminant Concentration Levels and Associated Health Effects (Riverside, California)

TAC	Concentration[A] / Health Risk[B]	2015	2016	2017	Health Effects

A = Concentrations for Hexavalent Chromium are expressed as µg/m^3, and concentrations for Diesel PM are expressed as µg/m^3. Concentrations for all other TACs are expressed as ppb.
B = Health Risk represents the number of excess cancer cases per million people based on a lifetime (70-year) exposure to the annual average concentration. Total Health Risk represents only those compounds listed in this table and only those with data for the year. There may be other significant compounds for which monitoring and/or health risk information are not available
Source: CARB 2018 for the SCAQMD Riverside-Rubidoux air monitoring station.

The basin-wide population weighted cancer risk is 367 per million based on averages at fixed monitoring sites estimated during the MATES-IV study. This level of risk means that on average an estimated 367 individuals in the basin could contract cancer out of a population of one million individuals exposed to all sources of toxic air contaminants over a lifetime of 70 years. A comprehensive air dispersion model and a detailed air toxics emission inventory were then used to estimate cancer risks at other locations where no monitoring sites were deployed. A 10-year research program[49] demonstrated that diesel PM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to diesel PM poses a chronic health risk.

In addition to increasing the risk of lung cancer, exposure to diesel exhaust can have other health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. Diesel exhaust has been a major source of fine particulate pollution as well, and studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems.

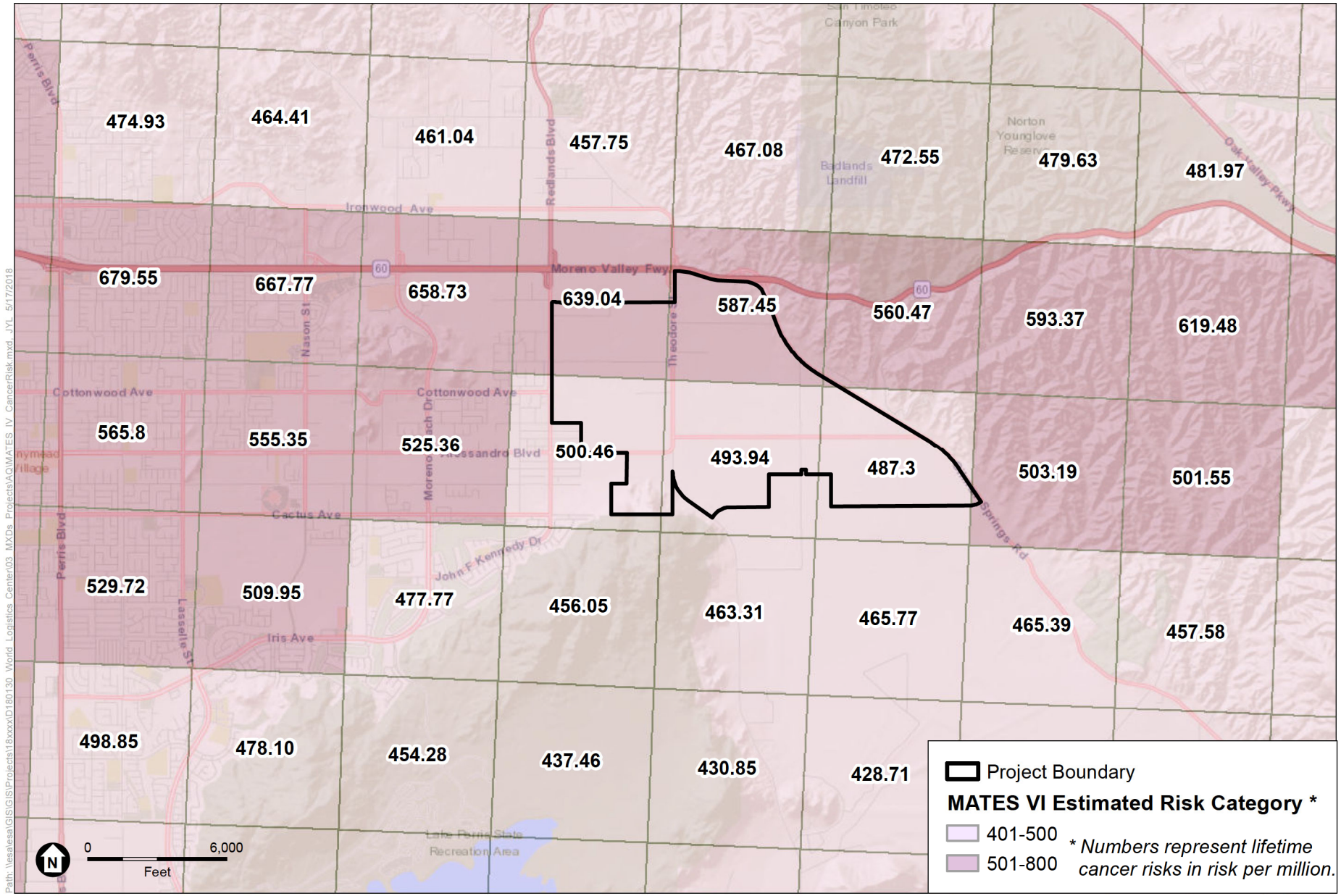
Diesel PM differs from other TACs in that it is not a single substance but a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled, internal combustion engines, the composition of the emissions varies, depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TACs, however, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. The CARB has made preliminary concentration estimates based on a diesel PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. Within the Basin, in addition to diesel PM, there are emissions of benzene, formaldehyde, acetaldehyde, naphthalene, ethylbenzene, acrolein, toluene, hexane, propylene, and xylene from a variety of sources located within the Basin that contribute to health risks.

Figure 16, *MATES IV Cancer Risk in Area*, shoes the average cancer risk in the project area. As shown in **Figure 17**, *Change in Air Toxics Simulated Risk from 2005 to 2012*, nearly all areas of the Basin experienced decreases in cancer risk during the time period from MATES–III time

[49] CARB. 1998. The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines

period of 2005 to the MATES-IV time period of 2012. The project area also experienced a decrease in cancer risk of between 100 and 400 in one million from the years 2005 to 2012.

Figure 20 depicts the cancer risk estimates as a "snapshot in time." That is, the cancer risks are derived from air dispersion models and are based on the emissions of various TACs during the years 2005 and 2012. The basic tenet used to estimate cancer risk assumes that the public will be exposed to these TAC emissions during an entire 70-year lifetime of continuous exposure. However, the SCAQMD, CARB, and the EPA have adopted numerous regulations that have



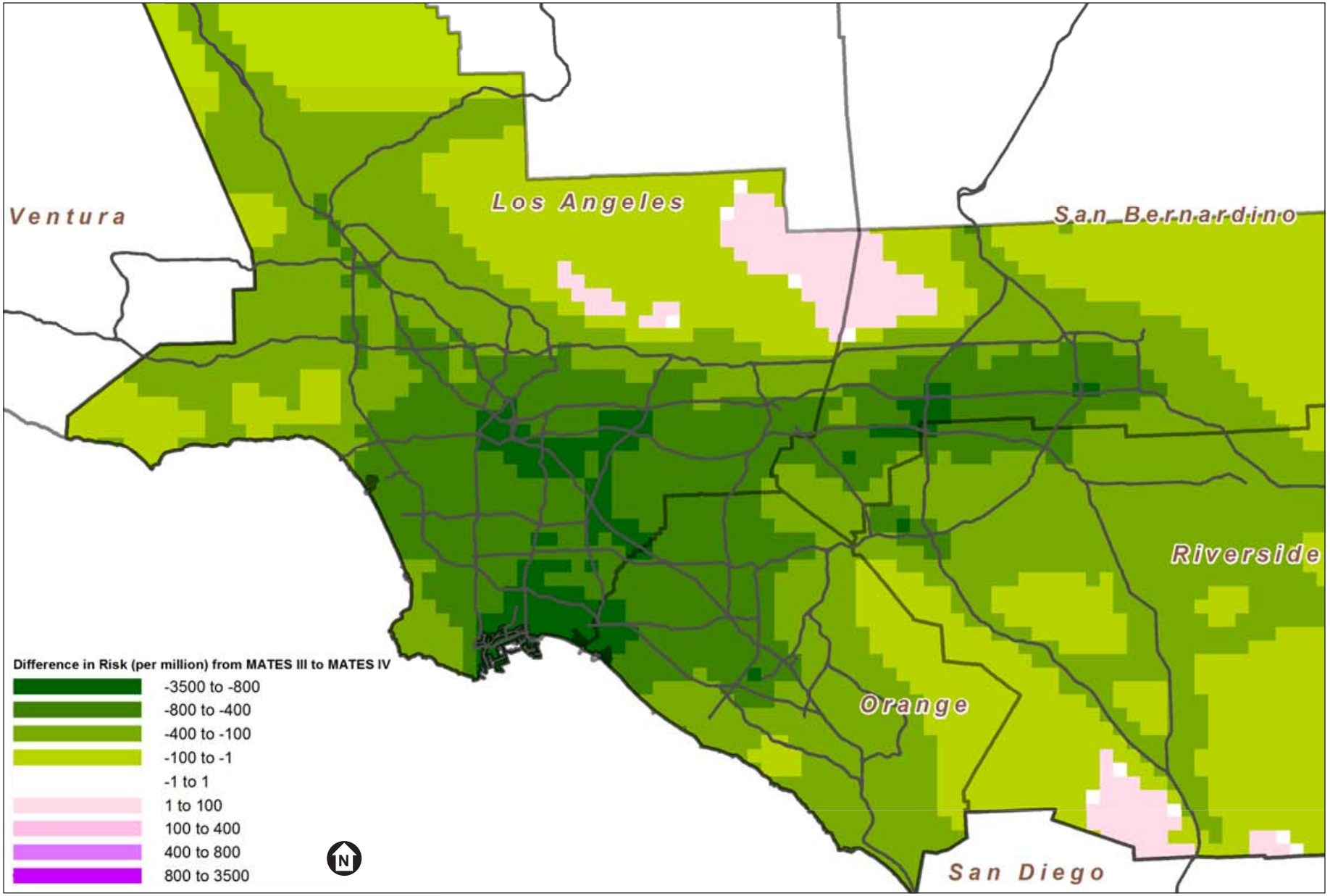
SOURCE: ESRI 2016; South Coast Air Quality Management District 2018

World Logistics Center

Figure 16

MATES IV Cancer Risk in Area

ESA



SOURCE: SCAQMD, MATES IV Final Report, May 2015

World Logistics Center

Figure 17
Change in Air Toxics Simulated Risk from 2005 to 2012

ESA

resulted in significant reductions in pollutant emissions with the attendant reductions in prevailing air quality levels since 2012 as noted earlier. The benefits of substantial additional emission reductions derived from the adoption and application of SCAQMD, CARB, and EPA regulations are not reflected in the estimate of 70-year lifetime cancer risks referred to in Figure 17.

Conservative Nature of Health Risk Assessments

Moreover, the current methodological protocols required by the SCAQMD and CARB when studying the health risk posed by diesel PM assume the following (from the California Air Pollution Control Officers Association 2009): (1) 24-hour constant exposure; (2) 350 days a year; (3) for a continuous period lasting 70 years. These are overly conservative assumptions that are not replicated in reality. Most people are indoors for 18–20 hours a day (at their place of employment or home) and most people do not live in the same location for a 70-year period. In fact, less than 10 percent of the population has a continuous residency at the same location of greater than 30 years (American Community Survey 2011). Thus, the health risk assessments prepared pursuant to the current protocols overestimate the risk of cancer associated with diesel PM exposure.

Alternative Views on Diesel PM Risk

Some researchers, such as Dr. James E. Enstrom (2008), believe that the risk from diesel PM is exaggerated. Enstrom calls into question some of the basic research on the declaration of diesel exhaust as a toxic air contaminant. In particular, the article states the following:

> *There is substantial new epidemiologic evidence relevant to the health effects of diesel exhaust that was not considered when the 1998 toxic air contaminant declaration was made. For instance, the 2007 paper by Francine Laden et al. measured death rates during 1985–2000 among 54,000 members of the unionized U.S. trucking industry. … This cohort, which included 36,000 diesel truck drivers, had death rates from all causes and all cancer that were substantially below the rates among US males. Furthermore, unlike earlier evidence that was used in the TAC declaration, this cohort did not have a substantially elevated lung cancer death rate.*

Dr. Enstrom also indicates that the premature mortality calculation in the report, "Quantification of the Health Impacts and Economic Valuation of Air Pollution from Ports and Goods Movement in California," is exaggerated. Dr. Enstrom's analysis "found no relationship between $PM_{2.5}$ and mortality in elderly Californians during 1983–2002."

Southern California Association of Governments

Southern California Association of Governments (SCAG) Sustainable Communities Strategy (SCS) within Regional Transportation Plan (RTP) demonstrates the region's ability to attain and exceed the GHG emission reduction targets set by the CARB. The SCS outlines the plan for integrating the transportation network and related strategies with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands. The regional vision of the SCS maximizes current voluntary local efforts that support the goals of SB 375, as evidenced by several Compass Blueprint Demonstration Projects and

various county transportation improvements. The SCS focuses the majority of new housing and job growth in high-quality transit areas and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development. This overall land use development pattern supports and complements the proposed transportation network, which emphasizes system preservation, active transportation, and transportation demand management measures.

The RTP/SCS exceeds its greenhouse gas emission-reduction targets set by the CARB by achieving an 8 percent reduction by 2020, an 18 percent reduction by 2035, and a 21 percent reduction by 2040 compared to the 2005 level on a per capita basis. **Table 7**, *SCAG Assumptions for Moreno Valley,* shows the assumptions regarding Moreno Valley that SCAG used in its 2016 analysis.

Table 7
SCAG Assumptions for Moreno Valley

Year	Population	Households	Employment
2012	197,600	51,800	31,400
2040	256,600	73,000	83,200

Source: Southern California Association of Governments 2016
(http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_DemographicsGrowthForecast.pdf)

The RTP also includes an appendix on Goods Movement, which provides an overview of the regional goods movement and initiatives to facilitate it. The 2016 RTP does not include a list of proposed or recommend strategies. Proposed Strategies in the 2012 RTP (that are still relevant in the 2016 RTP) that include the Local Jurisdiction as a responsible party, that could be applicable to the project, and that pertain to air quality or greenhouse gases are shown in **Table 8**, *Select 2012 Regional Transportation Plan Strategies*. Many of the strategies are similar to the project's mitigation measures and project design features.

Table 8
Select 2012 Regional Transportation Plan Strategies

Strategy	Responsible Party*	Project Consistency
Encourage the use of range-limited battery electric and other alternative fueled vehicles through policies and programs, such as, but not limited to, neighborhood oriented development, complete streets, and electric (and other alternative fuel) vehicle supply equipment in public parking lots.	Local Jurisdictions, COGs, SCAG, CTCs	Consistent with **Mitigation Measures AIR-7** (non-diesel yard trucks), **AIR-8** (alternative fuel station), and **AIR-11** (electric vehicle charging stations).
Support projects, programs, and policies that support active and healthy community environments that encourage safe walking, bicycling, and physical activity by children, including, but not limited to development of complete streets, school siting policies, joint use agreements, and bicycle and pedestrian safety education.	Local Jurisdictions and CTCs	Consistent with **Mitigation Measure AIR-11** (bicycle lanes, storage lockers, and pedestrian connections/pathways).

Table 8
Select 2012 Regional Transportation Plan Strategies

Strategy	Responsible Party*	Project Consistency
Engage in a strategic planning process to determine the critical components and implementation steps for identifying and addressing open space resources, including increasing and preserving park space, specifically in park-poor communities.	Local Jurisdictions and CTCs	The project is consistent with City's goal of conserving open space. As compared to the Moreno Highlands Specific Plan, theproject would change the zoning on 910 acres from residential to open space. In addition, the project preserves the zoning of 74 acres of open space in the southwest corner of the project site for passive open space and recreation uses. Finally, a network of trails has been proposed within the project site to provide public trail access to the Lake Perris Recreational Area and the San Jacinto Wildlife Area.
Develop first-mile/last-mile strategies on a local level to provide an incentive for making trips by transit, bicycling, walking, or neighborhood electric vehicle or other zero emission vehicle options.	Local Jurisdictions and CTCs	Consistent with **Mitigation Measure AIR-11** (Riverside County's Rideshare Program), bicycle lanes, and pedestrian access.
Encourage transit fare discounts and local vendor product and service discounts for residents and employees of transit oriented development/high quality transit areas or for a jurisdiction's local residents in general who have fare media	Local Jurisdictions	Not applicable. This measure is for areas in transit-oriented development.
Encourage the implementation of a Complete Streets policy that meets the needs of all users of the streets, roads and highways—including bicyclists, children, persons with disabilities, motorists, neighborhood electric vehicle (NEVs) users, movers of commercial goods, pedestrians, users of public transportation and seniors—for safe and convenient travel in a manner that is suitable to the suburban and urban contexts within the region.	Local Jurisdictions, COGs, SCAG, CTCs	Although the project is not implementing what is labeled as a "Complete Streets" policy, the project would include bicycle lanes and pedestrian access (**Mitigation Measure AIR-11**) and would implement handicapped access pursuant to current regulations.
Support work-based programs that encourage emission reduction strategies and incentivize active transportation commuting or ride-share modes.	SCAG, Local Jurisdictions	Consistent through **Mitigation Measure AIR-11** (Riverside County's Rideshare Program; designated parking for carpool/van pools).
Develop infrastructure plans and educational programs to promote active transportation options and other alternative fueled vehicles, such as neighborhood electric vehicles, and consider collaboration with local public health departments, walking/biking coalitions, and/or Safe Routes to School initiatives, which may already have components of such educational programs in place.	Local Jurisdictions	Consistent with **Mitigation Measures AIR-11** (bicycle lanes, pedestrian access, electric vehicle charging) and **AIR-8** (alternative fueling infrastructure).
Encourage the development of telecommuting programs by employers through review and revision of policies that may discourage alternative work options.	Local Jurisdictions and CTCs	Not applicable. Tenants may choose to implement telecommuting if feasible.
Emphasize active transportation and alternative fueled vehicle projects as part of complying with the Complete Streets Act (AB 1358).	State, SCAG, Local Jurisdictions	Consistent with **Mitigation Measure AIR-8** (alternative fueling station) and **Mitigation Measure AIR-11** (electric vehicle charging stations)

* Abbreviations:
SCAG = Southern California Association of Governments

Table 8
Select 2012 Regional Transportation Plan Strategies

Strategy	Responsible Party*	Project Consistency

CTCs = county transportation commissions
COGs = subregional councils of governments
Source: Southern California Association of Governments 2012

The Goods Movement appendix of the 2016 RTP/SCS describes a process to develop and deploy needed technologies, along with key action steps for public sector agencies to help move the region to that objective. The 2016 RTP/SCS reaffirms zero- and near zero-emission technologies as a priority, and establishes the regional path forward to such as goods movement system.

SB 375 took effect in 2009 and required regional municipal planning organizations to develop regional land use plans that demonstrate how the regions will achieve compliance with the GHG reduction goals of AB 32. Cities located within these regions are then required, in turn, to update their General Plans in accordance with the regional plans. Non-compliance with SB 375 will result in transportation funds being withheld from the regional and/or local agency. To date, the regional municipal planning organization for Riverside County (the Western Riverside Council of Governments, or WRCOG) has not adopted a regional plan that is in compliance with SB 375.

2.5 Local

City of Moreno Valley

General Plan

Chapter 9 of the City's General Plan defines goals and policies related to air quality within the City of Moreno Valley. The specific policies of the General Plan that are relevant to theproject are as follows:

Objective 6.6 Promote land use patterns that reduce daily automotive trips and reduce trip distance for work, shopping, school, and recreation.

Objective 6.7 Reduce mobile and stationary source air pollutant emissions.

Policy 6.7.1 Cooperate with regional efforts to establish and implement regional air quality strategies and tactics.

Policy 6.7.2 Encourage the financing and construction of park and ride facilities.

Policy 6.7.3 Encourage express transit service from Moreno Valley to the greater metropolitan areas of Riverside, San Bernardino, Orange, and Los Angeles Counties.

Policy 6.7.4 Locate heavy industrial and extraction facilities away from residential areas and sensitive receptors.

Policy 6.7.5 Require grading activities to comply with South Coast Air Quality Management District's Rule 403 regarding the control of fugitive dust.

Policy 6.7.6 Require building construction to comply with the energy conservation requirements of Title 24 of the California Administrative Code.

Climate Action Strategy

The City of Moreno Valley approved the Energy Efficiency and Climate Action Strategy (Strategy) in October 2012. The Strategy identifies ways that the City can reduce energy and water consumption and greenhouse gas emissions as an organization (its employees and the operation of its facilities) and outlines the actions that the City can encourage and community members can employ to reduce their own energy and water consumption and greenhouse gas emissions. The Strategy contains the following policies to reduce greenhouse gas emissions in 2010 by 15 percent by 2020:

R2-T1 Land Use Based Trips and VMT Reduction Policies. Encourage the development of Transit Priority Projects along High Quality Transit Corridors identified in the SCAG Sustainable Communities Plan, to allow a reduction in vehicle miles traveled.

R2-T3 Employment-Based Trip Reductions. Require a Transportation Demand Management (TDM) program for new development to reduce automobile travel by encouraging ride-sharing, carpooling, and alternative modes of transportation.

R2-E1 New Construction Residential Energy Efficiency Requirements. Require energy efficient design for all new residential buildings to be 10 percent beyond the current Title 24 standards.

R2-E2 New Construction Residential Renewable Energy. Facilitate the use of renewable energy (such as solar [photovoltaic] panels or small wind turbines) for new residential developments. Alternative approach would be the purchase of renewable energy resources off site.

R2-E5 New Construction Commercial Energy Efficiency Requirements. Require energy efficient design for all new commercial buildings to be 10 percent beyond the current Title 24 standards.

R3-E1 Energy Efficient Development, and Renewable Energy Deployment Facilitation and Streamlining. Updating of codes and zoning requirements and guidelines to further implement green building practices. This could include incentives for energy-efficient projects.

R3-L2 Heat Island Plan. Develop measures that address "heat islands." Potential measures include using strategically placed shade trees, using paving materials with a Solar Reflective Index of at least 29, an open grid pavement system, or covered parking.

R2-W1 Water Use Reduction Initiative. Consider adopting a per capita water use reduction goal which mandates the reduction of water use of 20 percent per capita with requirements applicable to new development and with cooperative support of the water agencies.

R3-W1 Water Efficiency Training and Education. Work with EMWD and local water companies to implement a public information and education program that promotes water conservation.

R2-S1 City Diversion Program. For solid waste, consider a target of increasing the waste diverted from the landfill to a total of 75 percent by 2020.

SECTION 3
Significance Thresholds

3.1 State CEQA Guidelines, Appendix G

Based on Appendix G of the CEQA Guidelines, air quality impacts would occur if the project would:

AIR-1: Conflict with or obstruct implementation of the applicable air quality plan;

AIR-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

AIR-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

AIR-4: Expose sensitive receptors to substantial pollutant concentrations; and/or

AIR-5: Create objectionable odors affecting a substantial number of people.

GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or

GHG-2: Conflict with any applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

In addition to the Federal and State AAQS, there are daily emissions thresholds for construction and operation of a project in the Basin. The Basin is administered by the SCAQMD, and guidelines and emissions thresholds established by the SCAQMD in its CEQA Air Quality Handbook[50] and subsequent additions to the Handbook were used in this analysis. It should be noted that the emissions thresholds were established based on the attainment status of the air basin with regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety, these emissions thresholds are regarded as conservative and would overstate an individual project's contribution related to air quality and health risks.

50 *CEQA Air Quality Handbook*, April 1993.

Air Quality Thresholds

Construction Emissions

The following CEQA significance thresholds for regional construction emissions have been established by the SCAQMD for the Basin:

- 75 pounds per day of VOC, also known as reactive organic compounds (ROC).
- 100 pounds per day of NO_X.
- 550 pounds per day of CO.
- 150 pounds per day of PM_{10}.
- 150 pounds per day of SO_X.
- 55 pounds per day of $PM_{2.5}$.

Projects in the Basin with construction-related emissions that exceed any of the emission thresholds are considered to be significant under CEQA.

Operational Emissions

Projects with regional operation-related emissions that exceed any of the regional emission thresholds listed below are considered significant under the SCAQMD guidelines.

- 55 pounds per day of VOC, also known as ROC.
- 55 pounds per day of NO_X.
- 550 pounds per day of CO.
- 150 pounds per day of PM_{10}.
- 150 pounds per day of SO_X.
- 55 pounds per day of $PM_{2.5}$.

Carbon Monoxide Hotspots

The significance of localized project impacts under CEQA depends on whether ambient CO levels in the vicinity of the project are above or below State and Federal CO standards. If ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or Federal standard, project emissions are considered significant if they increase one-hour CO concentrations by 1.0 ppm or more or eight-hour CO concentrations by 0.45 ppm or more. The Basin meets State and Federal attainment standards for CO; therefore, the project would have a significant CO impact if project emissions result in an exceedance of State or

Federal one-hour or eight-hour standard. The following emission concentration standards for CO, based on the SCAQMD CEQA Air Quality Handbook (1993), apply to the project:

- California State one-hour CO standard of 20.0 ppm.
- California State eight-hour CO standard of 9.0 ppm.

Localized Significance Thresholds

The SCAQMD published its Final Localized Significance Threshold Methodology in June 2003, revised July 2008) and Final Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Thresholds (October 2006), recommending that all air quality analyses include a localized assessment of both construction and operational impacts on the air quality of nearby sensitive receptors. Localized Significant Thresholds (LSTs) represent the maximum emissions from a project site that are not expected to result in an exceedance of Federal or State AAQS. LSTs are based on the ambient concentrations of that pollutant within the Source Receptor Area (SRA) where a project is located and the distance to the nearest sensitive receptor. The project site is located in the northern portions of SRAs 24 (Moreno Valley) and 28 (San Jacinto).

In the case of CO and NO_2, if ambient levels are below the air standards for these pollutants, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or Federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. This would apply to PM_{10} and $PM_{2.5}$, both of which are nonattainment pollutants in the Basin. For these latter two pollutants, the significance criteria are the pollutant concentration thresholds presented in SCAQMD Rules 403 and 1301. The Rule 403 threshold of 10.4 $\mu g/m^3$ applies to construction emissions (and may apply to operational emissions at aggregate handling facilities). The Rule 1301 threshold of 2.5 $\mu g/m^3$ applies to non-aggregate handling operational activities.

Sensitive receptors include residences, schools, hospitals, and similar uses that are sensitive to adverse air quality. There are currently six occupied single-family homes and associated ranch/farm buildings in various locations on the project site. These residences are existing on-site sensitive receptors. The nearest off-site existing sensitive receptors in the vicinity of the project site are the residences located along Bay Avenue, Merwin Street, and west of Redlands Boulevard, and scattered residences along Gilman Springs Road.

Following the SCAQMD LST methodology, for sites larger than 5 acres, air dispersion modeling needs to be conducted. Because the project site greatly exceeds 5 acres, the localized significance for project air pollutant emissions was determined by performing dispersion modeling to determine if the pollutant concentrations would exceed relevant significance thresholds established by the SCAQMD.

The following LSTs were applied to the construction and operation of the project:

- 0.18 ppm (State 1-hour); 0.100 ppm (Federal 1-hour); and 0.03 ppm (Annual) of NO_2 for construction or operations.

- 20 ppm (1-hour) and 9.0 ppm (8-hour) of CO for construction or operation.
- 10.4 µg/m^3 (24-hour) and 1 µg/m^3 of PM_{10} (Annual) for construction.
- 2.5 µg/m^3 (24-hour) and 1.0 ppm (Annual) of PM_{10} for operations.
- 10.4 µg/m^3 (24-hour) of $PM_{2.5}$ for construction.
- 2.5 µg/m^3 (24-hour) of $PM_{2.5}$ for operation.
- Note that when construction and operational activities occur at the same time, the SCAQMD recommends application of the significance thresholds for operation apply in determining emission significance

Health Risk Significance Thresholds

For pollutants without defined significance standards or air contaminants not covered by the standard criteria cited above, the definition of substantial pollutant concentrations varies. For toxic air contaminants (TAC), "substantial" is taken to mean that the individual cancer risk exceeds a threshold considered to be a prudent risk management level.

The SCAQMD has defined several health risk significance thresholds that it recommends to Lead Agencies in assessing a project's health risk impacts. The City of Moreno Valley has not adopted its own set of thresholds. Therefore, the following SCAQMD thresholds were adopted for the project.

- **Maximum Individual Cancer Risk (MICR) and Cancer Burden.** The MICR is the estimated increase in lifetime probability of the maximally exposed individual contracting cancer as a result of exposure of TACs over the applicable exposure period. Cancer burden multiples the cancer risk by the exposed population to estimate the number of individuals that would be expected to contract cancer from the project.

  A significant impact would occur for:

  A. An increased MICR greater than 10 in 1 million at any receptor location; or

  B. A cancer burden greater than 0.5.

- **Chronic Hazard Index (HI).** This is the ratio of the estimated long-term level of exposure to a TAC for a potential maximally exposed individual to its chronic reference exposure level. A reference exposure level is the exposure level below which an adverse health effect will not occur as determined by health professionals The chronic HI calculations include multi-pathway consideration, when applicable.

  A significant impact would occur if the increase in total chronic HI for any target organ system due to exposures to total TAC emissions from the project exceeds 1.0 at any receptor location.

- **Acute Hazard Index (HI).** This is the ratio of the estimated maximum one-hour concentration of a TAC for a potential maximally exposed individual to its acute reference exposure level, the exposure level below which an adverse health effect will not occur as determined by health professionals.

  A significant impact would occur if the increase in total acute HI for any target organ system due to exposure to total TAC emissions from the project exceeds 1.0 at any receptor location.

Greenhouse Gas Thresholds

On December 5, 2008, the SCAQMD Governing Board adopted an interim greenhouse gas significance threshold for stationary sources, rules, and plans where the SCAQMD is the lead agency (SCAQMD permit threshold). Tier 3 of the threshold is recommended by the SCAQMD for industrial projects.[51] The threshold consists of five tiers, as follows:

- Tier 1 consists of evaluating whether or not a project qualifies for any applicable exemption under CEQA. The project is not exempt under CEQA; therefore, go to Tier 2.

- Tier 2 consists of determining whether or not the project is consistent with a greenhouse gas reduction plan. If a project is consistent with a qualifying local greenhouse gas reduction plan, it does not have significant greenhouse gas emissions. There is no greenhouse gas reduction plan that could be used for CEQA purposes for this project; go to Tier 3.

- Tier 3 is a screening threshold level to determine significance using a 90 percent emission capture rate approach and is 10,000 $MTCO_2e$ per year (with construction emissions amortized/averaged over 30 years and added to operational emissions). Project greenhouse gas emissions are compared with the threshold, 10,000 $MTCO_2e$ per year (see analysis below).

- Tier 4 was not approved in the interim greenhouse gas threshold.

- Tier 5 would allow the project proponent to purchase offsite mitigation to reduce greenhouse gas emissions to less than the screening level (in Tier 3).

Section 15064.4(b) of the CEQA Guideline amendments for greenhouse gas emissions state that a lead agency may take into account the following three considerations in assessing the significance of impacts from greenhouse gas emissions.

Consideration #1: The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.

Consideration #2: Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

[51] SCAQMD. 2015. Air Quality Significance Thresholds. Revised March 2015. http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2

Consideration #3: The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

AB 32 Capped and Uncapped Emissions

The ARB has designed a California cap-and-trade program that is enforceable and meets the requirements of AB 32. The program began on January 1, 2012, with an enforceable compliance obligation beginning with its 2013 greenhouse gas emissions inventory. Some of the project's greenhouse gas emissions are subject to the requirements of the AB 32 Cap and Trade Program and will have a greenhouse gas allocation based on current emissions levels. The AB 32 Cap-and-Trade Program has divided allocations into sectors. The transportation and electricity sectors would be covered by the cap-and-trade program.

The SCAQMD has recognized that the greenhouse gas emissions associated with capped sources should not be counted for the purpose of determining what the greenhouse gas emissions are for facilities that will use electricity generated elsewhere. In September 2013, the SCAQMD adopted the following two Negative Declarations last year stating that greenhouse gas emissions subject to the ARB Cap-and-Trade Program do not count against the 10,000 $MTCO_2e$ significance threshold the SCAQMD applies when acting as a lead agency:

- Ultramar Inc. Wilmington Refinery Proposed Cogeneration Project[52]
- Phillips 66 Los Angeles Refinery Carson Plant - Crude Oil Storage Capacity Project[53]

In addition, the San Joaquin Valley Air Pollution Control District (SJVAPCD) has recently taken this issue one step further and adopted a policy: "CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation".[54] This policy applies when the SJVAPCD is the lead agency and when it is a responsible agency. In short, the SJVAPCD "has determined that GHG emissions increases that are covered under ARB's Cap-and-Trade regulation cannot constitute significant increases under CEQA . . ." The SJVAPCD classifies ARB's Cap-and- Trade Program as an approved greenhouse gas emission reduction plan or

52 SCAQMD. Final Negative Declaration for: Ultramar Inc. Wilmington Refinery Cogeneration Project. October 2014. https://planning.lacity.org/eir/CrossroadsHwd/deir/files/references/C38.pdf

53 SCAQMD. Final Negative Declaration for: Phillips 66 Los Angeles Refinery Carson Plant - Crude Oil Storage Capacity Project. December 2014. http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2014/phillips-66-fnd.pdf

54 San Joaquin Valley Air Pollution Control District (SJVAPCD). 2014. CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation. https://www.valleyair.org/policies_per/Policies/APR-2025.pdf

greenhouse gas mitigation program under CEQA Guidelines Section 15064(h) (3). Here are some other pertinent excerpts from that policy:

- Consistent with CCR §15064(h)(3), the District finds that compliance with ARB's Cap-and-Trade regulation would avoid or substantially lessen the impact of project-specific GHG emissions on global climate change.

- The District therefore concludes that GHG emissions increases subject to ARB's Cap-and-Trade regulation would have a less than significant individual and cumulative impact on global climate change.

- [I]t is reasonable to conclude that implementation of the Cap-and-Trade program will and must fully mitigate project-specific GHG emissions for emissions that are covered by the Cap-and-Trade regulation.

- [T]he District finds that, through compliance with the Cap-and-Trade regulation, project-specific GHG emissions that are covered by the regulation will be fully mitigated.

The policy acknowledges that "combustion of fossil fuels including transportation fuels used in California (on and off road including locomotives), not directly covered at large sources, are subject to Cap-and-Trade requirements, with compliance obligations starting in 2015." As such, the SJVAPCD concludes that greenhouse gas emissions associated with vehicle miles traveled cannot constitute significant increases under CEQA. This regulatory conclusion is therefore directly applicable to the project because vehicle miles traveled is by far the largest source of project greenhouse gas emissions.

Therefore, only the uncapped project emissions are compared with the SCAQMD significance threshold (see Tier 3 above).

SECTION 4
Methodology

The evaluation of potential impacts to air quality and GHG emissions that may result from the construction and long-term operations of the Project is conducted as follows:

4.1 Construction

Construction-related emissions are expected from various activities associated with the construction of the project such as rough grading, infrastructure construction, asphalt paving, building construction, architectural coatings, and construction workers commuting. Construction emissions for construction worker vehicles traveling to and from the project site, in addition to vendor trips (construction materials delivered to the project site) and haul trips (dump trucks and concrete trucks) were also accounted for in the analysis. Localized air quality in the project area would be affected by both heavy-duty construction equipment usage on site as well as local traffic due to the equipment delivery and construction worker commuting. The SCAQMD CEQA methodology was used to analyze the criteria pollutant emissions from these activities.

The assumptions that follow in this section are for the criteria pollutant analysis and the greenhouse gas analysis. This section describes the assumptions used to estimate the emissions using the California Emissions Estimator Model (CalEEMod) (Version 2016.3.2). The criteria pollutants estimated by CalEEMod for construction are as follows: VOC, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. In addition, CalEEMod also estimated construction emissions for methane, nitrous oxide, carbon dioxide, and $MTCO_2e$ for use in the greenhouse gas impact assessment.

Construction was assumed to occur over 15 years. Although buildout of the project would depend on market conditions, the project could be built out and operational as early as 2035.[55] Therefore, to provide a conservative air quality analysis, construction was assumed to be completed over a 15-year period that provides for phase overlap and the use of older construction equipment.

The various activities during construction are described as follows:

- Mass excavation: Approximately 42 million cubic yards (cy) of cut and fill will be required to rough/mass grade the entire project site, including remedial grading and over-

[55] *Full build out of the Project is expected to take 15 to 20 years, dependent on market forces. The TIA analyzes full project buildout in 2040, which is worst case for traffic analysis purposes as it accounts for greater regional growth in non-project traffic. However, for purposes of a conservative construction impact analysis, the fifteen-year buildout (construction ending in 2034 and full operations in 2035) is analyzed. An accelerated construction schedule occurring in earlier years would account for greater overlap of construction activity and the use of dirtier construction equipment (i.e. subject to less stringent emission standards).*

excavation. Earthwork will balance on site within the Specific Plan, eliminating the need to import or export dirt for the project.

- Finish grading: This activity is to fine tune the drainage patterns on the site and achieve the finish tolerance of the grading activity.

- Building: This activity involves construction of the buildings on the project site. The sub-activities include bringing concrete to the site, tilting up the concrete walls, constructing the wet utilities, installing the electrical, and installing the landscaping around the buildings.

- Concrete: Concrete pouring would likely occur during nighttime hours due to limitations high temperatures pose for concrete work during the day. On-site equipment used during concrete pouring would involve daytime prep with actual concrete pouring occurring during the nighttime hours. On average, the total hours of operation for each piece of equipment during the concrete phase would be approximately 10 hours. Therefore, the analysis assumes a realistic average use of construction equipment by assuming that the maximum equipment would be used for five days per week occurring for 10 hours per day (including the concrete pouring phase).

- Utilities: Grading and trenching for electrical, natural gas, etc.

- Interchange: Construction related to the State Route 60 (SR-60) interchange improvements.

- Curbing/driving approaches: Constructing curbs and driveways.

- Coatings: The exterior of the buildings and the interior of the office space would be painted. CalEEMod assumes that a high quantity of painting would occur, even though the project consists of warehouses and would require minimal painting. VOC from painting is estimated outside of CalEEMod.

- Paving: The acreage to be paved in unknown at this time; it was assumed for worst-case purposes that one-third of each planning area would be paved. The VOC emissions from paving were estimated manually using the calculations presented in the CalEEMod User's Guide and the acreage of the planning area.

- Landscaping: This involves landscaping the area outside the immediate proximity of the buildings.

Off-road Equipment

The off-road equipment refers to the equipment that would operate onsite (and in the adjacent offsite areas, for offsite improvements) to move dirt and materials around, and include equipment such as scrapers, graders, loaders, pavers, excavators, and dozers. This equipment operates during all subphases of construction of the project.

The emission levels for off-road equipment are based on the emission factors, horsepower, load factor, and activity level of the equipment. The emission factors are generally described as an emission rate per horsepower and time of operation and depend on the type of equipment, horsepower, and model year of the equipment. In general, the horsepower is the power of an engine – the greater the horsepower, the greater the power to be able to move dirt and materials around. In general, a greater horsepower also results in greater emissions. The load factor is the average power of a given piece of equipment while in operation compared with its maximum rated horsepower. A load factor of 1.0 indicates that a piece of equipment continually operated at its maximum operating capacity. The activity level is generally represented by the number of hours the equipment is in operation during a time period such as a day. An air emissions model, such as CalEEMod, combines the emission factors, horsepower, load factor, and activity level and outputs the emissions for the various pieces of equipment and air pollutants.

The onsite construction equipment assumptions, including the horsepower, load factor, and number, are included in Appendix A of this report and are used in the emission model to estimate construction emissions.

Equipment *tiers* refers to the adoption of emission standards established by the EPA and ARB that apply to diesel engines in off-road equipment. The "tier" of an engine depends on the model year and horsepower rating; generally, the newer a piece of equipment is, the greater the tier it is likely to have. Beginning in year 2011, new off-road mobile engines sold that are equal to or greater than 175 horsepower (hp) and non-emergency stationary engines less than 10 liters per cylinder and equal to or greater than 175 hp are required to meet Tier 4 Interim standards (40 Code of Federal Regulations, part 1039). Tier 4 Final for engines greater than 130 hp are required as of 2014.

CalEEMod contains a default inventory of construction equipment for various land uses that incorporates estimates of the number of equipment, their age, their hp, and equipment tier from which rates of emissions are developed. For the unmitigated emissions estimates, all equipment is assumed to be the CalEEMod defaults. For the mitigated emissions estimates, the off-road equipment (those over 50 hp) are assumed to be Tier 4.

The analysis assumes that the onsite equipment are in the on position for 10 hours per day as a project design feature. This is a conservative scenario as the CalEEMod default assumes construction equipment would be on for 6 to 8 hours per day. This is used to calculate maximum daily emissions which are required for the regional analysis, because project emissions can occur on any day of the week.

Onsite equipment used during concrete pouring, which would most likely occur during the night, was assumed to occur over 24 hours to calculate the regional emissions for a worst-case 24-hour construction day. Concrete pouring phases that would include nighttime activity would occur for a maximum of one or two days for each planning area and not throughout the entire concrete pouring phase. It is assumed that during 24-hour concrete pour days, no other construction would occur on the project site. Therefore, in order to calculate annual average emissions, it is necessary to base emissions upon a realistic work schedule. The analysis assumes a more realistic annual

average use of construction equipment by assuming that the maximum equipment would occur for five days per week occurring for 10 hours per day (including the concrete pouring phase). In this way, an annual average and daily emission inventories were estimated.

Construction Trips

Construction trips refer to the number of trips to the project site from offsite locations and include the following groups:

- Workers: These are trips from construction workers from their residence to the project site. The CalEEMod default worker trip length of 14.7 miles was increased to 25 miles, to account for a potentially longer commute distance for construction workers. The CalEEMod default vehicle fleet mix was used for employee trips.

- Vendors: These trips include water trucks and service/support trucks bringing smaller materials to the project site. The vendor trip length was increased from the default of 6.9 miles to 25 miles, to account for any additional trips and to account for deliveries from the greater Los Angeles area. The CalEEMod default vehicle fleet was used for vendor trips.

- Haul Trucks: Dump truck trips, support haul trucks, concrete trucks, and material delivery trips were represented as haul trips, with a mileage of 25 miles per trip (increased from the default of 20 miles). The CalEEMod default vehicle type was used for haul trips.

CalEEMod utilizes EMFAC2014 emissions factors for on-road sources. Therefore, construction trips emissions were calculated outside of CalEEMod using updated EMFAC2017 emissions factors. Calculations are included as Appendix A of this report. The vendor and haul trips for onsite travel (assuming trip length of 0.5 miles) and idling were also calculated using EMFAC2017 emissions factors. The CalEEMod default hp and load factors for water trucks, concrete trucks, and off-highway trucks were included in the onsite construction equipment by assigning hours per day to account for onsite travel and idling. The hp and load factors were used for each equipment as specified below:

- Water trucks and service support trucks: other material handling equipment, 1 hour per day per trip

- Concrete trucks: cement and mortar mixers, 1 hour per day per trip

- Delivery trucks, dump trucks, and support haul trucks: off-highway trucks, 0.3 hours per day per trip

Fugitive Dust Estimates

Off-Road Equipment

Approximately 42 million CY of cut and fill will be required to rough/mass grade the entire project site, including remedial grading and over-excavation. Grading is required to make the

land level before the building foundations are laid. Earthwork will balance on-site within the Specific Plan, eliminating the need to import or export dirt for the project.

During grading activities, fugitive dust can be generated from the movement of dirt on the project site. CalEEMod estimates dust from dozers moving dirt around, dust from graders or scrapers leveling the land, and loading or unloading dirt into haul trucks. Each of those activities is calculated differently in CalEEMod based on the number of acres traversed by the grading equipment.

Only some pieces of equipment generate fugitive dust within CalEEMod during grading activities. However, there could be construction emissions occurring over the entire planning area because some equipment does not generate fugitive dust. As an example, the building forklifts lifting materials up would not generate fugitive dust. In addition, there could be groups of graders and scrapers working at different ends of the planning area. The dispersion modeling assessment assumes that emissions would occur over the entire planning area.

According to CalEEMod, only several types of onsite off-road construction equipment generate fugitive dust. These include scrapers, crawler tractors, graders, and rubber tired dozers. For a conservative approach, for this assessment, it was assumed that compactors, excavators, and backhoes also generated fugitive dust. The scrapers are assumed to impact 1 acre over an 8-hour day and the other equipment mentioned above would impact ½ acre over an 8-hour day.

SCAQMD Rule 403 requires fugitive dust generating activities to follow best available control measures to reduce emissions of fugitive dust. In particular, the project would need to comply with the requirements of a "large operation," which requires more dust suppressant methods. Rule 403 states that for large operations, during earth moving, the soil moisture content must be at least 12 percent or water to prevent visible dust emissions from exceeding 100 feet in any direction. According to the SCAQMD's Mitigation Measure Examples: Fugitive Dust from Construction & Demolition,[56] maintaining a 12 percent soil moisture would reduce fugitive dust by 69 percent. Therefore, for the unmitigated and mitigated emissions estimates, dust emissions from earth moving are reduced by 69 percent. These measures from Rule 403 are accounted for in CalEEMod as "mitigation" because they reduce emissions, even though they are technically not mitigation, but requirements. Rule 403 is accounted for in CalEEMod by watering three times per day, which would result in a 61 percent reduction in fugitive dust.

Unpaved Road Dust

There could be fugitive dust generated on unpaved roads from the employee vehicles, vendor vehicles, and haul trucks during construction. The emissions estimates for this dust were estimated using assumptions consistent with CalEEMod defaults. The mean vehicle speed was reduced from 40 miles per hour to 20 miles per hour. The percent paved was changed to zero percent. Construction parking would likely be near the paved roads; therefore, the onsite distance

[56] SCAQMD. 2007. Fugitive Dust Mitigation Measures. http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-overview.pdf

is an average of 0.5 mile per trip on unpaved roads. The average vehicle weight was increased from the CalEEMod default of 2.4 tons to 5 tons. All other CalEEMod defaults were used.

SCAQMD Rule 403 requires dust control measures on unpaved roads. Best available control measure 15-1 requires that all off-road traffic and parking areas be stabilized (gravel/paving). Best available control measure 15-2 requires that all haul routes be stabilized gravel/paving) and measure 15-3 requires that construction traffic be directed over established haul routes. In addition, large operations must choose one of the following to reduce dust from unpaved roads:

(4a): Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8-hour work day]; or

(4b): Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; or

(4c): Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.

The fugitive dust reductions from the above control measures is quantified as follows; the smallest percent reduction is used in this analysis, which is from control measure 4a (60 percent reduction):

(4a): According to the SCAQMD mitigation measure examples for Fugitive Dust from Construction and Demolition,[57] applying water every three hours results in a 61 percent decrease in PM_{10}. Applying a 50 percent moisture content for unpaved roads in CalEEMod's "mitigation" module results in a 60 percent reduction in fugitive dust.

(4b): CalEEMod's watering twice per day would result in a 55 percent reduction in fugitive dust. A 55 percent reduction in unpaved road dust occurs when the soil moisture level is 34 percent. Applying a speed limit reduction of 15 miles per hour and watering twice per day reduces fugitive dust by 64.7 percent reduction, according to CalEEMod calculations.

(4c): According to the SCAQMD mitigation measure examples for Fugitive Dust from Unpaved Roads,[58] applying chemical dust suppressants results in an 84 percent reduction.

Water Usage

There would be water used during construction to be compliant with SCAQMD Rule 403. Approximately 30 to 50 gallons of water are needed to compact each cubic yard of soil. If there would be 42 million cy of cut and fill, a total of 6,445 acre feet (2,100 million gallons) of water

57 SCAQMD. 2007. Fugitive Dust Mitigation Measures. http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-overview.pdf

58 SCAQMD. 2007. Fugitive Dust Mitigation Measures. http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-overview.pdf

would be required. The greenhouse gas emissions associated with water transport are calculated using CalEEMod in its operation module.

Construction Waste

Greenhouse gas emissions associated with construction waste were estimated using the EPA's waste Reduction Model (WARM). The quantity of waste was estimated based on one construction waste case study and the 2008 California waste characterization study.

4.2 Operation

Operational emissions occur once the project commences operation. For purposes of this analysis, project buildout will occur in two phases. Therefore, operational emissions are analyzed for the Phase 1 buildout year and the full buildout year. The major sources of these emissions are summarized below.

To estimate some of the emissions on a year-by-year basis, the conceptual occupancy schedule for purposes of this analysis is shown in **Table 9**, *Conceptual Operational Occupancy Schedule,* based on the best current information. This schedule assumes that the square footage being constructed within each Plot will be occupied the following year and may vary in the future based on market demand factors associated with regional goods movement.

Table 9
Conceptual Operational Occupancy Schedule

Year	Annual Addition (Millions of Square Feet)	Cumulative Total (Millions of Square Feet)
2020	0.00	0.00
2021	4.60	4.60
2022	4.60	9.20
2023	4.60	13.80
2024	4.60	18.40
2025	4.55	22.95
2026	1.80	24.75
2027	1.80	26.55
2028	1.85	28.40
2029	1.80	30.20
2030	1.80	32.00
2031	1.80	33.80
2032	1.80	35.60
2033	1.80	37.40
2034	1.80	39.20
2035	1.40	40.60

Note: The square footage includes logistics development and light logistics square footage and does not include fueling station, fire station, and convenience store.

Motor Vehicle Emissions

Motor vehicle emissions refer to exhaust and road dust emissions from the automobiles and delivery trucks that would travel to and from the project site each day. The following procedures were used to estimate the mobile source criteria regional operational emissions, localized onsite emissions, and greenhouse gas emissions based on emission factors from the CARB EMFAC2017 mobile source emission model and emission information from the EPA dealing with paved road dust.

To quantify mobile source operational emissions, the following information is required:

- Trip generation – the number of vehicles that are expected to move to and from the project site each day.
- Vehicle fleet mix – the mix of vehicle types (i.e., automobiles, trucks, gasoline or diesel-fueled, etc.).
- Trip lengths – the distance each vehicle travels during each trips.
- Emission factors – the amount of emissions generated as a function of vehicle type, vehicle speed, calendar year, and vehicle model year for a given amount of vehicle idling time or distance traveled.

Trip Generation Rates

Trip generation quantifies the number of trips that a project generates each day during all facets of its operations. The trip generation is determined by multiplying an appropriate trip generation rate for a particular land use descriptive of the project by the quantity of that land use. Trip generation rates are determined for daily traffic, morning peak hour inbound and outbound traffic, and the evening peak hour inbound and outbound traffic for the proposed land use. The trip generation rates use for this project were derived from the project traffic impact analysis (TIA) prepared by WSP USA.[59] The trip generation rates applied in this assessment are shown in **Table 10**, *Trip Generation Rates*.

Table 10
Trip Generation Rates

Land Use	Units	Daily Trip Rate
High Cube Logistics Center	KSF	1.40
Light Logistics	KSF	1.74
Existing Utilities Servicing Station	KSF	13.24
Gas Station with Convenience Store	Fuel Pumps	31.61
Convenience Store	KSF	321.87
Fire Station	Number	137

KSF = thousands of square feet
Source: WSP USA Inc. Traffic Impact Analysis Report for The World Logistics Center. June 2018

[59] WSP USA, Inc. Traffic Impact Analysis Report for The World Logistics Center. June 2018

Working jointly with the National Association of Industrial and Office Properties (NAIOP), the SCAQMD conducted a trip generation study for high-cube warehouses, the predominant form of land use for the project, High-Cube Warehouse Vehicle Trip Generation Analysis (October 2016). The study replaces the earlier, smaller studies that produced conflicting results and created uncertainty regarding the amount of traffic generated by the newer, more automated type of high-cube warehouse proposed for the project. The results of the study for high-cube warehouse trip generation has been incorporated into the 10th edition of the Institute of Traffic Engineers (ITE) Trip Generation Manual. The trip generation rates included in this study for high-cube warehouse uses and trip rates from the 10th edition of the ITE Trip Generation Manual have been used for other proposed land uses.

Vehicle Fleet Mix

The vehicle fleet mix is defined as the mix of motor vehicle classes active during the operation of the project. Emission factors are assigned to the expected vehicle mix as a function of calendar year, vehicle class, speed, and fuel use (gasoline and diesel-powered vehicles). The vehicle fleet mix for the project is based on the assumptions contained in the TIA. The TIA provided a vehicle fleet mix for passenger cars, light duty trucks, medium duty trucks, and heavy duty trucks. For purposes of this assessment, the EMFAC2017 mobile source model was used to derive a complete mix of vehicles consisting of the following vehicle classes (some vehicle classes have been separated into subclasses based on vehicle weight):

- Passenger Car: light duty automobiles (LDA), and light duty trucks (LDT1 and LDT2) – identified as passenger cars in the TIA.
- Light Trucks: medium duty trucks (MDT) – identified as Light Trucks in the TIA.
- Medium Trucks: light-heavy duty trucks (LHDT1 and LHDT2) with a gross weight of between 8,501 pounds and 14,000 pounds – identified as Medium Trucks in the TIA.
- Heavy Trucks: medium-heavy duty trucks (MHDT) and heavy-heavy duty trucks (HHDT) with gross weight of 14,001 to 33,000 pound and 33,000-plus pounds, respectively – identified as Heavy Trucks in the TIA.

The EMFAC2017 model was also used to subdivide each vehicle class by electric, gasoline, diesel, and natural gas vehicles for each analysis year.

Two types of trip generation data were estimated for this assessment:

- Daily average: The daily average trip generation and VMT is representative of daily operations and is characterized by the total amount of vehicle trips and their travel distance during an operational day. The daily vehicle trips, VMT, and fleet mix were provided by the TIA and used to estimate the daily regional emissions from the operation of the project as a project's vehicles travel to and from the project site through the South Coast Air Basin. The daily vehicle trips and fleet mix were also used to estimate local daily and annual air quality impacts to the areas surrounding the project site.

- Peak hour: The peak hour vehicle fleet mix represents the number and mix of vehicles that would access the project during the peak hour of traffic. The peak hour information was provided by the TIA and used to estimate 1-hour and 8-hour local air pollutant impacts as well as for the estimation of acute non-cancer hazards.

Forecasted trip generation and vehicle miles traveled (VMT) contained in the TIA were used to estimate the project's motor vehicle emissions. The traffic model provided estimates of project traffic volumes segregated by vehicle class as passenger cars, light heavy duty trucks, medium heavy duty trucks, and heavy-heavy duty trucks. The TIA provides VMT attributable to the project based on the net effect the project has on regional travel as well as project VMT without consideration of a net effect. The net effect includes consideration that creation of a job center (the project) would redistribute existing regional travel and result in shorter employee trips. Freeway and non-freeway VMT and speed data, as provided by WSP, were utilized to determine the appropriate emission factors to apply to project trips from the EMFAC2017 model. In calculating the operational traffic emissions, the VMT per speed was based on daily speed data provided by WSP. Emissions factors vary by speed bin. Therefore, accounting for variations in speed attributable to slow downs occurring during peak hours provides a realistic representation of project mobile emissions.

For purposes of the health risk assessment, peak hour intersection turning movement volumes provided by the TIA for the project area were utilized in order to assign emissions to specific roadway and freeway segments to determine risk. The traffic model is composed of a series of traffic segments that represent the flow of traffic from one geographic point to another. The project's motor vehicle traffic volumes were estimated using the number of peak hour vehicles forecasted by the regional traffic model. The output of the traffic model is in the form of two-way traffic flows for each traffic segment. For each roadway segment, the total number of vehicles was forecasted. The number of vehicles was then broken down into several vehicle types, as described above. Motor vehicle emissions were then estimated for each roadway segment by using the traffic volumes extracted from the traffic model forecasts, the length of the roadway segment, and the emission factors from EMFAC2017.

Mobile emissions utilize EMFAC2017's projected vehicle fuel mix for Project milestone years 2025 and 2035, which are associated with Phase 1 buildout and project full occupancy, respectively. EMFAC2017 does not include population assumptions for electric trucks. The potential penetration of electric trucks and potential use in association with the project has been analyzed by ESA.[60] Although the State has set targets for zero-emission vehicles, it would be speculative to assume that any EV Penetration scenarios would be practicable or feasible. Therefore, as a worst-case analysis, the greenhouse gas analysis included herein does not factor in any potential emissions reductions provided by electric or natural gas-fueled trucks. For informational purposes only, emissions associated with a Medium EV Penetration Scenario has been taken into account to show further emissions reduction potential.

[60] ESA. World Logistics Center Transportation Energy Technical Study. June 2018

Local Travel

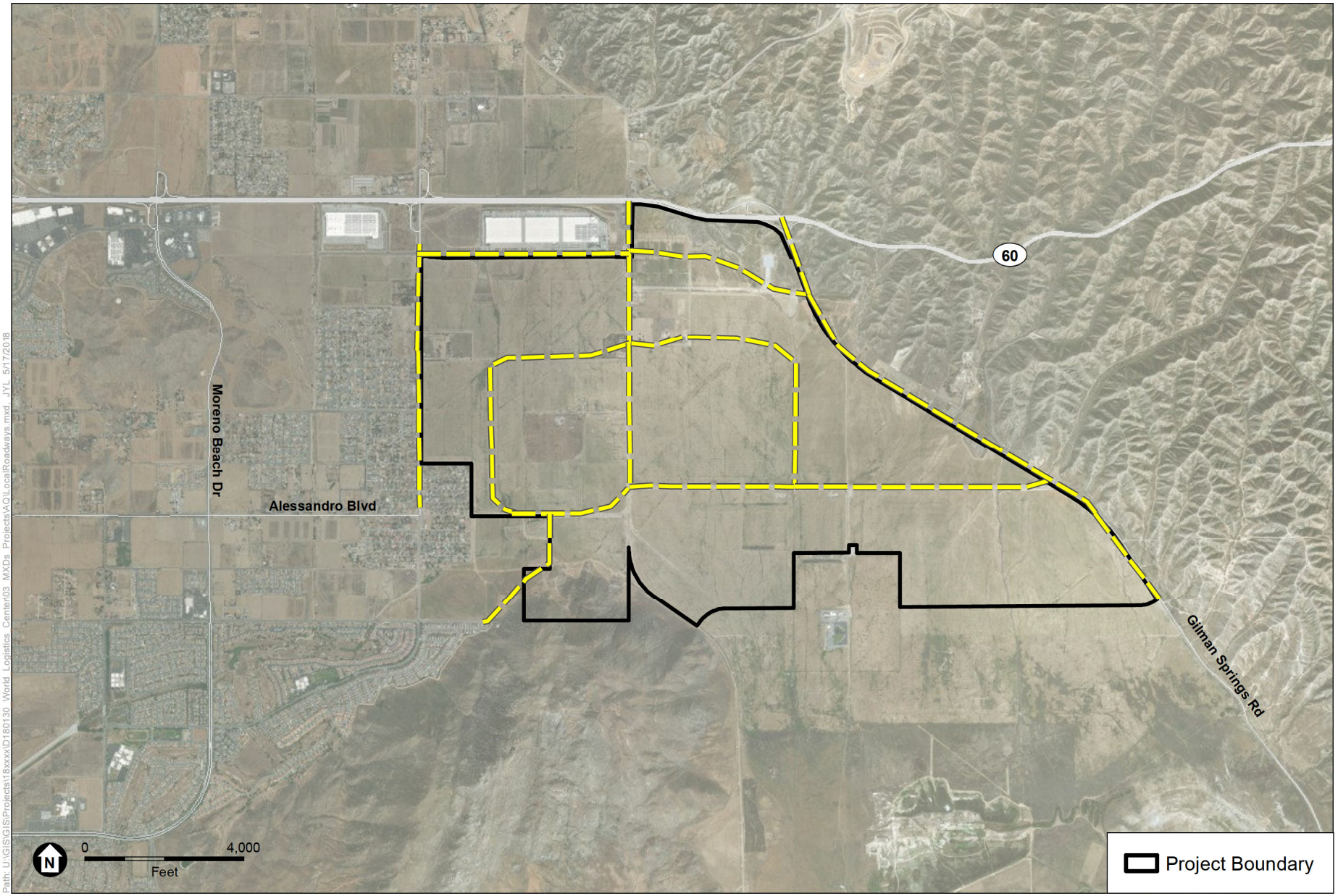
The automobile and truck traffic generated by the project would travel along several local roadways within and bordering the area of the project including Redlands Boulevard, World Logistics Center Parkway, Gilman Springs Road, Alessandro Boulevard, and Eucalyptus Avenue. As the project traffic travels along the roadway network, this traffic would generate air emissions. To examine the local air quality impacts from the project vehicles during operation along the local roadway network, a number of roadway segments were identified for analysis as described in the TIA.

The local roadway segments analyzed in this assessment are identified in Figure 18. The TIA only provided peak hour turning movement volumes along each of the roadway segments for passenger cars, and light, medium, and heavy trucks during the existing, Phase 1 interim year, and buildout year. For purposes of the health risk assessment, the average of the AM and PM peak hour volumes were multiplied by 10 to estimate daily traffic volumes along each of the studied roadway segments.

The localized air quality analysis also addressed vehicle travel and idling within the truck yards of each phase of the project site. The exact physical locations and sizes of the various buildings that would comprise the project are unknown at this time. However, average trip lengths within the truck yards for the project's two phases and individual land uses was estimated based on a review of the location of transportation analysis zones located within the project boundaries and the placement of the existing and planned local roadway network that would comprise the project. For this purpose, an average truck trip length of 1,080 feet was assigned to the high cube development truck yard areas, 574 feet for the light logistics land uses truck yards, 330 feet for the gas utility land use, and 160 feet for the fueling station/convenience store and fire station land uses.

Regional Travel

The project's motor vehicles would also travel along numerous regional roadways outside of the project boundaries including local surface street and freeways. Figure 19 shows the local surface street roadway network analyzed and Figure 20 shows the freeway segments analyzed.



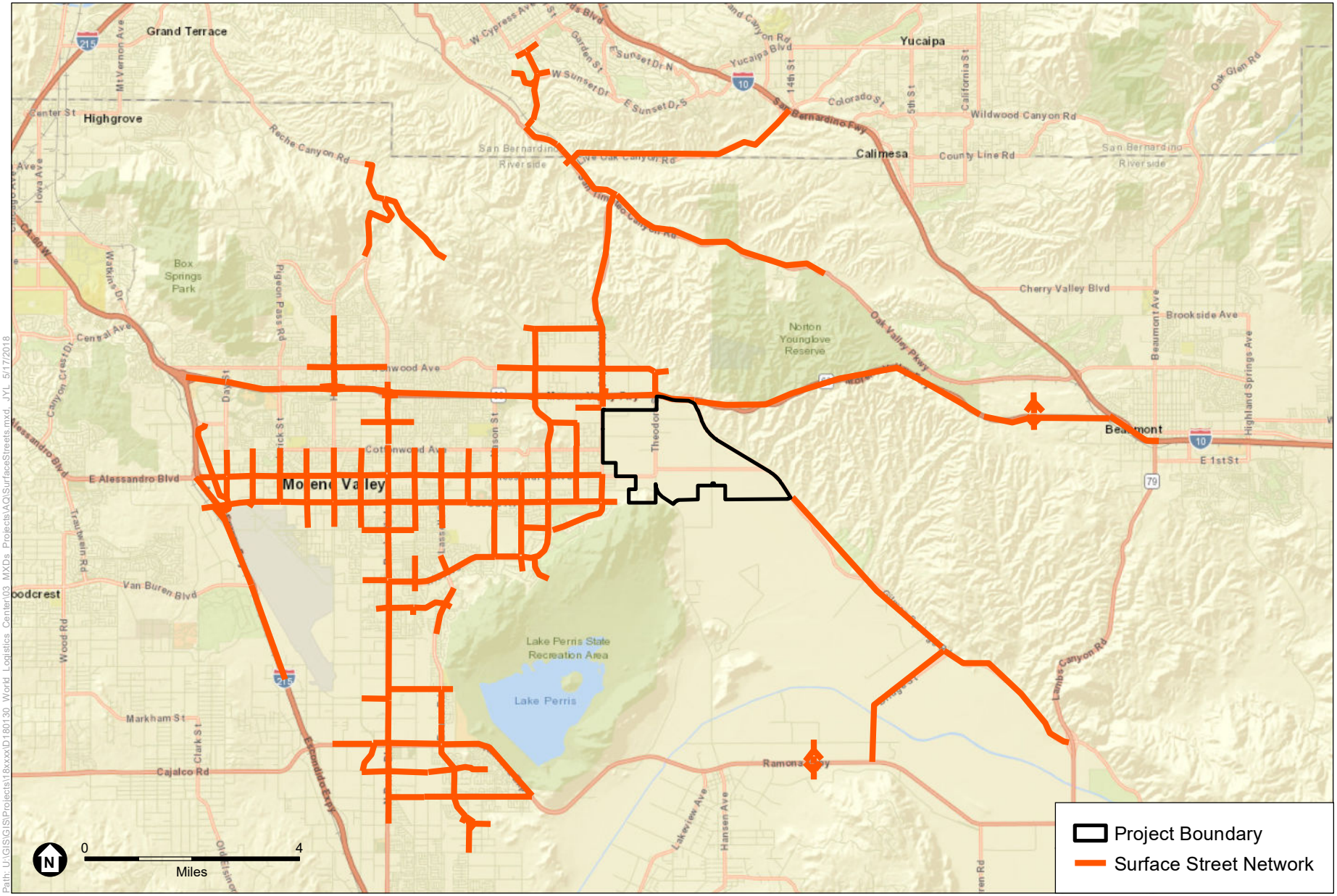
SOURCE: ESRI 2016; ESA 2018

World Logistics Center

Figure 18

Local Roadway Network Analyzed in the Local Air Quality and Health Risk Assessment

ESA

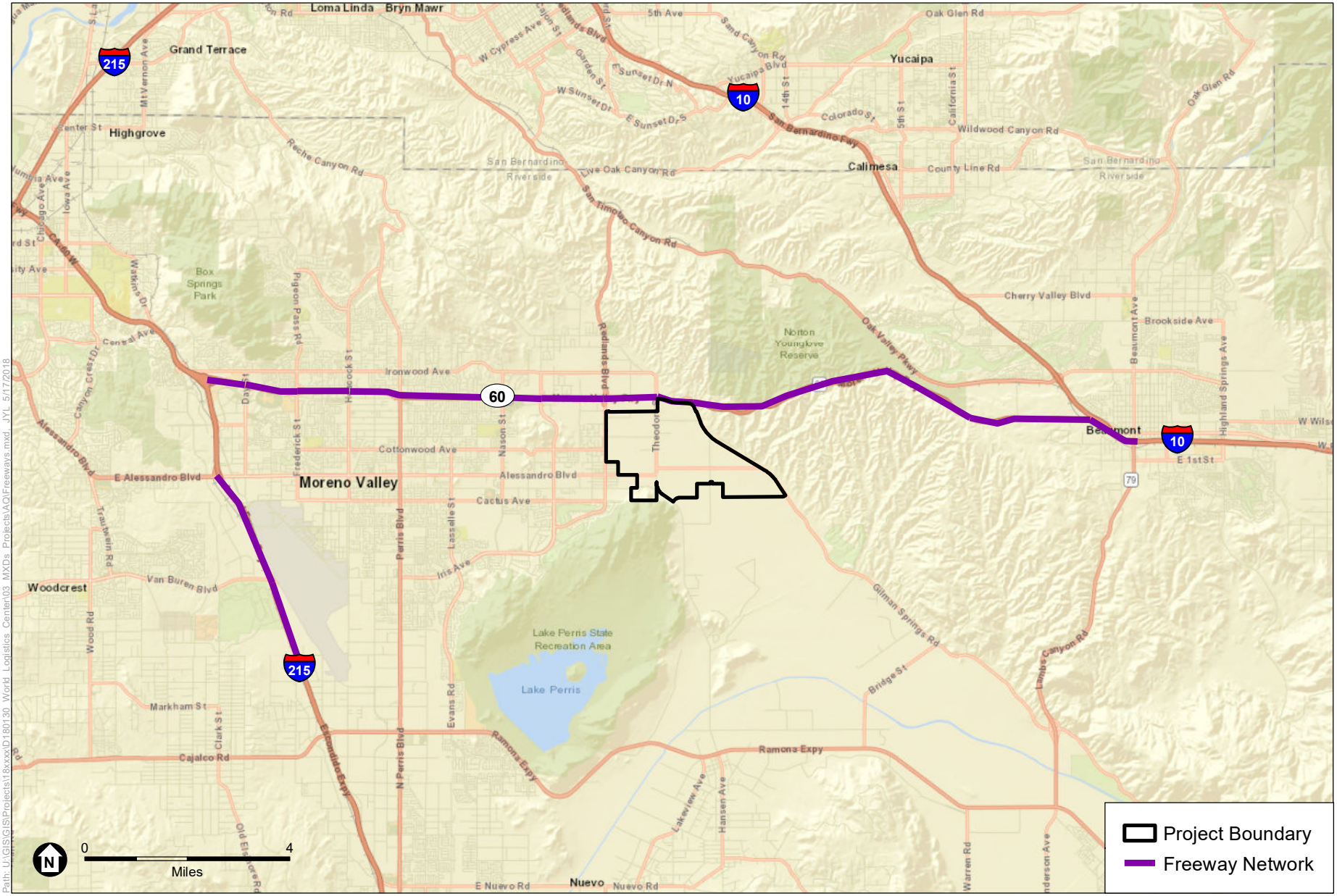


SOURCE: ESRI 2016; ESA 2018

World Logistics Center

Figure 19
Surface Street Network Analyzed in the Health Risk Assessment

ESA



SOURCE: ESRI 2016; ESA 2018

World Logistics Center

Figure 20

Freeway Network Analyzed in the Health Risk Assessment

ESA

Emission Factors

There are emission factors available through EMFAC for VOC, NO_X, CO, SO_X, PM_{10}, $PM_{2.5}$, CO_2, N_2O, and CH_4. There are no emission factors available for black carbon or ultrafine particles. Emissions from motor vehicles can be characterized as follows:

- Combustion Emissions (grams/mile traveled or grams/hour for idling): Combustion emissions (i.e., exhaust emissions) result from the combustion of fuel and are the main source of emissions for all pollutants for the project. EMFAC2017 has the capability to provide emission rates for user defined user speeds, fuel type, vehicle class, and model year.

- Running Loss (grams/mile): Running loss emissions are defined as evaporative hydrocarbons that are emitted from hoses, fittings or canisters, while the vehicle is in operation. This occurs either because fuel heating as caused the vapor generation rate to exceed the vehicle's capacity to control the vapors, or through permeation and leakage (VOC only).

- Diurnal and Resting Loss (grams/vehicle): Diurnal and resting loss emissions are evaporative hydrocarbons. Diurnal emissions result from a sitting vehicle as the ambient temperature rises. Resting loss emissions result from a sitting vehicle as the ambient temperature declines or remains constant.

- Tire wear (grams/mile): and Brake Wear (grams/mile): EMFAC has the capability to provide particulate emissions from tires and brakes that occur from operational wear (PM_{10} and $PM_{2.5}$ only).

- Road Dust (grams/mile) is generated from re-suspension of loose particulate material from the surface of the road as a result of movement of vehicles and wind flow. Road dust emissions are primarily a factor of the amount of re-suspendable particulate matter available on the road surface and the traffic flow volume on the road. The estimation of road dust emissions was based on the methodology presented by the EPA in its assessment of road dust emissions from paved roads (PM_{10} and $PM_{2.5}$ only).

The EMFAC2017 emission factors were developed for the South Coast Air Basin on an annual basis. To derive the basin-wide emission factors, the emission factors were developed as a weighted average of the county emission factors from the four counties that comprise the South Coast Air Basin, weighted by the vehicle miles traveled in each county.

Motor vehicle emissions for each category of emissions were estimated for vehicle travel within the project's truck yards, along adjacent and internal roadways, and truck idling within the project's truck yards.

Truck idling emissions assumed that each heavy duty truck would idle 5 minutes per day prior to mitigation, pursuant to the ARB Air Toxic Control Measure limiting the idling time for heavy duty diesel trucks and the World Logistics Center Specific Plan.

Emission factors for the year 2020 are used for the "worst-case" scenario. Phase 1 of the project used emission factors from the year 2025, and Phase 2 of the project used emission factors for the year 2035. For the mitigated version, the emission factors were modified to reflect the mitigation measure that requires the use of model year 2010 or newer trucks for all medium-heavy duty (MHDT) and heavy-heavy duty diesel (MHDT) trucks associated with the project.

Emission factors for the year 2020 were used for the "worst-case" scenario. Interim year 2025 (Phase 1 buildout) of the project used emission factors from the year 2025, and horizon year 2035 (Phase 2 buildout) of the project used emission factors for the year 2035. For years 2021 through 2024 and years 2026 through 2034, emissions factors and the Project's net effect on VMT were interpolated and scaled using data from 2025 and 2035 in order to provide an estimate of emissions and potential overlap of construction and operational emissions. For the mitigated scenario, the emission factors were modified to reflect the mitigation measure that requires the use of model year 2010 or newer trucks for all heavy-duty diesel trucks associated with the project. Note that emissions from the existing on-site residence and fugitive dust that would be removed were not included in this analysis as a worst-case scenario.

A Note About Operational Heavy-Duty Truck Emissions

The majority of the project's operational emissions are from on-road mobile sources, more particularly, heavy-duty trucks that contribute a disproportionate amount of emissions compared to passenger vehicles. Emissions from on-road mobile sources are regulated at the state and federal levels, and therefore, are outside of the control of local agencies such as the City and the SCAQMD. For example, the EPA is working closely with the EPA, engine, and vehicle manufacturers, and other interested parties to identify programs that will reduce emissions from heavy-duty diesel vehicles in California. In its "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles," the ARB presented a blueprint for achieving a 75 percent reduction in diesel particulates by 2010 and an 85 percent reduction by 2020 from the 2000 baseline.[61] The emission reductions would arise from a combination of measures including the use of ultra-low sulfur diesel fuel, new emission standards for large diesel engines, restrictions on diesel engine idling, addition of post-combustion filter and catalyst equipment, and retrofits for business and government diesel truck fleets. The implementation of these emission reductions will also result in reductions of other pollutants such as NO_X, VOC, and CO. As these emission reduction programs are implemented and there is a turnover in the use of older vehicles with newer and cleaner vehicles, the project's operational emissions are expected to decline significantly in the future.

Emission controls on mobile source vehicles already adopted by the ARB particularly dealing with NO_X and PM_{10} controls on heavy duty trucks will reduce truck emissions significantly over the next 10 years. Today's vehicle fleet (assumed to be 2020) is comprised of vehicles as old as 25 years and generates substantially more emissions than the vehicles that would replace them in the future.

61 CARB. 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles. https://www.arb.ca.gov/diesel/documents/rrpfinal.pdf

Greenhouse Gases

EMFAC2017 has emission factors for the greenhouse gases carbon dioxide and methane. Greenhouse gas emissions from mobile vehicles were estimated using the same procedures as shown above for carbon dioxide, nitrous oxide, and methane.[62] The emissions were estimated in tons per year and were converted to $MTCO_2e$ by multiplying the greenhouse gas by its global warming potential (1 for carbon dioxide and 21 for methane) and then multiplying it by 0.9072 (a conversion from tons to metric tons). The emissions factors from EMFAC2017 include reductions from the following regulations:

- Regulation – Pavley (AB 1493): Clean car standards to reduce greenhouse gas emissions from new passenger vehicles (LDA-MDV) from 2009 to 2016.
- Regulation – Low Carbon Fuel Standard (Executive Order S-01-07): The low carbon fuel standard would reduce carbon intensity in fuels. Carbon intensity is a measure of the greenhouse gas emissions associated with production and use of a fuel. Fuels like natural gas from landfills, dairy biogas, and biodiesel have lower carbon intensity than gasoline or diesel.

Black carbon emissions were estimated based on the diesel $PM_{2.5}$ emissions discussed below.

Other Emission Sources

There are other emission sources besides mobile vehicles during operation of the project. VOC emissions would be emitted during the occasional repainting of buildings and from consumer products. Criteria pollutants and greenhouse gases would be emitted from landscaping, natural gas usage, onsite yard trucks, onsite forklifts, and onsite emergency generators. Greenhouse gases would be emitted from electricity, water and wastewater, refrigerants, and solid waste generation. There would also be some sequestration from the onsite trees that would be planted on the project site as a result of the project. These emission sources are discussed below.

Architectural Coatings (Painting)

Paints release VOC emissions. The buildings in the project would be repainted on occasion. Painting emissions were estimated by CalEEMod using default assumptions for buildout and estimated for the previous years based on square footage shown in Table 9.

Consumer Products

Consumer products are various solvents used in non-industrial applications that emit VOCs during their product use. “Consumer Product” means a chemically formulated product used by household and institutional consumers including, but not limited to, detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden

[62] Running emissions for N2O are from EMFAC 2017 and Idling emissions are from the EPA. U.S. EPA. 2014. Emission Factors for Greenhouse Gas Inventories. https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

products; disinfectants; sanitizers; aerosol paints; and automotive specialty products; but does not include other paint products, furniture coatings, or architectural coatings.[63]

The default emission factor developed for CalEEMod is based on a statewide factor and is not applicable to the project. The entire project would not use consumer products as specified above. The warehouses may have small kitchen areas and bathrooms that would use cleaning products. The majority of the square footage for the project would be used for warehousing/distribution. Negligible quantities of personal care products, home, lawn, and garden products, disinfectants, sanitizers, polishes, cosmetics, and floor finishes would be used. In addition, the buildings in the project would be LEED certified; LEED has a variety of credits available for use of low emitting materials. Therefore, to estimate VOC emissions from the project, the emission factor is reduced to 25 percent of its original value, to 5.1E-6 pounds VOC per day per square foot.

Landscape Equipment

Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers. CalEEMod estimated the landscaping equipment using the default assumptions in the model. Emissions were estimated for buildout and interpolated for the previous years based on square footage in Table 9.

Electricity

There would be emissions from the power plants that would generate electricity to be used by the project (for lighting, etc.). Emissions were estimated using electricity generation numbers provided by WSP for 2025 and buildout and interpolated for the previous years based on square footage in Table 9.

The Moreno Valley Electric Utility (MVU) would provide electricity for the project, however Southern California Edison (SCE) annual emission factors from 2020 through 2064 were used as a proxy for calculating GHG emissions. As described in Section 4.7.2.2, SB 100 increased California's Renewables Portfolio Standard and requires retail sellers and local publicly owned electric utilities to procure eligible renewable electricity for 60 percent of retail sales by December 31, 2030, and that CARB should plan for 100 percent eligible renewable energy resources and zero-carbon resources by December 31, 2045. SB 100 also mandated interim RPS milestones of 44 percent of retail sales by December 31, 2024, and 52 percent by December 31, 2027. To achieve the RPS mandate, utilities such as MVU and SCE are expected to steadily increase their renewable resources for energy production. This assumption is appropriate because utilities have steadily increased the percentage of energy obtained from renewable resources in response to existing mandates. Therefore, all electricity consumption would decrease in GHG intensity (i.e., emissions generated per kilowatt-hour) as the RPS milestones are met.

[63] CARB. 2011. Regulation for Reducing Emissions from Consumer Products. https://www.arb.ca.gov/consprod/regs/fro%20consumer%20products%20regulation.pdf

For estimating electricity emissions for the Proposed Project through the expected life of the project, CO_2e intensity factors were projected for each operational year through 2064, based on RPS compliance.

Building annual electricity for the project would consume approximately 174,423 MWh per year in 2025 and 298,084 MWh per year in 2035. EV charging annual electricity under the Medium EV Penetration scenario would consume 9,157 MWh per year in 2025 and 127,132 MWh per year in 2035.

Natural Gas

There would be emissions from the combustion of natural gas for the project (heat and the CNG/LNG fueling station). The Project is not expected to generate demand for natural gas. The Project would mostly comprise high-cube warehouses that do not require heating from natural gas. The spaces that do require heating are ancillary office spaces. Because all heating and cooling is provided via direct evaporative cooling and heat pumps, natural gas is not required. This allows the Project to reduce on-site fossil fuel combustion that would normally be associated with service water and space heating. The Title 24 Baseline scenario assumes compliance but not exceedance of energy standards and includes annual natural gas use equating to 51,274 MMBtu in 2025 and 84,771 MMBtu at buildout. As such, the Project would result in a 100 percent decrease in consumption of natural gas from the Title 24 Baseline scenario for both Phase 1 and Full Buildout.

Wastewater

Depending on the type of wastewater treatment plant, there could be emissions from treatment of wastewater. However, the project's wastewater would be transferred to the Eastern Municipal Water District's Moreno Valley Regional Water Reclamation Facility. The facility was upgraded with fuel cell cogeneration. A digester gas-fueled fuel cell system provides power and heat to the plant while using all available digester gas.[64] CalEEMod was used to determine emissions from wastewater.

Water

There would be greenhouse gas emissions from the use of electricity to pump water to the project. The applicant conducted a water usage analysis; therefore, CalEEMod default water usage is not used. Emissions for buildout are estimated and calculated for prior years based on the square footage anticipated in those years. Emissions from years occurring after buildout are assumed to be affected by SB 100 and would gradually decrease to zero once 100 percent renewable electricity is reached in 2045.

64 Carollo Engineers. Moreno Valley Regional Water Reclamation Facility Fuel Cell Cogeneration Design and Construction. https://www.carollo.com/projects/moreno-valley-regional-wrf-fuel-cell-cogeneration-design-and-construction. Accessed May 2018.

Refrigerants

Refrigerants may be used in air conditioning for the office component of the warehouses. Refrigerants are hydrofluorocarbons and have a relatively high global warming potential around the range 1,000 to 3,000. The emissions take into account reductions from SCAQMD's Rule 1415, which require registration, refrigerant leak inspections, and refrigerant leak repairs. Procedures and assumptions for estimating the emissions are shown in Appendix F. The emissions are estimated in tons of hydrofluorocarbons and are converted to $MTCO_2e$.

Solid Waste: Operation

Greenhouse gas emissions would be generated from the decomposition of solid waste generated by the project. Operational waste from the project would initially be delivered to the Badlands Sanitary Landfill, which installed a landfill gas energy capture recovery system in 2011. The project is estimated to generated approximately 38,165 tons of solid waste per year. Emissions at buildout are estimated by CalEEMod and are applied to earlier years based on a percentage of the square footage assumed to be operational.

Yard Trucks

According to a project design feature, the yard trucks could be powered by natural gas, propane, or electricity. Therefore, diesel is not assumed for the yard trucks. For the Port of Los Angeles activities, the most common fuel for yard trucks besides diesel is propane.[65] Therefore, emissions are based on assuming that the yard trucks are powered by propane. It is assumed for purposes of this analysis that there would be two yard trucks at each facility in the on position for seven hours per day.

Emergency Generators

Emissions from emergency generators would result during testing and maintenance. It is assumed that there would be one generator per 1.5 million square feet based on the current equipment in operation at the adjacent Skechers warehouse north of the project. The generators were assumed to operate for a total 50 hours per year per generator for routine testing and maintenance purposes, with all generators operating for one hour on the same day to estimate the maximum daily emissions. For the unmitigated emissions, the generator is assumed to be Tier 4 diesel. For the mitigated emissions, it is assumed that the generators would be fueled by natural gas.

Forklifts

It is assumed that there would be five natural gas forklifts per light logistics planning area, and assuming three light logistics areas, there would be a total of 15 natural gas forklifts. It is assumed that the warehouses would have electric forklifts, as they would primarily operate inside.

65 Port of Los Angeles. 2012. Port of Los Angeles Inventory of Air Emissions – 2012. https://www.portoflosangeles.org/pdf/2012_Air_Emissions_Inventory.pdf

Land Use Change

The project would change the land use from pervious surfaces to impervious (buildings, asphalt, concrete) thereby reducing potential carbon sequestration from the existing farmland. CalEEMod has default accumulation for "cropland" of 6.2 tons CO_2/acre/year. However, since the project site is dry farmed and therefore would have less carbon accumulation, a different method was chosen to estimate these emissions. These emissions are included in the operational greenhouse gas emissions. The assumptions are shown in **Table 11**, *Land Use Change*.

Table 11
Land Use Change

Vegetation Land Use Type	Vegetation Land Use Subtype	Initial Acres	Final Acres	Carbon Sequestration ($MTCO_2e$/acre/year)
Cropland	Cropland	2,610	45	0.45

Source of acres: Project description
Source of carbon sequestration: Brown and Huggins 2010; Table 1 in the article presents a range of carbon sequestration for dryland agriculture; the highest of the range was selected (0.90 Mg C ha^{-1} yr^{-1}) and was converted by multiplying by 1.24 (the conversion of Mg to $MTCO_2e$) and dividing by 2.47 (conversion of ha to acres).

Carbon Sequestration (New Trees)

The project would plant trees and integrate landscape into the project design, thereby increasing carbon sequestration. Carbon sequestration is the process of capture and storage of carbon dioxide; trees and vegetation store carbon in their tissues and wood. There is no estimate of the number of trees to be planted in the Specific Plan. The Specific Plan indicates the following regarding trees:

- Streetscapes: The Specific Plan (Section 4.2.3) indicates that trees are required along all street frontages.
- Parking area: Specific Plan measure 5.4.3 requires that landscaping in parking areas comply with the standards contained in the Municipal Code.
- Tree size: Specific Plan measure 5.3.4 specifies that all trees are to be a minimum of 15 gallons.
- Building perimeters: Specific Plan measure 5.3.5 indicates that trees along building and site perimeters are required at a minimum average spacing of 1 tree per 30 linear feet of perimeter.

The number of trees is estimated as shown in **Table 12**, *Estimated Tree Inventory*. This inventory does not represent actual future plantings, which would be refined later during individual building plans. There would also be trees in the project entryways, the roundabouts, the open space areas, and the detention areas; however, those were not included to be conservative.

Table 12
Estimated Tree Inventory

Project Location	Tree Inventory Calculation Details[4]	Tree Species[3]	Trees
Automobile parking	1 tree/6 stalls x 10,981 stalls [1]	Average [2]	1,830
Building perimeters	Assuming an average of 1,500,000 sf per building; taking the square root and multiplying by 4 yields the building perimeter (4,900 ft x 27.8 buildings – 136,220 ft); 1 tree per 60 ft	Average [2]	2,270
Redlands Boulevard, Bay Street	Length = 6,642 ft/40 ft (1 side of road)	Pine	55
		Blue Palo Verde	55
		Sweet Acacia	55
Gilman Springs Road	Length = 12,257 ft/40 ft (1 side only)	Afghan Pine	59
		Date Palm (25' trunk height)	59
Street A	Length = 8,656 ft/40 ft x 2 sides of street	Chilean Mesquite/ Algarrobo	216
		Mexican Fan Palm (30' trunk height)	216
Eucalyptus Street	Length = 5,350 feet/ 40 ft (1 side of road)	Brisbane Box	45
		Afghan Pine	45
		Date Palm (30' trunk height)	45
Street B	Length = 4,418 ft / 40 ft x 3 (two sides of street and median)	Brisbane Box	330
Streets C, D, E, F, G, H	Length = 38,363 ft/ 40 ft x 2 sides of street	Chilean Mesquite/ Algarrobo	1,918
Total			**7,504**

Notes:
1 Table 9.11.040C-12 in Moreno Valley Code states that warehouse and distribution uses are required to have 1/1000 sf of gross floor area for the first 20,000 sf; 1/2000 sf of gross floor area for the second 20,000 sf; 1/4000 sf of gross floor area for areas in excess of the initial 40,000 sf. Assuming 27.8 buildings each 1,500,000 sf in size yields 10,981 stalls.
2 The tree types are not specified in the Specific Plan; therefore, the carbon sequestration rate for the average was used.
3 If more than one species is listed for a project location, the species are distributed evenly.
4 Calculations assume one tree per 40 feet of distances listed, as an average.
Source: World Logistics Center Specific Plan

Although CalEEMod does have calculations to estimate carbon sequestration from new trees, the carbon sequestration rates from the Center for Urban Forest Research (CUFR) Tree Carbon Calculator provide specific species information. As a comparison, CalEEMod has a sequestration rate of 0.0354 metric tons per miscellaneous tree per year. **Table 13**, *Tree Carbon Sequestration Rates (Age of Tree),* displays the carbon dioxide sequestration rates per tree from the CUFR Tree Carbon Calculator for tree species at 5 years and 10 years old. As shown in the table, generally, the older the tree is, the higher the sequestration rate. Therefore, for purposes of this analysis, the rate at five years is used because it assumes less carbon sequestration.

Table 13
Tree Carbon Sequestration Rates (Age of Tree)

Tree Species	Code	CO_2 Sequestration (lb/tree/year)	
		5 years	10 years
Afghan pine	PIBR2	47.3	161.0
Blue palo verde	CEFL	14.6	53.3
Brisbane box	TRCO	40.1	36.8
Chilean mesquite/ Algarrobo	PRCH	36.1	100.3
Crape myrtle sp.	LAIN	2.0	3.6
Desert willow	CHLI	4.9	15.1
Sweet acacia	ACFA	17.0	38.0
Sycamore	PLRA	41.7	109.5
Average	--	24.0	55.4

Note:
The rate at 5 years is used in this analysis; 10 years is shown for informational purposes, to demonstrate that the tree will increase sequestration rates overtime. The Codes for the trees are listed in the event that the reader wants to duplicate the modeling; the code makes it easier to conduct the modeling.
Source: CUFR Tree Carbon Calculator (2012) – the model does not provide model output

Table 14, *Tree Carbon Sequestration Rates (Height of Tree),* displays the carbon sequestration rates for the height of the tree, which is used as surrogate for two tree types that do not have data for the age of the tree. The lower tree height (25 feet) is used in this analysis.

Table 14
Tree Carbon Sequestration Rates (Height of Tree)

Tree Species	Code	CO_2 Sequestration (lb/tree/year)	
		5 years	10 years
Date Palm	PHDA4	14.8	15.0
Mexican Fan Palm	WARO	26.9	26.4

Source: CUFR Tree Carbon Calculator (2012) – the model does not provide model output

Table 15, *Tree Carbon Sequestration Estimates,* displays the carbon sequestration estimates for the new trees that would be planted on the project site. As shown in the table, the trees would absorb 111 tons per year.

Table 15
Tree Carbon Sequestration Estimates

Type of Tree	Trees	CO_2 Sequestration (lb/tree/year)	CO_2 Sequestration (tons/year)
Average	4,100	24.0	49
Afghan pine	465	47.3	11
Blue Palo Verde	55	14.6	<1
Sweet Acacia	55	17,0	<1
Date Palm	104	14.8	1
Chilean Mesquite/ Algarrobo	2,134	36.1	39
Mexican Fan Palm (30' trunk height)	216	26.4	3
Brisbane Box	375	40.1	8
Total	**7,504**	**--**	**111**

Source: Calculated using the data in prior tables.

Black Carbon

As discussed above, there is substantial uncertainty in estimating greenhouse gas impacts from black carbon emissions at this time. In addition, black carbon is not considered a "greenhouse gas" according to AB32. Nevertheless, black carbon emissions from construction and operation are estimated.

Emissions Methodology

The methodology used in estimating black carbon emissions is from EPA's Report to Congress on Black Carbon (EPA 2012). Essentially, $PM_{2.5}$ emissions are converted to black carbon emissions by application of speciation factors. The equation:

> $PM_{2.5}$ Emissions (in tons) x fraction of $PM_{2.5}$ that is black carbon = black carbon emissions

The speciation factors of black carbon as a percentage of $PM_{2.5}$ are from Table A1-5 and associated text in the EPA's Report to Congress on Black Carbon (EPA 2012). The only sources in this greenhouse gas analysis that assume a portion of black carbon emissions are as follows:

- **Construction.** 77 percent of the $PM_{2.5}$ exhaust emitted during construction is assumed to be black carbon.[66] $PM_{2.5}$ exhaust was estimated using CalEEMod, which is converted to black carbon emissions.

- **Operational mobile – heavy duty.** The EPA's report identifies diesel heavy-heavy duty trucks (HHDT) may have 77 percent black carbon out of the $PM_{2.5}$ exhaust emissions. Therefore, this percentage is applied to the following vehicle classes: diesel light-heavy duty trucks (LHDT1 and LHDT2), diesel medium-heavy duty trucks (MHDT), and HHDT. The black carbon emissions are estimated in the $PM_{2.5}$ spreadsheets in Appendix B.

- **Operational mobile – light duty.** The EPA report indicates that 64 percent of $PM_{2.5}$ exhaust emissions for light duty diesel vehicles may be black carbon.[67] Therefore, this percentage is applied to the following vehicle classes: diesel light duty trucks (LDT1 and LDT2) and medium duty trucks (MDT).

- **Natural gas**. 38 percent of the $PM_{2.5}$ emissions from natural gas usage is assumed to be black carbon.

This is a conservative estimate of black carbon, as discussed in the following excerpt from the EPA's report:

[66] For construction equipment equipped with diesel particulate matter filters, the BC component is 10 percent of PM2.5; however, this percentage is not applied. The construction equipment will be Tier 3 or higher; however, the BC component of Tier 3 equipment is currently not available so a worst-case assessment is provided.

[67] The percentage of BC for the light duty diesel vehicle group varies from 31% to 64%; therefore, the worst-case scenario is used in this analysis.

> *For the 2007 vehicle (engine) model year, stringent [EPA] emission standards of 0.01 g/BHP-hr (grams per break horsepower/hour – a standard unit for emissions from heavy-duty mobile source engines) became effective for heavy-duty diesel engines, which represents over 99% control [or reduction] from a pre=control diesel engine in the 1970 time frame. As a result of these standards, BC [black carbon] emissions have been dramatically or even preferentially reduced as the major PM constituent. To meet these stringent PM standards, virtually all new on-highway diesel trucks in the United States, beginning with the 2007 model year, have been equipped with diesel particular filters (DPFs). DPFs typically eliminate more than 90% of diesel PM and can reduce BC by as much as 99%.*[68]

Global Warming Potential

In the EPA's "Report to Congress on Black Carbon," black carbon emissions are estimated for the United States and globally but are not converted to a metric (such as $MTCO_2e$) using a global warming potential. The report discusses the global warming potential of BC:

> *[Black carbon] BC influences the climate differently than the warming effects of GHGs. These differences have important implications for identifying appropriate metrics to compare climate impacts (and reductions thereof) … While a GWP can be calculated for BC, there are reasons that GWPs may be less applicable for this purpose due to the different nature of BC compared to GHGs, in terms of various physical properties and the fact that unlike GHGs, BC is not well mixed in the atmosphere. However, because GWPs are the most commonly used, and only official, metric in climate policy discussions, many studies have calculated GWPs for BC. One-hundred-year GWPs for BC in the literature range from 330- to 2,240. That is to say, 330 to 2,240 tons of CO_2 would be required to produce the same integrated radiative effect over 100 years as one ton of BC. Some of the factors that account for the range in these estimates include the use of different and uncertain indirect and snow/ice albedo effects*[69]*estimates, use of a different CO_2 lifetime for the baseline, and recognition of the dependence of a GWP for BC on emissions location…*
>
> *… There is currently no single metric widely accepted by the research and policy community for comparing BC and long-lived GHGs. In fact, some question whether and when such comparisons are useful. For example, there are concerns that some such comparisons may not capture the different weights placed on near-term and long-term climate change.*[70]

4.3 Localized Significance Threshold Analysis

Localized Analysis Methodology

SCAQMD has developed the Localized Significance Threshold (also known as "LST") methodology and recommends that this methodology be used in determining whether a project

68 U.S. EPA. 2012. Report to Congress on Black Carbon, March 2012.

69 The albedo is the reflecting power of a surface.

70 U.S. EPA. 2012. Report to Congress on Black Carbon, March 2012.

may generate significant adverse localized air quality impacts and substantially affect sensitive receptors. The evaluation of localized air quality impacts determines the potential of the project to violate any air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations.

According to the SCAQMD LST assessment methodology, the assessment of localized impacts addresses only those emissions that are generated "onsite," that is for the purposes of this project, emissions generated from within or along the boundaries of the project. Therefore, for this localized analysis, only the onsite emissions are examined. Freeway trips as well as trips along the surface street network away from the project were only included in the health risk assessment prepared for this project.

To evaluate localized impacts for construction and operation, an air dispersion model (EPA model, AERMOD) was used to simulate the movement of project related air pollutants through the air and output air concentrations of those pollutants at numerous receptor locations surrounding the project. The estimated concentrations provide conservative estimates (in terms of likely over-predictions) and may not represent actual occurrences. The methodology follows SCAQMD modeling guidance for AERMOD, where applicable.[71]

Table 16, *General Air Dispersion Modeling Assumptions – Localized Air Quality Assessment,* lists the general model assumptions used in the localized significance threshold assessment.

[71] SCAQMD. AB 2588 & Rule 1402 Supplement Guidelines, 2016. Available at http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab2588-supplemental-guidelines.pdf?sfvrsn=9

Table 16
General Air Dispersion Modeling Assumptions – Localized Air Quality Assessment

Feature	Assumption
Terrain processing	Complex terrain; elevations were obtained for the project site using the EPA AERMAP terrain data pre-processor
Emission source configuration	See Table 17 and 18
Land Use	Urban: County of Riverside population provided by the SCAQMD
Coordinate System	Universal Transverse Mercator
Meteorological Data	SCAQMD Riverside Meteorological Data for 2012-2016
NO2 Assessment Methodology	Ozone Limiting using ozone data from the SCAQMD Riverside-Rubidoux air monitoring station for 2012-2016
Receptor Height	0 meters, as recommended by SCAQMD LST methodology
Receptor Location	Receptor locations were defined both within and outside of the project boundaries.

Each of the emission sources that are included in the AERMOD air dispersion model consist of a particular emission source representation. The following definitions are used in defining the emission source representations referred to in **Table 17**, *Project Localized Analysis Construction Emission Source Assumptions*, and **Table 18**, *Project Localized Analysis Operational Emission Source Assumptions*.

- Point source: a single identifiable local source of emissions; it is approximated in the AERMOD air dispersion model as a mathematical point in the modeling region with a location and emission characteristics such as height of release, temperature, etc. (example: a stack from a standby generator or a stack from a motor vehicle such as a truck);

- Volume source: a three dimensional source of pollutants release (example: exhaust emissions from construction equipment);

- Line source: a series of volume sources along a path (example: vehicular traffic along a street or freeway); and

- Area source: a large area where emissions are assumed to be uniformly distributed in the horizontal and vertical directions (example: parking lot).

Construction Modeling Assumptions – Local Air Quality Assessment

Table 17 summarizes the emission source characteristics during construction. For the unmitigated scenario, it is assumed that construction equipment would be in the on position for 10 hours per day for all construction activities. In addition, during building construction, additional hours from midnight to 6 AM were also included to account for the concrete pouring of the tilt-up building walls that would most likely take place at night. The construction was assumed to take place five days per week.

Table 17
Project Localized Analysis Construction Emission Source Assumptions

Emission Source Type	Air Dispersion Model Emission Source Description	Relevant Assumptions
Onsite: Off-road Construction Equipment	Volume Source	• Stack release height: 16.4 feet • Emissions derived from the CalEEMod land use emission model • Volume sources were used to characterize the construction equipment with a volume source dimension of 270 meters on a side to cover the construction area; the number of volume sources used is dependent on the size of the construction area.
Onsite: Fugitive Dust	Area Source	• Release height: 0.0 feet in accordance with LST guidance • Emissions derived from the CalEEMod land use emission model • Area sources were used to characterize the fugitive dust generated from the construction equipment.

Operational Model Assumptions – Local Air Quality Assessment

The characterization of the project's operational emission sources as required by AERMOD air dispersion model is provided in Table 18. It is assumed for this analysis that facility operations would occur for 24 hours per day, 7 days per week, 365 days per year.

A graphical representation of the AERMOD air dispersion model local operational sources is shown in **Figure 21**. The AERMOD model also requires the placement of a network of receptors which represent the geographic locations where the impacts from the project's emissions are calculated.

Figure 22 shows the receptor network used in the localized significance threshold analysis. Receptors were located within and outside of the project's boundaries. A dense receptor grid was used in order to adequately characterize the project's offsite impacts. Of particular importance is the location of receptors in the residential areas adjacent and to the west of the project across Redlands Boulevard and scattered residences across Gilman Springs Road as well as locations of other sensitive receptors such as schools.

Table 18
Project Localized Analysis Operational Emission Source Assumptions

Emission Source Type	Air Dispersion Model Emission Source Description	Relevant Assumptions
Onsite vehicle traffic within the truck yards	Area Source	• Stack release height: 6 feet for all vehicles • Vehicle speed: 15 mph • Vehicle trip length based on a review of the layout of the project development phases in relation to the local roadway network. - High cube warehouse: 1,080 feet - Light logistics: 570 feet - Gas compressor utility: 330 feet - All other land uses: 160 feet • Vehicle types: passenger cars and heavy duty delivery trucks • Emission factor: ARB EMFAC2017 model
Onsite diesel truck idling within the truck yards	Area source	• State release height: 6 feet • Idle time: 5 minutes per truck per day (unmitigated) • Vehicle type: heavy duty delivery trucks • Emission factor: ARB EMFAC2017 model
Local Roadway Vehicle Travel	Line sources	• Line source width equal to the width of the roadway plus 3 meters on both sides. • Vehicle speeds: - Heavy duty trucks: 25 mph on local roadways - All other vehicles: 35 mph on local roadways
Standby Diesel Electric Generators	Point sources	• The project was assumed to contain 27 emergency standby diesel generators distributed within the project boundary at full build out (1 generator per 1.5 million square feet of space) • Rated at 315 kilowatts electrical output • Projected testing and maintenance assumed to be 1 hour per day and 50 hours per year • Height of emission release assumed to be 9 feet based on estimates of the generator's temperature, gas flow rate, and influence of building downwash on plume rise • Emissions based on EPA Tier 3 emission standards for diesel generators
Support Equipment	Area sources	• Forklifts using natural gas as fuel • Yard trucks using liquid petroleum gas as fuel

Localized Significance Threshold Analysis

The localized significance threshold analysis evaluated four conditions:

- Project Build Out (2020): this condition assumes that Phase 1 and Phase 2 of the project are fully built out in 2020 as a worst-case scenario.

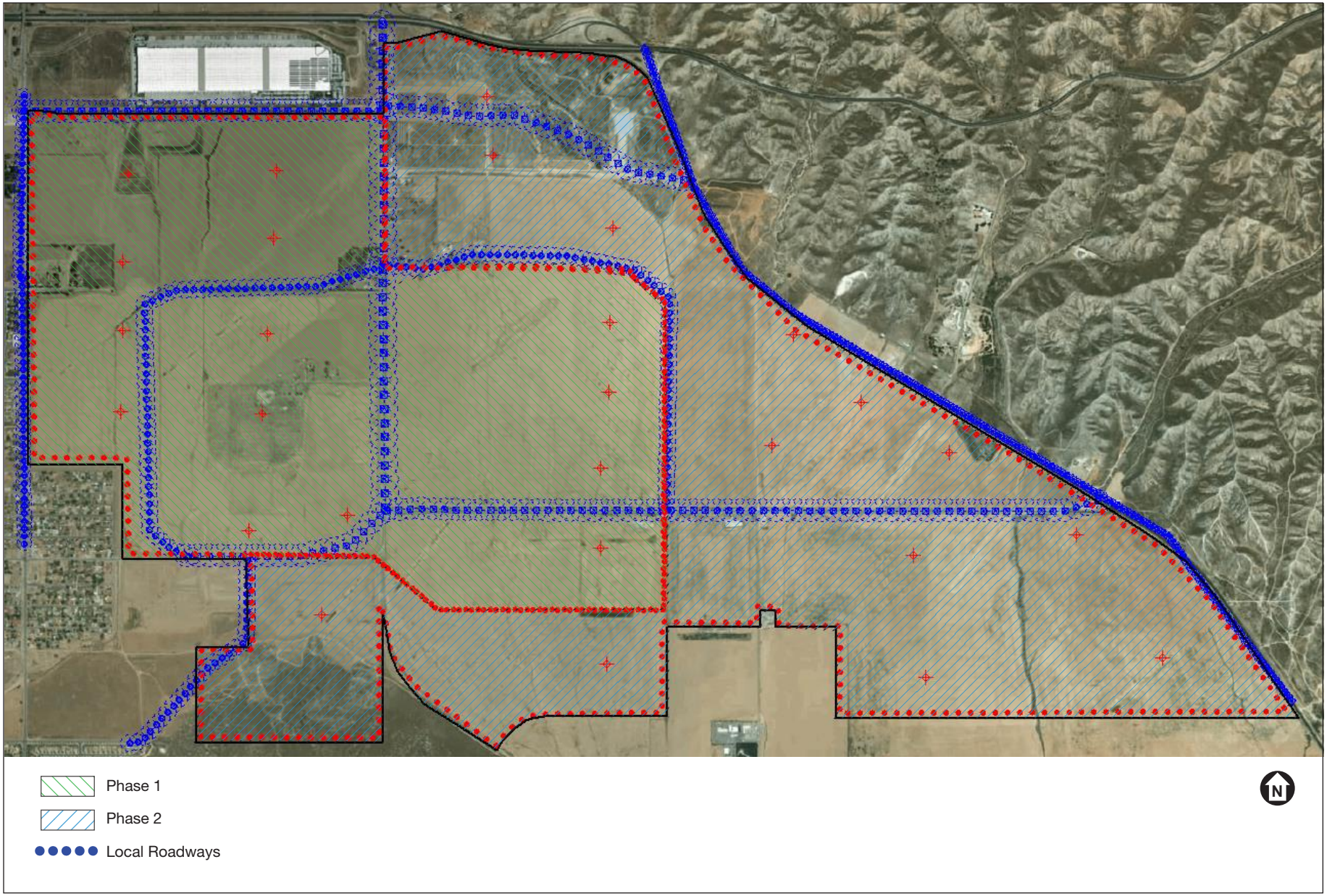
- 2022, the year when the project emissions from both project construction and operation are at their highest combined levels for several pollutants; and when construction activities would occur near the existing residences west of the project boundary along Merwin Street;

- 2025, the earliest year Phase 1 is assumed to be fully operational. When the projected construction schedule would result in construction activities in the southern portion of the project adjacent to Alessandro Boulevard and east of the existing residential areas along

Merwin Street, and when all of Phase I operations would occur (approximately 57 percent of entire project floor space); and

- 2035 when Phase 1 and Phase 2 of the project are fully operational.

Project Full Build Out 2020 represents a worst-case scenario since the project could not be physically built out in its entirety in a single year and does not reflect the fact that the project would be developed over a time period of 15 years depending on market demands for warehouse space. This assumption also does not account for the fact that emissions from mobile sources, prior to mitigation, particularly from heavy duty diesel trucks are expected to decline significantly over time as emissions control technologies continue to improve. This assessment also provided consistency with the TIA and noise reports which examines Project Build Out under existing conditions. The project impact results were added to the existing background concentrations and then compared to the localized threshold for the appropriate pollutant. Background concentration data was obtained from the SCAQMD's Rubidoux monitoring station for years 2016-2018, the most recent data available. Background concentrations of CO and NO_2 for State standards were derived as the highest air quality measured data over the most recent 3 years of meteorological data 2016-2018. Background concentrations for the National 1-hour NO2 is the 3-year average of the 98^{th} percentile of the daily maximum 1-hour average. The 2022, 2025, and 2035 conditions represent the project development including the localized impacts during construction and operation over the time period of 2020 to 2035.



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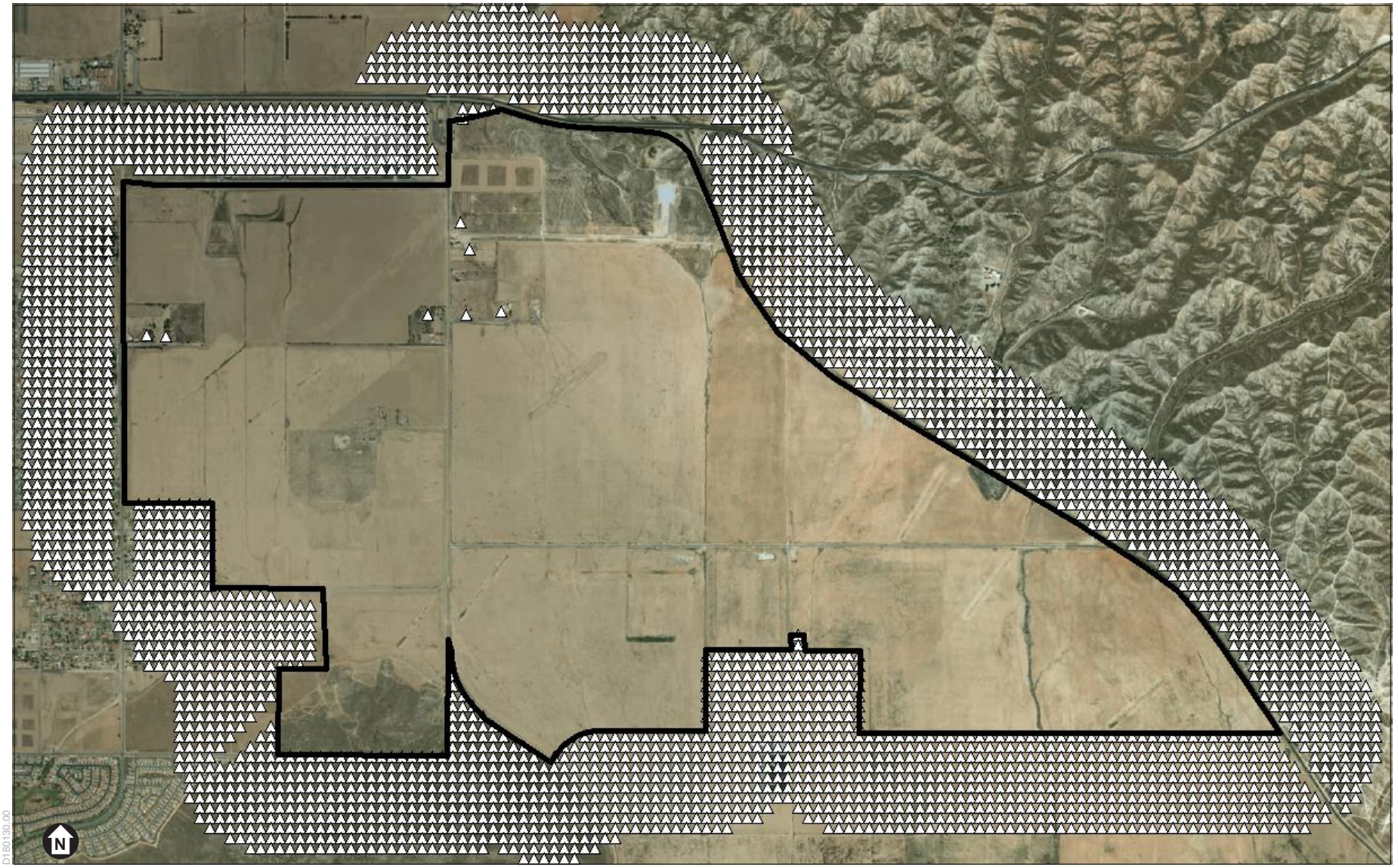
SOURCE: ESA

World Logistics Center

Figure 21
Localized Analysis Operational Emission Sources

ESA



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SOURCE: ESA

World Logistics Center

Figure 22
Air Dispersion Model Receptors for the Localized Analysis

ESA

4.4 Health Risk Assessment

About Health Risk Assessments

A Health Risk Assessment (HRA) is a guide that helps to determine whether current or future exposures to a chemical or substance in the environment could affect the health of a population. In general, risk depends on the following factors:

- How much of a chemical is present in an environmental medium (e.g., air);
- How much contact (exposure) a person has with the contaminated environmental medium; and
- The inherent toxicity of the chemical.

This HRA builds and expands upon the methodology described above in the localized air quality assessment by examining the regional effects of the project's potential health risk impacts. The HRA methodology applies a risk characterization model to the results from the air dispersion model to estimate potential health risks at each sensitive receptor location. However, unlike the localized assessment of the criteria pollutants (e.g., carbon monoxide, oxides of nitrogen, and particulate matter), which looks at impacts from exposure times of one hour to a year within a specific year, the HRA examines the impacts over an exposure time period from one hour to an extended exposure time period of many years.

Health Risk Impacts Assessed

The health risk assessment estimated the incremental health impacts attributable to the project's construction and operations for the following condition:

- Proposed Project Development condition which examines the effect of project-related construction and operational traffic emissions as if the project were built out in accordance with its proposed phased construction and operational buildout schedule commencing with the construction of Phase 1 in 2020 and the final full build out in 2035. This condition forms the basis for quantifying the incremental impacts from the project.

A multi-pollutant health risk assessment was conducted for the Proposed Project. The health risk assessment evaluated toxic emissions from a variety of sources. These included exhaust emissions of particulate matter (PM) and total organic gases (TOG) from diesel and gasoline combustion, as well as toxics associated with fugitive PM from tire wear and brake wear of mobile sources. Annual average emissions and impacts were calculated for each year starting from 2020 when construction of the Project would commence. Specifically, annual average concentrations of toxics were estimated from the construction emissions for each year of construction from 2020 to 2034 according to the construction schedule and equipment usage projected for each year of construction. Proposed Project Development examines project impacts resulting from the proposed construction and operation of the project from the commencement of construction in 2020 for a 30-year duration for sensitive/residential receptors, 25-year for worker

receptors, and 9-year exposure time periods for school-site student receptors. Annual average emissions and impacts during operation were estimated for the Phase 1 build out year and the final full build out year, years for which detailed traffic information was available from the TIA. The annual average operational emissions were then scaled among operational years between 2021 and 2035 based on the Phase 1 build out year and final full build out year's emissions, using scaling factors that reflecting changes in EMFAC-based emission factors from 2025 or 2035 and the project occupancy schedule for each specific year. See Appendix B.9 for detail on the scaling factor development and how the in-between years' emissions were calculated.

During years when both construction and operations occur simultaneously (2021 to 2034), the annual concentrations at the sensitive receptors from construction were added to the annual concentrations from operations to provide a total impact assessment of all emissions from the project during each year. The resulting total annual average concentrations calculated each year for the exposure time period (individual annual averages) multiplied by the requisite daily breathing rates, age sensitivity factors, and time-at-home factors for each year of exposure. The HRA studied two scenarios for the 30-year exposure cancer risk calculation for sensitive/residential receptors. Scenario 1 assumes that a fetus in the 3rd trimester (within the mother's womb) commences its 30-year exposure starting in year 2020 (construction start year), covering the entire 15 years of construction and progressive project occupancy (operations are not assumed to commence until the year 2021, the first year of operational occupancy) between 2020 and 2035 and another 15 years after project full buildout between 2035 and 2050 (construction + operation scenario); Scenario 2 assumes that a fetus in the 3rd trimester commences its 30-year exposure starting in the 1st year of full buildout in 2035 and last until 2064 (full operation scenario).

The mitigation conditions require all construction equipment that are greater than 50 horsepower to be Tier 4, all medium-heavy-duty and heavy-heavy-duty diesel trucks accessing the project during operation be model year 2010 or newer and that all on-site equipment be Tier 4.

Risk Assessment Methodology

The HRA process involves four main steps: hazard identification, dose-response assessment, exposure assessment, and risk characterization.

Hazard Identification

Hazard identification is the process by which contaminants of concern are selected for investigation in the risk assessment, and includes a review of the chemicals that are potentially released to the atmosphere from the equipment of concern. This assessment is responsive to the emissions of various toxic air contaminants from the construction and operation of the project. The main toxic air contaminants associated with the project include PM and (TOG)[72] from diesel and gasoline combustion, as well as toxics associated with fugitive PM from tire wear and brake

[72] Total Organic Gases (TOG) means compounds of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid; metallic carbides or carbonares, and ammonium carbonate; also includes all organic gas compounds emitted to the atmosphere including low reactivity or exempt compounds such as methane, ethane, etc.

wear of mobile sources. An abbreviated list of common toxicity values for chemicals evaluated in this analysis and target organs[73] that each contaminant affects in a toxic exposure are summarized in **Table 19**, *Toxicity Values*. Please refer to Appendix E for a more detailed list of the TACs analyzed in this study.

The ARB has simplified the process for estimating cancer and chronic non-cancer impacts of air toxics by specifying cancer potency values and reference exposure levels (RELs). For diesel PM, which is a surrogate for the combined health effects associated with exposure to diesel exhaust emissions (ARB 2005b) and provides a hazard level that is greater than would occur when estimating the cancer and chronic non-cancer risk by specifying the individual TOG compounds. However, no acute non-cancer REL has been defined for diesel PM, therefore emissions of the speciated toxic air contaminants in diesel exhaust were evaluated in estimating acute non-cancer hazards.

No such surrogate values exist for gasoline, tire wear or break wear emissions, so the speciated toxic air contaminants were determined as well as their corresponding cancer potency values and RELs.

Table 19
Toxicity Values

Toxic Air Contaminant	CAS Number	Inhalation Cancer Potency Factor $[mg/kg\text{-}day]^{-1}$	Chronic Reference Exposure Level $\mu g/m^3$	Target Organ for Chronic Exposure	Acute Reference Exposure Level $\mu g/m^3$	Target Organ for Acute Exposure
Diesel PM*	9901	1.1	5	I	ND	ND
Acetaldehyde	75070	*	*	*	470	D,I
Acrolein	107028	*	*	*	2.5	D,I
Benzene	71432	*	*	*	27	C,E,F
Formaldehyde	50000	*	*	*	55	D
Methanol	67561	*	*	*	28,000	G
MEK	78933	*	*	*	13,000	D,I
Styrene	100425	*	*	*	21,000	H,D,I
Toluene	108883	*	*	*	37,000	D,G,H,I
M-Xylene	108383	*	*	*	22,000	D,G,I
O-Xylene	95476	*	*	*	22,000	D,G,I
P-Xylene	106423	*	*	*	22,000	D,G,I
1-3 Butadiene	106990	*	*	*	660	H
Copper	7440508	*	*	*	100	I
Chlorine	7782505	*	*	*	210	D,I
Nickel	7440020	*	*	*	0.2	F
Sulfates	9960	*	*	*	120	I
Arsenic	7440382	*	*	*	0.2	I,G,
Vanadium (fume or dust)	7440622	*	*	*	30	D,I

Notes:
* Only diesel PM emissions were evaluated for cancer risk and chronic hazard indices because diesel PM is a surrogate for the combined health effects associated with exposure to diesel exhaust emissions (ARB 2005b). For the acute hazard indices, diesel PM was not evaluated since no acute non-cancer REL has been defined for diesel PM; rather, emissions of the other toxic air contaminants were evaluated for all emission sources in

[73] A target organ is an organ or bodily system that is most affected by exposure to a specific toxic air contaminant.

estimating acute non-cancer hazards.
Key to non-cancer and chronic exposure target organs:
C. Cardiovascular; D. Eye; E. Hematologic System; F. Immune System; G. Nervous System
H. Reproductive System; I. Respiratory System
ND = not defined as the California Office of Environmental Health Hazard Assessments has not defined an acute reference exposure level for diesel PM.
Source: California Air Resources Board 2015

Dose-Response

The dose-response assessment develops relationships between exposures to a given chemical and the corresponding potential health effects associated with exposure to that chemical. In general, data are limited regarding adverse effects associated with direct exposure to humans to a particular chemical. Therefore, animal experiments have often been performed to assess a chemical's toxicity. These experiments are conducted to determine the organs that are adversely affected by a toxic chemical and the amount of the chemical needed to produce an adverse effect on the organ.

Two types of adverse health effects are generally considered in health risk assessments: carcinogenic and non-carcinogenic. Carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Any exposure, therefore, will have some associated risk. Chemicals that potentially produce carcinogenic effects have been shown or are suspected to produce tumors in animals or humans.

Non-carcinogenic effects, such as liver or kidney damage, may be either reversible or permanent. In these situations, it is assumed that there is a level of exposure at which these chemicals produce no adverse effects in the human body. In other words, exposure to these chemicals in amounts less than a threshold level will result in no adverse health effects. The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure.

Exposure Assessment

Exposure assessment identifies potential exposure pathways, estimates chemical concentrations at potential exposure points, and calculates expected doses of emitted substances. An exposure pathway is defined as the means by which an individual or a population is exposed to contaminants that originate from a source. Each pathway represents a different mechanism for exposure.

Four elements must be present in order for a potential human exposure pathway to exist;

1. A source and mechanism of substance release to the environment;

2. An environmental transport medium (e.g., air, water, soil);

3. An exposure point, or point of potential contact with the contaminated medium; and

4. A receiver (i.e., human) with a route of entry (e.g., inhaling air, drinking water) at the point of contact.

The current risk assessment only considers toxic air contaminants that are released into the air and inhaled. The levels of atmospheric contaminants resulting from emissions of toxic air contaminants are calculated using mathematical air dispersion models, which use emission rates and exposure duration, design features specific to the emissions sources, and meteorological data. The air modeling results include annual average and maximum hourly ambient air concentrations of the modeled substances at various receptor locations. In order to evaluate human exposure, a human receiver with a route of exposure to the affected medium is required, such as a person inhaling air in a potentially affected area. Therefore, potential health risks are only evaluated for developed areas where humans typically are present. A quantitative estimate of potential human exposure is developed for the inhalation pathway in this study.

The cancer risk and chronic non-cancer hazard indices are based on concentrations from sources of exhaust PM and TOG, and fugitive PM. These sources include off-road construction equipment, heavy duty trucks, gasoline vehicles, onsite equipment and emergency generators. A majority of the toxic emissions are related to diesel exhaust. Diesel exhaust, a complex mixture that includes hundreds of individual constituents, is identified by the State of California as a known carcinogen. Under California regulatory guidelines,[74] diesel PM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole. The California Environmental Protection Agency and other proponents of using the surrogate approach to quantifying cancer risks associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known, and/or exposure and health effect information for all chemicals identified within the mixture may not be available.

Gasoline combustion can also release chemicals that are carcinogenic, and are included in this study. A preliminary comparison of the relative toxicity of gasoline-borne toxics compared to diesel PM concluded that the potential cancer risks associated with the TACs from gasoline combustion emissions from the project's gasoline vehicles are substantially less than the potential cancer risks from the project's diesel PM emissions. Less than 2 percent of the total cancer risk from the project's vehicles can be attributed to the gasoline TACs with the remaining 98 percent attributable to toxics from diesel PM. Furthermore, toxics associated with fugitive PM from tire wear and brake wear contribute substantially less than the potential cancer risks from the project's diesel PM emissions.

[74] CARB. 2005. HARP User Guide, Appendix K, Risk Assessment Procedures to Evaluate Particulate Emissions from Diesel-Fueled Engines. https://www.arb.ca.gov/toxics/harp/docs/userguide/appendixK.pdf

The acute non-cancer indices are based on toxic concentrations from both diesel and gasoline vehicles. To estimate acute non-cancer hazard indices, specific chemical concentrations that comprise the PM and TOG emissions must be calculated in a process called speciation.[75]

Risk Characterization

Risk characterization is the process of combining dose-response information with the estimates of human exposure in order to derive a quantitative estimate of the likelihood that humans will experience any adverse health effects for the given exposure assumptions. Two general types of health effects are generally considered: potential carcinogenic risks after chronic (long-term) exposure and potential non-carcinogenic health impacts following chronic (long-term) and acute (short-term) exposure. Each of these health effects was evaluated in this report.

Estimation of Cancer Risks

Excess cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens over a specified exposure duration. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF). A risk level of 1 in a million implies a likelihood that up to one person, out of one million equally exposed people would contract cancer if exposed continuously (24 hours per day) to the levels of toxic air contaminants over a specified duration of time. This risk would be an excess cancer risk that is in addition to any cancer risk borne by a person not exposed to these air toxics.

As noted above, diesel PM is used as a surrogate measure of carcinogenic exposure for the mixture of chemicals that make up diesel exhaust as a whole. Cancer risks were estimated in accordance with the "Current OEHHA Guidance".[76] The "Current OEHHA Guidance" assumes a lifetime exposure of 30 years with the inclusion of early-in-life sensitivity factors for sensitive receptors, a 25-year exposure for worker receptors, and a 9-year exposure duration for school-site student receptors.

The cancer risk from toxics is calculated by multiplying an average toxics concentration calculated using the AERMOD air dispersion model and an inhalation exposure factor as shown in Equation 1 below.

Cancer Risk = Inhalation cancer potency factor (CPF) x Dose-inhalation (EQ-1)

Where:

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75 Total organic compounds are comprised of many types of individual chemical compounds. Speciation is the process of breaking a total organic compound into its individual compounds. From this information, speciation profiles are devised for many emission sources to provide the makeup of that sources total organic emissions. Speciation profiles are used to estimate emissions of the individual compounds from the emission source which, in turn, are used to estimate the health effects of the emission sources and their total organic compound emissions.

76 Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments, February 2015. http://www.oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf

Cancer Risk = Total individual lifetime excess cancer risk defined as the cancer risk a hypothetical individual faces if exposed to carcinogenic emissions from a particular facility; this risk is defined as an excess risk because it is the risk above and beyond the background cancer risk to the population contributed by causes not related to the project; cancer risk is expressed in terms of risk per million exposed individuals.

Inhalation cancer potency factor (CPF) = 1.1 (milligrams per kilogram per day)$^{-1}$ for diesel PM;

Dose-inhalation = C_{air} x (EF x ED x 10^{-6} ÷ AT x AAF) **(EQ-2)**

Where:

C_{air} is the average diesel PM concentrations calculated from the AERMOD model in μg/m^3;

EF is the exposure frequency (days per week);

ED is the exposure duration (years); and

AT is the time period over which the exposure is calculated (days)

AAF are a set of age-specific adjustment factors that include age sensitivity factors (ASF), daily breathing rates (DBR), and time at home factors (TAH).

Cancer Risk Exposure Assumptions

The principal focus of this HRA is on the potential health impacts to sensitive/residential receptors located within and surrounding the project site. Sensitive receptors include hospitals, schools, daycare facilities, elderly housing and convalescent facilities. Residences are also considered sensitive receptors. An important parameter necessary to estimate cancer risk is the duration of exposure of an individual to toxic air contaminants. An assessment of population mobility can assist in determining the length of time a residential receptor is exposed in a particular location. For example, the duration of exposure to a source of toxic air contaminants will be directly related to the period of time residents live near the source of the emissions.

Table 20, *Exposure Assumptions for Cancer Risk,* summarizes the primary exposure assumptions used in this HRA to calculate individual cancer risk by receptor type, which is based on the SCAQMD HRA Guidance and the "Current OEHHA Guidance".

Table 20
Exposure Assumptions for Cancer Risk

Type of Guidance	Receptor Type	Exposure Frequency		Exposure Duration (years)	Age Sensitivity Factors	Time at Home Factor (%)	Daily Breathing Rate (L/kg-day)
		Hours/ day	Days/ year				
Current OEHHA Guidance	Sensitive/Residential:						
	3rd Trimester	24	350	0.25	10	100	361
	0-2 years	24	350	2	10	100	1090
	2-16 years	24	350	14	3	100	572
	Older than 16 years	24	350	13.75	1	73	261
	Student	8	180	9	3	NA	640
	Worker	8	250	25	1	NA	230

Table 20
Exposure Assumptions for Cancer Risk

Type of Guidance	Receptor Type	Exposure Frequency		Exposure Duration (years)	Age Sensitivity Factors	Time at Home Factor (%)	Daily Breathing Rate (L/kg-day)
		Hours/ day	Days/ year				
Time at home factor is 1 if there is a school receptor within the 1 in a million (or greater) cancer risk isopleth, which was the case for this project's unmitigated scenario for the Construction + Operation HRA.							
(L/kg-day) = liters per kilogram body weight per day; NA = not applicable.							
The daily breathing rates shown are RMP using the Derived Method for residential as recommended by the SCAQMD and the 95th percentile rate for other receptors as recommended by the OEHHA.							
Source: OEHHA 2015; SCAQMD, 2016							

The underlying factors used in the analysis exemplify the conservative nature of utilizing the exposure scenarios and the underlying assumptions:

- The residential cancer risk calculation assumes that each resident will be exposed to particulate matter and organic gases for 24 hours a day for 350 days a year at the location of his or her home throughout the entire 30-year residential exposure period.

- The worker and student cancer risk calculations assume that workers or students are exposed to diesel PM for 8 hours a day, next to, but outside of the buildings in which they work or study.

- The atmospheric dispersion model and traffic model that are used to estimate risks generally provide impact estimates that are over-estimated based on the use of conservative model assumptions.

Other Factors that Influence Health Risk Estimates: Conservative Trip Estimates

It should also be noted that the TIA used a conservative estimate of the number of truck trips after the project begins operation. The number of truck trips is important because diesel PM emissions are directly related to both the number of trucks and the vehicle miles traveled.

As mentioned above, the TIA uses the traffic generation rate for high-cube warehouses from the 10th edition of the Institute of Traffic Engineers Trip Generation Manual which is based on the High-Cube Warehouse Vehicle Trip Generation Analysis prepared jointly by SCAQMD and National Association of Industrial and Office Properties (NAOIP).

Cancer Burden

Whereas cancer risk represents the probability that an individual will develop cancer, cancer burden multiplies the cancer risk by the exposed population to estimate the number of individuals that would be expected to contract cancer from the project. The exposed population is defined as the number of persons within a facility's zone of impact, which is typically the area exposed to an incremental cancer risk of one in a million from the project. Consistent with this definition,

cancer burden was calculated by first identifying all population census tracts[77] located within the project's zone of impact, multiplying the estimated incremental project cancer risk impact in the census tract by the population of the census tract and then summing all of products of population times estimated cancer risk in the zone of impact. Note that each census tract contributes to the cancer burden in proportion to its population and risk. For example, if a census tract has a relatively high estimated cancer risk, but no people living there, it will not contribute to the estimation of the cancer burden. As provided in the "Current OEHHA Guidance", the cancer burden is calculated assuming a 70-year exposure duration along with the appropriate exposure frequency, daily breathing rates, age sensitivity factors, and time at home factors appropriate to each age group.[78] A cancer burden greater than 0.5 is considered a significant cancer burden.

Non-cancer Hazards

An evaluation of the potential non-cancer effects of chronic (long-term) and acute (short-term) chemical exposures was also conducted. For chemicals that cause non-cancer health effects, risks are typically characterized using a measure called the hazard index (HI). Adverse non-cancer health effects are evaluated by comparing the concentration of each TAC with the reference concentration level below which an adverse health effect will not occur as determined by health professionals. This reference concentration level is referred to as the Reference Exposure Level (REL). The State of California has published a database of RELs for numerous toxic air contaminants. Toxic air contaminants may have a unique chronic and/or acute REL. A significant risk is defined by the SCAQMD as an HI of 1 or greater, and indicates that the source of TAC emissions has a potential to cause adverse non-cancer health effects.

Chronic Non-cancer Impacts

Exposures to TACs such as diesel PM can cause chronic non-cancer illnesses such as reproductive effects, respiratory effects, eye sensitivity, immune effects, kidney effects, blood effects, central nervous system, birth defects, or other adverse environmental effects. Risk characterization for chronic non-cancer health risks from diesel PM is expressed as a HI. The HI is a ratio of the predicted concentration of a project's emissions to its REL.

When evaluating chronic non-cancer effects due to TAC exposures, a hazard quotient (HQ) is established for each individual TAC as follows and for each target organ[31] affected by the individual TAC:

$$\mathbf{HQ_i = C_{air}/REL_i} \qquad \textbf{(EQ-3)}$$

Where:

77 A census tract is a geographic region defined for the purpose of taking a census. Usually these regions coincide with the limits of cities, towns, or other administrative areas. Each tract has a unique numeric code and averages about 4,000 inhabitants. The census tract centroid is the geographic center of the tract based on a weighted distribution of the population within the tract using the census blocks that comprise the tract. A census block is the smallest geographic unit used to tabulate population and each tract can be comprised of several blocks.

78 Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments, February 2015, Section 8.1. http://www.oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf

HQi = chronic hazard quotient for each TAC, i

Cair = Annual average concentration of each TAC, i (< g/m3)

RELi = Chronic Reference Exposure Level for TAC, i (< g/m3)

i = toxic air contaminant of interest

To evaluate the potential for adverse non-cancer health effects from simultaneous exposure to multiple TACs, the HQs for all TACs that affect the same target organ are summed yielding a HI as follows:

$$\mathbf{HI_{to} = \Sigma HQ_{tac}} \qquad \textbf{(EQ-4)}$$

Where:

HI_{to} = sum of the hazard quotients for all TACs affecting the same target organ

HQ_{tac} = hazard quotient for TAC and target organ

Chronic health effects were calculated based on maximum annual average of toxic concentrations from the construction and operation of the project.

Acute Non-cancer Impacts

The OEHHA has not defined an acute non-cancer REL for diesel PM. This HRA calculated the potential acute non-cancer hazards associated with the various toxic air contaminant components of PM and organic gas exhaust emissions from diesel and gasoline vehicles that have been found to cause acute non-cancer hazards.

The ARB maintains and updates estimates of the chemical composition and hazard levels of TOGs for a variety of emission source categories. These estimates are contained in what are referred to as speciation profiles. Speciation profiles provide estimates of the toxic air contaminant composition of TOG emissions, and are used in the development of emission inventories and air quality models.

Speciation profiles based on those developed by the ARB were used in this study[79] to derive estimates of the pollutant levels of the PM and TOG components and their acute non-cancer hazards from both gasoline exhaust and diesel exhaust.

Table 21, *Speciation Profiles for Diesel and Gas Fuel Combustion Sources,* presents the speciation profiles that were used to convert PM and organic gas emissions into individual TAC emissions. Only chemicals that have a defined acute non- cancer reference exposure level (RELs) were included. The estimated total PM and organic gas emissions are multiplied by the profile percentage for a particular TAC to obtain the emissions of that particular TAC.

79 CARB. 2013. Speciation Profiles Used in ARB Modeling. https://www.arb.ca.gov/ei/speciate/speciate.htm

Table 21
Speciation Profiles for Diesel and Gas Fuel Combustion Sources

Sources	Emission Type	TAC Speciation Profile
Off-road diesel construction equipment	Exhaust TOG	ARB TOG profile #818
	Exhaust PM	ARB PM Profile #425
	Evaporative TOG	Assume negligible
	Brake/Tire PM	N/A
On-road diesel vehicles	Exhaust TOG	ARB TOG profile #818
	Exhaust PM	ARB PM profile #425
	Evaporative TOG	Assume negligible
	Brake PM	ARB PM profile #472
	Tire PM	ARB PM profile #473
On-road gasoline vehicles	Exhaust TOG	ARB TOG profile #2118
	Exhaust PM	ARB PM profile #400
	Evaporative TOG	ARB TOG profile #660
	Brake PM	ARB PM profile #472
	Tire PM	ARB PM profile #473
Off-road natural gas-fired internal combustion engine	Exhaust TOG	ARB TOG Profile #719

Notes:
(1) TOG speciation profile 2108 is from the ARB SPECIATE database; this profile is used to characterize TOG emissions from gasoline-fueled vehicles
(2) TOG speciation profile 818 is from the ARB SPECIATE database; this profile was used to characterize TOG emissions from diesel-fueled vehicles Source:
California Air Resources Board 2013.

The methodology used to estimate acute non-cancer hazards follows a similar basic methodology used to estimate chronic non-cancer hazards with two important differences: the toxic air contaminant concentration, C_{air} in Equation 3 is based on the predicted maximum one-hour concentration of the toxic air contaminant, and the REL used is specific to the acute impacts from the contaminant.

Geographic Scope of the Health Risk Assessment

The HRA is characterized by two important differences from the localized significance threshold assessment for criteria pollutants. According to the SCAQMD localized significance threshold assessment methodology, the assessment of localized impacts addresses only those emissions that are generated "onsite", that is for the purposes of this project, emissions generated from within or along the boundaries of the Specific Plan. However, for the HRA, both the universe of the project's emission sources and air dispersion model receptors were expanded to assess the off-site impact of the project's emissions of toxics. Besides onsite emission sources and receptors, the

HRA also included a receptor grid that extends from the project boundary to 5 kilometers (km) away and roadway network that ends 10 km from the project boundary (e.g., including approximately 18 miles of SR-60, surface roadway networks that are extending from the project boundary to 7.6 miles west and 6.9 miles east). The study area reasonably captures the most extensive emissions from project-generated vehicles on the roadway network since all trips to and from the project would travel on the roadway segments and freeway segments (SR-60) nearest the project site regardless of origin or destination. Since project activity is highest on-site, the project's emissions and associated health impact decreases with distance from the project site. Thus, the selected study area is capable of capturing the project's maximum impact. If the maximum risk from the study area is less than significant, project health risk impacts will be less than significant for receptors further away.

The generation of emissions from traffic traveling along the various arterial and freeway mainline roadway segments requires information on traffic volumes, length of segment, and emission factors. The emission factors, in turn, depend on vehicle type, speed, calendar year, and fuel type. Estimates of peak hour vehicle volumes and types (passenger cars, light heavy duty trucks, medium heavy duty trucks, and heavy-heavy duty trucks) were provided by the traffic consultant for each roadway segment analyzed. The TIA provided peak hourly volumes of cars and trucks traveling on freeways. Based on the distribution of traffic of cars and trucks, an hourly emissions profile for cars and trucks was applied to the mobile source segments in the HRA dispersion modeling to best represent daily traffic conditions. The TIA also provided daily vehicle volumes for freeway segments, but not for non-freeway segments. For use in the cancer risk and chronic non-cancer hazard calculations, the daily vehicle volumes for non-freeway segments were assumed to be 10 times that of the peak hour vehicle volumes. The physical length and width of each roadway segment were estimated using the segment location as provided by the traffic consultant and aerial photographs available from Google Earth. Vehicle speeds for each roadway segment and vehicle type were based on the speed groups provided by the traffic consultant. Vehicles traveling on freeways were assumed to be traveling 55 miles per hour.

SECTION 5
Environmental Impacts

5.1 Compliance with Air Quality Plan

Conflict with or obstruct the implementation of the applicable air quality plan (AIR-1)

According to the 1993 SCAQMD Handbook, there are two key indicators of consistency with the AQMP:

1. Indicator: Whether the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

2. Indicator: A project would conflict with the AQMP if it would exceed the assumptions in the AQMP in 2012 or increments based on the year of project buildout and phase. The Handbook indicates that key assumptions to use in this analysis are population number and location and a regional housing needs assessment. The parcel-based land use and growth assumptions and inputs used in the Regional Transportation Model run by the Southern California Association of Governments that generated the mobile inventory used by the SCAQMD for AQMP are not available and assumed not to include the project; therefore, the SCAQMD's significance thresholds are used to determine if the project exceeds the assumptions in the AQMP.

Considering the recommended criteria in the SCAQMD's 1993 Handbook, this analysis utilizes the following criteria to address this potential impact:

Project's Contribution to Air Quality Violations and Assumptions in AQMP

According to the SCAQMD, the project is consistent with the AQMP if the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.[80] As shown in analyses in Impact AIR-2, the project could violate an air quality standard and therefore could contribute substantially to an existing or projected air quality violation.

[80] SCAQMD. 1993. South Coast Air Quality Management District. CEQA Air Quality Handbook, 1993.

If a project's emissions exceed the SCAQMD regional thresholds for NO_X, VOC, PM_{10}, or $PM_{2.5}$, it follows that the emissions could cumulatively contribute to an exceedance of a pollutant for which the Basin is in nonattainment (ozone, PM_{10}, and $PM_{2.5}$) at a monitoring station in the Basin.

The thresholds are criteria for determining environmental significance and are discussed in the SCAQMD's 1993 Handbook for Air Quality Analysis and are updated in the SCAQMD's most recent thresholds published online in 2012. An exceedance of a nonattainment pollutant at a monitoring station would not be consistent with the goals of the AQMP to achieve attainment of pollutants.

As discussed in the analyses below (AIR-2), the project would exceed the regional emission significance thresholds for VOC, NO_X, CO, PM_{10}, and/or $PM_{2.5}$ prior to the application of mitigation. (Refer specifically to Table 22 for construction emissions and Table 25 for operational emissions.) This means that project emissions could combine with other sources and could result in an ozone, PM_{10}, or $PM_{2.5}$ exceedance at a nearby monitoring station. The Basin in which the project is located is in nonattainment for these pollutants; therefore, according to this criterion, the project would not be consistent with the AQMP. The regional emissions assume a zero baseline for existing emissions on the project site and therefore assumes that the AQMP had no emissions for the project site. The regional significance thresholds can be interpreted to mean that if project emissions exceed the thresholds, then the project would also not be consistent with the assumptions in the AQMP. Therefore, based on this criterion, the project could contribute to air quality violations and would not be consistent with the AQMP.

Compliance with Emission Control Measures

The second indicator of whether the project could conflict with or obstruct implementation of the AQMP is by assessing the project's compliance with the control measures in the AQMPs and the State Implementation Plan (SIP).

2012 AQMP

The project would comply with all applicable rules and regulations enacted as part of the AQMP. In addition, the AQMP relies upon the SCAG regional transportation strategy, which is in its adopted 2012–2035 RTP/SCS and 2011 FTIP. Included in the RTP/SCS are transportation control measures including active transportation (non-motorized transportation, e.g., biking and walking); transportation demand management; transportation system management; transit; passenger and high-speed rail; goods movement; aviation and airport ground access; highways; arterials; and operations and maintenance.

2016 AQMP

As stated previously, the SCAQMD recently approved on March 3, 2017 the Final 2016 AQMP. Currently, the 2016 AQMP is being reviewed by the U.S. EPA and CARB. Until the approval of the EPA and CARB, the current regional air quality plan is the Final 2012 AQMP adopted by the SCAQMD on December 7, 2012. Therefore, consistency analysis with the 2016 AQMP has not been included. Nonetheless, the project would comply with all applicable rules and regulations

enacted as part of the 2016 AQMP, including transportation control measures from the 2016 RTC/SCS.

State Implementation Plans

Geographical areas in the State that exceed the Federal air quality standards are called nonattainment areas. The project area is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$. SIPs show how each area will attain the Federal standards. To do this, the SIPs identify the amount of pollutant emissions that must be reduced in each area to meet the standard and the emission controls needed to reduce the necessary emissions. On September 27, 2007, the CARB adopted its State Strategy for the 2007 SIP. In 2009, the SIP was revised to account for emissions reductions from regulations adopted in 2007 and 2008 and clarifies CARB's legal commitment. Additional recent revisions to the SIP are as follows:

- In 2008, the EPA revised the lead[81] national ambient air quality standard by reducing it to 0.15 $\mu g/m^3$. On December 31, 2010, the Los Angeles County portion of the Basin was designated as nonattainment for the 2008 lead national standard as a result of exceedances measured near a large lead-acid battery recycling facility. The 2012 Lead SIP for Los Angeles County was prepared by the SCAQMD and addresses the recent revision to the lead national standard, and outlines the strategy and pollution control activities that demonstrate attainment of the lead national standard before December 31, 2015. The 2012 Lead SIP was approved May 4, 2012.

- A SIP revision for the federal nitrogen dioxide standard was prepared in 2012, to address the new 1-hour federal ambient air quality standard for nitrogen dioxide.

- The proposed California Infrastructure SIP revision was considered by the CARB on January 23, 2014. The proposed Infrastructure SIP revision is administrative in nature and covers the National Ambient Air Quality Standards (federal standards) for ozone (1997 and 2008), fine particulate matter ($PM_{2.5}$; 1997, 2006, and 2012), lead (2008), nitrogen dioxide (2010), and sulfur dioxide (2010). The proposed revision describes the infrastructure (authorities, resources, and programs) California has in place to implement, maintain, and enforce these federal standards. It does not contain any proposals for emission control measures.

The SIP takes into account CARB rules and regulations. The project will comply with applicable rules and regulations as identified in the AQMPs and SIPs and therefore, complies with this criterion.

Summary

Although the project would be consistent with the policies, rules, and regulations in the AQMP and SIPs, the project must meet all the criteria listed above to be consistent with the AQMP. The project could impede AQMP attainment because its construction and operation emissions exceed

81 Lead referred to here is a chemical element; a heavy metal.

the SCAQMD regional significance thresholds, so the project is considered to be inconsistent with the AQMP.

5.2 Regional Emissions

Violate any air quality standard or contribute substantially to an existing or projected air quality violation (AIR-2)

Regional Construction Emissions

Grading and other construction activities produce combustion emissions from various sources such as site grading, utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, asphalt paving, and motor vehicles transporting the construction crew. Exhaust emissions during these construction activities will vary daily as construction activity levels change. The use of construction equipment on site would result in localized exhaust emissions. Activity during peak grading days typically generates a greater amount of air pollutants than other project construction activities.

While the actual details of the future construction schedule are not known, it is expected that project construction would occur in two phases with the construction of Phase 1 occurring over five years and the construction of Phase 2 occurring over ten years. Appendix A includes details of the emission factors and other assumptions.

Table 22, *Short-Term Regional Construction Emissions – Without Mitigation,* identifies projected emissions resulting from grading and construction activities for the project and shows the estimated maximum daily construction emissions over the course of project construction prior to the application of mitigation.

The construction emissions estimates summarized in Table 22 are based on an assumed construction scenario. Using emission factors from the CalEEMod model for off-road sources and EMFAC2017 emission factors for on-road sources, Table 22 indicates that construction emissions of criteria pollutants would exceed the SCAQMD daily emission thresholds for all criteria pollutants (VOC, NO_x, CO, PM_{10}, and $PM_{2.5}$), with the exception of SO_X.[82] This is a significant impact requiring mitigation.

Fugitive dust emissions are generally associated with land clearing and exposure of soils to the air and wind, and cut-and-fill grading operations. Dust generated during construction varies substantially by project, depending on the level of activity, the specific operations and equipment, local soils, and weather conditions at the time of construction. The project will be required to comply with SCAQMD Rules 402 and 403 to control fugitive dust. There are a number of feasible control measures that can be reasonably implemented to significantly reduce PM_{10} emissions from construction.

[82] The project would emit SO_X from construction equipment exhaust; however, the maximum emissions (2 pounds per day) are less than significant as they are far below the threshold of 150 pounds per day.

As identified in Table 22, fugitive dust and exhaust emissions during the anticipated peak construction day for the project would exceed SCAQMD daily construction thresholds. The percentage of dust and exhaust varies by year but for PM_{10} is an average of 85 percent dust and 15 percent exhaust. $PM_{2.5}$ has an average of 54 percent dust and 46 percent exhaust.

Table 22
Short-Term Regional Construction Emissions–Without Mitigation

	Maximum Daily Pollutant Emissions (lbs/day)									
Year	VOC	NO_X	CO	SO_2	PM_{10} dust	PM_{10} exhaust	PM_{10} Total	$PM_{2.5}$ dust	$PM_{2.5}$ exhaust	$PM_{2.5}$ Total
2020	319	989	701	2	127	42	168	27	38	66
2021	333	1124	832	2	126	47	172	26	43	69
2022	333	1103	865	2	154	45	199	37	41	78
2023	328	1010	858	2	170	41	211	40	37	77
2024	312	811	771	2	151	32	184	31	30	61
2025	285	529	576	1	124	20	144	27	19	46
2026	270	405	401	1	91	16	107	18	14	33
2027	267	380	376	1	40	15	55	10	14	24
2028	272	423	400	1	172	16	188	24	14	39
2029	268	390	378	1	114	15	129	18	14	32
2030	272	206	324	1	114	6	120	18	6	24
2031	263	163	292	1	108	5	113	15	5	20
2032	261	151	267	1	103	4	107	14	4	19
2033	251	110	226	1	81	3	84	11	3	14
2034	250	111	221	1	99	3	102	13	3	15
SCAQMD Threshold	**75**	**100**	**550**	**150**	**NA**	**NA**	**150**	**NA**	**NA**	**55**
Exceeds Threshold?	**Yes**	**Yes**	**Yes**	**No**	**NA**	**NA**	**Yes**	**NA**	**NA**	**Yes**

Notes:
- The emissions assume all construction activities (mass grading, fine grading, building, utilities, curbing, landscaping, painting, paving, and/or interchange) occur on the same day, depending on the year in which the activity occurs.
- Emissions assume compliance with SCAQMD Rule 403.

* PM totals may not add up due to rounding.
VOC = volatile organic compounds; NO_X = nitrogen oxides; CO = carbon monoxide; PM_{10} and $PM_{2.5}$ = particulate matter; NA = not applicable as there is no separate threshold for dust/exhaust

Concrete pouring would likely occur during nighttime hours due to limitations high temperatures pose for concrete work during the day. On-site equipment used during concrete pouring would involve daytime prep with actual concrete pouring occurring during the nighttime hours. On average, the total hours of operation for each piece of equipment during the concrete phase would be approximately 10 hours. Therefore, maximum daily emissions presented in Table 22 represent the maximum daily emissions including the average concrete pour day. However, under rare occurences, extended concrete pour days may be required. **Table 23**, *Short-Term Regional 24-Hour Concrete Pour Emissions – Without Mitigation* summarizes daily maximum emissions for

each year of construction associated with 24-hour operation of on-site building concrete equipment. As shown in Table 23, maximum 24-hour concrete pour days would exceed SCAQMD thresholds for NO_X. However, all maximum daily emissions are less than those for the worst-case construction day as summarized in Table 22. Therefore, rare 24-hour concrete pour days would be within the estimated worst-case construction day assumptions. No further analysis of 24-hour concrete pour days is required.

Table 23
Short-Term Regional 24-Hour Concrete Pour Emissions–Without Mitigation

	Maximum Daily Pollutant Emissions (lbs/day)									
Year	VOC	NO_X	CO	SO_2	PM_{10} dust	PM_{10} exhaust	PM_{10} Total	$PM_{2.5}$ dust	$PM_{2.5}$ exhaust	$PM_{2.5}$ Total
2020	18	155	165	0	12	9	20	1	8	9
2021	17	144	164	0	12	8	19	1	7	8
2022	15	131	163	0	12	7	18	1	6	7
2023	15	123	163	0	12	6	17	1	6	7
2024	14	117	163	0	12	5	17	1	5	6
2025	13	110	163	0	12	4	16	1	4	5
2026	13	110	163	0	12	4	16	1	4	5
2027	13	110	163	0	12	4	16	1	4	5
2028	13	110	163	0	12	4	16	1	4	5
2029	13	110	163	0	12	4	16	1	4	5
2030	14	87	167	0	12	2	14	1	2	3
2031	14	87	167	0	12	2	14	1	2	3
2032	14	87	167	0	12	2	14	1	2	3
2033	14	87	167	0	12	2	14	1	2	3
2034	14	87	167	0	12	2	14	1	2	3
SCAQMD Threshold	**75**	**100**	**550**	**150**	**NA**	**NA**	**150**	**NA**	**NA**	**55**
Exceeds Threshold?	**No**	**No**	**No**	**No**	**NA**	**NA**	**No**	**NA**	**NA**	**No**

* PM totals may not add up due to rounding.
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter
NA = not applicable as there is no separate threshold for dust/exhaust

Similar to extended concrete pouring days, other phases of construction such as utility installation and building construction may require an occasional extended construction day based on the task at hand and schedule goals. Occasional extended construction hours would occur for specific tasks within specific planning areas as needed (determined on a day-to-day basis) and would not occur site-wide throughout the 15-year construction period. Therefore, it is anticipated that estimated yearly maximum construction day emissions, as summarized in Table 22, represent the realistic worst-case regional construction emissions for the 15-year construction duration. Therefore, no further analysis of potential extended construction days is required.

The project is required to comply with regional rules that assist in reducing short-term air pollutant emissions. SCAQMD Rule 402 requires implementation of dust-suppression techniques to prevent fugitive dust from creating a nuisance off site. SCAQMD Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the PM_{10} component). Compliance with these rules would reduce impacts on nearby sensitive receptors. The applicable Rule 403 measures are as follows:

- All clearing, grading, earthmoving, or excavation activities shall cease when winds exceed 25 miles per hour per SCAQMD guidelines in order to limit fugitive dust emissions.

- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.

- Cover all trucks hauling dirt, sand, soil, or other loose materials, or maintain at least 0.6 meter (2 feet) of freeboard (vertical space between the top of the load and top of the trailer) in accordance with the requirements of California Vehicular Code Section 23114.

- The contractor shall ensure that traffic speeds on unpaved roads and project site areas are 15 miles per hour or less to reduce fugitive dust haul road emissions.

As previously discussed, SCAQMD Rule 1113 regulates the sale and application of architectural coatings. Rule 1113 is applicable to any person who applies or solicits the application of any architectural coating within the Basin. Rule 1113 sets limits on the amount of ROG or VOC emissions allowed for all types of architectural coatings. Compliance with Rule 1113 means that architectural coatings used during construction would have ROG or VOC emissions that comply with these limits.

Operational Emissions

Long-term air pollutant emission impacts that would result from the project are those associated with stationary sources (generators, forklifts, etc.), area sources (landscaping and maintenance activities), and mobile sources (e.g., emissions from the use of motor vehicles by project-generated traffic).

As discussed above in Section 4, the TIA provides VMT attributable to the project based on the net effect the project would have on regional travel as well as project VMT without consideration of a net effect. The emissions from the net effect on VMT, in conjunction with the proposed stationary and area sources, are shown in **Table 24**, *Operational Regional Air Pollutant Emissions (Worst-Case Scenario)*, **Table 25**, *Operational Regional Air Pollutant Emissions (Detail, Unmitigated)*, **Table 26**, *Operational Regional Air Pollutant Emissions (Year by Year,*

Pounds per Day, Unmitigated), and **Table 27**, *Combined Construction and Operational Regional Air Pollutant Emissions (Year by Year, Pounds per Day, Unmitigated)*, below for determination of significance. For informational purposes only **Table 28**, *Operational Regional Air Pollutant Emissions (Detail, Unmitigated) – No Net Effect (For Informational Purposes Only)* includes operational mobile emissions without consideration of a net effect in regional traffic volumes.

Worst-case Scenario

Projected emissions resulting from operational activities of the project under the worst-case scenario are identified in Table 24.

There may be minor emissions of VOC from the fueling station, depending on what type of fuel is used. However, details regarding the fueling station are currently unknown so the emission source is not estimated. This is a worst-case analysis because it assumes that the entire project would be built-out in 2020. The motor vehicle and truck emission factors are from 2020, which assumes a "dirtier" fleet than would be the case in later years. In addition, no reductions are taken for mitigation measures.

As identified in Table 24, operational emissions for the project would exceed SCAQMD daily operational thresholds for all criteria pollutants with the exception of SO_X for the "worst-case" 2020 scenario.

Table 24
Operational Regional Air Pollutant Emissions (Worst-Case Scenario)

Scenario	Source	Emissions (pounds per day)					
		VOC	NO_X	CO	SO_x	PM_{10}	$PM_{2.5}$
Buildout 2020 emission factors	Mobile	161	3,500	1,377	14	260	131
	Area	311	<1	4	0	<1	<1
	Onsite equipment	9	245	89	0	2	2
	Total	**481**	**3,745**	**1,470**	**14**	**263**	**134**
Significance Threshold		55	55	550	150	150	55
Significant Impact?		**Yes**	**Yes**	**Yes**	No	**Yes**	**Yes**

Notes: VOC = volatile organic compounds; NOx = nitrogen oxides; CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter <1 = less than one

Operational Regional Emissions

Table 25 shows the detailed operational emission sources generated both on site and off site for Phase 1 and buildout. The table shows particulate matter (PM_{10} and $PM_{2.5}$) divided into dust (roadway and tire and brake wear) and exhaust sources. As shown in the table, emissions of VOC, NO_x, CO, PM_{10}, and $PM_{2.5}$ are significant after completion of Phase 1 and after full buildout.

Table 26 shows the operational emissions year by year using emission factors interpolated from 2025 and 2035 emission factors. The VOC, NO_x, CO, PM_{10}, and $PM_{2.5}$ emissions would be over the SCAQMD's significance thresholds for most years. The emissions demonstrate that although the number of vehicles and trucks would increase year by year, the emissions do not increase

dramatically because the per-vehicle emission factors decrease over time as cleaner vehicles enter the fleet over time.

Combined Construction and Operation

There would be overlapping of construction and operational emissions with project implementation. The maximum daily operational emissions as shown in Table 26 were added to the maximum daily construction emissions and are shown in Table 27, which shows all pollutants for all years exceed the SCAQMD thresholds, with the exception of SO_X emissions.

As identified in the preceding tables, project-related air quality impacts for all criteria pollutants, with the exception of SO_X, would be significant and mitigation measures are required.

Table 25
Operational Regional Air Pollutant Emissions (Detail, Unmitigated)

Phase	Source	Emissions (pounds/day)									
		VOC	NO_X	CO	SO_X	PM_{10} Dust	PM_{10} Exh.	PM_{10} Total	$PM_{2.5}$ Dust	$PM_{2.5}$ Exh.	$PM_{2.5}$ Total
Phase 1	Mobile	24	849	277	5	129	13	141	40	7	47
	Area	203	0	3	0	0	0	0	0	0	0
	On-site Equipment	5	138	51	0	0	1	1	0	1	1
	Total	**232**	**988**	**331**	**5**	**129**	**14**	**143**	**40**	**9**	**48**
Buildout	Mobile	45	1,361	867	10	375	13	388	113	12	125
	Area	311	0	4	0	0	0	0	0	0	0
	On-site Equipment	9	245	89	0	0	2	2	0	2	2
	Total	**364**	**1,606**	**961**	**10**	**375**	**15**	**390**	**113**	**15**	**127**
Significance Threshold		**55**	**55**	**550**	**150**	**None**	**None**	**150**	**None**	**None**	**55**
Significant Impact?		**Yes**	**Yes**	**Yes**	**No**	**--**	**--**	**Yes**	**--**	**--**	**Yes**

Notes: VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter Exh. = exhaust
<1 = less than 1
On-site equipment emissions include emissions from yard trucks, forklifts, and stationary generators.

Table 26
Operational Regional Air Pollutant Emissions (Year by Year, pounds per day, unmitigated)

Year	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
2020	0	0	0	0	0	0
2021	51	338	111	1	34	14
2022	97	608	200	2	67	27
2023	138	808	269	3	97	37
2024	174	941	315	4	125	45
2025	205	988	330	5	138	48
2026	221	1,033	417	6	169	57
2027	238	1,109	494	6	195	65
2028	255	1,184	570	7	220	73
2029	272	1,255	639	7	245	81
2030	289	1,323	705	8	271	89
2031	305	1,388	766	8	296	97
2032	321	1,451	825	9	321	105
2033	337	1,511	879	9	346	113
2034	353	1,568	930	9	371	121
2035	364	1,606	961	10	390	127
SCAQMD Threshold	**55**	**55**	**550**	**150**	**150**	**55**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**

- Emissions are from local vehicles, trucks, natural gas, emergency generators, forklifts, yard trucks, painting, and consumer products. There is no reduction from existing onsite emissions.
- Operational emissions are assumed to be zero in 2020 when project construction commences.
- PM_{10} and $PM_{2.5}$ emissions include exhaust and road dust.
- Landscaping emissions are negligible.

VOC = volatile organic compounds; NO_X = nitrogen oxides; SO_2 = sulfur dioxide; CO = carbon monoxide; PM_{10} and $PM_{2.5}$ = particulate matter

Table 27
Combined Construction and Operational Regional Air Pollutant Emissions (Year by Year, Pounds per Day, Unmitigated)

Year	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
2020 (construction only)	319	989	701	2	168	66
2021	384	1,463	943	3	207	83
2022	429	1,710	1,066	4	266	105
2023	465	1,818	1,127	5	308	114
2024	486	1,751	1,086	6	309	106
2025	490	1,517	906	7	282	94
2026	491	1,438	817	7	276	90
2027	505	1,489	870	7	250	89
2028	528	1,607	970	8	408	112
2029	540	1,645	1,017	8	374	113
2030	560	1,529	1,029	9	391	114
2031	568	1,551	1,058	9	408	117
2032	582	1,602	1,092	9	428	124
2033	588	1,620	1,105	10	429	127
2034	603	1,679	1,150	10	473	137
2035	364	1,606	961	10	390	127
Max Daily Emissions	**603**	**1,818**	**1,150**	**10**	**473**	**137**
SCAQMD Threshold	**55**	**55**	**550**	**150**	**150**	**55**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**

- Year 2020 contains construction emissions only; buildout contains operational emissions only
- Sulfur oxide (SOx) emissions are substantially under the threshold of 150 pounds per day
- Reduction from existing onsite emissions are not included.

VOC = volatile organic compounds; NO_X = nitrogen oxides; CO = carbon monoxide; PM_{10} and $PM_{2.5}$ = particulate matter

Table 28
Operational Regional Air Pollutant Emissions (Detail, Unmitigated) – No Net Effect (For Informational Purposes Only)

Phase	Source	Emissions (pounds/day)									
		VOC	NO_X	CO	SO_2	Fugitive PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$
Phase 1	Mobile	80	1,353	1,211	11	435	19	454	128	12	140
	Area	203	0	3	0	-	0	0	-	0	0
	On-site Equipment	5	138	51	-	-	1	1	-	1	1
	Total	**288**	**1,491**	**1,265**	**11**	**435**	**20**	**455**	**128**	**14**	**141**
Buildout	Mobile	106	1,994	1,711	16	852	19	872	246	18	264
	Area	311	0	4	0	-	0	0	-	0	0
	On-site Equipment	9	245	89	-	-	2	2	-	2	2
	Total	**426**	**2,239**	**1,804**	**16**	**852**	**21**	**874**	**246**	**21**	**266**

Notes: VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter Exh. = exhaust <1 = less than 1

5.3 Cumulatively Considerable Air Quality Impacts

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 (including releasing emissions which exceed quantitative thresholds for ozone precursors) (AIR-3)

The project would result in the emission criteria pollutants for which the project area is in non-attainment during both construction and operation. A significant impact may occur if a project would add a cumulatively considerable contribution of a federal or state non-attainment pollutant. The Basin is currently in non-attainment for ozone, PM_{10}, and $PM_{2.5}$.

Construction Emissions

The emissions from construction of the project would exceed applicable SCAQMD regional and local impact thresholds. Therefore, the project would result in a cumulatively considerable net increase for non-attainment pollutants or ozone precursors.

Operational Emissions

Future operations would exceed applicable SCAQMD regional thresholds. Therefore, the project would result in a cumulative considerable net increase for non-attainment of criteria pollutants or ozone precursors.

5.4 Substantial Pollutant Concentrations

Expose Sensitive Receptors to Substantial Pollutant Concentrations (AIR-4)

Localized Construction and Operational Emissions

The localized significance threshold analysis evaluated four conditions:

1. Project Build Out (2020), which assumes that Phase 1 and Phase 2 of the Project are fully built out in 2020 as a worst-case scenario;

2. 2022, the year when the Project emissions from both Project construction and operation are at their highest combined levels for several pollutants; and when construction activities would occur near the existing residences west of the Project boundary along Merwin Street;

3. 2025, the earliest year Phase 1 is assumed to be fully operational. When the projected construction schedule would result in construction activities in the southern portion of the Project adjacent to Alessandro Boulevard and east of the existing residential areas along Merwin Street, and when all of Phase 1 operations would occur (approximately 57 percent of entire project floor space); and

4. 2035, when Phase 1 and Phase 2 of the Project are fully operational.

Project Full Build Out under 2020 conditions represents hypothetical worst-case conditions in that the project physically could not be built-out in 2020 or, in fact, in any single year due to the size of the project. These conditions have been included in this assessment to correspond to the analysis scenarios examined in the project TIA. These conditions also do not account for the fact that vehicle emissions are expected to decline over time as vehicle emission control technologies improve. Thus, consideration of these conditions will significantly overestimate the project's potential air quality impacts. The 2022, 2025, and 2035 conditions represent the logical and realistic development of the project over a period of 15 years as represented by the project applicant. The LST analysis is presented for each condition below.

Pursuant to the SCAQMD's LST methodology, only emissions generated from emission sources located within and along the project boundaries are included in the LST assessment. These emission sources include vehicle travel on the roadway network within and along the borders of the project and emissions from support equipment including forklifts, yard/hostler trucks, and emergency standby electric generators.

Project Full Build Out (2020) LST Assessment

The localized assessment results for the Project Phase 1 and Phase 2 Full Build Out (2020) condition are provided in **Table 29**, *Localized Assessment of Project Phase 1 and Phase 2 Full Build Out (2018) Emissions Maximum Impacts Within the Project Boundaries (Without Mitigation),* for receptors located within the project boundaries and in **Table 30**, *Localized Assessment of Project Phase 1 and Phase 2 Full Build Out (2018) Emissions Maximum Impacts Outside the Project Boundaries (Without Mitigation),* for receptors located outside the project's boundaries along with a comparison to the SCAQMD's localized significance thresholds. The significance thresholds for CO and nitrogen dioxide are derived from the measured ambient air quality data from the SCAQMD Riverside air monitoring station and serve as the measure of existing air quality.

Table 29
Localized Assessment of Project Phase 1 and Phase 2 Full Build Out (2018) Emissions Maximum Impacts Within the Project Boundaries (Without Mitigation)

Pollutant	Averaging Time, Units	Existing Background[1]	Air Concentration[2]		Standard/ Threshold	Total Impact Exceeds Threshold
			Project Local Increase	Total (Background + Project)		
Carbon Monoxide	1 hour, ppm	2.2	0.05	2.2	20.0	**No**
	8 hour, ppm	2.0	0.03	2.0	9.0	**No**
Nitrogen Dioxide	State 1 hour, ppm	0.073	0.019	0.092	0.180	**No**
	National 1 hour, ppm	0.058	0.018	0.076	0.100	**No**
	Annual, ppm	0.015	0.004	0.019	0.030	**No**
PM_{10}	24 hour, $\mu g/m^3$	NA	7.2	7.2	2.5	**Yes**

Table 29
Localized Assessment of Project Phase 1 and Phase 2 Full Build Out (2018) Emissions Maximum Impacts Within the Project Boundaries (Without Mitigation)

Pollutant	Averaging Time, Units	Existing Background[1]	Air Concentration[2]		Standard/ Threshold	Total Impact Exceeds Threshold
			Project Local Increase	Total (Background + Project)		
	Annual, $\mu g/m^3$	NA	4.0	4.0	1.0	**Yes**
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	2.0	2.0	2.5	**No**

$\mu g/m^3$ = micrograms per cubic meter (a concentration unit)
NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$

1 Background data for CO and NO_2 for State standards were derived as the highest air quality measured data over the most recent 3 years of meteorological data 2016-2018. Background concentrations for the National 1-hour NO2 is the 3 year average of the 98th percentile of the daily maximum 1-hour average.

2 Highest impacts generally occur at the existing residences within the project boundaries.

Table 30
Localized Assessment of Project Phase 1 and Phase 2 Full Build Out (2018) Emissions Maximum Impacts Outside the Project Boundaries (Without Mitigation)

Pollutant	Averaging Time, Units	Existing Background[1]	Air Concentration[2]		Standard/ Threshold	Total Impact Exceeds Threshold
			Project Local Increase	Total (Background + Project)		
Carbon Monoxide	1 hour, ppm	2.2	0.03	2.2	20.0	**No**
	8 hour, ppm	2.0	0.02	2.0	9.0	**No**
Nitrogen Dioxide	State 1 hour, ppm	0.073	0.015	0.088	0.180	**No**
	National 1 hour, ppm	0.058	0.015	0.073	0.100	**No**
	Annual, ppm	0.015	0.001	0.016	0.030	**No**
PM_{10}	24 hour, $\mu g/m^3$	NA	2.9	2.9	2.5	**No**
	Annual, $\mu g/m^3$	NA	1.8	1.8	1.0	**No**
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	0.8	0.8	2.5	**No**

Notes:
$\mu g/m^3$ = micrograms per cubic meter (a concentration unit); NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$

1 Background data for CO and NO_2 for State standards were derived as the highest air quality measured data over the most recent 3 years of meteorological data 2016-2018. Background concentrations for the National 1-hour NO2 is the 3 year average of the 98th percentile of the daily maximum 1-hour average.

2 Highest impacts generally occur at the existing residences along Gilman Springs Road to the east of the project.

As noted from Table 29, the project would exceed the SCAQMD's significance thresholds for the annual PM_{10} threshold for receptors located within the project's boundaries. As shown in table 30, the significance thresholds would not be exceeded at any sensitive receptor located outside of the project boundaries.

It is important to note the Project Phase 1 and Phase 2 Full Build Out (2020) conditions assumes that the project's emissions are at the levels that would occur in 2020. The majority of the project's operational emissions are from on-road mobile sources, more particularly, heavy-duty trucks that contribute a disproportionate amount of emissions compared to passenger vehicles. Emissions from on-road mobile sources are regulated at the State and Federal levels and, therefore, are outside of the control of local agencies such as the City and the SCAQMD. For example, the CARB is working closely with the USEPA, engine and vehicle manufacturers, and other interested parties to identify programs that will reduce emissions from heavy-duty diesel vehicles in California. Emission reductions arise from a combination of measures including the use of ultra-low sulfur diesel fuel, new emission standards for large diesel engines, restrictions on diesel engine idling, addition of post-combustion filter and catalyst equipment, and retrofits for business and government diesel truck fleets. The implementation of these emission reductions will also result in reductions of other pollutants such as NO_X, VOC, and CO. As these emission reduction programs are implemented and there is a turnover in the use of older vehicles with newer and cleaner vehicles, the project's operational emissions are expected to decline significantly in the future. Emission controls on mobile source vehicles already adopted by the CARB particularly dealing with NO_X and PM_{10} controls on heavy duty trucks will reduce truck emissions significantly over time. Thus, two Project (2020) conditions represent highly conservative estimates, in terms of overestimating of the project's operational impacts.

Proposed Project Development Schedule LST Assessment

The final localized threshold assessment condition examined potential local project impacts considering the proposed construction and build out schedule of the project over a time period of 15 years from the commencement of construction in 2020 to the final build out and operation in 2035. This condition examined three specific time periods:

- The project's onsite maximum daily and annual construction emissions were estimated using the CalEEMod land use emission model and the construction equipment inventory and activities provided by the applicant. The project's onsite operational emissions, principally from the project's mobile sources, were derived from detailed traffic volume data provided by the project's TIA that reflects a completely operational Phase 1. The TIA applied a comprehensive regional transportation model to develop daily and peak hour traffic volumes for 2025 and buildout from the project's mobile sources. Peak hour and daily project traffic volumes were developed for each year from 2020 to buildout for roadway segments within and along the boundaries of the project using the following assumptions:

  – Project operational traffic volumes were assumed to be zero in 2020, the year that project construction would commence.

  – Traffic volumes for the years 2021 to 2024 (the completion year for Phase 1 operations) were interpolated from 2025 volumes provided in the TIA by applying the annual project occupancy schedule to the 2025 traffic volumes.

  – Traffic volumes for the years 2026 to 2034 were interpolated from the provided traffic volumes at buildout by applying the annual project occupancy schedule.

Year 2025

The localized impacts for the short-term construction and operational activities were analyzed using an air dispersion model (EPA AERMOD Model) to simulate the transport and dispersion of project-related emissions through the air. These impacts were then compared to the applicable SCAQMD localized concentration thresholds.

The estimated maximum localized air quality impacts from the construction and operation of the project at Phase 1 buildout are summarized in **Table 31**, *Localized Assessment – Construction and Operation, Year 2025 Maximum Impacts within the Project Boundaries (Without Mitigation),* for locations within the project's boundaries. These maximum impacts were found at the locations of the existing residences within the project boundaries. **Table 32**, *Localized Assessment – Construction and Operation, Year 2025 Maximum Impacts Outside the Project Boundaries (Without Mitigation),* summarizes the highest air quality impacts for sensitive receptors located outside of the project boundaries. These maximum impacts were found at the locations of the existing residences outside of the project boundary located west of the project boundary along Merwin Street. As noted from these two tables, project impacts would exceed the significance thresholds for PM_{10} for locations within the project boundaries, and thus represents a significant impact without mitigation.

Table 31
Localized Assessment – Construction and Operation, Year 2025 Maximum Impacts Within the Project Boundaries (Without Mitigation)

Pollutant	Averaging Time, Units	Existing Background [1]	Air Concentration		Standard/ Threshold	Total Impact Exceeds Threshold?
			Project Local Increase	Total (Background + Project)		
Carbon Monoxide	1 hour, ppm	2.2	0.09	2.3	20.0	No
	8 hour, ppm	2.0	0.03	2.0	9.0	No
Nitrogen Dioxide	State 1 hour, ppm	0.073	0.030	0.104	0.180	No
	National 1 hour, ppm	0.058	0.021	0.079	0.100	No
	Annual, ppm	0.015	0.002	0.017	0.030	No
PM_{10}	24 hour, µg/m^3	NA	5.7	5.7	2.5[2]	**Yes**
	Annual, µg/m^3	NA	2.6	2.6	1.0	**Yes**
$PM_{2.5}$	24 hour, µg/m^3	NA	1.5	1.5	2.5[2]	No

Notes:
µg/m^3 = micrograms per cubic meter (a concentration unit), ppm = parts per million (a concentration unit); NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$

[1] Background data for CO and NO_2 for State standards were derived as the highest air quality measured data over the most recent 3 years of meteorological data 2016-2018. Background concentrations for the National 1-hour NO2 is the 3 year average of the 98th percentile of the daily maximum 1-hour average.

[2] During periods when both construction and operation overlap the SCAQMD recommends the operational significance thresholds for PM_{10} and $PM_{2.5}$ as opposed to the construction thresholds which are 10.4 ug/m^3 for PM_{10} and $PM_{2.5}$. This provides a very conservative threshold for determining the significance of project impacts.

Table 32
Localized Assessment – Construction and Operation, Year 2025 Maximum Impacts Outside the Project Boundaries (without Mitigation)

Pollutant	Averaging Time, Units	Existing Background [1]	Air Concentration		Standard/ Threshold	Total Impact Exceeds Threshold?
			Project Local Increase	Total (Background + Project)		
Carbon Monoxide	1 hour, ppm	2.2	0.11	2.3	20.0	No
	8 hour, ppm	2.0	0.03	2.0	9.0	No
Nitrogen Dioxide	State 1 hour, ppm	0.073	0.037	0.110	0.180	No
	National 1 hour, ppm	0.058	0.024	0.082	0.100	No
	Annual, ppm	0.015	0.001	0.016	0.030	No
PM_{10}	24 hour, µg/m^3	NA	5.4	5.4	2.5[2]	**Yes**
	Annual, µg/m^3	NA	0.6	0.6	1.0	No
$PM_{2.5}$	24 hour, µg/m^3	NA	1.3	1.3	2.5[2]	No

Notes:
µg/m^3 = micrograms per cubic meter (a concentration unit), ppm = parts per million (a concentration unit); NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$

[1] Background data for CO and NO_2 for State standards were derived as the highest air quality measured data over the most recent 3 years of meteorological data 2016-2018. Background concentrations for the National 1-hour NO2 is the 3 year average of the 98th percentile of the daily maximum 1-hour average.

[2] During periods when both construction and operation overlap the SCAQMD recommends the operational significance thresholds for PM_{10} and $PM_{2.5}$ as opposed to the construction thresholds which are 10.4 ug/m^3 for PM_{10} and $PM_{2.5}$. This provides a very conservative threshold for determining the significance of project impacts.

Year 2022

The year 2022 was selected for the LST Analysis for two principal reasons: 1) the year 2022 corresponds to the year with the highest combined total onsite construction and operational emissions for NO_x and $PM_{2.5}$, the second highest onsite emissions for CO, and the fourth highest onsite emissions of PM_{10}; and 2) the location of the building construction in 2022 places the construction emissions nearest to the existing residences located west of the project boundary along Merwin Street.

The project's maximum combined impacts from construction and operations during 2022 are shown in **Table 33**, *Localized Assessment – Construction and Operation, Year 2032 Maximum Impacts Within the Project Boundaries (Without Mitigation),* for the existing sensitive receptors located within the project boundaries along with the SCAQMD-recommended significance thresholds. **Table 34**, *Localized Assessment – Construction and Operation, Year 2032 Maximum Impacts Outside the Project Boundaries (Without Mitigation),* shows the maximum combined impacts for sensitive receptors located outside of the project boundaries. Maximum impacts outside of the project boundary were found within the residential areas located to the west of the project boundary. As shown in these tables, the project would exceed the SCAQMD's significance thresholds for PM_{10} at locations within the project boundary and outside of the project boundary and NO_X within the project boundary.

Table 33
Localized Assessment – Construction and Operation, Year 2032 Maximum Impacts Within the Project Boundaries (Without Mitigation)

Pollutant	Averaging Time, Units	Existing Background[1]	Air Concentration[2]		Standard/ Threshold	Total Impact Exceeds Threshold?
			Project Local Increase	Total (Background + Project)		
Carbon Monoxide	1 hour, ppm	2.2	0.13	2.3	20.0	No
	8 hour, ppm	2.0	0.04	2.0	9.0	No
Nitrogen Dioxide	State 1 hour, ppm	0.073	0.056	0.129	0.180	No
	National 1 hour, ppm	0.058	0.048	0.106	0.100	**Yes**
	Annual, ppm	0.015	0.002	0.017	0.030	No
PM_{10}	24 hour, µg/m^3	NA	5.2	5.2	2.5[3]	**Yes**
	Annual, µg/m^3	NA	1.4	1.4	1.0	**Yes**
$PM_{2.5}$	24 hour, µg/m^3	NA	1.6	1.6	2.5[3]	No

µg/m^3 = micrograms per cubic meter (a concentration unit)
NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$

1 Background data for CO and $NO_2$for State standards were derived as the highest air quality measured data over the most recent 3 years of meteorological data 2016-2018. Background concentrations for the National 1-hour NO2 is the 3 year average of the 98th percentile of the daily maximum 1-hour average.

2 Highest impacts at any receptor located outside of the boundaries of the project generally occur in the residential areas to the west of the project.

3 During periods when both construction and operation overlap the SCAQMD recommends the operational significance thresholds for PM_{10} and $PM_{2.5}$ as opposed to the construction thresholds which are 10.4 ug/m^3 for PM_{10} and $PM_{2.5}$. This provides a very conservative threshold for determining the significance of project impacts.

Table 34
Localized Assessment – Construction and Operation, Year 2032 Maximum Impacts Outside the Project Boundaries (without Mitigation)

Pollutant	Averaging Time, Units	Existing Background[1]	Air Concentration[2]		Standard/ Threshold	Total Impact Exceeds Threshold?
			Project Local Increase	Total (Background + Project)		
Carbon Monoxide	1 hour, ppm	2.2	0.11	2.3	20.0	No
	8 hour, ppm	2.0	0.03	2.0	9.0	No
Nitrogen Dioxide	State 1 hour, ppm	0.073	0.041	0.115	0.180	No
	National 1 hour, ppm	0.058	0.036	0.094	0.100	No
	Annual, ppm	0.015	0.001	0.016	0.030	No
PM_{10}	24 hour, µg/m^3	NA	4.0	4.0	2.5[3]	**Yes**
	Annual, µg/m^3	NA	0.8	0.8	1.0	No
$PM_{2.5}$	24 hour, µg/m^3	NA	1.3	1.3	2.5[3]	No

µg/m^3 = micrograms per cubic meter (a concentration unit)
NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$
[1] Background data for CO and nitrogen dioxide derived as the highest air quality measured data over a 3-year rolling average from 2014-2017.
[2] Highest impacts at any receptor located outside of the boundaries of the project generally occur in the residential areas to the east of the project across Gilman Springs Road
[3] During periods when both construction and operation overlap the SCAQMD recommends the operational significance thresholds for PM_{10} and $PM_{2.5}$ as opposed to the construction thresholds which are 10.4 ug/m^3 for PM_{10} and $PM_{2.5.}$ This provides a very conservative threshold for determining the significance of project impacts.

Year 2035

The year 2035 represents a long-term planning year when both phases of the project would be fully in operation. Operational emissions during 2035 were estimated based on the project's trip generation and project-related travel along the local roadway network within and along the project boundaries. **Table 35**, *Localized Assessment – Project Operation Full Build Out, Year 2035 Maximum Impacts Within the Project Boundaries (Without Mitigation),* shows the maximum localized air quality impacts for 2035 relative to the background air quality levels at the existing sensitive receptors located within the project boundaries. **Table 36**, *Localized Assessment – Project Operation, Year 2035 Maximum Impacts Outside of the Project Boundaries (Without Mitigation),* identifies the highest localized impacts for sensitive receptors located outside of the project boundaries. As shown in Table 35 and Table 36, the project would exceed PM_{10} LSTs for receptors within and outside the project boundary and would, therefore, represent a significant impact without mitigation.

Table 35
Localized Assessment – Project Operation Full Build Out, Year 2035 Maximum Impacts Within the Project Boundaries (Without Mitigation)

Pollutant	Averaging Time, Units	Existing Background[1]	Air Concentration		Standard/ Threshold	Total Impact Exceeds Threshold?
			Project Local Increase	Total (Background + Project)		
Carbon Monoxide	1 hour, ppm	2.2	0.04	2.2	20	No
	8 hour, ppm	2.0	0.02	2.0	9.0	No
Nitrogen Dioxide	State 1 hour, ppm	0.073	0.018	0.091	0.180	No
	National 1 hour, ppm	0.058	0.016	0.074	0.100	No
	Annual, ppm	0.015	0.003	0.018	0.030	No
PM_{10}	24 hour, $\mu g/m^3$	NA	8.3	8.3	2.5	**Yes**
	Annual, $\mu g/m^3$	NA	4.6	4.6	1.0	**Yes**
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	2.1	2.1	2.5	No

(1) Background data for CO and NO_2 for State standards were derived as the highest air quality measured data over the most recent 3 years of meteorological data 2016-2018. Background concentrations for the National 1-hour NO2 is the 3-year average of the 98th percentile of the daily maximum 1-hour average.
$\mu g/m^3$ = micrograms per cubic meter (a concentration unit)
NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$

Table 36
Localized Assessment – Project Operation, Year 2035 Maximum Impacts Outside of the Project Boundaries (Without Mitigation)

Pollutant	Averaging Time, Units	Existing Background[1]	Air Concentration		Standard/ Threshold	Total Impact Exceeds Threshold?
			Project Local Increase	Total (Background + Project)		
Carbon Monoxide	1 hour, ppm	2.2	0.03	2.2	20	No
	8 hour, ppm	2.0	0.01	2.0	9.0	No
Nitrogen Dioxide	State 1 hour, ppm	0.073	0.013	0.086	0.180	No
	National 1 hour, ppm	0.058	0.012	0.070	0.100	No
	Annual, ppm	0.015	0.001	0.016	0.030	No
PM_{10}	24 hour, $\mu g/m^3$	NA	2.50	2.50	2.5	**Yes**
	Annual, $\mu g/m^3$	NA	0.95	0.95	1.0	No
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	0.66	0.66	2.5	No

$\mu g/m^3$ = micrograms per cubic meter (a concentration unit); NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$

[1] Background data for CO and NO_2 for State standards were derived as the highest air quality measured data over the most recent 3 years of meteorological data 2016-2018. Background concentrations for the National 1-hour NO_2 is the 3-year average of the 98th percentile of the daily maximum 1-hour average.

Summary

The localized significance analysis demonstrates that without mitigation, the project would exceed the localized significance thresholds for NO_X and PM_{10} for one or more of the LST assessment years (2022, 2025, or 2035) analyzed. Therefore, according to this criterion, the air pollutant emissions would result in a significant impact and could exceed or contribute to an exceedance of the national 1-hour NO_2 annual, as well as the 24-hour and annual PM_{10} ambient air quality standards.

Toxic Air Contaminants

Acute and Chronic Health Risk Impacts

Acute and chronic health risk impact analyses examine the increased risk for non-cancer health outcomes associated with project-related air pollutant emissions. Since these are non-cancer health impacts, as described below, the impacts are analyzed separately from increased cancer risk associated with air pollution.

The construction and operation of the project would not emit any toxic chemicals in any significant quantity other than vehicle exhaust. While there may be other toxic substances in use on site, risk would be negligible due to intermittent use (i.e., chemicals from periodic maintenance), dispersion of chemicals throughout the project site, and compliance with State and Federal handling regulations.

Exposure to diesel exhaust can have immediate (acute) health effects, such as irritation of the eyes, nose, throat, and lungs, and can cause coughs, headaches, light headedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. However, according to the rulemaking on Identifying Particulate Emissions from Diesel-Fueled Engines as a Toxic Air Contaminant[83], the available data from studies of humans exposed to diesel exhaust are not sufficient for deriving an acute non-cancer REL.

The analysis, however, does derive an estimate of acute non-cancer risks by examining the acute health effects of the various toxic components that comprise diesel and gasoline emissions. There is specific guidance for estimating the acute non-cancer hazards from these toxic components based on chemical profiles established by the CARB which was used in the analysis to determine the project's acute non-cancer hazards.

To determine the project's *chronic* non-cancer hazard impact, the highest emissions concentrations was determined covering the years 2020 (the commencement of project construction) to 2035 (the full build out of the project). In this regard, the highest annual average concentrations prior to mitigation determined through air dispersion modeling occurred at an existing residence located within the project boundaries. This concentration was due to the impacts of emissions from the off-road construction equipment and operation equipment. This level of impact results in a chronic

[83] CARB. 1998. The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines. https://www.arb.ca.gov/toxics/dieseltac/factsht1.pdf

non-cancer HI of 0.04. This HI is less than the SCAQMD's significance level of 1.0, and is, therefore, less than significant.

The estimation of the acute non-cancer HI requires the estimation of the maximum 1-hour impacts of toxic air contaminant (TAC) components in organic gases and PM emissions. For project construction, estimates of the maximum 1-hour ROG and PM exhaust emissions were derived from the project's peak daily construction equipment emissions; for project operation, estimates of the project's maximum 1-hour TOG and PM emissions were derived from the project's peak hour traffic data along the nearly 230 roadway segments contained within the study area and then speciated or broken down into the various TAC components by fuel type, gasoline and diesel, and emission type (i.e., exhaust, evaporative, brake wear and tire wear). The acute non-cancer HI was determined for a worst-case condition that assumed the project would be constructed between 2020 and 2034 and full operation starts in 2035. Based on this information, the maximum acute non-cancer HI found at any receptor within the model domain prior to mitigation was 0.07 during any year of project construction and operation, which is less than the SCAQMD's non-cancer HI of 1.0, and, therefore, is less than significant without mitigation.

Therefore, the potential for short-term acute and chronic exposure from TAC emissions are considered to be less than significant and no mitigation is required.

Cancer Risks

As noted in Section 4, Methodology, the project health risk assessment examined the following condition for impacts to both sensitive/residential and worker receptors:

- Proposed Project Development condition which evaluates the impacts of project-related construction and operational traffic diesel PM emissions as if the project were built out in accordance with its proposed phased construction and operational buildout schedule commencing with the construction of Phase 1 in 2020 and the full build out in 2035.

The mitigation conditions require that all diesel-fueled haul trucks during construction be 2010 or newer, diesel trucks accessing the project during operation be model year 2010 or newer, and that all on-site equipment be Tier 4.

To be conservative, the HRA relied on EMFAC2017 to determine the breakdown of vehicle types and fuel types and did not consider the potential reductions in TACs emissions and health risks from increased penetration of zero emission vehicles (ZEVs). The increased penetration of ZEVs is speculative, but likely given rapid technology advancement and more stringent legislation. For example, this HRA assumed that the 2035 heavy duty truck fleet would be made up of 89 percent diesel, 9 percent gasoline, 3 percent natural gas, and 0 percent electric. According to the WLC Transportation Energy Technical Report (ESA, 2019), a High EV Penetration scenario projects that the heavy duty truck fleet would consist 30 percent electric by 2035. Therefore, accounting for the High EV Penetration scenario would result in a greatly reduced health risk impact than what has been calculated in this analysis.

Localized Risk

Cancer Risk for Sensitive/Residential Receptors. For reference, a risk level of 1 in a million implies a likelihood that up to one person, out of one million equally exposed people would contract cancer if exposed continuously (24 hours per day) to the specific concentration of TAC emissions over the duration of the exposure. This risk would be an excess cancer risk that is in addition to any cancer risk borne by a person not exposed to these air toxics.[84]

Table 37, *Estimated Cancer Risks, 30-Year Exposure for Sensitive/Residential Receptors Starting from Beginning of Project Construction (Construction and Operation HRA), Without Mitigation,* presents the estimated cancer risks for the 30-year exposure scenario that starts from the beginning of project construction (Construction + Operation HRA), which uses updated construction and operational emissions values. The results are provided separately for project construction emissions, operational emissions, and the total project emissions prior to the application of emission mitigation. **Table 38**, *Estimated Cancer Risks, 30-Year Exposure Duration for Sensitive/Residential Receptors Starting from Beginning of Project Full Operation in 2035, Without Mitigation,* shows the estimated cancer risk for the 30-year exposure scenario that starts from the beginning of project full operation in 2035 (Operational HRA), which used the 2035 emission levels to represent the emissions for 2035 to 2064.

On the basis of the results shown in Table 37, the project would exceed the SCAQMD's cancer risk significance threshold of 10 in a million prior to the application of mitigation and would represent a significant impact. Table 38 shows that during full project operation, the estimated maximum cancer risk would exceed the 10 in a million threshold within and outside of the Project boundary and would represent a significant impact. Overall, without mitigation, the Project is expected to have a significant impact mainly due to diesel PM emissions from construction and heavy-duty diesel truck activities.

Figure 23, *Incremental Project Cancer Risk – No Mitigation (Construction and Operation),* and **Figure 24,** *Incremental Project Cancer Risk – No Mitigation (30 Years of Full Operation),* show the incremental cancer risks for the project location. The figures show the results prior to the application of mitigation.

Estimates of Cancer Risk for School Site Receptors. Cancer risk estimates at school sites in the area were prepared assuming a 9-year exposure during construction and operation as well as operation at full buildout. Prior to the application of the mitigation, the maximum cancer risk is at Ridgecrest Elementary School for the construction + operational scenario and would be approximately 12.6 in a million. Similarly, the maximum cancer risk for the full operational scenario is 3.54 in one million is at Bear Valley Elementary School. Therefore, maximum impacts at schools are greater than the 10 in one million significance threshold prior to mitigation and are potentially significant without mitigation.

Estimates of Cancer Risk for Worker Receptors. Estimates of worker exposures were prepared based on the assumption of a 25-year exposure duration for 250 days per year and 8 hours per day

[84] Definition of a 1 in a million cancer risk from the US EPA, Technology Transfer Network Air Toxics, Glossary of Key Terms, Website: www.epa.gov/ttn/atw/natamain/gloss1.html.

as described in the methodology section above. Note that the OEHHA early-in-life age factors do not apply to worker receptors. The highest worker cancer risk estimates prior to the application of mitigation is approximately 10.9 in one million for the construction + operational scenario and 3.8 in one million for the full operational scenario, both at one onsite location. Therefore, cancer risk for worker receptors anywhere in the revised HRA's study area is greater than the 10 in one million significance threshold. Projected impacts are potentially significant without mitigation.

Estimates of Cancer Burden. The cancer burden calculation provides an estimate of the increased number of cancer cases as a result of exposures to TAC emissions. The total cancer burden is the product of the number of persons in a population area (such as a census tract) and the estimated individual risk from TACs in that population area and then summed over all of the population areas. The SCAQMD indicates that the burden calculation includes those population units having an incremental cancer risk of 1 in a million or greater.

Cancer risks were estimated at the geographical center (centroid) of census tracts that are within the study area of the HRA. For the 30-year exposure duration in accordance with "Current OEHHA Guidance", the cancer burden is estimated to be 0.64 out of a population of about 176,824 individuals that were estimated to have a cancer risk of 1 in a million or more prior to mitigation. The SCAQMD has established a threshold for cancer burden of 0.5. Therefore, the project would potentially exceed the SCAQMD's cancer burden significance threshold prior to the application of mitigation.

These analyses are based on the assumption that new technology diesel exhaust cause cancer, contrary to what was found by the HEI study and discussed in more detail below.

Table 37
Estimated Cancer Risks, 30-Year Exposure Duration for Sensitive/Residential Receptors Starting from Beginning of Project Construction (Construction and Operation HRA), Without Mitigation

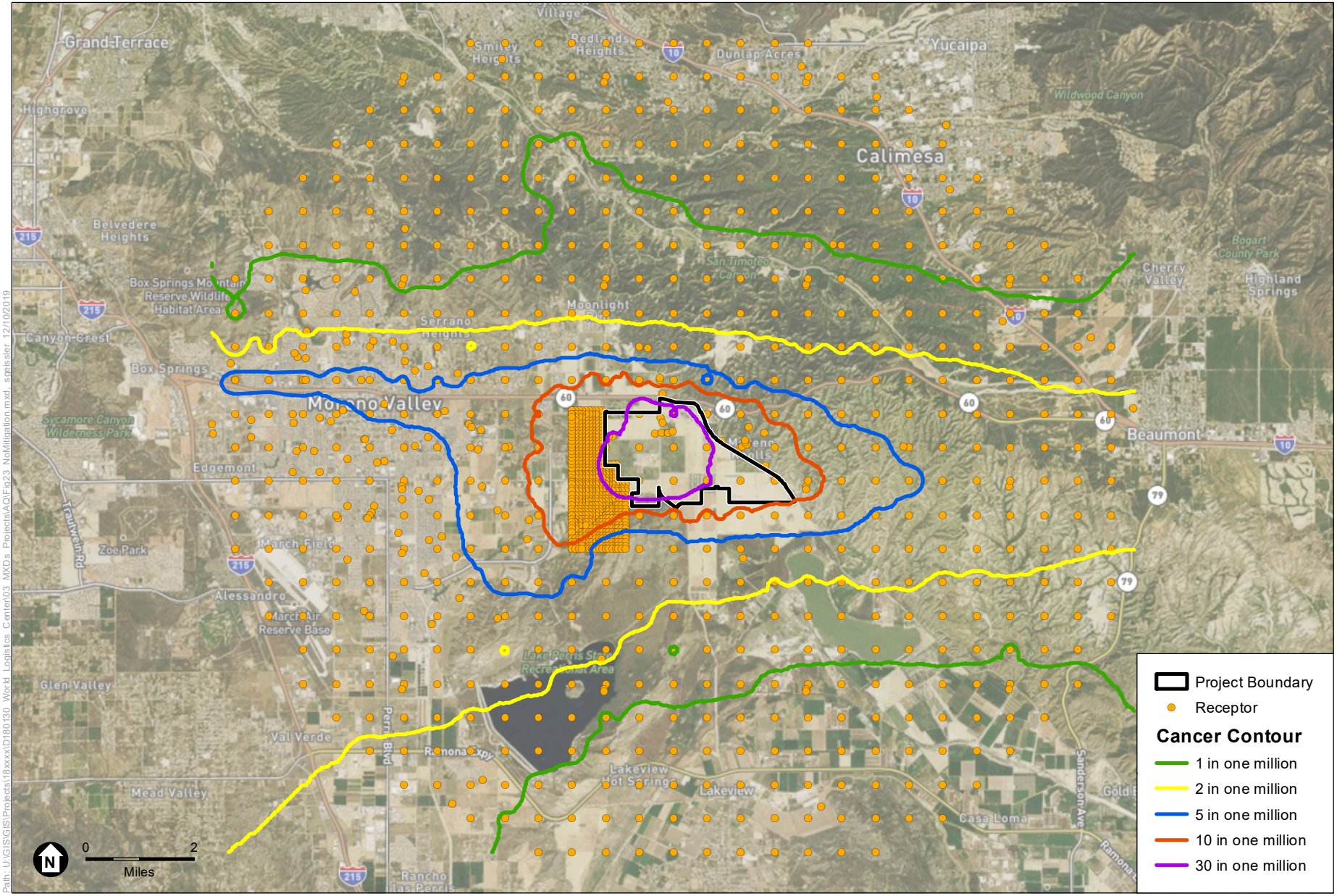
Receptor Location	Incremental Increase in Cancer Risk During Project Construction (risk/million)	Incremental Increase in Cancer Risk During Project Operation (risk/million)	Total Incremental Increase in Cancer Risk[1] (risk/million)	SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?
Maximum risk anywhere in the modeling domain[2]	49.5	17.3	66.8	10	Yes
Maximum risk within the project boundaries[3]	49.5	17.3	66.8	10	Yes
Maximum risk at any area outside of the project boundaries[4]	46.46	8.76	55.22	10	Yes

Notes:
1 Conservatively assumed all receptors in the studied domain are residential receptors and will have 30-year average exposures from 2020 to 2049 (includes diesel PM emissions from construction and operation); cancer risk estimates derived from the updated construction emission estimate, TIA, EMFAC2017 emission model, SCAQMD HRA guidance and "Current OEHHA Guidance" for estimating cancer risks.
2 Location is at the existing residences within the boundaries of the project, located at the 13241 World Logistic Parkway (formerly Theodore Street).
3 Location is at the existing residences within the boundaries of the project, located at the 13241 World Logistic Parkway (formerly Theodore Street).
4 Location is adjacent to the southwestern boundary of the project.

Table 38
Estimated Cancer Risks, 30-Year Exposure Duration for Sensitive/Residential Receptors Starting from Beginning of Project Full Operation in 2035, Without Mitigation

Receptor Location	Total Incremental Increase in Cancer Risk[1] (risk/million)	SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?
Maximum risk anywhere in the modeling domain[2]	34.0	10	Yes
Maximum risk within the project boundaries[3]	34.0	10	Yes
Maximum risk at any area outside of the project boundaries[4]	29.9	10	Yes
Maximum risk along SR 60 freeway[5]	34.0	10	No

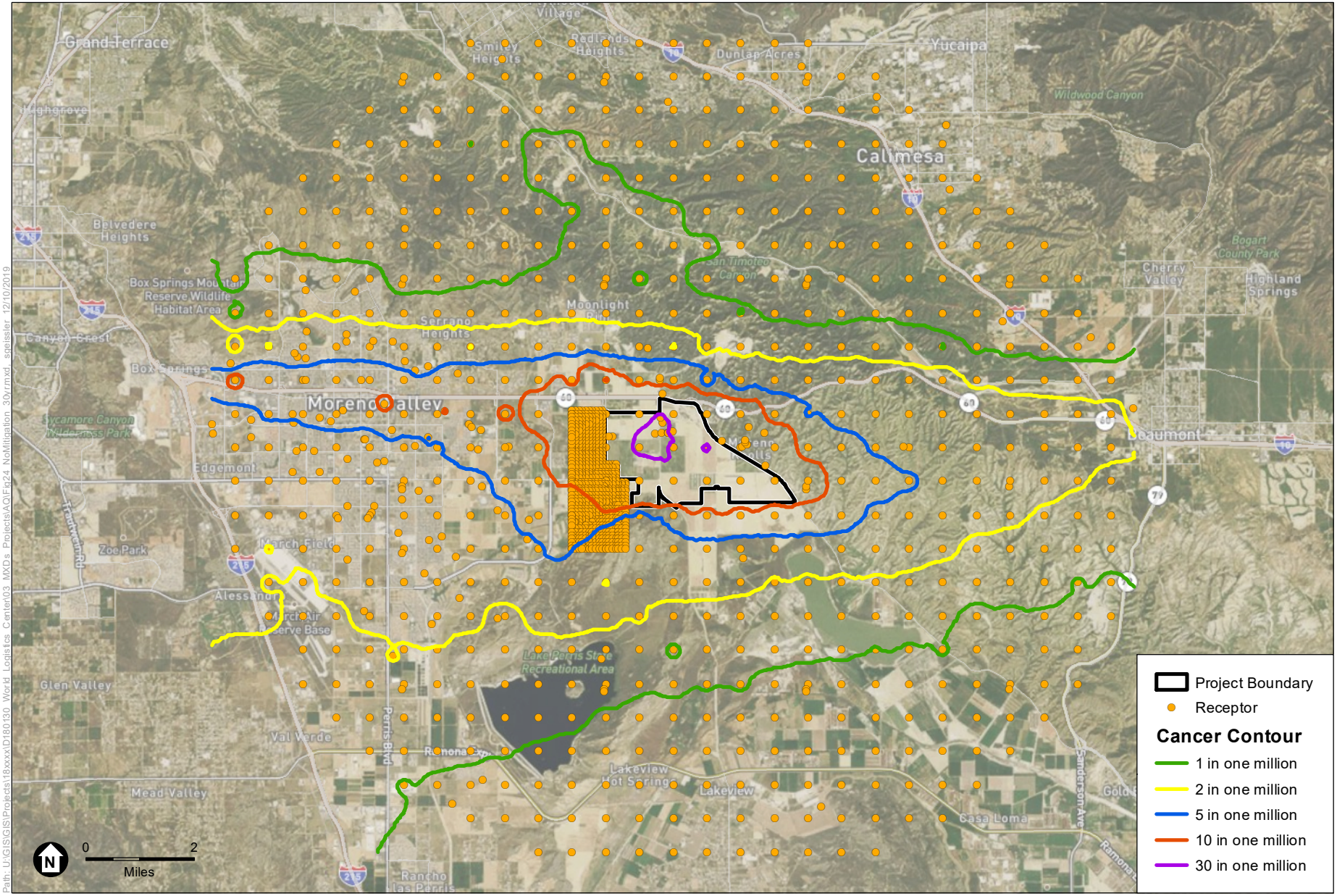
Notes:
1 Conservatively assumed all receptors in the studied domain are residential receptors and will have 30-year average exposures from 2035 to 2064 (includes diesel PM emissions from full project operation); cancer risk estimates derived from the TIA, EMFAC2017 emission model, SCAQMD HRA guidance and "Current OEHHA Guidance" for estimating cancer risks.
2 Location is at the existing residence immediately to the north of the project boundary at 13241 World Logistics Center Parkway (formerly Theodore Avenue).
3 Location is at the existing residence located at 30220 Dracaea Avenue.
4 Location is to the northwest of the project boundary, on the west side of Redlands Boulevard and south of Eucalyptus Avenue.
5 Location is south of SR 60 freeway, same as the location in footnote (2).



SOURCE: ESRI 2019; ESA 2019

World Logistics Center

Figure 23
Incremental Project Cancer Risk – No Mitigation
(Construction and Operation)



SOURCE: ESRI 2019; ESA 2019.

World Logistics Center

Figure 24
Incremental Project Cancer Risk – No Mitigation
(30 Years of Full Operation)

ESA

Regional Freeway Network Risk

As mentioned in the methodology section, the HRA study area was focused on the most extensive emissions from project related activities. Because project activity is highest on-site and surrounding the Project boundary, the Project's emissions and associated health impact decreases with an increase in distance from the project site. This is demonstrated by the cancer risk contours in Figures 23 and 24. The HRA study area includes approximately 18 miles of freeway segments along SR-60 that extend from north of the project boundary 8.6 miles toward the west (toward Port of Long Beach) and 9 miles toward east (toward Palm Springs), and the HRA receptor grids include receptors along the SR-60 freeway. Based on the results shown in Figure 23 for the construction plus operation scenario, without mitigation, a segment surrounding the project boundary will potentially have an incremental cancer risk exceeding the SCAQMD 10 in one million threshold; at an approximate distance of 2.5 miles away from the project boundary. Based on results shown in Figure 24 for 30 years of the full project operation, without mitigation, a similar section surrounding the Project boundary out to an approximate distance of 2.5 miles will potentially have an incremental cancer risk exceeding 10 in one million. Some receptors near the SR-60 could also exceed the 10 in one million cancer risk threshold.

The Project's mitigation conditions require that all construction equipment over 50 horsepower would be Tier 4, all diesel trucks accessing the project during operation be model year 2010 or newer, that all on-site equipment be Tier 4. Also, air filtration system meeting ASHRAE Standard 52.2 MERV-13 standards will be offered to the owners of the houses located at 13100 World Logistics Center Parkway (formerly Theodore Street) and 12400 World Logistics Center Parkway (formerly Theodore Street).

Because Project-generated vehicle trips and associated impacts decrease with an increase in distance from the project site, the project impact along the regional freeway network outside the HRA's study area will be less than those presented in Figures 23 and 24. Therefore, the project's impact to the regional freeway network will be the greatest during Project full operation, as shown in Tables 54 and 55, and will be less than significant with mitigation.

Of note, results in Figure24 is based on project construction overlapping with project operations (partial project operation since project is not built out yet) while Figure 24 is based on full project operation. The difference between the two sets of results indicate that the incremental cancer risk in Figure 23 is mainly driven by the DPM emissions from onsite construction equipment. Therefore, the impact would be localized near the project site and will disappear once construction completes.

Carbon Monoxide Hotspots

Vehicular trips associated with the development of the project could contribute to congestion at intersections and along roadway segments in the project vicinity resulting in potential local CO "hotspot" impacts. The primary mobile source pollutant of local concern is CO, which is a direct function of vehicle travel speeds and idling time and, thus, traffic flow conditions. CO transport is extremely limited; it disperses rapidly with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations proximate to a congested roadway or intersection may reach unhealthful levels affecting local

sensitive receptors (residents, school children, etc.). High CO concentrations are typically associated with roadways or intersections operating at unacceptable levels of service or with very high traffic volumes. In areas with high ambient background CO concentrations, modeling is recommended to determine a project's effect on local CO levels.

Carbon monoxide (CO) "hotspot" thresholds ensure that emissions of CO associated with traffic impacts from a project in combination with CO emissions from existing and forecast regional traffic do not exceed State or Federal standards for CO at any traffic intersection affected by the project. Project concentrations may be considered significant if a CO hot spot intersection analysis determines that project-generated CO concentrations cause a localized violation of the State CO 1-hour standard of 20 ppm, State CO 8-hour standard of 9 ppm, Federal CO 1-hour standard of 35 ppm, or Federal CO 8-hour standard of 9 ppm.

A CO hotspot is a localized concentration of CO that is above the State or Federal 1-hour or 8-hour CO ambient air standards. Localized high levels of CO are associated with traffic congestion and idling or slow-moving vehicles. To provide a worst-case scenario, CO concentrations are estimated at project-impacted intersections where the concentrations would be the greatest.

This analysis follows guidelines recommended by the CO Protocol[85] and the SCAQMD. According to the CO Protocol, intersections with Level of Service (LOS) E or F require detailed analysis. In addition, intersections that operate under LOS D conditions in areas that experience meteorological conditions favorable to CO accumulation require a detailed analysis. The LOS for intersections is determined in the TIA. The SCAQMD recommends that a local CO hot spot analysis be conducted if the intersection meets one of the following criteria: (1) the intersection is at LOS D or worse and where the project increases the volume to capacity ratio by 2 percent, or (2) the project decreases LOS at an intersection from C to D. A decrease in LOS, i.e., from C to D, means that there is more traffic and more delay at the intersection.

For this project analysis, the intersections with the highest traffic volumes and the LOS E or F before mitigation were identified for 2025 using information from the table in the TIA "Intersection LOS under 2025 Plus Phase 1 Conditions." The intersections with the greatest LOS before mitigation were also identified for buildout using information from the table in the TIA "Intersection LOS under 2040 Plus Build-out Conditions."

The CO concentrations were estimated using the CALINE4 model using 2025 and 2035 emission factors. The emission factors are for "all" vehicle classes and are not adjusted for a project-specific fleet to provide a worst-case scenario. In addition, the emission factors do not take into account the project mitigation reductions from requiring that all diesel trucks are model year 2010 or newer. Results of the CO hotspot modeling are provided in Appendix C.

Table 39, *Carbon Monoxide Concentrations at Intersections, 2025,* shows estimated CO concentrations at year 2025 plus project traffic conditions. The estimated CO concentrations at year buildout are shown in **Table 40**, *Carbon Monoxide Concentrations at Intersections, 2035*.

[85] University of California, Davis. 1997. Prepared for California Department of Transportation. 1996. Transportation Project-Level Carbon Monoxide Protocol. http://www.dot.ca.gov/env/air/co-protocol.html

As shown in the tables, the estimated 1-hour and 8-hour average CO concentrations from project-generated and cumulative traffic plus the background concentrations are below the State and Federal standards. No CO hotspots are anticipated because of traffic-generated emissions by the project in combination with other anticipated development in the area. Therefore, the mobile emissions of CO from the project are not anticipated to contribute substantially to an existing or projected air quality violation of CO. Therefore, according to this criterion, air pollutant emissions during operation would result in a less than significant impact. No mitigation is required.

Table 39
Carbon Monoxide Concentrations at Intersections, 2025

Intersection	Peak Hour	CO Concentration (ppm)		Significant Impact?
		1 Hour	8 Hour	
Alessandro Boulevard and Chicago Avenue	PM	2.0	1.3	No
Alessandro Boulevard and Canyon Crest Drive	PM	1.6	1.1	No
Alessandro Boulevard and Mission Grove Parkway	PM	1.4	0.9	No
Arlington Avenue and Victoria Avenue	PM	1.1	0.7	No
Alessandro Boulevard and Sycamore Canyon Boulevard	AM	1.1	0.7	No

- ppm = parts per million
- A significant impact would occur if the estimated CO concentration is over the 1-hour State standard of 20 ppm or the 8-hour State/Federal standard of 9 ppm.

Table 40
Carbon Monoxide Concentrations at Intersections, 2035

Intersection	Peak Hour	CO Concentration (ppm)		Significant Impact?
		1 Hour	8 Hour	
Alessandro Boulevard and Chicago Avenue	PM	1.9	1.3	No
Alessandro Boulevard and Canyon Crest Drive	PM	1.8	1.2	No
Alessandro Boulevard and Sycamore Canyon Boulevard	PM	1.6	1.1	No
Ramona Expressway and Sanderson Avenue	PM	2.2	1.5	No
Alessandro Boulevard and Mission Grove Parkway	PM	1.5	1.0	No

- ppm = parts per million
- A significant impact would occur if the estimated CO concentration is over the 1-hour State standard of 20 ppm or the 8-hour State/Federal standard of 9 ppm.

5.5 Odors

Create objectionable odors affecting a substantial number of people (AIR-5)

The SCAQMD recommends that odor impacts be addressed in a qualitative manner. Such an analysis shall determine whether the project would result in excessive nuisance odors, as defined

under the California Code of Regulations and Section 41700 of the California Health and Safety Code, and thus would constitute a public nuisance related to air quality.

Land uses typically considered associated with odors include wastewater treatment facilities, waste-disposal facilities, or agricultural operations. The project does not contain land uses typically associated with emitting objectionable odors.

SCAQMD Rule 402 dictates that air pollutants discharged from any source shall not cause injury, nuisance, or annoyance to the health, safety, or comfort of the public. With the exception of short-term construction-related odors (e.g., equipment exhaust, paint, and asphalt odors), the proposed uses that would be developed on the proposed site do not include uses that are generally considered to generate offensive odors (e.g., agricultural uses, wastewater treatment plants, or landfills). While the application of architectural coatings and installation of asphalt may generate odors, these odors are temporary and not likely to be noticeable beyond the project boundaries. SCAQMD Rules 1108 and 1113 identify standards regarding the application of asphalt and architectural coatings, respectively.

SCAQMD Rule 1108 sets limitations on ROG (reactive organic gases), which are similar to and for the purposes of this EIR equivalent to and therefore interchangeable with volatile organic compounds (VOC) content in asphalt. This rule is applicable to any person who supplies, sells, offers for sale, or manufactures any asphalt materials for use in the Basin. Rule 1113 of the SCAQMD deals with the selling and application of architectural coatings. Rule 1113 is applicable to any person who supplies, sells, offers for sale, or manufactures any architectural coating for use in the Basin that is intended to be applied to buildings, pavements, or curbs. This rule is also applicable to any person who applies or solicits the application of any architectural coating within the Basin. Rule 1113 sets limits on the amount of VOC emissions allowed for all types of architectural coatings, along with a time table for tightening the emissions standards in the future. Compliance with Rule 1113 means that architectural coatings used during construction would have VOC emissions that comply with these limits.

The SCAQMD indicates that the number of overall complaints has been declining. Between 2003 and 2007, odor complaints made up 50 to 55 percent of the total nuisance complaints. Over the past decade, odor complaints from paint and coating operations have decreased from 27 to 7 percent and odor complaints from refuse collection stations have increased from 9 to 34 percent.

Diesel exhaust and VOCs would be emitted during construction of the project, which are objectionable to some; however, emissions would disperse rapidly from the project site and therefore should not reach an objectionable level at the nearest sensitive receptors. Diesel exhaust would also be emitted during operation of the project from the long-haul trucks that would visit the project site. However, the concentrations would not be at a level to result in a negative odor response at nearby sensitive or worker receptors. In addition, modern emission control systems on diesel vehicles since 2007 virtually eliminate diesel's characteristic odor.

During blow-down maintenance activities, natural gas odors will be present around the SDG&E Compressor Plant located on the project site. When this portion of the WLC Specific Plan is developed, these odors will occasionally be detectable from the industrial warehouse properties

adjacent to the SDG&E facility. These odors will be infrequent and odorized natural gas will not be present in high concentrations. Therefore, potential odor impacts from on-site natural gas operations are considered to be less than significant and do not require mitigation.

Adherence to applicable provisions of these rules is standard for all development within the Basin. In addition, conditions for the design of waste storage areas on the proposed site would be established through the permit process to ensure enclosures are appropriately designed and maintained to prevent the proliferation of odors. Solid waste generated by the proposed on-site uses will be collected by a contracted waste hauler, ensuring that any odors resulting from on-site uses would be adequately managed. Therefore, impacts associated with this issue would be less than significant and no mitigation is required.

5.6 Greenhouse Gas Emissions

Generate GHG Emissions, either directly or indirectly, that may have a significant impact on the environment (GHG-1)

Future development that could occur within the project site could generate GHG emissions during both construction and operation activities. The following activities are associated with the project and could directly or indirectly contribute to the generation of GHG emissions:

- **Removal of Vegetation (Land Use Change) and Sequestration**: Carbon sequestration is the process of capture and storage of carbon dioxide; trees, vegetation, and soil store carbon in their tissues and wood. The net removal of vegetation for construction from land use change results in a loss of the carbon sequestration in plants. However, planting additional vegetation (sequestration) would result in additional carbon sequestration and would lower the carbon footprint of the project.

- **Construction Activities**: During construction of the project, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Leaks from installation of refrigeration equipment for air conditioning may occur.

- **Gas, Electric, and Water Use**: Natural gas use results in the emissions of CH_4 (the major component of natural gas) and CO_2 from the combustion of natural gas. Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. Conveying water to the project and treating wastewater also uses electricity.

- **Solid Waste Disposal**: Solid waste generated by the project could contribute to GHG emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste, and they produce additional GHGs to varying degrees. Landfilling, the most common waste management practice, results in the release of CH_4 from the anaerobic decomposition of organic materials. CH_4 is approximately 21 times more potent than CO_2. Landfill CH_4 can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere.

- **Motor Vehicle Use**: Transportation associated with the project would result in GHG emissions from the combustion of fossil fuels and the use of electricity in daily automobile and truck trips.

- **On-site Equipment**: During operation of the project, there would be on-site equipment operating, including yard trucks, emergency generators, and forklifts.

Construction Emissions

The project would emit GHGs mainly from direct sources such as combustion of fuels from worker vehicles and construction equipment, as shown in **Table 41**, *Construction Greenhouse Gas Emissions (Without Mitigation)*. The GHG emissions are from all phases of construction. The SCAQMD recommends that construction emissions be averaged over a 30-year period.

Table 41
Construction Greenhouse Gas Emissions (Without Mitigation)

Year	Annual Emissions (mt CO_2e)
2020	18,770
2021	22,198
2022	23,363
2023	23,511
2024	22,113
2025	16,408
2026	12,424
2027	11,692
2028	12,000
2029	11,452
2030	12,311
2031	10,610
2032	9,993
2033	7,451
2034	7,430
Total	**221,727**
Averaged over 30 years	**7,391**

mt CO_2e = metric tons of carbon dioxide equivalents.
Note: The SCAQMD recommends that construction emissions be averaged over a 30-year period.
Sources include onsite construction equipment, worker trips, haul trips, vendor trips, refrigerant installation for the air conditioning in the offices, construction waste, and water use. Values presented in the table may not equal the sum due to rounding.

Operational Emissions

Total Emissions, Worst-case Scenario

Operational or long-term emissions occur over the life of the project. Operational emissions for a worst-case buildout condition are shown in **Table 42**, *Project Operational GHG Emissions (Worst-Case 2020 Analysis at Buildout)*. This is a worst-case analysis because it assumes that the entire project would be build-out in 2020. The emissions are presented by greenhouse gas (in tons per year), which was also converted to metric tons of carbon dioxide equivalents (mt CO_2e). The

vehicle emissions in the table represent travel within the South Coast Air Basin. The emissions do not take into account mitigation measures to reduce emissions, such as the use of model year 2010 and later diesel trucks on the project site. As shown in the table, the project's uncapped emissions are over the SCAQMD's significance threshold of 10,000 mt CO_2e per year. Therefore, emissions are potentially significant.

The analysis presented in Table 42, also represents a worst-case analysis because the emission factors do not take into account implementation of California's Mobile Source Strategy and the full reductions expected from newer trucks and cars as a result of the Pavley regulations, the Low Carbon Fuel Standard, and California's Advanced Clean Car program. The emissions are estimated using emission factors from EMFAC2017, CARB's emission factor model, for the year 2020.

Table 42
Project Operational GHG Emissions (Worst-Case 2020 Analysis at Buildout)

Source	Emissions (metric tons per year)					GHG Emissions (mt CO_2e)[1]
	Carbon Dioxide	Methane	Nitrous Oxide	HFCs	Black Carbon	
Capped Emissions						
Construction	7,382	0.00	0.00	0.00	0.01	7,391
Net Mobile	245,516	6.84	31.06	0.00	8.10	261,099
Yard trucks	7,172	0.00	0.00	0.00	0.00	7,172
Generator	242	0.01	0.00	0.00	0.03	267
Forklifts	250	0.00	0.00	0.00	0.01	257
Electricity [2]	34,147	-	-	-	-	34,147
Water	2,548	-	-	-	-	2,548
Natural gas [2]	4,483	2.15	24.49	-	0.00	4,689
Total Capped	**300,931**	**44.13**	**144.66**	**0.00**	**8.16**	**317,570**
Uncapped Emissions						
Construction Refrigerants and Waste	104	0.00	0.00	0.05	0.00	166
Waste	7,747	457.83	0.00	-	-	19,193
Refrigerants	0	0.00	0.00	1.71	0.00	2,572
Land use change	1,154	0.00	0.00	0.00	0.00	1,154
Sequestration	-111	0.00	0.00	0.00	0.00	-111
Total Uncapped	**8,894**	**457.83**	**0.00**	**1.77**	**0.00**	**22,974**
Threshold	--	--	--	--	--	10,000
Significant impact?	--	--	--	--	--	Yes

[1] mt CO_2e is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons [HFC] – 1500, black carbon 760) and converted to metric tons by multiplying by 0.9072. <0.01 = less than 0.01.
[2] – Electricity and natural gas emissions estimates are based on minimum compliance with 2019 Title 24 building standards and compliance with RPS.

Total Project Emissions

Table 43, *Project GHG Emissions at Buildout by GHG (Unmitigated),* shows the unmitigated capped and uncapped project emissions at buildout, including estimates of the project's mobile emissions estimates for future years based on EMFAC2017 emission factors for the actual year assessed, which take into account the Pavley regulations, the LCFS, and California's Advanced Clean Car Program. Emissions are shown by individual GHG (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, and black carbon) and totaled using the common unit of metric tons CO_2e based on the globalwarming potential of each gas. Emissions estimates for electricity and natural gas do not account for Project Design Features that improve building energy efficiency and maximize the use of on-site renewable energy.

Table 43
Project GHG Emissions at Buildout by GHG (Unmitigated)

Source	Emissions (metric tons per year)					GHG Emissions (mt CO_2e)[1]
	Carbon Dioxide	Methane	Nitrous Oxide	HFCs	Black Carbon	
Capped Emissions						
Construction	7,382	0.00	0.00	0.00	0.02	7,391
Net Mobile	172,164	7.23	19.61	0.00	1.53	179,355
Yard trucks	7,172	0.00	0.00	0.00	0.00	7,172
Generator	242	0.01	0.00	0.00	0.03	267
Forklifts	250	0.00	0.00	0.00	0.01	257
Electricity [2]	34,147	-	-	-	-	34,147
Water	2,548	-	-	-	-	2,548
Natural gas [2]	4,483	2.15	24.49	-	0.00	4,689
Total Capped	**227,579**	**44.53**	**133.21**	**0.00**	**9.64**	**235,826**
Uncapped Emissions						
Construction Refrigerants and Waste	104	0.00	0.00	0.05	0.00	166
Waste	7,747	457.83	0.00	-	-	19,193
Refrigerants	0	0.00	0.00	1.71	0.00	2,572
Land use change	1,154	0.00	0.00	0.00	0.00	1,154
Sequestration	-111	0.00	0.00	0.00	0.00	-111
Total Uncapped	**8,894**	**457.83**	**0.00**	**1.77**	**0.00**	**22,974**
Threshold	--	--	--	--	--	10,000
Significant impact?	--	--	--	--	--	Yes

[1] mt CO_2e is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons [HFC] – 1500, black carbon 760)
[2] – Electricity and natural gas emissions estimates are based on minimum compliance with 2019 Title 24 building standards and compliance with RPS.

The total emissions estimate for the project, summarized in **Table 44**, *Project GHG Emissions (Year by Year Without Mitigation),* include both construction and operations emissions, and do not account for Project Design Features that improve building energy efficiency and maximize the use of on-site renewable energy; nor do they account for the project's mitigation measures.

Table 44 shows a summary of project emissions (unmitigated) for each year between 2020 and 2064. The analysis assumes the gradual phasing in of structures until buildout (2035) and the gradual phasing out of structures as they reach their presumed lifetime of 30 years. Therefore, the lifetime of the Project extends until 2064 when the final structures are presumed to have reached their 30-year lifetime. As shown in the table, the annual uncapped emissions are over the SCAQMD's significance threshold of 10,000 mt CO_2e per year for a majority of the years presented. Therefore, emissions are potentially significant, and mitigation is required.

Table 44a
Project GHG Emissions (Year by Year without Mitigation)

Source	GHG Unmitigated Emissions (mt CO_2e/year)														
	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Capped Emissions															
Construction	18,770	22,198	23,363	23,511	22,113	16,408	12,424	11,692	12,000	11,452	12,311	10,610	9,993	7,451	7,430
Net Mobile	0	22,089	42,984	62,716	81,169	97,097	103,414	113,746	123,988	133,464	142,515	151,159	159,397	167,226	174,639
Yard trucks	0	813	1,625	2,438	3,250	4,053	4,371	4,689	5,016	5,334	5,652	5,970	6,288	6,606	6,924
Generator	0	30	61	91	121	151	163	175	187	199	211	222	234	246	258
Forklifts	0	29	58	87	117	145	157	168	180	191	203	214	226	237	248
Electricity	0	6,097	11,672	18,583	24,799	36,149	40,666	41,689	41,168	40,436	40,169	39,884	39,257	38,288	36,329
Water	0	133	267	445	623	953	1,283	1,458	1,562	1,667	1,817	1,986	2,156	2,326	2,437
Natural gas	0	0	545	1,089	1,634	2,723	3,080	3,259	3,438	3,617	3,795	3,974	4,153	4,331	4,510
Solar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capped	**18,770**	**51,390**	**80,574**	**108,959**	**133,825**	**157,680**	**165,558**	**176,875**	**187,539**	**196,360**	**206,672**	**214,020**	**221,703**	**226,711**	**232,775**
Uncapped Emissions															
Construction Refrigerants and Waste	209	209	209	209	206	102	141	144	141	141	141	141	141	141	118
Waste	0	2,175	4,349	6,524	8,698	10,847	11,698	12,549	13,423	14,274	15,125	15,976	16,827	17,678	18,529
Refrigerants	0	291	583	874	1,166	1,454	1,568	1,682	1,799	1,913	2,027	2,141	2,255	2,369	2,483
Land use change	0	131	262	392	523	652	704	755	807	858	910	961	1,012	1,063	1,114
Sequestration	0	-13	-25	-38	-50	-63	-68	-72	-77	-82	-87	-92	-97	-102	-107
Total Uncapped	**209**	**2,793**	**5,377**	**7,961**	**10,543**	**12,992**	**14,043**	**15,057**	**16,093**	**17,104**	**18,116**	**19,127**	**20,138**	**21,149**	**22,137**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant impact?	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 44b
Project GHG Emissions (Year by Year without Mitigation)

Source	GHG Unmitigated Emissions (mt CO_2e/year)														
	2035 (Buildout)	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**
Capped Emissions															
Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Mobile	179,355	179,355	179,355	179,355	179,355	179,355	179,355	179,355	179,355	179,355	179,355	179,355	179,355	179,355	179,355
Yard trucks	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172
Generator	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267
Forklifts	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
Electricity	34,147	29,379	26,115	22,850	19,586	16,322	13,057	9,793	6,529	3,264	0	0	0	0	0
Water	2,548	2,580	2,580	2,580	2,580	2,580	2,580	2,580	2,580	2,580	0	0	0	0	0
Natural gas	4,689	4,689	4,689	4,689	4,689	4,689	4,689	4,689	4,689	4,689	4,689	4,689	4,689	4,689	4,689
Solar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capped	**228,435**	**223,699**	**220,435**	**217,170**	**213,906**	**210,642**	**207,377**	**204,113**	**200,849**	**197,584**	**191,740**	**191,740**	**191,740**	**191,740**	**191,740**
Uncapped Emissions															
Construction Refrigerants and Waste	166	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste	19,193	19,193	19,193	19,193	19,193	19,193	19,193	19,193	19,193	19,193	19,193	19,193	19,193	19,193	19,193
Refrigerants	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572
Land use change	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154
Sequestration	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111
Total Uncapped	**22,974**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**	**22,808**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant impact?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 44c
Project GHG Emissions (Year by Year without Mitigation)

Source	GHG Unmitigated Emissions (mt CO_2e/year)															
	2050	**2051**	**2052**	**2053**	**2054**	**2055**	**2056**	**2057**	**2058**	**2059**	**2060**	**2061**	**2062**	**2063**	**2064**	**Total (2020-2064)**
Capped Emissions																
Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	221,727
Net Mobile	154,246	132,651	107,890	87,750	57,330	45,453	40,481	37,820	35,334	32,020	28,614	25,570	22,850	21,257	19,775	5,114,971
Yard trucks	6,168	5,304	4,314	3,509	2,293	1,818	1,619	1,512	1,413	1,280	1,144	1,022	914	850	791	204,561
Generator	230	198	161	131	85	68	60	56	53	48	43	38	34	32	29	7,620
Forklifts	221	190	155	126	82	65	58	54	51	46	41	37	33	30	28	7,340
Electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	636,226
Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44,876
Natural gas	4,032	3,468	2,820	2,294	1,499	1,188	1,058	989	924	837	748	668	597	556	517	132,674
Solar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capped	**164,897**	**141,811**	**115,340**	**93,810**	**61,289**	**48,592**	**43,277**	**40,432**	**37,774**	**34,231**	**30,590**	**27,336**	**24,428**	**22,725**	**21,141**	**6,369,995**
Uncapped Emissions																
Construction Refrigerants and Waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,559
Waste	16,506	14,195	11,545	9,390	6,135	4,864	4,332	4,047	3,781	3,426	3,062	2,736	2,445	2,275	2,116	547,418
Refrigerants	2,212	1,902	1,547	1,258	822	652	580	542	507	459	410	367	328	305	284	73,356
Land use change	993	854	694	565	369	293	261	243	227	206	184	165	147	137	127	32,922
Sequestration	-95	-82	-67	-54	-35	-28	-25	-23	-22	-20	-18	-16	-14	-13	-12	-3,159
Total Uncapped	**19,615**	**16,869**	**13,720**	**11,159**	**7,291**	**5,780**	**5,148**	**4,809**	**4,493**	**4,072**	**3,639**	**3,252**	**2,906**	**2,703**	**2,515**	**653,096**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	**450,000**
Significant impact?	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes

mt CO_2e = metric tons of carbon dioxide equivalents, which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons – 1500, black carbon 760) and converted to metric tons by multiplying by 0.9072.

1 - Electricity and natural gas emissions estimates account for PDFs that improve energy efficiency and eliminate the use of building natural gas; includes electricity use by on-site EV chargers.

2 - Estimated construction emissions are included prior to buildout.

3 – 2036 is the first full year that the Project would be built out. Years from buildout until 2049 are conservatively estimated to be equivalent to buildout year emissions and exclude construction emissions since construction activity would cease after buildout. Years post-2049 take into account the phasing out of structures as they reach their presumed 30-year lifetime.

4 – Electricity emissions decrease to zero in 2045 after RPS has reached 100% renewable electricity

5.7 Greenhouse Gas Plan, Policy, Regulation Consistency

Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs (GHG-2)

Federal and State Reduction Strategies

Table 45, *Project Compliance with Federal/State Greenhouse Gas Reduction Strategies,* evaluates the consistency of the project with the various Federal and State energy conservation strategies and other regulations related to GHG emissions.

Table 45
Project Compliance with Federal/State Greenhouse Gas Reduction Strategies

Strategy	Project Consistency
Mandatory Codes	
California Green Building Code. The Cal Green Code (Title 24, Part 11) prescribes a wide array of measures that would directly and indirectly result in reduction of GHG emissions from the Business as Usual Scenario (California Building Code). The mandatory measures that are applicable to nonresidential projects include site selection, energy efficiency, water efficiency, materials conservation and resource efficiency, and environmental quality measures.	**Consistent.** The project will be required to adhere to the non-residential mandatory measures as required by the Cal Green Code.
Energy Efficiency Measures	
Energy Efficiency. Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities).	**Consistent with Mitigation Incorporated.** The project will comply with current California Building Code (CBC) requirements for building construction. **Mitigation Measures MM-GHG-5** and **MM-GHG-6** would increase energy efficiency. **Mitigation Measure MM-GHG-7** would require that the project exceed Title 24 (2008 version) by 10 percent or comply with the current version. The WLC PDFs go further by committing the project to energy conservation measures that will enable the project to exceed the more rigorous 2016 Title 24 requirements.
Renewables Portfolio Standard. Achieve a 50 percent renewable energy mix statewide by 2050. Qualifying renewable energy sources under the RPS include (but are not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas.	**Not Applicable.** The project is not part of the State's power generation grid, but would install solar photovoltaic panels on project roofs pursuant to **Mitigation Measure MM-GHG-7**. The solar would reduce the project's electricity related emissions by approximately 5.0 percent. In addition, Moreno Valley Electric Utility is subject to the Renewable Portfolio Standard.

Table 45
Project Compliance with Federal/State Greenhouse Gas Reduction Strategies

Strategy	Project Consistency
Water Conservation and Efficiency Measures	
Water Use Efficiency. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions. The CalGreen Code, including the California Plumbing Code (Part 5), promotes water conservation. Title 20 includes appliance and fixture efficiency standards that promote water conservation.	**Consistent with Mitigation Incorporated.** The project will be required to adhere to the non-residential mandatory measures as required by the CalGreen Code. The Specific Plan outlines a number of water conservation measures, and **Mitigation Measures MM-GHG-2** through **MM-GHG-4** will help reduce potential water use even further.
Solid Waste Reduction Measures	
Increase Waste Diversion, Composting, and Commercial Recycling, and Move Toward Zero-Waste. AB 341 mandates commercial recycling and sets a goal that 75 percent of the state's solid waste generated be reduced, recycled, or composted by 2020. AB 1826 adds requirements regarding mandatory commercial organics recycling. SB 1383 requires methane emissions reduction from landfills and sets statewide disposal targets to reduce landfilling of organic waste by 50 percent from the 2014 level by 2020, and 75 percent from the 2014 level by 2025.	**Consistent with Mitigation Incorporated.** Data available from the California Integrated Waste Management Board (CIWMB) indicate that the City of Moreno Valley has not achieved the 50 percent diversion rate. The project will comply with **MM-GHG-1** to help increase solid waste diversion, composting, and recycling. The measure would also require 50 percent diversion of construction waste prior to 2020 and 75 percent diversion starting in 2020.
Transportation and Motor Vehicle Measures	
Pavley Regulations and Vehicle Fuel Efficiency Standards. AB 1493 (Pavley) and the Advanced Clean Car (ACC) program required the State to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles and light-duty trucks. Regulations were adopted by the CARB in September 2004 and expanded with the ACC program in 2012.	**Consistent.** The project does not involve the manufacture of vehicles or production of vehicle fuels. However, vehicles that are purchased and used within the project site would comply with any vehicle and fuel standards that the CARB adopts or has adopted. In addition, the project would require that all diesel trucks be 2010 or newer (**Mitigation Measure MM-AQ-6**) and would be built to support the charging of future electric-powered vehicles anticipated by the Mobile Source Strategy. The Project design also includes supporting infrastructure to accommodate future EV populations consistent with targets in the Mobile Source Strategy.
Light-Duty Vehicle Efficiency Measures. Implement additional measures that could reduce light-duty vehicle GHG emissions. For example, measures to ensure that tires are properly inflated can both reduce GHG emissions and improve fuel efficiency.	
Heavy- and Medium-Duty Fuel and Engine Efficiency Measures. Regulations to require retrofits to improve the fuel efficiency of heavy-duty trucks that could include devices that reduce aerodynamic drag and rolling resistance. This measure could also include hybridization of and increased engine efficiency of vehicles.	
Mobile Source Strategy. This 2016 plan includes a target of 4.2 million zero emission vehicles (ZEVs) by 2030, and GHG reductions from medium-duty and heavy-duty vehicles, and transit. It also includes reductions in GHGs from medium-duty and heavy-duty vehicles via the Phase 2 Medium and Heavy-Duty GHG Standards.	

Table 45
Project Compliance with Federal/State Greenhouse Gas Reduction Strategies

Strategy	Project Consistency
Low Carbon Fuel Standard. The CARB identified this measure as a Discrete Early Action Measure in the 2008 Scoping Plan. As included in the Mobile Source Strategy, this measure would reduce the carbon intensity of California's transportation fuels by at least 18 percent by 2030.	
Sustainable Freight Action Plan. The 2016 plan directs the State to establish targets to improve freight efficiency, transition to zero emission technologies, and increase the competitiveness of California's freight transport system.	
Regional Transportation-Related Greenhouse Gas Targets. Develop regional GHG emissions reduction targets for passenger vehicles, as required by SB 375. Local governments will play a significant role in the regional planning process to reach passenger vehicle GHG emissions reduction targets. Local governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces GHGs associated with vehicle travel.	**Not Applicable.** Specific regional emission targets for transportation emissions do not directly apply to the project; regional GHG reduction target development is outside the scope of this project. The project will comply with any plans developed by the City of Moreno Valley.
Measures to Reduce High Global Warming Potential (GWP) Gases	
Short-lived Climate Pollutant Strategy. SB 1383 (2016) requires the CARB to approve and implement Short-Lived Climate Pollutant strategy to reduce high GWP GHGs to achieve a statewide reduction in methane by 40%, hydrofluorocarbon gases by 40%, and anthropogenic black carbon by 50% below 2013 levels by 2030.	**Not Applicable.** New products used or serviced on the project site (after implementation of the reduction of GHG gases) would comply with future CARB rules and regulations, as would vehicles (with their refrigerants used in air conditioning systems) visiting the site.

AB = Assembly Bill CARB = California Air Resources Board GHG = greenhouse gas

With implementation of applicable strategies/measures project design features, and mitigation measures, the project's contribution to cumulative GHG emissions would be reduced. In order to ensure that the project complies with and would not conflict with or impede the implementation of reduction goals identified in AB 32 and SB 32, the Mitigation Measures listed in the above table shall be implemented.

The project will comply with existing State and Federal regulations regarding the energy efficiency of buildings, appliances, and lighting. The warehouse buildings will be built in compliance with the California Building Code to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices. In addition, Mitigation Measure MM-GHG-5 requires that the project will exceed the Title 24 energy conservation standards (2008 version) by 10 percent or comply with the current version, while the WLC Sustainability Plan goes even further by committing the project to energy

conservation measures that will enable the project to exceed the more rigorous 2019 Title 24 requirements.[86]

CARB Scoping Plan

AB 32 focuses on reducing GHG emissions to 1990 levels by the year 2020, while SB 32 has a target of 40 percent below 1990 levels by 2030. Pursuant to the requirements in AB 32, the CARB adopted the Climate Change Scoping Plan (Scoping Plan) in 2008, which contains a variety of strategies to reduce the State's emissions. The First Update to the Scoping Plan was approved in 2014 and the Second Update was approved in 2017 following the passage of SB 32. The 2017 Scoping Plan Update incorporates all of the state's GHG reduction strategies included in Table 45. **Table 46**, *Analysis of Additional Measures in the 2017 Scoping Plan Update*, considers the strategies in the 2017 Scoping Plan Update that are not included in Table 52, indicating that all are either consistent with or not applicable to the project; therefore, the project does not conflict with the Scoping Plan.

Table 46
Analysis of Additional Measures in the 2017 Scoping Plan Update

Scoping Plan Reduction Measure	Consistency Analysis
16. **Carbon Sequestration in Natural and Working Lands**. Natural and working lands – including forests and agricultural lands – are a key sector in the State's climate change strategy. Storing carbon in trees, other vegetation, soils, and aquatic sediment is an effective way to remove carbon dioxide from the atmosphere. The 2017 Scoping Plan Update describes policies and programs that prioritize protection and enhancement of California's landscapes, and commits the State to finalizing a carbon sequestration and GHG emissions reduction goal for natural and working lands by September 2018	**Not Applicable.** No forested lands exist on site. As reported in the Agriculture and Forestry Resources section 4.2.1, approximately 2,200 acres of the 2,610-acre Specific Plan area is currently dry farmed, mainly with winter wheat. However, the state's Natural and Working Lands Climate Change Implementation Plan has not been adopted, and there is no protection currently in place to preserve the site for agriculture. Further, as described in the Agriculture and Forestry Resources section, the conversion of the existing agricultural lands to urban uses is supported by the City's General Plan policies, and the entire project site and adjacent lands have been designated for urban uses for nearly 20 years by the City. The Agriculture and Forestry Resources section concludes that project implementation will result in less than significant impacts to conversion of Farmland of Local Importance.

Source: CARB, 2017e

Moreno Valley General Plan Policies

The project must also be evaluated against the City's General Plan policies that relate to greenhouse gas emissions, as shown in **Table 47**, *Consistency with City General Plan Air Quality Policies*. This analysis shows that the project is consistent with the applicable General Plan objectives and policies, or the particular objective or policy is not applicable to the proposed WLC project.

86 WSP. World Logistics Center Comparison of Renewable Energy Technologies. 2018

Table 47
Consistency with City General Plan Air Quality Policies

Objective or Policy	Project Consistency
Objective 6.6. Promote land use patterns that reduce daily automotive trips and reduce trip distance for work, shopping, school, and recreation.	**Consistent.** The project is providing employment opportunities to Moreno Valley and the surrounding area.
Policy 6.6.1. Provide sites for new neighborhood commercial facilities within close proximity to the residential areas they serve.	**Not Applicable.** The project does not propose the development of neighborhood commercial facilities or residential dwellings.
Policy 6.6.2. Provide multifamily residential development sites in close proximity to neighborhood commercial centers in order to encourage pedestrian instead of vehicular travel.	**Not Applicable.** The project is industrial and does not propose the development of residential uses.
Policy 6.6.3. Locate neighborhood parks in close proximity to the appropriate concentration of residents in order to encourage pedestrian and bicycle travel to local recreation areas.	**Not Applicable.** The project is industrial and does not propose the development of residential uses.
Objective 6.7. Reduce mobile and stationary source air pollutant emissions.	**Consistent.** The project would be implementing feasible Mitigation Measures to reduce mobile and stationary emissions (**Mitigation Measures MM-AQ-6, MM-AQ-7, MM-AQ-8,** and **MM-AQ-10**).
Policy 6.7.1. Cooperate with regional efforts to establish and implement regional air quality strategies and tactics.	**Not Applicable.** This measure is beyond the scope of the project; the City will continue to work with the SCAQMD in regional planning efforts.
Policy 6.7.2. Encourage the financing and construction of park-and-ride facilities.	**Not Applicable.** The project consists of industrial uses; a park and ride on the project would not be feasible.
Policy 6.7.3. Encourage express transit service from Moreno Valley to the greater metropolitan areas of Riverside, San Bernardino, Orange and Los Angeles Counties.	**Not Applicable.** No express mass transit facilities are designated on the project site or planned on the project site; therefore, this measure is beyond the scope of the project.
Policy 6.7.6. Require building construction to comply with the energy conservation requirements of Title 24 of the California Administrative Code.	**Consistent.** The project will comply with Title 24 requirements.

Source of objective and policy: Moreno Valley General Plan (2006).

Moreno Valley Climate Action Strategy

Table 48, *Consistency with City Climate Action Strategy,* evaluates the consistency of the project with the policies of the City's Climate Action Strategy approved in October 2012. As shown below, the project is consistent with the requirements of the Strategy for non-residential development with implementation of project design features and mitigation measures.

Table 48
Consistency with City Climate Action Strategy

Strategy Items	Project Consistency
R2-T1: Land Use Based Trips and VMT Reduction Policies. Encourage the development of Transit Priority Projects along High Quality Transit Corridors identified in the SCAG Sustainable Communities Plan, to allow a reduction in vehicle miles traveled.	**Not Applicable.** A Transit Priority Project is one that has at least 50 percent residential use based on area, at least 20 units per acre and is within a ½ mile of a major transit stop or High Quality Transit Corridor. A High Quality Transit Corridor is defined as one with 15-minute frequencies during peak commute hours. The project does not include a residential component and is not along a High Quality Transit Corridor nor are there any High Quality Transit Corridors or major transit stops in the vicinity of the project area. As a result, the strategy is not applicable.
R2-T3: Employment-Based Trip Reductions. Require a Transportation Demand Management (TDM) program for new development to reduce automobile travel by encouraging ride-sharing, carpooling, and alternative modes of transportation.	**Consistent** with implementation of **Mitigation Measure MM-AQ-10.**
R2-E1: New Construction Residential Energy Efficiency Requirements. Require energy efficient design for all new residential buildings to be 10 percent beyond the current Title 24 standards.	**Not Applicable.** This measure applies to residential projects.
R2-E2: New Construction Residential Renewable Energy. Facilitate the use of renewable energy (such as solar (photovoltaic) panels or small wind turbines) for new residential developments. Alternative approach would be the purchase of renewable energy resources offsite.	**Not Applicable.** This measure applies to residential projects.
R2-E5: New Construction Commercial Energy Efficiency Requirements. Require energy efficient design for all new commercial buildings to be 10% beyond the current Title 24 standards.	**Consistent** with **Mitigation Measure MM-GHG-7.**
R3-E1: Energy Efficient Development, and Renewable Energy Deployment Facilitation and Streamlining. Updating of codes and zoning requirements and guidelines to further implement green building practices. This could include incentives for energy efficient projects.	**Not Applicable.** This refers to updating building and zoning codes and does not apply to this warehousing development plan.
R3-L2: Heat Island Plan. Develop measures that address "heat islands." Potential measures include using strategically placed shade trees, using paving materials with a Solar Reflective Index of at least 29, an open grid pavement system, or covered parking.	**Consistent.** The Specific Plan indicates that vehicle parking areas are to be landscaped to provide a shade canopy (50 percent coverage at maturity).
R2-W1: Water Use Reduction Initiative. Consider adopting a per capita water use reduction goal which mandates the reduction of water use of 20 percent per capita with requirements applicable to new development and with cooperative support of the water agencies.	**Consistent.** California Green Building Standards Code, Chapter 5, Division 5.3, Section 5.303.2 requires that indoor water use be reduced by 20 percent. Section 5.304.3 requires irrigation controllers and sensors. The Specific Plan also contains a variety of water conservation features. **Mitigation Measures MM-GHG-2, MM-GHG-3,** and **MM-GHG-4** also provide water reduction measures.
R3-W1: Water Efficiency Training and Education. Work with EMWD and local water companies to implement a public information and education program that promotes water conservation.	**Consistent.** Tenants and owners within the WLC site will provide water conservation information from EMWD and other sources to workers on a regular basis.

Table 48
Consistency with City Climate Action Strategy

Strategy Items	Project Consistency
R2-S1: City Diversion Program. For Solid Waste, consider a target of increasing the waste diverted from the landfill to a total of 75 percent by 2020.	**Consistent.** The project would incorporate standard City waste reduction features and **Mitigation Measure MM-GHG1** (has a target to reduce waste by 75 percent by 2020).
C11: Require that developer recycle existing street material for use as base for new streets.	**Consistent.** Project will implement **Mitigation Measure MM-GHG-1** where feasible.

Executive Order S-3-05

The SCAQMD developed its thresholds based on consistency with California Executive Order S-3-05. As shown in Section 5.6 (GHG-1), the project's uncapped GHG emissions would not exceed the SCAQMD's industrial threshold. However, with mitigation implemented, the Project would be reduced to levels less than 10,000 $MTCO_2e$ and, therefore, the project would not conflict with Executive Order S-3-05. This impact is less than significant with mitigation.

SECTION 6
Mitigation Measures

6.1 Air Quality

Compliance with AQMP

Applicable SCAQMD regulatory requirements are restated in the mitigation measures identified below. These measures shall be incorporated in all project plans, specifications, and contract documents. Implementation of the project would exceed applicable thresholds for all criteria pollutants, with the exception of SO_X. Despite the implementation of mitigation measures, emissions associated with the project cannot be reduced below the applicable thresholds. Construction and operational emissions would be reduced to the extent feasible through implementation of mitigation measures described below. Construction emissions would be reduced through implementation of mitigation measures that require the use of Tier 4 construction equipment, reduced idling time, use of non-diesel equipment where feasible, low-VOC paints and cleaning solvents, and dust suppression measures. Operational emissions would be reduced through implementation of mitigation measures that require reduced vehicle idling, use of non-diesel on-site equipment, meeting or exceeding 2010 engine emission standards for all diesel trucks entering the site, electric vehicle charging stations, and prohibition of refrigerated warehouses. In the absence of further feasible mitigation to reduce the project's emission of criteria pollutants to below SCAQMD thresholds, potential air quality impacts resulting from exhaust from construction equipment will remain significant and unavoidable.

Regional Emissions

Construction

The following measures are recommended to reduce the level of emissions of criteria pollutants:

MM-AIR-1 Construction equipment maintenance records (including the emission control tier of the equipment) shall be kept on site during construction and shall be available for inspection by the City of Moreno Valley.

a) Off-road diesel-powered construction equipment greater than 50 horsepower shall meet United States Environmental Protection Agency Tier 4 off-road emissions standards. A copy of each unit's certified tier specification shall be available for inspection by the City at the time of mobilization of each applicable unit of equipment.

b) During all construction activities, off-road diesel-powered equipment may be in the "on" position not more than 10 hours per day.

c) Construction equipment shall be properly maintained according to manufacturer specifications.

d) All diesel powered construction equipment, delivery vehicles, and delivery trucks shall be turned off when not in use. On-site idling shall be limited to three minutes in any one hour.

e) Electrical hook ups to the power grid shall be provided for electric construction tools including saws, drills and compressors, where feasible, to reduce the need for diesel-powered electric generators. Where feasible and available, electric tools shall be used

f) The project shall demonstrate compliance with South Coast Air Quality Management District Rule 403 concerning fugitive dust and provide appropriate documentation to the City of Moreno Valley.

g) All construction contractors shall be provided information on the South Coast Air Quality Management District Surplus Off-road Opt-In "SOON" funds which provides funds to accelerate cleanup of off-road diesel vehicles.

h) Construction on-road haul trucks shall be model year 2010 or newer if diesel-fueled.

i) Information on ridesharing programs shall be made available to construction employees.

j) During construction, lunch options shall be provided onsite.

k) A publicly visible sign shall be posted with the telephone number and person to contact regarding dust complaints per AQMD Standards.

l) Off-site construction shall be limited to the hours between 6 a.m. to 8 p.m. on weekdays only. Construction during City holidays shall not be permitted.

MM-AIR-2 Prior to issuance of any grading permits, a Construction Staging Plan shall be submitted to and approved by the City of Moreno Valley that describes in detail the location of equipment staging areas, stockpiling/storage areas, construction parking areas, safe detours around the project construction site, as well as provide temporary traffic control (e.g., flag person) during construction-related truck hauling activities. Construction trucks shall be rerouted away from sensitive receptor areas. Trucks shall use State Route 60 using World Logistics Center Parkway (formerly Theodore Street), Redlands Boulevard (north of Eucalyptus Avenue), and Gilman Springs Road. In addition to its traffic safety purpose, the

traffic control plan can minimize traffic congestion and delays that increase idling emissions. A copy of the approved Construction Staging Plan shall be retained on site in the construction trailer.

MM-AIR-3 The following measures shall be applied during construction of the project to reduce volatile organic compounds (VOC):

a) Non-VOC containing paints, sealants, adhesives, solvents, asphalt primer, and architectural coatings (where used), or pre-fabricated architectural panels shall be used in the construction of the project to the maximum extent practicable. If such products are not commercially available, products with a VOC content of 100 grams per liter or lower for both interior and exterior surfaces shall be used.

b) Leftover paint shall be taken to a designated hazardous waste center.

c) Paint containers shall be closed when not in use

d) Low VOC cleaning solvents shall be used to clean paint application equipment.

e) Paint and solvent-laden rags shall be kept in sealed containers.

MM-AIR-4 No grading shall occur on days with an Air Quality Index forecast greater than 150 for particulates or ozone as forecasted for the project area (Source Receptor Area 24).

MM-AIR-5 The project shall comply with the SCAQMD proposed Indirect Source Rule for any warehouse that are constructed after the rule goes into effect. This rule is expected to reduce NO_X and PM_{10} emissions during construction and operation. Emission reductions resulting from this rule were not included in the project analysis.

As shown in **Table 49,** *Mitigated Short-Term Regional Construction Emissions*, construction emissions are still significant after mitigation, with the exception of $PM_{2.5}$ and SO_2. The reduction in $PM_{2.5}$ emissions is by a reduction in exhaust from the application of Tier 4 off-road equipment. PM_{10} emissions are still significant because emissions in 2022, 2023, 2024, and 2028 exceed the threshold; however, emissions of PM_{10} during all other years of construction are less than significant. Although mitigation reduces emissions of all pollutants (with the exception of CO due to how CalEEMod calculates Tier 4 emissions) during construction, potential air quality impacts resulting from exhaust from construction equipment and fugitive dust will remain significant and unavoidable.

Table 49
Mitigated Short-Term Regional Construction Emissions

Year	Maximum Daily Pollutant Emissions (lbs/day)					
	VOC	NO_X	CO[1]	SO_2	PM_{10} Total[2]	$PM_{2.5}$ Total[2]
2020	160	148	789	2	130	31
2021	163	172	943	2	130	30
2022	166	191	995	2	159	42
2023	164	172	996	2	174	44
2024	162	165	939	2	155	35
2025	155	126	709	1	126	30
2026	149	87	493	1	93	20
2027	147	71	454	1	42	12
2028	151	103	476	1	174	26
2029	148	87	451	1	116	20
2030	148	82	430	1	116	20
2031	147	77	375	1	109	16
2032	145	72	348	1	104	16
2033	143	61	270	1	82	12
2034	143	64	263	1	100	14
SCAQMD Threshold	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Threshold?	**Yes**	**Yes**	**Yes**	No	**Yes**	No

Notes:
- Mitigation Measure AIR-1 was estimated by CalEEMod using its mitigation module by assuming Tier 4 off-road equipment for equipment greater than 50 horsepower.
- Mitigation Measure AIR-1(b) restricts equipment from operating more than 10 hours per day in the on position, which is estimated in CalEEMod in both the unmitigated and mitigated estimates.
- Mitigation Measures AIR-1(c) through (e), AIR-1(g) through (m), AIR-2, and AIR-4 are not quantified.
- Mitigation Measure AIR-1 is assumed in the unmitigated and mitigated estimates (Rule 403).
- Mitigation Measure AIR-1(i) requires that construction haul trucks be 2010 model year or greater. Mitigated model years are reflected in EMFAC2017 emission factors.
- Mitigation Measure AIR-3 reduces VOC emissions during painting and is calculated as demonstrated in Appendix A.3.

[1] There is an error in the way CalEEMod estimates the effect of a higher tier (such as Tier 3 or 4) on mitigated CO; therefore, the mitigated CO values are greater than unmitigated values.
[2] PM totals may not add up due to rounding.
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter

Operations

The following mitigation measures are required to reduce emissions of criteria pollutants during project operations.

MM-AIR-6 Prior to issuance of occupancy permits for each warehouse building within the WLCSP, the developer shall demonstrate to the City that vehicles can access the building using paved roads and parking lots.

MM-AIR-7 The following shall be implemented as indicated:

Prior to Issuance of a Certificate of Occupancy

a) Signs shall be prominently displayed informing truck drivers about the California Air Resources Board diesel idling regulations, and the prohibition of parking in residential areas.

b) Signs shall be prominently displayed in all dock and delivery areas advising of the following: engines shall be turned off when not in use; trucks shall not idle for more than three consecutive minutes; telephone numbers of the building facilities manager and the California Air Resources Board to report air quality violations.

c) Signs shall be installed at each exit driveway providing directional information to the City's truck route. Text on the sign shall read "To Truck Route" with a directional arrow. Truck routes shall be clearly marked per the City Municipal Code.

On an Ongoing Basis

d) Tenants shall maintain records on fleet equipment and vehicle engine maintenance to ensure that equipment and vehicles are maintained pursuant to manufacturer's specifications. The records shall be maintained on site and be made available for inspection by the City.

e) Tenant's staff in charge of keeping vehicle records shall be trained/certified in diesel technologies, by attending California Air Resources Board approved courses (such as the free, one-day Course #512). Documentation of said training shall be maintained on-site and be available for inspection by the City.

f) Tenants shall be encouraged to become a SmartWay Partner.

g) Tenants shall be encouraged to utilize SmartWay 1.0 or greater carriers.

h) Tenants' fleets shall be in compliance with all current air quality regulations for on-road trucks including but not limited to California Air Resources Board's Heavy-Duty Greenhouse Gas Regulation and Truck and Bus Regulation.

i) Information shall be posted in a prominent location available to truck drivers regarding alternative fueling technologies and the availability of such fuels in the immediate area of the World Logistics Center.

j) Tenants shall be encouraged to apply for incentive funding (such as the Voucher Incentive Program [VIP], Carl Moyer, etc.) to upgrade their fleet.

k) All yard trucks (yard dogs/yard goats/yard jockeys/yard hostlers) shall be powered by electricity, natural gas, propane, or an equivalent non-diesel fuel.

Any off-road engines in the yard trucks shall have emissions standards equal to Tier 4 Interim or greater. Any on-road engines in the yard trucks shall have emissions standards that meet or exceed 2010 engine emission standards specified in California Code of Regulations Title 13, Article 4.5, Chapter 1, Section 2025.

l) All diesel trucks entering logistics sites shall meet or exceed 2010 engine emission standards specified in California Code of Regulations Title 13, Article 4.5, Chapter 1, Section 2025 or be powered by natural gas, electricity, or other diesel alternative. Facility operators shall maintain a log of all trucks entering the facility to document that the truck usage meets these emission standards. This log shall be available for inspection by City staff at any time.

m) All standby emergency generators shall be fueled by natural gas, propane, or any non-diesel fuel.

n) Truck and vehicle idling shall be limited to three (3) minutes.

MM-AIR-8 Prior to the issuance of building permits for more than 25 million square feet of logistics warehousing within the Specific Plan area, a publically-accessible fueling station shall be operational within the Specific Plan area offering alternative fuels (natural gas, electricity, etc.) for purchase by the motoring public. Any fueling station shall be placed a minimum of 1,000 feet from any off-site sensitive receptors or off-site zoned sensitive uses. This facility may be established in connection with the convenience store required in Mitigation Measure MM-AIR-8.

MM-AIR-9 Prior to the issuance of building permits for more than 25 million square feet of logistics warehousing within the Specific Plan area a site shall be operational within the Specific Plan area offering food and convenience items for purchase by the motoring public. This facility may be established in connection with the fueling station required in Mitigation Measure MM-AIR-7.

MM-AIR-10 Refrigerated warehouse space is prohibited unless it can be demonstrated that the environmental impacts resulting from the inclusion of refrigerated space and its associated facilities, including, but not limited to, refrigeration units in vehicles serving the logistics warehouse, do not exceed any environmental impact for the entire World Logistics Center identified in the Revised Sections of the FEIR. Such environmental analysis shall be provided with any warehouse plot plan proposing refrigerated space. Any such proposal shall include electrical hookups at dock doors to provide power for vehicles equipped with Transportation Refrigeration Units (TRUs).

MM-AIR-11 The following measures shall be incorporated as conditions to any Plot Plan approval within the Specific Plan:

a) All tenants shall be required to participate in Riverside County's Rideshare Program.

b) Storage lockers shall be provided in each building for a minimum of three percent of the full-time equivalent employees based on a ratio of 0.50 employees per 1,000 square feet of building area. Lockers shall be located in proximity to required bicycle storage facilities.

c) Class II bike lanes shall be incorporated into the design for all project streets.

d) The project shall incorporate pedestrian pathways between on-site uses.

e) Site design and building placement shall provide pedestrian connections between internal and external facilities.

f) The project shall provide pedestrian connections to residential uses within 0.25 mile from the project site.

g) A minimum of two electric vehicle-charging stations for automobiles or light-duty trucks shall be provided at each building. In addition, parking facilities with 200 parking spaces or more shall be designed and constructed so that at least six percent of the total parking spaces are capable of supporting future electric vehicle supply equipment (EVSE) charging locations. Sizing of conduit and service capacity at the time of construction shall be sufficient to install Level 2 Electric Vehicle Supply Equipment (EVSE) or greater.

h) Each building shall provide indoor and/or outdoor - bicycle storage space consistent with the City Municipal Code and the California Green Building Standards Code. Each building shall provide a minimum of two shower and changing facilities for employees.

i) Each building shall provide preferred and designated parking for any combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles equivalent to the number identified in California Green Building Standards Code Section 5.106.5.2 or the Moreno Valley Municipal Code whichever requires the higher number of carpool/vanpool stalls.

j) The following information shall be provided to tenants: onsite electric vehicle charging locations and instructions, bicycle parking, shower facilities, transit availability and the schedules, telecommunicating benefits, alternative work schedule benefits, and energy efficiency.

Mitigated operational emissions for full buildout are shown in **Table 50**, *Operational Regional Air Pollutant Emissions (Mitigated)*. Note that the emissions are based on conservative assumptions and does not subtract existing emissions that would cease to exist (i.e., assumes all

emissions are net new). As shown in Table 57, even with implementation of the mitigation measures, emissions are still significant.

Table 50
Operational Regional Air Pollutant Emissions (Mitigated)

Source	Emissions (pounds per day)					
	VOC	NO_X	CO[1]	SO_2	PM_{10}	$PM_{2.5}$
Vehicles: Local and trucks	45	1,341	867	10	387	125
Area	311	0	4	0	0	0
Onsite Equipment	8	91	107	0	0	0
Total Project Emissions	**363**	**1,432**	**978**	**10**	**388**	**125**
Significance Threshold	**55**	**55**	**550**	**150**	**150**	**55**
Significant Impact?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**

Notes:
- PM_{10} and $PM_{2.5}$ emissions include exhaust and road dust.
- Landscaping emissions are negligible.
- On-site equipment emissions include emissions from yard trucks, forklifts, and stationary generators.

VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter
[1] Mitigation requiring the use of natural gas and propane equipment lead to decreases in PM and NO_X, but may lead to increases in CO; therefore, the mitigated CO values are greater than unmitigated values.

During overlap of construction and operation, VOC, NO_X, CO, PM_{10}, and $PM_{2.5}$ would continue to exceed SCAQMD significance thresholds after mitigation, as shown in **Table 51**, *Combined Construction and Operational Regional Air Pollutant Emissions (Year by Year, Pounds per Day) – Mitigated*. Therefore, impacts are significant and unavoidable. The emissions do not take into account the existing onsite agricultural emissions.

Table 51
Combined Construction and Operational Regional Air Pollutant Emissions (Year by Year, Pounds per Day) – Mitigated

Year	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
2020	160	148	789	2	130	31
2021	207	369	1,032	3	160	40
2022	251	574	1,164	4	220	62
2023	290	730	1,236	5	264	74
2024	328	885	1,238	6	275	75
2025	359	982	1,049	7	263	77
2026	369	983	920	7	261	76
2027	384	1,036	959	7	235	76
2028	406	1,138	1,057	8	393	98
2029	420	1,187	1,103	8	360	100
2030	436	1,245	1,148	9	385	108
2031	451	1,301	1,156	9	403	112
2032	466	1,355	1,188	9	423	119
2033	479	1,401	1,165	10	426	123
2034	495	1,459	1,210	10	469	133
2035	363	1,432	978	10	388	125
Max Daily Emissions	**495**	**1,459**	**1238**	**10**	**469**	**133**
SCAQMD Threshold	**55**	**55**	**550**	**150**	**150**	**55**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**

Notes:
- Year 2020 contains construction emissions only; buildout contains operational emissions only.
- Emissions do not include existing onsite emissions.

VOC = volatile organic compounds; NO_X = nitrogen oxides; CO = carbon monoxide; PM_{10} and $PM_{2.5}$ = particulate matter

As discussed above, the TIA provides VMT attributable to the project based on the net effect the project has on regional travel as well as project VMT without consideration of a net effect. For informational purposes only, **Table 52,** *Operational Regional Air Pollutant Emissions (Mitigated) – No Net Effect (For Informational Purposes Only* includes mitigated operational mobile emissions without consideration of a net effect in regional traffic volumes.

Table 52
Operational Regional Air Pollutant Emissions (Mitigated) – No Net Effect (For Informational Purposes Only)

Scenario	Source	Emissions (pounds per day)					
		VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Buildout	Vehicles: Local and trucks	106	1,965	1,711	16	871	264
	Area	311	0	4	0	0	0
	Onsite Equipment	8	91	107	0	0	0
	Total Project Emissions	424	2,056	1,822	16	872	265

- PM_{10} and $PM_{2.5}$ emissions include exhaust and road dust.
- Landscaping emissions are negligible.
- Sulfur oxides emissions are under the 150 pounds per day significance threshold and at buildout would be less than 23 pounds per day.

VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter
On-site equipment emissions include emissions from yard trucks, forklifts, and stationary generators.

Substantial Pollutant Concentrations

Localized Emissions

With implementation of Mitigation Measures MM-AIR-6 through MM-AIR-10, the project would continue to exceed the localized significance thresholds at one or more of the existing residences located within and outside the project boundaries for PM_{10} (24-hour and/or annual). **Table 53**, *Comparison of Local Project Air Quality Impacts Before and After Mitigation,* compares the project impacts before and after mitigation for those assessment conditions and pollutants that indicated a significant impact before mitigation.

Table 53
Comparison of Local Project Air Quality Impacts Before and After Mitigation

Assessment Condition	Location	Pollutant, Averaging Time, Units	Total Impact Before Mitigation[1]	Total Impact After Mitigation	Significance Threshold	Exceeds Threshold After Mitigation?
Project Development Schedule Year 2025	Inside Project Boundaries	PM_{10} 24-hour, µg/m^3	5.7	5.6	2.5	**Yes**
		PM_{10}, Annual, µg/m^3	2.6	2.6	1.0	**Yes**
Project Development Schedule Year 2025	Outside Project Boundaries	PM_{10} 24-hour, µg/m^3	5.4	5.2	2.5	**Yes**
Project Development Schedule Year 2022	Inside Project Boundaries	NO_X National 1 hour, ppm	0.106	0.068	0.100	**No**
		PM_{10} 24-hour, µg/m^3	5.2	5.2	2.5	**Yes**
		PM_{10} Annual, µg/m^3	1.4	1.4	1.0	**Yes**
	Outside Project Boundaries	PM_{10} 24-hour, µg/m^3	4.0	4.0	2.5	**Yes**
Project Development Schedule Year 2035 Build Out	Inside Project Boundaries	PM_{10} 24 hour, µg/m^3	8.3	8.3	2.5	**Yes**
		PM_{10} Annual, µg/m^3	4.6	4.6	1.0	**Yes**
	Outside Project Boundaries	PM_{10} 24 hour, µg/m^3	2.50	2.49	2.5	**No**

Notes:
[1] Total Impacts include the incremental impacts from the project plus the pollutant background.
µg/m^3 = micrograms per cubic meter (a unit of concentration); ppm = parts per million (a unit of concentration)

Cancer Risks

Mitigation Measures MM-AIR-1, MM-AIR-2, and MM-AIR-4 through MM-AIR-10 to reduce construction and operational emissions of criteria pollutants would reduce the estimated cancer risks associated with the project. Additionally, the following mitigation measure is required to ensure that significant health risk does not occur at on-site sensitive receptors.

MM-AIR-12 (a) The house at 30220 Dracaea Avenue shall be demolished prior to the issuance of the first grading permit for grading within the World Logistics Center.

(b) An air filtration system meeting ASHRSE Standard 52.2 MERV-13 standards shall be offered to the owners of the houses located at 13100 World Logistics Center Parkway (formerly Theodore Street) and 12400 World Logistics Center Parkway (formerly Theodore Street). The developer shall offer to install

the air filtration system to the owners of the two properties within two months of the certification of the Final Revised FEIR. Prior to the issuance of the first grading permit within the World Logistics Center, documentation shall be provided to the City confirming that an offer to install the air filtration system has been extended to the owners of each of the two properties. The owners of the two properties shall be under no obligation to accept the offer. Each property owner shall have two years from the receipt of the offer to accept the offer. Upon acceptance of each offer, the developer shall work with each owner to ensure the air filtration system is properly installed within one year of acceptance.

Through mitigation requirements, new technology diesel engines are required for the WLC project. The mitigation conditions require that all diesel trucks accessing the project during operation be model year 2010 or newer and that all on-site equipment be Tier 4.

Mitigation Measures MM-AIR-1 and MM-AIR-2 require 2010-compliant trucks for operation and Tier 4 equipment for construction, both of which rely on diesel particulate filters. These vehicles reduce emissions by 90 percent when compared to 2006 vehicles and by 99 percent when compared to uncontrolled diesel engines. Recent emissions testing by CARB revealed that these diesel engines are cleaner than originally estimated. These findings, which are reflected in the CARB emissions factor model EMFAC2017, are 70 percent cleaner than previously estimated.

Beginning in 2001, USEPA and CARB began issuing a series of regulations that require new diesel-powered vehicles and equipment to use the latest emissions control technology. This technology relies on two components. The first is a diesel particulate filter, which is capable of reducing particulate matter emissions by over 90 percent (required for new engines beginning in 2007). The second technology is selective catalytic reduction, which reduces emissions of nitrogen oxides by over 90 percent (required for new engines beginning in 2010). Diesel emissions from equipment equipped with this technology is referred to as New Technology Diesel Engines (NTDE).

Mitigation Measure MM-AIR-8 encourages the use of alternative fueled vehicles on the project site. As discussed above, a High EV Penetration scenario assumes that up to 40 percent of the project's heavy duty trucks would be electric-powered; however, no reduction in emissions has been taken.

As discussed above, the HRA has been prepared consistent with "Current OEHHA Guidance". Although air quality significance thresholds have been established for outdoor environments, a significant portion of human exposure to air pollutants occurs indoors where people spend more than 90 percent of their time.[87] One approach to reduce exposure is the installation of high efficiency panel filters inside the HVAC system. Air filters and other air-cleaning devices are designed to remove pollutants from indoor air. Some are installed in the ductwork of a home's central heating, ventilating, and air-conditioning (HVAC) system to clean the air in the entire

[87] U.S. EPA. 2011. Exposure Factors Handbook. Chapter 16. Activity Factors, Table 16-111. https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252

house. In studies of the effectiveness of air filtration systems in classrooms and by the EPA in residences,[88, 89] the combination of an HVAC system with a high performance panel filter reduced indoor levels of fine particulate matter, $PM_{2.5}$ and smaller particles by 70 to 90 percent.

The use of a filtration system consisting of the application of filters with a rating of ASHRSE Standard 52.2 MERV-13, as required by Mitigation MM-AIR-12, is sufficient to capture a significant portion of the diesel particulate matter. However, the filtration system would not remove the smallest of particles (less than approximately 0.01 to 0.2 micron in diameter). MERV-13 filters would, however, reduce particles in the range of 0.3 to 1 micron by up to 75 percent and particles larger than 1 micron by 90 percent.[90] Based on measurement studies of the size distribution of the collected DPM, approximately 0.1 to 10 percent of the total DPM mass includes particles between 0.01 and 0.2 micrometer in diameter, particles between 0.3 and 1 micrometer in diameter comprise 70 percent of the total DPM mass, and particles above 1 micrometer comprise 5 to 20 percent of the total DPM mass.[91]

Since the cancer risk from DPM is calculated from the mass of DPM emitted, the quantity of DPM reduced by the action of air filters would thus equate to a reduction in cancer risk. The application of MERV-13 air filter filtration system would result in a reduction of DPM exposures by approximately 70 percent.

DPM size:	0.01 to 0.2 µm	0.3 to 1 µm	Greater than 1 µm
Calculation:	10% mass x 0% reduction	70% mass x 75% reduction	20% mass x 90% reduction
Reduction:	0% reduction	52.5% reduction	18% reduction

Attributing an adjustment for time that windows might be open, residents would be outside, or for different compounds that result in the cancer risk would reduce the efficacy of the filters by about 20 percent, bringing the total cancer risk reduction from the filters to 50 percent.

The use of the filters would bring the OEHHA-calculated risk below the SCAQMD threshold eliminating any possible risk from the project on any onsite or offsite receptors within the study area.

Residential Receptors

Table 54, Estimated Cancer Risks, 30-Year Exposure Duration for Sensitive/Residential Receptors Starting from Beginning of Project Construction (Construction and Operation HRA), With Mitigation, and **Figure 25**, Incremental Project Cancer Risk – With Mitigation (Construction and Operation), shows the cancer risks for the construction and operation HRA

88 SCAQMD. Air Filtration in Schools. http://www.aqmd.gov/docs/default-source/technology-research/clean-fuels-program/clean-fuels-program-advisory-group---february-3-2010/air-filtration-in-schools.pdf

89 U.S. EPA. Publications about Indoor Air Quality. https://www.epa.gov/indoor-air-quality-iaq/publications-about-indoor-air-quality#residential-air-cleaners

90 CARB. 2013. Rulemaking to Consider Proposed Amendments to the Air Designations for State Ambient Air Quality Standards, 2013. https://www.arb.ca.gov/regact/2012/area12/area12.htm

91 Dieselnet.com. Diesel Exhaust Particle Size, 2002. https://www.dieselnet.com/tech/dpm_size.php

after application of mitigation. As noted, the cancer risks are substantially lower after mitigation, and the SCAQMD cancer risk significance threshold would not be exceeded at any of the onsite or offsite receptors within the study area. The large reduction in cancer risk after mitigation is attributable principally to the reduced emissions associated with the commitment to Tier 4 construction equipment. The impact of this mitigation is largely felt during the first 3 to 5 years of construction when "Current OEHHA Guidance" assigns large age sensitivity factors to the first few years of the 30-year exposure duration. **Table 55**, Estimated Cancer Risks, 30-Year Exposure Duration for Sensitive/Residential Receptors Starting from Beginning of Project Full Operation in 2035, With Mitigation, and **Figure 26**, Incremental Project Cancer Risk – With Mitigation (30 Years of Full Operation), shows the mitigated cancer risk from the 30-year full project buildout.

School Sensitive Receptors

With the application of the mitigation measures discussed above, the maximum cancer risk would be approximately 3.0 in one million at Bear Valley Elementary School for both the construction + operational scenario and the full operational scenario. Therefore, maximum impacts at schools are less than the 10 in one million significance threshold with the implementation of mitigation and are less than significant.

Worker Receptors

The highest worker cancer risk estimates after the application of mitigation is approximately 1.8 in one million for the construction + operational scenario and 1.6 in one million for the full operational scenario. Therefore, cancer risk for worker receptors anywhere in the revised HRA's study area is less than the 10 in one million significance threshold with the implementation of mitigation and are less than significant.

Cancer Burden

With the application of mitigation measures, the cancer burden is estimated to be 0.48 out of a population of about 142,397 individuals that were estimated to have a cancer risk of 1 in a million or more after mitigation. The is less than the SCAQMD threshold for cancer burden of 0.5. Therefore, the project would not exceed the SCAQMD's cancer burden significance threshold after the application of mitigation.

In summary, the implementation of all the recommended mitigation measures, including the requirement to use 2010 diesel engine emissions standards, Tier 4 construction equipment, and installation of air filters at the identified on-site residence will reduce the OEHHA-calculated cancer risk to below 10 in one million at all sensitive receptors. Therefore, impacts would be less than significant.

Table 54
Estimated Cancer Risks, 30-Year Exposure Duration for Sensitive/Residential Receptors Starting from Beginning of Project Construction (Construction and Operation HRA), With Mitigation

Receptor Location	Incremental Increase in Cancer Risk During Project Construction (risk/million)	Incremental Increase in Cancer Risk During Project Operation (risk/million)	Total Incremental Increase in Cancer Risk[1] (risk/million)	SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?
Maximum risk anywhere in the modeling domain[2]	4.9	4.2	9.1	10	No
Existing residences within the project boundaries					
13241 World Logistics Center Pkwy	4.9	4.2	9.1	10	No
13100 World Logistics Center Pkwy	3.3	4.6	7.9	10	No
13200 World Logistics Center Pkwy	4.0	3.8	7.8	10	No
30220 Dracaea Ave	4.1	4.8	8.9	10	No
29080 Dracaea Ave	2.3	2.5	4.8	10	No
29140 Dracaea Ave	2.5	2.7	5.2	10	No
Maximum risk at any area outside of the project boundaries[3]	1.4	4.3	5.7	10	No

Notes:
* Pursuant to Mitigation Measure MM-AQ-12, the Applicant shall install MERV-13 air filters at the residence located at 13241 World Logistics Center Parkway (formerly Theodore Avenue).
1 Cancer risk calculation conservatively assumed all receptors modeled are residential receptors. 30-year average exposures from 2020 to 2049 (includes diesel PM emissions from construction and operation); cancer risk estimates derived from the EMFAC2017 emission model and "Current OEHHA Guidance" for estimating cancer risks.
2 Location is at existing residences within the boundaries of the project.
3 Location is adjacent to the midwestern boundary of the project.

Table 55a
Estimated Cancer Risks, 30-Year Exposure Duration for Sensitive/Residential Receptors Starting from Beginning of Project Full Operation in 2035, With Mitigation

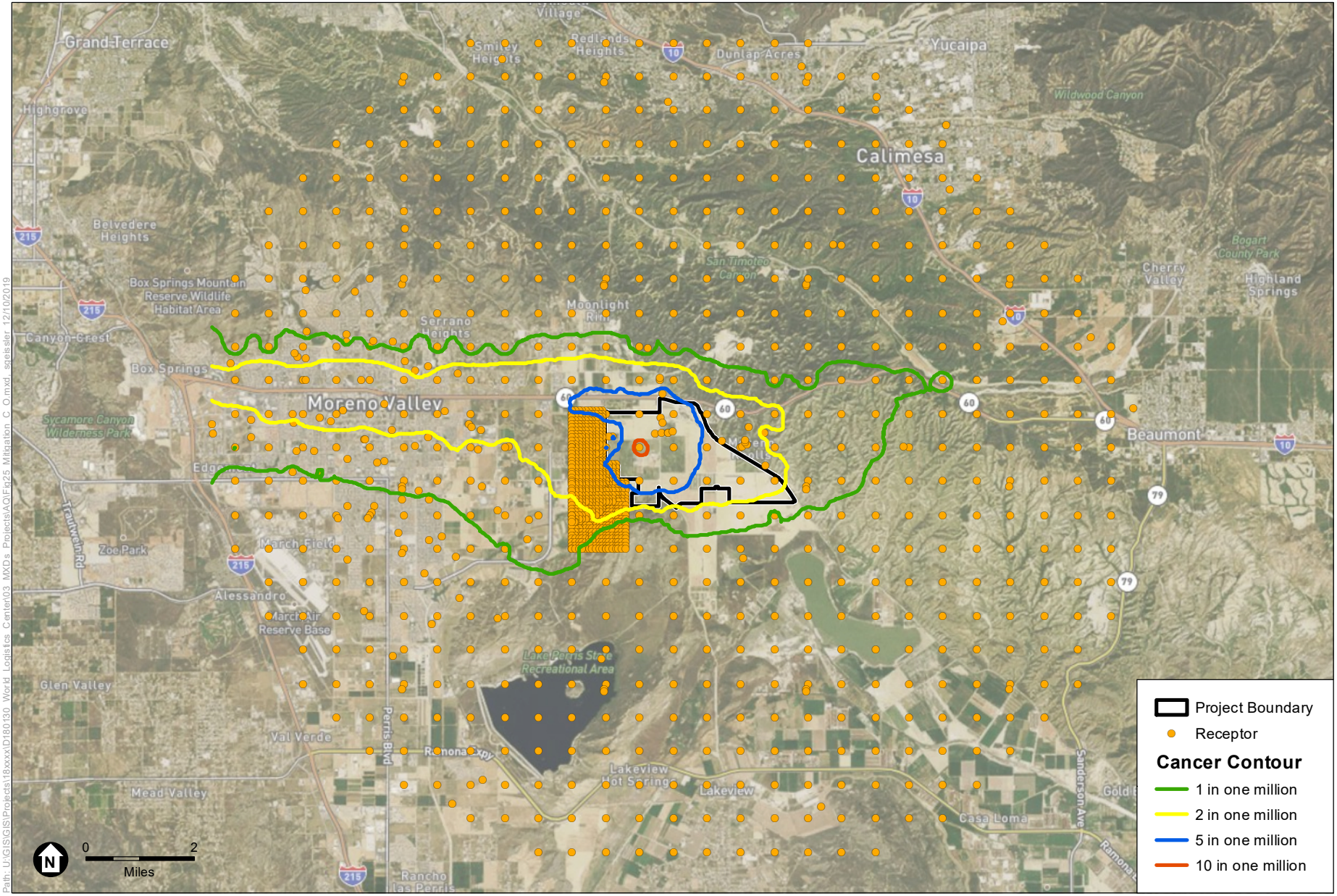
Receptor Location	Total Incremental Increase in Cancer Risk[(1)] (risk/million)	SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?
Maximum risk anywhere in the modeling domain[2]	14.2	10	Yes
Maximum risk within the project boundaries[3]	10.7	10	Yes
Maximum risk at any area outside of the project boundaries[4]	9.5	10	No
Maximum risk along SR60 freeway outside of the project boundaries[5]	9.5	10	No

Notes:
1 Conservatively assumed all receptors in the studied domain are residential receptors and will have 30-year average exposures from 2035 to 2064 (includes diesel PM emissions from full project operation); cancer risk estimates derived from the TIA, EMFAC2017 emission model, SCAQMD HRA guidance and "Current OEHHA Guidance" for estimating cancer risks.
2 Location is at the existing residence immediately to the north of the project boundary and is owned by the project sponsor.
3 Location is at the existing residence located at 30220 Dracaea Avenue.
4 Location is to the northwest of the project boundary, on the west side of Redlands Boulevard and south of Eucalyptus Avenue.
5 Location is south of SR 60 freeway, same as the location in footnote (4), which to the northwest of the project boundary, on the west side of Redlands Boulevard and south of Eucalyptus Avenue.

Table 55b
Estimated Cancer Risks, 30-Year Exposure Duration for Sensitive/Residential Onsite Receptors Starting from Beginning of Project Full Operation in 2035, With Mitigation & Installation of MERV-13 Filters

Receptor Location	Total Incremental Increase in Cancer Risk[1] (risk/million)	SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?
12400 World Logistics Center Parkway	7.1	10	No
30220 Dracaea Avenue	5.35	10	No
13241 World Logistics Center Parkway	4.75	10	No

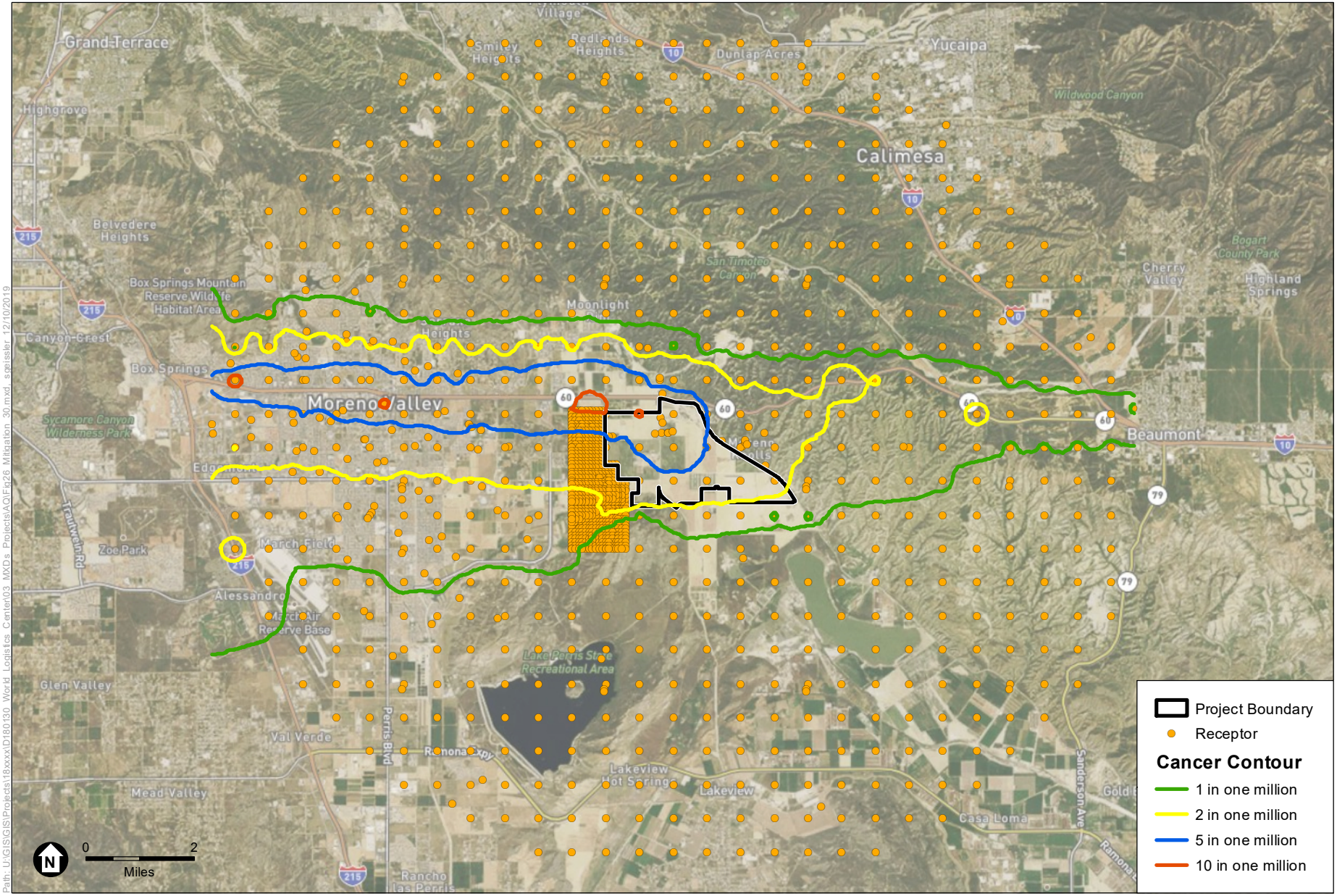
Notes:
1 DieselNet.com, 2002



SOURCE: ESRI 2019; ESA, 2019.

World Logistics Center

Figure 25
Incremental Project Cancer Risk – with Mitigation
(Construction and Operation)



SOURCE: ESRI 2019; ESA 2019.

World Logistics Center

Figure 26
Incremental Project Cancer Risk – with Mitigation
(30 Years of Full Operation)

6.2 Greenhouse Gas Emissions

Greenhouse Gas Emissions

Implementation of MM-AIR-7, MM-AIR-8, MM-AIR-9, MM-AIR-11, and MM-GHG-1 would result in reductions in greenhouse gas emissions and ensure consistency with applicable plans, policies, and regulations. Additional mitigation includes the following:

MM-GHG-1 The World Logistics Center project shall implement the following requirements to reduce solid waste and greenhouse gas emissions from construction and operation of project development:

a) Prior to January 1, 2020, divert a minimum of 50 percent of landfill waste generated by operation of the project. After January 1, 2020, development shall divert a minimum of 75 percent of landfill waste. In January of each calendar year after project approval the developer and/or Property Owners Association shall certify the percentage of landfill waste diverted on an annual basis.

b) Prior to January 1, 2020, recycle and/or salvage at least 50 percent of non-hazardous construction and demolition debris. After January 1, 2020, recycle and/or salvage at least 75 percent of non-hazardous construction and demolition debris. In January of each calendar year after project approval the developer and/or Property Owners Association shall certify the percentage of landfill waste diverted on an annual basis.

   Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site or co-mingled. Calculations can be done by weight or volume, but must be consistent throughout.

c) The applicant shall submit a Recyclables Collection and Loading Area Plan for construction related materials prior to issuance of a building permit with the Building Division and for operational aspects of the project prior to the issuance of the occupancy permit to the Public Works Department. The plan shall conform to the Riverside County Waste Management Department's Design Guidelines for Recyclable Collection and Loading Areas.

d) Prior to issuance of certificate of occupancy, the recyclables collection and loading area shall be constructed in compliance with the Recyclables Collection and Loading Area plan.

e) Prior to issuance of certificate of occupancy, documentation shall be provided to the City confirming that recycling is available for each building.

f) Within six months after occupancy of a building, the City shall confirm that all tenants have recycling procedures set in place to recycle all items that are recyclable, including but not limited to paper, cardboard, glass, plastics, and metals.

g) The property owner shall advise all tenants of the availability of community recycling and composting services.

h) Existing onsite street material shall be recycled for new project streets to the extent feasible.

MM-GHG-2 Prior to approval of a precise grading permit for each plot plan for development within the World Logistics Center Specific Plan (WLCSP), the developer shall submit landscape plans that demonstrate compliance with the World Logistics Center Specific Plan, the State of California Model Water Efficient Landscape Ordinance (AB 1881), and Conservation in Landscaping Act (AB 325). This measure shall be implemented to the satisfaction of the Planning Division. Said landscape plans shall incorporate the following:

- Use of xeriscape, drought-tolerant, and water-conserving landscape plant materials wherever feasible and as outlined in Section 6.0 of the World Logistics Center Specific Plan;
- Use of vacuums, sweepers, and other "dry" cleaning equipment to reduce the use of water for wash down of exterior areas;
- Weather-based automatic irrigation controllers for outdoor irrigation (i.e., use moisture sensors);
- Use of irrigation systems primarily at night or early morning, when evaporation rates are lowest;
- Use of recirculation systems in any outdoor water features, fountains, etc.;
- Use of low-flow sprinkler heads in irrigation system;
- Provide information to the public in conspicuous places regarding outdoor water conservation; and
- Use of reclaimed water for irrigation if it becomes available.

MM-GHG-3 All buildings shall include water-efficient design features outlined in Section 4.0 of the World Logistics Center Specific Plan. This measure shall be implemented to the satisfaction of the Land Development/Public Works. These design features shall include, but not be limited to the following:

- Instantaneous (flash) or solar water heaters;

- Automatic on and off water facets;
- Water-efficient appliances;
- Low-flow fittings, fixtures and equipment;
- Use of high efficiency toilets (1.28 gallons per flush [gpf] or less);
- Use of waterless or very low water use urinals (0.0 gpf to 0.25 gpf);
- Use of self-closing valves for drinking fountains;
- Infrared sensors on drinking fountains, sinks, toilets and urinals;
- Low-flow showerheads;
- Water-efficient ice machines, dishwashers, clothes washers, and other water-using appliances;
- Cooling tower recirculating system where applicable;
- Provide information to the public in conspicuous places regarding indoor water conservation; and
- Use of reclaimed water for wash down if it becomes available.

MM-GHG-4 Prior to approval of a precise grading permit for each plot plan, irrigation plans shall be submitted to and approved by the City demonstrating that the development will have separate irrigation lines for recycled water. All irrigation systems shall be designed so that they will function properly with recycled water if it becomes available. This measure shall be implemented to the satisfaction of the City Planning Division and Land Development Division/Public Works.

MM-GHG-5 Each application for a building permit shall include energy calculations to demonstrate compliance with the California Energy Efficiency Standards (Title 24, Part 6). Plans shall show the following:

- Energy-efficient roofing systems, such as "cool" roofs, that reduce roof temperatures significantly during the summer and therefore reduce the energy requirement for air conditioning.
- Cool pavement materials such as lighter-colored pavement materials, porous materials, or permeable or porous pavement, for all roadways and walkways not within the public right-of-way, to minimize the absorption of solar heat and subsequent transfer of heat to its surrounding environment.
- Energy-efficient appliances that achieve the 2016 California Appliance Energy Efficiency Standards (e.g., EnergyStar Appliances) and use of sunlight-filtering window coatings or double-paned windows.

MM-GHG-6 Prior to the issuance of any building permits within the World Logistics Center site, each project developer shall submit energy calculations used to demonstrate compliance with the performance approach to the California Energy Efficiency Standards, for each new structure. Plans may include but are not necessarily limited to implementing the following as appropriate:

- High-efficiency air-conditioning with electronic management system (computer) control.
- Isolated High-efficiency air-conditioning zone control by floors/separable activity areas.
- Use of Energy Star ® exit lighting or exit signage.

MM-GHG-7 Prior to the issuance of a building permit, new development shall demonstrate that each building has implemented the following:

- Install solar panels with a capacity equal to the peak daily demand for the ancillary office uses in each warehouse building or up to the limit allowed by Moreno Valley Utility's restriction on distributed solar PV connecting to their grid, whichever is greater;
- Increase efficiency for buildings by implementing either 10 percent over the 2008 Title 24's energy saving requirements for the Title 24 requirements in place at the time the building permit is approved, whichever is more strict; and
- Require the equivalent of "Leadership in Energy and Environmental Design Certified" for the buildings constructed at the World Logistics Center based on Leadership in Energy and Environmental Design Certified standards in effect at the time of project approval.

This measure shall be implemented to the satisfaction of the Building and Safety and Planning Divisions.

The WLCSP incorporates site and building designs that emphasize conservation of water and energy, which in turn help reduce greenhouse gas emissions (WLCSP September 2014, Section 1.3.2, Green Building-Sustainable Development). The current proposed Project Design Features go substantially beyond that previous commitment with energy conservation measures that exceed minimal compliance with current (2016) Title 24 requirements by about 17 percent at Phase 1 and 16 percent at full buildout, as outlined in the WLC Sustainable Energy Plan.[92] **Table 56**, *Greenhouse Gas Emissions Reduction Analysis,* evaluates to what degree various design features of the project will reduce potential GHG emissions.

[92] WSP. World Logistics Center Comparison of Renewable Energy Technologies. 2018

Table 57, *GHG Reductions at Buildout,* shows the GHG emissions and mitigation reductions after implementation of Project Design Features and mitigation at buildout only. **Table 58**, *Project GHG Emissions (Year by Year With Mitigation),* shows the mitigated GHG emissions for each year from 2020 through construction and 30 years operation of all Project facilities. Total uncapped GHG emissions are below the threshold of significance for every year and are therefore less than significant after mitigation.

Table 56
Greenhouse Gas Emissions Reduction Analysis

Category	Operational Mitigation Measure or Project Design Feature[1]	Calculation Method and Reductions
Construction Fuel	**Mitigation Measure MM-AQ-1** would require that construction equipment be Tier 4.	This reduction was estimated in CalEEMod. Tier 4 construction equipment would have fewer $PM_{2.5}$ emissions, and therefore black carbon emissions.
Construction Waste	Regulation in the California Green Building Standards require that projects divert (reduce or recycle) at least 50 percent of waste.	This reduction was estimated using the U.S. EPA's Waste Reduction Model (WARM) version 13.
On-Road Vehicles: Local	*Project Design Feature:* Local bus service to the area is provided by the Riverside Transit Agency. Local bus routes would typically be extended into the project area when adequate demand is generated from this employment center. Future bus routes could circulate on available looped routes with adequate right-of-way along the major arterial roadways of Redlands Boulevard, Theodore Street, and Alessandro Boulevard. Likewise, the industrial collector roadways provide access to locations nearest building front entrances. Due to building scale, bus stops may be spread out by grouped entrances or centralized gateway drive areas as compared to individual business entries.	The California Air Pollution Control Officer's Association (CAPCOA) report's reduction measure TRT-1 indicates a 5.2 percent reduction in commute vehicle miles traveled for low-density suburbs for inclusion of a commute trip reduction program. However, this reduction is not used in this analysis. No reductions are taken for these measures in order to provide a conservative analysis.
	Mitigation Measure MM-AQ-10: Class II bike lanes.	
	Mitigation Measure MM-AQ-10: Participate in Riverside County's rideshare program	
	Mitigation Measure MM-AQ-10: Lockers for employees.	
	Mitigation Measure MM-AQ-10: Bicycle storage and changing rooms	
	Project Design Features: The project would have pedestrian circulation (, sidewalks, and a multiuse trail.	
	Mitigation Measure MM-AQ-10*:* Safe pedestrian connections	
	Mitigation Measure MM-AQ-10: Parking for fuel-efficient vehicles	
On-road Vehicles: Long haul trucks	**Mitigation Measure MM-AQ-6:** Require model year 2010 diesel trucks or later.	This was implemented by utilizing the emission factors for medium-heavy duty and heavy-heavy duty trucks from EMFAC2017 for year 2010 and after.

Table 56
Greenhouse Gas Emissions Reduction Analysis

Category	Operational Mitigation Measure or Project Design Feature[1]	Calculation Method and Reductions
On-road Vehicles: all	*Pavley-I Regulation:* A clean-car standard to reduce greenhouse gas emissions from new passenger vehicles (light duty automobiles and medium duty vehicles) from 2009 through 2016. *Low Carbon Fuel Standard:* A fuel standard that requires a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. *California Mobile Source Strategy:* This 2016 plan includes targets for zero emission vehicles (ZEVs) that exceed assumptions included in EMFAC 2014. Project design includes supporting infrastructure to accommodate future EV populations consistent with targets in the Mobile Source Strategy.	EMFAC2017 provides emission factors for carbon dioxide that include these regulations. Therefore, both the unmitigated and mitigated emissions account for these regulations.
Electricity and Natural Gas: Title 24	**Mitigation Measures MM-GHG-5** and **MM-GHG-6** would reduce electricity related emissions. In addition, the project would require LEED certification for buildings and would require buildings to exceed Title 24 (2008 version) by 10 percent or comply with the current version in place. Project design includes energy conservation measures that would enable the project to exceed 2019 Title 24 energy standards by lowering electrical demand with implementation of sustainability measures such as high efficiency appliances and skylights.	Reductions from exceeding the requirements of Title 24 (2016) were accounted for in calculations.
Electricity, Lighting	**Mitigation Measures MM-GHG-6** (lighting efficiency) and **MM-GHG-7** (Title 24) would reduce electricity from lighting. Project design includes energy conservation measures that lower electrical demand with implementation of sustainability measures such as high efficiency lighting and motion sensors.	Reductions due to efficient lighting were accounted for in calculations.
Electricity: Solar	**Mitigation Measure MM-GHG-7** requires that the project install solar panels. Project design includes on-site solar panel installation.	The estimated electricity generation from onsite solar is 24,083 MWh per year, which is 5.0 percent of the electricity demand at buildout. Therefore, 5.0 percent of the unmitigated electricity-related GHG emissions are reduced by solar generation.
Water	**Mitigation Measure MM-GHG-2** would reduce outdoor water usage	CalEEMod mitigation for water-efficient irrigation systems (6.1% reduction, CalEEMod default)

Table 56
Greenhouse Gas Emissions Reduction Analysis

Category	Operational Mitigation Measure or Project Design Feature[1]	Calculation Method and Reductions
	Mitigation Measure MM-GHG-3 would reduce interior water usage, including low flow fittings, fixtures and equipment.	CalEEMod mitigation for: - low-flow toilet (20% reduction in flow, CalEEMod default) - low flow bathroom faucet (32% reduction in flow, CalEEMod default) - low-flow kitchen faucet (18% reduction in flow, CalEEMod default) - low-flow shower (20% reduction in flow, CalEEMod default)
	Mitigation Measure MM-GHG-4 would allow reclaimed water to be used for irrigation.	No reductions are taken for the potential use of reclaimed water.
Waste	**Mitigation Measure MM-GHG-1***:* Recycling and composting to divert construction and operational waste by at least 50 percent before 2020 and 75 percent thereafter.	The project would commit to reducing construction and operational waste by 50 percent prior to 2020 and 75 percent thereafter; therefore, a 75 percent reduction is applied.
	Project Design Feature: Specific Plan (Section 5.1.6) requires that all development within the project provide enclosures or compactors for trash and recyclable materials.	

[1] Project design features are from the Project Description and WLC Sustainable Energy Plan (WSP, 2018); mitigation measures are shown in Section 1.0, Table 1.B.

Table 57
GHG Reductions at Buildout (with Mitigation)

Source	GHG Emissions (mt CO_2e) at Buildout		
	Unmitigated	Reductions from Mitigation	With Reductions (Mitigated)
Capped Emissions			
Construction	7,391	0	7,391
Net Mobile	179,355	-557	178,798
Yard trucks	7,172	0	7,172
Generator	267	19	286
Forklifts	257	0	257
Electricity	34,147	-4,715	29,432
Water	2,548	-268	2,280
Natural gas	4,689	-4,689	0
Solar	0	-3,386	-3,386
Total Capped	**238,686**	**-13,596**	**222,230**
Uncapped Emissions			
Construction Refrigerants and Waste	166	-17	149
Waste	19,193	-14,395	4,798
Refrigerants	2,572	0	2,572
Land use change	1,154	0	1,154
Sequestration	-111	0	-111
Total Uncapped	**22,974**	**-14,412**	**8,562**
Threshold	**10,000**	**-**	**10,000**
Significant Impact?	**Yes**	**-**	**No**

Notes:
mt CO_2e = metric tons of carbon dioxide equivalents which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons – 1500, black carbon 760) and converted to metric tons by multiplying by 0.9072.
1 - Electricity and natural gas emissions estimates account for PDFs that improve energy efficiency and eliminate the use of building natural gas; includes electricity use by on-site EV chargers. Electricity-based emissions result in an increase due to the inclusion of EV charging stations and electric outlets for electrical property maintenance equipment.
2 - Construction would no longer occur at buildout; however, according to SCAQMD recommendations, construction emissions are included as amortized over 30 years.

Table 58a
Project GHG Emissions (Year by Year With Mitigation)

Source	GHG Mitigated Emissions (mt CO_2e/year)														
	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Capped Emissions															
Construction	18,770	22,198	23,363	23,511	22,113	16,408	12,424	11,692	12,000	11,452	12,311	10,610	9,993	7,451	7,430
Net Mobile	0	20,982	41,248	60,829	79,602	96,308	102,643	112,971	123,218	132,710	141,787	150,466	158,748	166,632	174,108
Yard trucks	0	813	1,625	2,438	3,250	4,053	4,371	4,689	5,016	5,334	5,652	5,970	6,288	6,606	6,924
Generator	0	32	65	97	130	162	174	187	200	213	225	238	251	263	276
Forklifts	0	29	58	87	117	145	157	168	180	191	203	214	226	237	248
Electricity	0	5,487	10,505	16,725	22,319	32,535	36,088	36,779	36,207	35,461	35,096	34,716	34,056	33,116	31,366
Water	0	119	239	398	557	853	1,148	1,304	1,398	1,492	1,626	1,778	1,929	2,081	2,181
Natural gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar	0	-179	-357	-595	-834	-1,276	-1,705	-1,931	-2,068	-2,204	-2,398	-2,618	-2,838	-3,059	-3,203
Total Capped	**18,770**	**49,483**	**76,746**	**103,490**	**127,254**	**149,188**	**155,300**	**165,860**	**176,151**	**184,649**	**194,501**	**201,374**	**208,653**	**213,328**	**219,330**
Uncapped Emissions															
Construction Refrigerants and Waste	192	192	192	192	190	85	124	127	124	124	124	124	124	124	101
Waste	0	544	1,087	1,631	2,175	2,712	2,924	3,137	3,356	3,569	3,781	3,994	4,207	4,419	4,632
Refrigerants	0	291	583	874	1,166	1,454	1,568	1,682	1,799	1,913	2,027	2,141	2,255	2,369	2,483
Land use change	0	131	262	392	523	652	704	755	807	858	910	961	1,012	1,063	1,114
Sequestration	0	-13	-25	-38	-50	-63	-68	-72	-77	-82	-87	-92	-97	-102	-107
Total Uncapped	**192**	**1,145**	**2,098**	**3,051**	**4,003**	**4,840**	**5,252**	**5,628**	**6,009**	**6,382**	**6,755**	**7,128**	**7,501**	**7,874**	**8,223**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant Impact?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Table 58b
Project GHG Emissions (Year by Year With Mitigation)

Source	GHG Mitigated Emissions (mt CO_2e/year)														
	2035 (Buildout)	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Capped Emissions															
Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Mobile	178,798	178,798	178,798	178,798	178,798	178,798	178,798	178,798	178,798	178,798	178,798	178,798	178,798	178,798	178,798
Yard trucks	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172
Generator	286	286	267	267	267	267	267	267	267	267	267	267	267	267	267
Forklifts	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
Electricity	29,432	26,712	23,744	20,776	17,808	14,840	11,872	8,904	5,936	2,968	0	0	0	0	0
Water	2,280	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	0	0	0	0	0
Natural gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386
Total Capped	**214,839**	**212,148**	**209,161**	**206,193**	**203,225**	**200,257**	**197,289**	**194,321**	**191,353**	**188,385**	**183,109**	**183,109**	**183,109**	**183,109**	**183,109**
Uncapped Emissions															
Construction Refrigerants and Waste	149	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798
Refrigerants	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572
Land use change	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154
Sequestration	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111
Total Uncapped	**8,563**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant Impact?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Table 58c
Project GHG Emissions (Year by Year With Mitigation)

Source	GHG Mitigated Emissions (mt CO_2e/year)															
	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	Total (2020-2064)
Capped Emissions																
Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	221,727
Net Mobile	153,767	132,239	107,555	87,478	57,152	45,312	40,356	37,703	35,225	31,920	28,525	25,491	22,779	21,191	19,714	5,090,636
Yard trucks	6,168	5,304	4,314	3,509	2,293	1,818	1,619	1,512	1,413	1,280	1,144	1,022	914	850	791	204,561
Generator	230	198	161	131	85	68	60	56	53	48	43	38	34	32	29	7,821
Forklifts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,122
Electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	563,449
Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40,159
Natural gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar	-2,912	-2,505	-2,037	-1,657	-1,082	-858	-764	-714	-667	-605	-540	-483	-431	-401	-373	-92,091
Subtotal, capped	**157,252**	**135,237**	**109,993**	**89,461**	**58,448**	**46,339**	**41,270**	**38,557**	**36,023**	**32,644**	**29,172**	**26,068**	**23,295**	**21,671**	**20,161**	**6,042,384**
Uncapped Emissions																
Construction Refrigerants and Waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,289
Waste	4,126	3,549	2,886	2,348	1,534	1,216	1,083	1,012	945	857	765	684	611	569	529	136,855
Refrigerants	2,212	1,902	1,547	1,258	822	652	580	542	507	459	410	367	328	305	284	73,356
Land use change	993	854	694	565	369	293	261	243	227	206	184	165	147	137	127	32,922
Sequestration	-95	-82	-67	-54	-35	-28	-25	-23	-22	-20	-18	-16	-14	-13	-12	-3,159
Subtotal, uncapped	**7,236**	**6,223**	**5,061**	**4,116**	**2,689**	**2,132**	**1,899**	**1,774**	**1,658**	**1,502**	**1,342**	**1,199**	**1,072**	**997**	**928**	**242,263**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	**450,000**
Significant Impact?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

mt CO_2e = metric tons of carbon dioxide equivalents, which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons – 1500, black carbon 760) and converted to metric tons by multiplying by 0.9072.
1 - Electricity and natural gas emissions estimates account for PDFs that improve energy efficiency and eliminate the use of building natural gas; includes electricity use by on-site EV chargers.
2 - Estimated construction emissions are included prior to buildout.
3 – 2036 is the first full year that the Project would be built out. Years from buildout until 2049 are conservatively estimated to be equivalent to buildout year emissions and exclude construction emissions since construction activity would cease after buildout. Years post-2049 take into account the phasing out of structures as they reach their presumed 30-year lifetime.
4 – Electricity emissions decrease to zero in 2045 after RPS has reached 100% renewable electricity
Source: *ESA, 2019*

The Scoping Plan Scenario assumes that California's 2016 Mobile Source Strategy (MSS) would be implemented as a key strategy in the 2017 Scoping Plan Update for meeting the state's 2030 GHG target (presented in the Energy section as Vehicle Scenario B: Medium EV Penetration). The MSS has a target of 4.2 million zero emission vehicles (ZEVs) in operation statewide by 2030. As explained in the Energy Section, after 2025 the sales and penetration of ZEVs under the MSS start to exceed the numbers assumed by EMFAC2017. **Table 59**, *California and SCAQMD Electric Vehicle (EV) Penetration Estimates,* shows that under the MSS approximately 5.2 percent of the passenger vehicle (LDA, LDT1, and LDT2) and light truck (MDV) fleet is expected to powered by electricity or other zero emission engines by 2025 in the South Coast AQMD region, compared to 2.5 percent of passenger vehicles and 1.6 percent of light trucks using EMFAC2017 assumptions. By 2035, 21 percent of passenger vehicles and 22.5 percent of light trucks are expected to be ZEVs in the South Coast AQMD region, compared to 4.7 percent of passenger vehicles and 3.9 percent of light trucks using EMFAC2017 assumptions.

AB 32/SB 32 capped emissions are shown for informational purposes in **Table 60**, *Project Operational GHG Emissions (Year by Year With Mitigation and Medium EV Penetration) – Scoping Plan Scenario, For Informational Purposes Only*, as those emissions are not compared with the SCAQMD's significance threshold. The emissions presented under the Scoping Plan scenario (Table 60) assume successful implementation of the 2017 Scoping Plan Update, which included the Mobile Source Strategy in addition to the Pavley regulations, the Low Carbon Fuel Standard, and California's Advanced Clean Car program. The mobile emissions estimates for future years are based on emission factors that account for higher penetrations of electric vehicles (EVs) than assumed by EMFAC.

Table 59
California and SCAQMD Electric Vehicle (EV) Penetration Estimates

		Passenger Vehicles			Light Trucks		
Jurisdiction	**Year**	**Total**	**EVs**	**% EVs**	**Total**	**EVs**	**% EVs**
South Coast Air Basin using EMFAC2017 Model	2020	9,125,366	103,722	1.1%	1,539,990	3,852	0.3%
	2025	10,034,980	252,889	2.5%	1,627,185	26,375	1.6%
	2030	10,907,401	417,413	3.8%	1,733,368	51,603	3.0%
	2035	11,642,018	546,208	4.7%	1,849,556	72,433	3.9%
South Coast Air Basin with Governor's order and MSS	2020	9,125,366	103,722	1.1%	1,539,990	3,852	0.3%
	2025	10,034,980	517,550	5.2%	1,627,185	83,921	5.2%
	2030	10,907,401	1,444,602	13.2%	1,733,368	229,571	13.2%
	2035	11,642,018	2,447,659	21.0%	1,849,556	416,980	22.5%

LDA, LDT1, and LDT2 = Passenger cars (EMFAC category)
MDV = Light Duty Trucks (EMFAC category)

Sources: CARB, 2017b - based on EMFAC2011 Categories, and EMFAC2017 Volume III - Technical Documentation

Table 60a
Project GHG Emissions (Year by Year with Mitigation and Medium EV Penetration) – Scoping Plan Scenario, For Informational Purposes Only

Source	GHG Mitigated Emissions (mt CO_2e/year)														
	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Capped Emissions															
Construction	18,770	22,198	23,363	23,511	22,113	16,408	12,424	11,692	12,000	11,452	12,311	10,610	9,993	7,451	7,430
Mobile	0	20,982	41,248	60,829	79,602	94,618	102,528	112,913	123,228	132,810	141,992	150,778	159,165	167,154	174,742
Yard trucks	0	813	1,625	2,438	3,250	4,053	4,371	4,689	5,016	5,334	5,652	5,970	6,288	6,606	6,924
Generator	0	32	65	97	130	162	174	187	200	213	225	238	251	263	276
Forklifts	0	29	58	87	117	145	157	168	180	191	203	214	226	237	248
Electricity	0	5,634	10,785	17,172	22,915	33,404	40,224	42,353	42,411	42,184	42,583	42,956	42,870	42,326	40,453
Water	0	119	239	398	557	853	1,148	1,304	1,398	1,492	1,626	1,778	1,929	2,081	2,181
Natural gas	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Solar	0	-179	-357	-595	-834	-1,276	-1,705	-1,931	-2,068	-2,204	-2,398	-2,618	-2,838	-3,059	-3,203
Total Capped	**18,770**	**49,629**	**77,027**	**103,937**	**127,851**	**148,367**	**159,322**	**171,376**	**182,365**	**191,474**	**202,194**	**209,926**	**217,884**	**223,060**	**229,051**
Uncapped Emissions															
Construction Refrigerants and Waste	192	192	192	192	190	85	124	127	124	124	124	124	124	124	101
Waste	0	544	1,087	1,631	2,175	2,712	2,924	3,137	3,356	3,569	3,781	3,994	4,207	4,419	4,632
Refrigerants	0	291	583	874	1,166	1,454	1,568	1,682	1,799	1,913	2,027	2,141	2,255	2,369	2,483
Land use change	0	131	262	392	523	652	704	755	807	858	910	961	1,012	1,063	1,114
Sequestration	0	-13	-25	-38	-50	-63	-68	-72	-77	-82	-87	-92	-97	-102	-107
Total Uncapped	**192**	**1,145**	**2,098**	**3,051**	**4,003**	**4,840**	**5,252**	**5,628**	**6,009**	**6,382**	**6,755**	**7,128**	**7,501**	**7,874**	**8,223**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant Impact?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Table 60b
Project GHG Emissions (Year by Year with Mitigation and Medium EV Penetration) – Scoping Plan Scenario, For Informational Purposes Only

Source	GHG Mitigated Emissions (mt CO_2e/year)														
	2035 (Buildout)	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**
Capped Emissions															
Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mobile	172,356	172,356	172,356	172,356	172,356	172,356	172,356	172,356	172,356	172,356	172,356	172,356	172,356	172,356	172,356
Yard trucks	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172	7,172
Generator	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286
Forklifts	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
Electricity	38,279	34,818	30,949	27,080	23,212	19,343	15,475	11,606	7,737	3,869	0	0	0	0	0
Water	2,280	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	0	0	0	0	0
Natural gas	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Solar	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386	-3,386
Total Capped	**217,245**	**213,812**	**209,943**	**206,075**	**202,206**	**198,337**	**194,469**	**190,600**	**186,731**	**182,863**	**176,686**	**176,686**	**176,686**	**176,686**	**176,686**
Uncapped Emissions															
Construction Refrigerants and Waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798	4,798
Refrigerants	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572	2,572
Land use change	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154
Sequestration	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111
Total	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**	**8,414**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant Impact?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Table 60c
Project GHG Emissions (Year by Year with Mitigation and Medium EV Penetration) – Scoping Plan Scenario, For Informational Purposes Only

Source	GHG Mitigated Emissions (mt CO_2e/year)															
	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	Total (2020-2064)
Capped Emissions																
Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	221,727
Mobile	148,226	127,475	103,680	84,326	55,093	43,680	38,902	36,344	33,956	30,770	27,497	24,572	21,958	20,428	19,003	4,963,844
Yard trucks	6,168	5,304	4,314	3,509	2,293	1,818	1,619	1,512	1,413	1,280	1,144	1,022	914	850	791	204,561
Generator	246	211	172	140	91	72	65	60	56	51	46	41	36	34	32	8,152
Forklifts	221	190	155	126	82	65	58	54	51	46	41	37	33	30	28	7,340
Electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	680,637
Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40,159
Natural gas	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	20
Solar	-2,912	-2,505	-2,037	-1,657	-1,082	-858	-764	-714	-667	-605	-540	-483	-431	-401	-373	-92,091
Total Capped	**151,950**	**130,677**	**106,284**	**86,444**	**56,477**	**44,777**	**39,879**	**37,257**	**34,808**	**31,543**	**28,188**	**25,189**	**22,510**	**20,941**	**19,481**	**6,034,349**
Uncapped Emissions																
Construction Refrigerants and Waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,140
Waste	4,126	3,549	2,886	2,348	1,534	1,216	1,083	1,012	945	857	765	684	611	569	529	136,855
Refrigerants	2,212	1,902	1,547	1,258	822	652	580	542	507	459	410	367	328	305	284	73,356
Land use change	993	854	694	565	369	293	261	243	227	206	184	165	147	137	127	32,922
Sequestration	-95	-82	-67	-54	-35	-28	-25	-23	-22	-20	-18	-16	-14	-13	-12	-3,159
Total Uncapped	**7,236**	**6,223**	**5,061**	**4,116**	**2,689**	**2,132**	**1,899**	**1,774**	**1,658**	**1,502**	**1,342**	**1,199**	**1,072**	**997**	**928**	**242,114**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	**450,000**
Significant Impact?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

mt CO_2e = metric tons of carbon dioxide equivalents, which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons – 1500, black carbon 760) and converted to metric tons by multiplying by 0.9072.
1 - Electricity and natural gas emissions estimates account for PDFs that improve energy efficiency and eliminate the use of building natural gas; includes electricity use by on-site EV chargers.
2 - Estimated construction emissions are included prior to buildout.
3 – 2035 is the first full year that the Project would be built out. Years from buildout until 2049 are conservatively estimated to be equivalent to buildout year emissions and exclude construction emissions since construction activity would cease after buildout. Years post-2049 take into account the phasing out of structures as they reach their presumed 30-year lifetime.
4 – Electricity emissions decrease to zero in 2045 after RPS has reached 100% renewable electricity
Source: *ESA, 2019*

Plan, Policy, Regulation Consistency

The WLCSP contains a sustainability section that emphasizes water and energy conservation throughout the project design, which in turn will help reduce GHG emissions (Section 1.3.2, Green Building-Sustainable Development). The WLC Sustainable Energy Plan includes additional Project Design Features that go beyond the WLSCP with energy conservation measures that exceed minimal compliance with current (2016) Title 24 requirements by about 17 percent at Phase 1 and 16 percent at full buildout.[93]

As previously identified, implementation of the project could result in the development of an approximately 40.6 million square foot high cube-logistics distribution logistics. The project includes a variety of physical attributes and operational programs that would help reduce operational-source pollutant emissions from worker commuting, including GHG emissions. Future development that would occur under the project would be consistent with greenhouse gas emission reduction strategies and policies, including the City's Climate Change Strategy. The project would implement the Mitigation Measures listed above to reduce its contribution to GHG emissions and to ensure it does not conflict with or impede implementation of reduction goals identified in AB 32, SB 32, Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor. In addition, the project would also be subject to all applicable regulatory requirements, which would also reduce the GHG emissions of the project. Therefore, the project would not conflict with any applicable plan, program, policy, or regulation related to the reduction of GHG emissions. Impacts are considered less than significant.

Similar to the discussion of cumulative air quality impacts, the project may employ workers locally from the City. This has the benefit of improving the local jobs/housing balance leading to air quality benefits in terms of shorter trip lengths, which lead to lower emissions than if the workforce was derived from distant locations.

The State of California has adopted a number of policies, including AB 32, SB 32, Governor's Executive Order S-3-05, the Pavley vehicle standards, the Advanced Clean Car program, and the Mobile Source Strategy, which collectively provide the structure and commitment to address California's contribution to global climate change. Since the project is consistent with these policies, including being below the SCAQMD threshold for greenhouse gases that was structured in accordance with these State policies, the project is consistent with greenhouse gas plans, policies, and regulations and impacts are less than significant after mitigation.

[93] WSP. World Logistics Center Comparison of Renewable Energy Technologies. 2018