Appendix C
Air Quality, Greenhouse Gas, Energy

ORD MOUNTAIN SOLAR AND ENERGY STORAGE PROJECT
ENVIRONMENTAL IMPACT REPORT

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

MEMORANDUM

To:	Jesse Marshall, NextEra Energy
From:	Adam Poll, Dudek
Subject:	Ord Mountain Solar and Energy Storage Project and Calcite Substation Project Air Quality and Greenhouse Gas Emissions Assessment
Date:	October 23, 2017
cc:	Lori Carpenter, Southern California Edison
Attachment A:	Air Quality and Greenhouse Gas Emissions Analysis Technical Report for the Ord Mountain Solar and Energy Storage Project, San Bernardino, California
Attachment B:	Air Quality and Greenhouse Gas Technical Memorandum Report for the Calcite Substation Project in Lucerne Valley, San Bernardino County

Dudek is pleased to submit this air quality and greenhouse gas (GHG) emissions assessment to assist NextEra Energy Resources (NextEra) with environmental planning requirements for the proposed Ord Mountain Solar and Energy Storage and Southern California Edison's (SCE) Calcite Substation Project (collectively the proposed project) located in San Bernardino County (County), California.

This memorandum estimates criteria air pollutant and GHG emissions from construction and operation of the proposed project and evaluates potential air quality and GHG emissions impacts resulting from project implementation. This memorandum combines two air quality and GHG emissions analyses—1) Ord Mountain Solar and Energy Storage Project, and 2) Calcite Substation Project—and analyzes them together as one project against CEQA significance criteria.

The contents and organization of this memorandum are as follows: project description; general analysis and methodology; threshold of significance and an impact analysis for the air quality assessment and GHG emissions assessment; conclusions; and references cited.

1 PROJECT DESCRIPTION

NextEra ("Applicant") proposes to construct and operate the project on approximately 484-acres to produce approximately 160,000 megawatt-hours (MWh) of renewable energy annually. The proposed solar and energy storage project would be a 60-megawatt (MW) alternating current (AC) photovoltaic (PV) solar and energy storage facility with associated on-site substation, inverters, fencing, roads, and supervisory control and data acquisition (SCADA) system. The proposed solar and energy storage project would include a 60 MW AC maximum capacity, 4-hour energy storage (battery) system. The proposed solar and energy storage project also includes a 220-kilovolt (kV) overhead generation tie line (gen-tie line), which would extend approximately 0.6 mile southwest to SCE's proposed Calcite Substation. The proposed Calcite Substation would include the development of a new substation to connect to the nearby transmission lines, including a loop-in line and telecommunications. Project details are provided in Attachment A and B.

2 GENERAL ANALYSIS AND METHODOLOGY

The project is located within the Mojave Desert Air Basin (MDAB) and is within the jurisdictional boundaries of the Mojave Desert Air Quality Management District (MDAQMD), which has jurisdiction over the desert portion of San Bernardino County and the far eastern end of Riverside County. A spreadsheet based model and emissions factors from the California Air Resources Board (CARB) Mobile Source Emissions Inventory Model (EMFAC; version 2014), CARB Off-road Emissions Inventory Model (OFFROAD2011), and the EPA AP-42. Emission calculations were based on assumptions derived from CalEEMod.

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. Criteria air pollutants that are evaluated include volatile organic compounds (VOCs; also referred to as reactive organic gases (ROGs)), oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), particulate matter with an aerodynamic diameter less than or equal to 10 microns in size (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns in size ($PM_{2.5}$). VOCs and NO_x are important because they are precursors to ozone (O_3). Criteria air pollutant emissions associated with construction of the proposed project were estimated for the following emission sources: operation of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. Project operational emission sources evaluated include mobile (vehicle) sources, area sources such as consumer products, and energy use.

GHGs are gases that absorb infrared radiation in the atmosphere. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect. Principal GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), O_3, and water vapor. If the atmospheric concentrations of GHGs rise, the average temperature of the lower atmosphere will gradually increase. Globally, climate change has the potential to impact numerous environmental resources though uncertain impacts related to future air temperatures and precipitation patterns. Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. Climate change is already affecting California: average temperatures have increased, leading to more extreme hot days and fewer cold nights; shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year; sea levels have risen; and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010).

The effect each GHG has on climate change is measured as a combination of the mass of its emissions and the potential of a gas or aerosol to trap heat in the atmosphere, known as its global warming potential (GWP), which varies among GHGs. Total GHG emissions are expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG emissions are typically measured in terms of pounds or tons of CO_2 equivalent (CO_2E).[1]

Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs (CAT 2010). This approach is consistent with the *Final Statement of Reasons for Regulatory Action* for amendments to the CEQA Guidelines, which confirms that an environmental impact report or other environmental document must analyze the incremental contribution of a project to GHG levels and determine whether those emissions are cumulatively considerable (CNRA 2009).

GHG emissions associated with construction of the proposed project were estimated for the following emission sources: operation of off-road construction equipment, on-road hauling and vendor trucks, and worker vehicles. GHG emission sources associated with operation of the proposed project were evaluated for energy use (generation of electricity consumed by the project); water supply, area sources (gas-insulated switchgear), and project-generated vehicular traffic. The detailed project construction and operational assumptions are included in Attachment A for the Ord Mountain Solar and Energy Storage Project and Attachment B for the Calcite Substation Project.

2.1 Ord Mountain Solar and Energy Storage Project Methodology

A summary of the calculation methodology for the Ord Mountain Solar and Energy Storage Project is presented below. Detailed emissions calculation spreadsheets are provided in Attachment A.

Construction

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[1] The CO_2E for a gas is derived by multiplying the mass of the gas by the associated GWP, such that metric tons of CO_2E = (metric tons of a GHG) × (GWP of the GHG). CalEEMod assumes that the GWP for CH_4 is 25, which means that emissions of 1 metric ton of CH_4 are equivalent to emissions of 25 metric tons of CO_2, and the GWP for N_2O is 298, based on the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report.

Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and VOC off-gassing) and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Emissions from the construction phase of the project were estimated using a spreadsheet based model and emissions factors from the CARB Mobile Source Emissions Inventory Model (EMFAC; version 2014), CARB Off-road Emissions Inventory Model (OFFROAD2011), and the EPA AP-42. Emission calculations were based on assumptions derived from CalEEMod.

Construction scenario assumptions, including phasing, equipment mix, and vehicle trips, were based on information provided by the project applicant. For purposes of estimating project emissions, and based on information provided by the project applicant, it is assumed that construction of the project would commence in August 2019[2] and would last approximately 12 months, ending in July 2020. The analysis contained herein is based on the following assumptions (duration of phases is approximate):

- Perimeter Fence Installation: 2 months (August 2019–October 2019)
- Site Preparation and Grading: 1.5 months (August 2019–September 2019)
- Demolition of Existing Structures: 2 weeks (September 2019)
- Trenching: 3 months (October 2019–December 2019)
- Solar PV System Installation: 4 months (October 2019–January 2020)
- Generation Tie-In Installation: 1 month (February 2020)
- Energy Storage System: 7 months (August 2019–March 2020)
- Testing and Commissioning: 3 months (March 2020–May 2020)
- Site Clean-up and Restoration: 1 month (June 2020)

As shown above, several of the construction phases will run concurrently. The commissioning of the solar PV system is not dependent on the energy storage system being built; therefore, the energy storage system can be constructed along a concurrent schedule. For the analysis, it was generally assumed that heavy construction equipment would be operating at the site for

2 The analysis assumes a construction start date of August 2019, which represents the earliest date construction would initiate. Assuming the earliest start date for construction represents the worst-case scenario for criteria air pollutant and GHG emissions because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, as well as fleet turnover replacing older equipment and vehicles in later years.

approximately 8 hours per day, 5 days per week (22 days per month), during project construction. Because the site has a very low slope, mass grading is not proposed under this project. There will be minor grading associated with the energy storage and on-site substation phases.

Peak daily construction employees would be approximately 250 (generating 500 one-ways trips) with an average of 90 workers daily. In addition to the 250 maximum daily workers traveling to the site there would be up to 19 truck trips per day at peak construction activity (trenching and system installation phases overlap). A total of up to 279 trips per day are anticipated during peak construction activities.

Delivery of material and supplies would reach the site via on-road truck delivery via SR-247. The majority of the truck deliveries would be for the PV system installation, as well as any aggregate material that may be required for road base. It is estimated that a total of up to 440 truck trips are required to complete the project. It is estimated that there would be an average of 44 truck deliveries per month (about 2 per work day). These truck trips would be intentionally spread out throughout the construction day to optimize construction efficiency as is practical by scheduling deliveries at predetermined times.

The heaviest delivery loads to the site would also consist of the tracker structures, rock truck deliveries, and the delivery of the generator step up. These loads would typically be limited to total weight of 80,000 pounds (lbs), with a cargo load of approximately 25 tons or 50,000 lbs of rock or tracker structures. The generator step up could be up to 160,000 lbs. Typically, the rock is delivered in “bottom dump trucks” or ”transfer trucks” with six axles and the tracker structures will be delivered on traditional flatbed trucks with a minimum of five axles. Low bed transport trucks would transport the construction equipment to the site as needed. The size of the low bed truck (axles for weight distribution) would depend on the equipment transported.

Because the site is fairly level, grading is expected to be minor in most instances. However, grading would occur throughout the site especially for the construction of roads, on-site substation, energy storage system, and inverter pads. This would be accomplished with scrapers, motor graders, water trucks, dozers, and compaction equipment. The PV modules would be off-loaded and installed using small cranes, boom trucks, forklifts, rubber tired loaders, rubber tired backhoes, and other small to medium sized construction equipment as needed. Construction equipment would be delivered to the site on “low bed” trucks unless the equipment can be driven to the site (for example the boom trucks).

Water consumption during construction is estimated to be approximately 75 acre-feet (AF) for dust suppression and earthwork over an approximately 10-month period. Panel rinsing is expected to be conducted up to four times annually as performance testing and weather and site conditions dictate. Construction as well as operational water for panel rinsing would be provided by on-site groundwater through an improved existing well or a new well permitted and drilled (if necessary). An on-site diesel generator may be used to power pumps for well water use. In addition, during construction, water may be pumped directly into 2,000-4,000 gallon tanked water trucks or water may be stored in up to three overhead temporary, approximately 12,000 gallon water storage tower/tanks (up to 16 feet tall), to assist in the availability of water for trucks and expedient filling thereof. The existing wells on-site that would not be used for the proposed project would be capped in place in accordance with County requirements.

Operation

Emissions from the operational phase of the project were estimated using a spreadsheet based model and emissions factors from EMFAC (version 2014), OFFROAD, and the US EPA AP-42. Emission calculations were based on assumptions derived from CalEEMod. Operational emissions include area, energy, and mobile source emissions.

Area Sources

CalEEMod emission factors were used to estimate operational emissions from area sources, which include architectural coatings. VOC off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers using during building maintenance. The VOC evaporative emissions from application of residential and nonresidential surface coatings were calculated based on the VOC emission factor, the building square footage, the assumed fraction of surface area, and the reapplication rate. The VOC emission factor is based on the VOC content of the surface coatings, and MDAQMD's Rule 1113 (Architectural Coatings Rule) governs the VOC content for interior and exterior coatings. The reapplication rate of 10% of area per year is assumed. Based on the type of structure for the energy storage structure, it is assumed that the surface area for painting equals 2.0 times the floor square footage, with 75% assumed for interior coating and 25% assumed for exterior surface coating (CAPCOA 2016).

Energy Sources

Energy sources include emissions associated with project electricity usage and on-site power generation. The groundwater well pumps are operated by a diesel generator. The generator emits criteria pollutants from the combustion of diesel fuel. The generator will be regulated by an operating permit under the MDAQMD's Rule 1160 for Internal Combustion Engines.

Electricity use would contribute indirectly to criteria air pollutant emissions; however, the emissions from electricity use were only quantified for GHGs, since criteria pollutant emissions occur at the site of the power plant, which is typically off site. Energy use was provided by the applicant for security lighting and any ancillary use for the energy storage structure.

Mobile Sources

Mobile sources for the project would primarily be motor vehicles (automobiles and light-duty trucks) traveling to and from the project site. Motor vehicles may be fueled with gasoline, diesel, or alternative fuels. Based on conservative estimates for vehicular movement, the project is anticipated to have up to 36 trips per year, for regular maintenance intervals, including panel washing, pole/structure brushing, herbicide application, and equipment repair. Emission factors representing the vehicle mix and emissions for 2019 and 2020 from EMFAC were used to estimate emissions associated with full buildout of the project.

Water

Supply, conveyance, treatment, and distribution of water for the project require the use of electricity, which would result in associated indirect GHG emissions. Water for dust suppression and cleaning the PV panels will come from on-site wells. The emissions associated with water use are generated from the generator used to power the water well pumps. The emissions from this generator are accounted for in the Energy source emissions estimates. There is no wastewater generated during the construction or operation of this project.

Area Sources

Gas-Insulated Switchgear

During O&M, one of the main sources of GHG emissions would be fugitive emissions from equipment containing SF_6 gas installed at the proposed on-site substation. This facility would be an air-insulated substation; therefore, the 500 kV, 220 kV, and 66 kV circuit breakers and 220 kV ground disconnect switches would be the only pieces of equipment on site containing SF_6. The Proposed Project's circuit breakers and 220 kV ground disconnect switches would have a maximum annual leak rate of 0.5%, based on the manufacturer's guaranteed specifications. The 220 kV ground disconnect switches are unique to the Proposed Project and are a maintenance requirement due to 220 kV fault duty (protection against abnormal electric current). The annual fugitive SF_6 emissions that are anticipated from O&M of the proposed on-site substation are summarized in Attachment A. The "delta" represents the estimated increase in emissions specifically due to the Proposed Project's new equipment containing SF_6 over existing equipment containing SF_6 currently located at the on-site substation.

At the present time, specific substation devices, such as transformers and circuit breakers, have not been identified; however, the substation may include gas-insulated switchgear (e.g., circuit breakers) that use SF_6, which is a GHG often associated with high-voltage switching devices. If the substation circuit breakers contain SF_6, they would potentially leak small amounts of SF_6 to the atmosphere. New circuit breakers are reported to have a potential upper-bound leakage rate of 0.5% (Blackman n.d.). For the 138 kV substation, the estimated total capacity of the circuit breakers could be up to 75 lbs (Mehl, pers. comm. 2013). SF_6 has a GWP of 23,900 using CO_2 at a reference value of 1 (UNFCCC 2012).

2.2 Calcite Substation Project Methodology

ICF developed a project specific emissions estimation spreadsheet to calculate criteria pollutant and GHG emissions during Project construction for the Calcite Substation Project. Detailed emission calculations and results are presented in Attachment B. Spreadsheet development and modeling assumptions are detailed below:

- Construction Activity Assumptions. Estimates of construction schedule, construction equipment requirements and construction workforce requirements were provided by SCE (see Attachment B).

- Off Road Emissions Factors. Used CalEEMod defaults for horsepower and utilization rates, applied to year 2019 emissions factors.

- On Road Emissions Factors. Used EMFAC 2014 emissions factors for the Mojave Desert portion of San Bernardino County, year 2019.

- Trip Length. 100 mile trips, each way, were assumed for calculation of employee and vendor trip mobile emissions. Furthermore, it was assumed that half of these emissions would occur within the MDAB and half would occur within the SCAB.

- Re-Entrained Road Dust. Used the USEPA developed AP 42 calculations to estimate emissions for paved and unpaved roads.

- Fugitive Dust from Earthwork. Used the CalEEMod calculation formulas for grading, bulldozing and truck loading. Water trucks may be used to minimize the quantity of airborne dust created by construction activities.

3 AIR QUALITY ASSESSMENT

3.1 Ambient Air Quality

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the National Ambient Air Quality Standards (NAAQS) to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. Air quality is considered "in attainment" if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, 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. The NAAQS and CAAQS are presented in Table 1.

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary*[c,d]	*Secondary*[c,e]
O_3	1 hour	0.09 ppm (180 μg/m^3)	—	Same as Primary Standard[f]
	8 hours	0.070 ppm (137 μg/m^3)	0.070 ppm (137 μg/m^3)[f]	
NO_2[g]	1 hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)	
CO	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
SO_2[h]	1 hour	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3)	—
	3 hours	—	—	0.5 ppm (1,300 μg/m^3)
	24 hours	0.04 ppm (105 μg/m^3)	0.14 ppm (for certain areas)[g]	—
	Annual	—	0.030 ppm (for certain areas)[g]	—
PM_{10}[i]	24 hours	50 μg/m^3	150 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 μg/m^3	—	

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary*[c,d]	*Secondary*[c,e]
$PM_{2.5}$[i]	24 hours	—	35 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3
Lead[j,k]	30-day Average	1.5 μg/m^3	—	—
	Calendar Quarter	—	1.5 μg/m^3 (for certain areas)[k]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 μg/m^3	
Hydrogen sulfide	1 hour	0.03 ppm (42 μg/m^3)	—	—
Vinyl chloride[j]	24 hours	0.01 ppm (26 μg/m^3)	—	—
Sulfates	24- hours	25 μg/m^3	—	—
Visibility reducing particles	8 hour (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to the number of particles when the relative humidity is less than 70%	—	—

Source: CARB 2016a.

Notes: μg/m^3 = micrograms per cubic meter; CO = carbon monoxide; mg/m^3= milligrams per cubic meter; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; ppm = parts per million by volume; SO_2 = sulfur dioxide

a California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter (PM_{10}, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{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 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

c Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on 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.

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

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

f On October 1, 2015, the EPA Administrator signed the notice for the final rule to revise the primary and secondary NAAQS for O_3. The EPA is revising the levels of both standards from 0.075 ppm to 0.070 ppm and retaining their indicators (O_3), forms (fourth-highest daily maximum, averaged across 3 consecutive years) and averaging times (8 hours). The EPA is in the process of submitting the rule for publication in the Federal Register. The final rule will be effective 60 days after the date of publication in the Federal Register. The lowered national 8-hour standards are reflected in the table.

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

h 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 national 1-hour standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

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

j CARB has identified lead and vinyl chloride as TACs 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.

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

Under authority and oversight from the EPA pursuant to 40 CFR Part 58, the MDAQMD and CARB maintain ambient air quality monitoring stations throughout the MDAB, and the MDAQMD currently operates six monitoring sites[3]. In addition, the MDAQMD gathers air quality data from a variety of monitoring sites from other contracted agencies (e.g., United States Marine Corps). Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. Not all air pollutants are monitored at each station; thus, data from the closest representative station that monitors a specific pollutant are summarized.

The closest ambient air quality monitoring station to the project site that monitors O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ is the Victorville monitoring station, located at 14306 Park Avenue, Victorville, California 92392, approximately 35 miles to the west of the proposed project. The data collected at this station are considered representative of the air quality experienced in the project vicinity. The most recent background ambient air quality data from 2013 to 2015 and the number of days exceeding the ambient air quality standards are presented in Table 2. The Barstow Monitoring station, located at 1301 W. Mountain View Street, Barstow, California 92311, is the nearest air quality monitoring station that monitors CO, located approximately 28 miles to the north of the project site.

Table 2
Local Ambient Air Quality Data

Concentration or Exceedances	Ambient Air Quality Standard	2014	2015	2016
Ozone (O_3) Victorville, CA Monitoring Station)				
Maximum 1-hour concentration (ppm)	0.09 ppm (state)	0.122	0.132	0.100

3 Barstow, Hesperia, Phelan, Lucerne Valley, Trona, and Victorville,

Table 2
Local Ambient Air Quality Data

Concentration or Exceedances	Ambient Air Quality Standard	2014	2015	2016
Number of days exceeding state standard (days)		3	8	4
Maximum 8-hour concentration (ppm)	0.070 ppm (state)	0.097	0.106	0.086
	0.070 ppm (federal)	0.096	0.105	0.085
Number of days exceeding state standard (days)		*40*	*39*	*35*
Number of days exceeding federal standard (days)		*18*	*21*	*18*
Nitrogen Dioxide (NO_2) Victorville, CA Monitoring Station)				
Maximum 1-hour concentration (ppm)	0.18 ppm (state)	0.066	0.118	0.097
	0.100 ppm (federal)	0.0666	0.1181	0.0972
Number of days exceeding state standard (days)		*0*	*0*	*0*
Number of days exceeding federal standard (days)		*0*	*1*	*0*
Annual concentration (ppm)	0.030 ppm (state)	0.013	0.010	0.010
	0.053 ppm (federal)	0.013	0.011	0.010
Carbon Monoxide (CO) Barstow, CA Monitoring Station)				
Maximum 1-hour concentration (ppm)	20 ppm (state)	—	—	—
	35 ppm (federal)	301	2.2	3.8
Number of days exceeding state standard (days)		—	—	—
Number of days exceeding federal standard (days)		*1*	*0*	*0*
Maximum 8-hour concentration (ppm)	9.0 ppm (state)	—	—	—
	9 ppm (federal)	37.8	0.6	1.2
Number of days exceeding state standard (days)		—	—	—
Number of days exceeding federal standard (days)		*8*	*0*	*0*
Sulfur Dioxide (SO_2) Victorville, CA Monitoring Station)				
Maximum 1-hour concentration (ppm)	0.075 ppm (federal)	0.0048	0.0179	0.0263
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Maximum 24-hour concentration (ppm)	0.14 ppm (federal)	0.0019	0.018	0.031
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Annual concentration (ppm)	0.030 ppm (federal)	0.0012	0.00063	0.00059
Coarse Particulate Matter (PM_{10}) Victorville, CA Monitoring Station)				
Maximum 24-hour concentration ($\mu g/m^3$)	50 $\mu g/m^3$ (state)	ND	ND	ND
	150 $\mu g/m^3$ (federal)	246.2	100.8	226.5
Number of days exceeding state standard (days)[b]		*ND (ND)*	*ND (ND)*	*ND (ND)*
Number of days exceeding federal standard (days) [b]		*1.0 (1)*	*ND (0)*	*2.0 (2)*
Annual concentration (state method) ($\mu g/m^3$)	20 $\mu g/m^3$ (state)	ND	ND	ND
Fine Particulate Matter ($PM_{2.5}$) Victorville, CA Monitoring Station)				
Maximum 24-hour concentration ($\mu g/m^3$)	35 $\mu g/m^3$ (federal)	24.1	50.2	41.5
Number of days exceeding federal standard (days) [b]		*ND (0)*	*6.6 (1)*	*1.0 (1)*
Annual concentration ($\mu g/m^3$)	12 $\mu g/m^3$ (state)	7.7[a]	6.7	7.6
	12.0 $\mu g/m^3$ (federal)	7.7[a]	6.7	7.5

Sources: CARB 2016b; EPA 2016.
Notes: — = not available; μg/m3 = micrograms per cubic meter; ND = insufficient data available to determine the value; ppm = parts per million
Data taken from CARB iADAM (http://www.arb.ca.gov/adam) and EPA AirData (http://www.epa.gov/airdata/) represent the highest concentrations experienced over a given year.
Exceedances of federal and state standards are only shown for O_3, particulate matter, and Carbon Monoxide. Daily exceedances for particulate matter are estimated days because PM_{10} and $PM_{2.5}$ are not monitored daily. All other criteria pollutants did not exceed federal or state standards during the years shown. There is no federal standard for 1-hour ozone, annual PM_{10}, or 24-hour SO_2, nor is there a state 24-hour standard for $PM_{2.5}$.
Barstow Monitoring Station is located 200 E. Buena Vista Barstow, California12312
Victorville Monitoring Station is located 14306 Park Avenue, Victorville California, 92392
[a] Mean does not satisfy minimum data completeness criteria.
[b] Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

3.2 Thresholds of Significance

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.), which provides guidance that a project would have a significant environmental impact if it would:

- Conflict with or obstruct the implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- 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 O_3 precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

In addition, Appendix G of the CEQA Guidelines indicates that where available, the significance criteria established by the applicable air quality management district or APCD may be relied upon to determine whether the proposed project would have a significant impact on air quality. The MDAQMD has adopted thresholds to address the significance of air quality impacts resulting from a proposed project. As outlined in the MDAQMD's CEQA and Federal Conformity Guidelines (MDAQMD 2016), a project would result in a significant environmental impact if it:

1. Would generate total emissions (direct and indirect) in excess of the established significance thresholds (indicated in Table 6 of the MDAQMD guidelines and presented as Table 3 in this memorandum)
2. Would generate a violation of any ambient air quality standard when added to the local background

3. Does not conform with the applicable attainment or maintenance plan
4. Would expose sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million (10×10^{-6}) and/or a Hazard Index (noncarcinogenic) greater than or equal to 1.

A project is deemed to be in conformance with the applicable attainment or maintenance plans, and hence not be significant, if it is consistent with the existing land use plan. Zoning changes, specific plans, general plan amendments and similar land use plan changes that do not increase dwelling unit density, do not increase vehicle trips, and do not increase vehicle miles traveled are also deemed to be in conformance and would not exceed threshold number 3 (MDAQMD 2016).

Residences, schools, daycare centers, playgrounds, and medical facilities are considered sensitive receptor land uses. The following project types proposed for sites within the specified distance to an existing or planned sensitive receptor land use must be evaluated using significance threshold number 4:

- Any industrial project within 1,000 feet
- A distribution center (40 or more trucks per day) within 1,000 feet
- A major transportation project (50,000 or more vehicles per day) within 1,000 feet
- A dry cleaner using perchloroethylene within 500 feet
- A gasoline dispensing facility within 300 feet.

The MDAQMD *CEQA Air and Federal Conformity Guidelines* (MDAQMD 2016), sets forth quantitative emission significance thresholds for criteria air pollutants below which a project would not have a significant impact on ambient air quality. Project-related air quality emissions estimated in this environmental analysis would be considered significant if any of the applicable significance thresholds presented in Table 3, MDAQMD Air Quality Significance Thresholds, are exceeded. The emission-based thresholds for O_3 precursors are intended to serve as a surrogate for an "ozone significance threshold" (i.e., the potential for adverse O_3 impacts to occur) because O_3 itself is not emitted directly, and the effects of an individual project's emissions of O_3 precursors (VOC and NO_x) on O_3 levels in ambient air cannot be determined through air quality models or other quantitative methods. MDAQMD recommends that its quantitative air pollution thresholds be used to determine the significance of project emissions.

Table 3
MDAQMD Air Quality Significance Thresholds

Pollutant	Annual Threshold (tons per year)	Daily Threshold (pounds per day)
VOC	25	137
NO_x	25	137
CO	100	548
SO_x	25	137
PM_{10}	15	82
$PM_{2.5}$	12	65
Hydrogen Sulfide[a]	10	54
Lead[a]	0.6	3

Source: MDAQMD 2016

[a] The project includes typical construction equipment and on-road vehicles, which result in negligible (if any) emissions of hydrogen sulfide and lead. Therefore, these pollutants are not discussed in this analysis.

3.3 Impact Analysis

3.3.1 Would the Project Conflict With or Obstruct Implementation of the Applicable Air Quality Plan?

A project is non-conforming with an air quality plan if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable MDAQMD rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan). Zoning changes, specific plans, general plan amendments and similar land use plan changes which do not increase dwelling unit density, do not increase vehicle trips, and do not increase vehicle miles traveled are also deemed to comply with the applicable air quality plan (MDAQMD 2016).

The project would comply with all applicable MDAQMD rules and regulations, such as Rule 401 (Visible Emissions) and Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area). The project would not conflict with or propose to change existing land uses or result in population growth. In addition, the project would not result in a long-term increase in the number of trips or increase the overall vehicle miles traveled in the area. Haul truck, vendor truck, and worker vehicle trips would be generated during the proposed construction activities, but would cease after construction is completed. In regards to long-term operations, the project would have routine inspection and maintenance which would result in a net increase in emissions. However, the increase in emissions would not exceed any significance threshold or violate any MDAQMD rule or regulation. The project would not conflict with or delay the implementation of the

MDAQMD Federal 8-hour Ozone Attainment Plan. Based on these considerations, the project would result in a less-than-significant impact.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

3.3.2 Would the Project Violate Any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation?

Construction Emissions

Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and VOC off-gassing) and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts. Table 4 presents the estimated maximum daily construction emissions generated during construction of the project. Details of the emission calculations are provided in Attachment A and B.

Table 4
Estimated Maximum Daily Unmitigated Construction Criteria Air Pollutant Emissions

Year	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	pounds per day					
2019-Ord Mountain	10.28	163.59	45.97	0.43	100.61	12.91
2019-Calcite Substation	4.16	45.45	72.79	0.17	9.06	3.49
2019-Total	**14.44**	**209.04**	**118.76**	**0.60**	**109.67**	**16.40**
2020-Ord Mountain	7.10	29.28	16.31	0.24	72.36	8.37
2020-Calcite Substation	3.24	35.35	56.61	0.13	7.04	2.71
2020-Total	**10.34**	**64.64**	**72.92**	**0.37**	**79.40**	**11.08**
Maximum Daily Emissions	**14.44**	**209.04**	**118.76**	**0.60**	**109.67**	**16.40**
MDAQMD Threshold	*137*	*548*	*137*	*137*	*82*	*65*
Threshold Exceeded?	No	No	No	No	**Yes**	No

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; MDAQMD = Mojave Desert Air Quality Management District; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxides; VOC = volatile organic compound
Watering three times daily surrogate for compliance with Rule 403.2
See Attachment A and B for complete results.

Maximum daily emissions of NO_x, CO, SO_x, and $PM_{2.5}$ emissions would occur during the construction phase in 2019 and 2020 as a result of off-road equipment operation and on-road vendor trucks and haul trucks. The overlap of the building construction phase and the architectural coatings phases in 2019 would produce the maximum daily VOC and PM_{10} emissions. As shown in Table 4, daily construction emissions would not exceed the MDAQMD significance thresholds for VOC, NO_x, CO, SO_x, or $PM_{2.5}$ during construction in all construction years. The project would exceed the MDAQMD significance threshold for PM_{10} in 2019. As such, mitigation is required.

Table 5 presents the estimated annual construction emissions generated during construction of the project in 2019 and 2020.

Table 5
Estimated Annual Unmitigated Construction Criteria Air Pollutant Emissions

Year	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	tons per year					
2019-Ord Mountain	0.73	10.19	2.33	0.03	5.33	0.67
2019-Calcite Substation	0.34	3.04	6.41	0.00	0.73	0.28
2019-Total	**1.07**	**13.23**	**8.74**	**0.03**	**6.06**	**0.95**
2020-Ord Mountain	0.78	13.80	2.00	0.03	3.88	0.54
2020-Calcite Substation	0.26	2.36	4.99	0.00	0.57	0.22
2020-Total	**1.04**	**16.16**	**6.99**	**0.03**	**4.45**	**0.76**
Maximum Annual Emissions	**1.07**	**16.16**	**8.74**	**0.03**	**6.06**	**0.95**
MDAQMD Threshold	*25*	*100*	*25*	*25*	*15*	*12*
Threshold Exceeded?	No	No	No	No	No	No

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; MDAQMD = Mojave Desert Air Quality Management District; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxides; VOC = volatile organic compound
Watering 3 times daily surrogate for compliance with Rule 403.2
See Attachment A for complete results.

As shown in Table 5, the project would not exceed the MDAQMD annual emissions thresholds for VOC, NO_x, CO, SO_x, $PM_{10,}$ or $PM_{2.5}$ in either construction year.

The project would be required to comply with MDAQMD Rule 403.2 to control fugitive dust emissions generated during grading activities. Standard construction practices that would be employed to reduce fugitive dust emissions include:

- Short-term dust control by a water truck and/or available water source on or near the drilling rig;
- Minimize and cleanup trackout onto paved roads;
- Cover haul trucks;
- Stabilize (chemical or vegetation) site upon completion of grading when subsequent development is delayed;
- Rapid cleanup of project-related trackout or spills on paved roads; and
- Minimize grading and soil movement when winds exceed 30 miles per hour.

In addition, SCE would implement the following Applicant Proposed Measure (APM) during construction of the Calcite Substation:

APM-AIR-01: Fugitive Dust During construction, surfaces disturbed by construction activities would be covered or treated with a dust suppressant until completion of activities at each site of disturbance. On-site unpaved roads and off-site unpaved access roads utilized during construction within the Proposed Project area would be effectively stabilized (e.g., using water or chemical stabilizer/ suppressant) to control dust emissions. On-road vehicle speeds on unpaved roadways would be restricted to 15 miles per hour.

Construction Mitigation Measures

As stated above, the project would exceed the MDAQMD daily significance threshold for PM_{10} in 2019. MM-AQ-1 is required to reduce project-generated construction PM_{10} emissions.

MM-AQ-1 **Unpaved Road Vehicle Speed Limit Restrictions**. The project would implement a speed limit of 25 miles per hour during the construction phase for vehicles travelling on un-paved roads. According to the Western Region Air Partnership's Fugitive Dust Handbook, this mitigation would result in a 44% reduction in PM_{10} emissions (WRAP 2006).

Construction Level of Significance After Mitigation

Table 6 presents the estimated maximum daily mitigated construction emissions generated during construction of the project.

Table 6
Estimated Maximum Daily Mitigated Construction Criteria Air Pollutant Emissions

Table 6
Estimated Maximum Daily Mitigated Construction Criteria Air Pollutant Emissions

Year	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	pounds per day					
2019-Ord Mountain	10.28	163.59	45.97	0.43	60.12	10.91
2019-Calcite Substation	4.16	45.45	72.79	0.17	9.06	3.49
2019-Total	**14.44**	**209.04**	**118.76**	**0.60**	**69.18**	**14.40**
2020-Ord Mountain	7.10	29.28	16.31	0.24	42.96	8.08
2020-Calcite Substation	3.24	35.35	56.61	0.13	7.04	2.71
2020-Total	**10.34**	**64.63**	**72.92**	**0.37**	**50.00**	**10.79**
Maximum Daily Emissions	**14.44**	**209.04**	**118.76**	**0.60**	**69.18**	**14.40**
MDAQMD Threshold	*137*	*548*	*137*	*137*	*82*	*65*
Threshold Exceeded?	No	No	No	No	No	No

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; MDAQMD = Mojave Desert Air Quality Management District; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxides; VOC = volatile organic compound
See Attachment A for complete results.

As shown in Table 6, with implementation of MM-AQ-1, the project would have a less than significant impact. In addition, construction-generated emissions would be temporary and would not represent a long-term source of criteria air pollutant emissions.

Operational Emissions

The project involves development of a 60 MW PV solar energy facility and substation with an energy storage system and overhead gen-tie line. Operation of the project would generate VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$ emissions from mobile sources, including vehicle trips from maintenance vehicles. As discussed in Section 2, pollutant emissions associated with long-term operations were quantified using a spreadsheet model. Project-generated mobile source emissions were estimated based on project-specific trip rates. As discussed in detail in Attachment B, there is no net-increase in operational emissions for the Calcite Substation part of the project.

Table 7 presents the maximum daily mobile source emissions associated with operation (year 2021) of the project. The values shown are the maximum daily emissions results from the operation of the project. Details of the emission calculations are provided in Attachment A and B.

Table 7
Estimated Maximum Daily Operational Criteria Air Pollutant Emissions

Year	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	pounds per day					
Area	0.31	0.00	0.00	0.00	0.00	0.00

Table 7
Estimated Maximum Daily Operational Criteria Air Pollutant Emissions

Energy	0.02	0.19	0.04	0.00	0.01	0.01
Mobile	0.10	3.27	1.84	0.02	0.25	0.11
Total Daily Emissions	**0.43**	**3.46**	**1.89**	**0.02**	**0.26**	**0.11**
MDAQMD Threshold	*137*	*548*	*137*	*137*	*82*	*65*
Threshold Exceeded?	No	No	No	No	No	No

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; MDAQMD = Mojave Desert Air Quality Management District; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxides; VOC = volatile organic compound
Operational emissions in year 2020 presented.
See Attachment A for complete results.

As shown in Table 7, the combined daily area, energy, and mobile source emissions would not exceed the MDAQMD operational thresholds for VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$. Impacts associated with project-generated operational criteria air pollutant emissions would be less than significant.

Operational Mitigation Measures

No operational mitigation measures required.

Operational Level of Significance After Mitigation

Impacts would be less than significant with mitigation.

3.3.3 Would the Project Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant for Which the Project Region is Non-Attainment Under an Applicable Federal or State Ambient Air Quality Standard (Including Releasing Emissions Which Exceed Quantitative Thresholds for Ozone Precursors)?

Air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development, and the MDAQMD develops and implements plans for future attainment of ambient air quality standards. Based on these considerations, project-level thresholds of significance for criteria pollutants are relevant in the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality. As described in Section 3.2.2, the project would have a less than significant impact with mitigation for construction and a less than significant impact for operations.

The MDAB is a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$ under the NAAQS and/or CAAQS. The poor air quality in the MDAB is the result of cumulative emissions from motor vehicles, off-road equipment, commercial and industrial facilities, and other emission sources. Projects that emit these pollutants or their precursors (i.e., VOC and NO_x for O_3) potentially contribute to poor air quality. As indicated in Table 6, daily construction emissions associated with the project would not exceed the MDAQMD significance thresholds with mitigation. The project would not generate a long-term increase in operational emissions, as shown in Table 7. Furthermore, the project would not conflict with the MDAQMD 2004 or 2008 Ozone Attainment Plans, or the PM_{10} Attainment Plan, which address the cumulative emissions in the MDAB and account for emissions associated with construction activity in the MDAB. Accordingly, the project would not result in a cumulatively considerable increase in emissions of nonattainment pollutants. This impact would be less than significant.

Based on the previous considerations, the project would not result in a cumulatively considerable increase in emissions of nonattainment pollutants. Impacts would be less than significant.

Mitigation Measures

No mitigation measures required.

Level of Significance After Mitigation

Impacts would be less than significant with mitigation.

3.3.4 Would the Project Expose Sensitive Receptors to Substantial Pollutant Concentrations?

The MDAQMD considers residences, schools, daycare centers, playgrounds and medical facilities to be sensitive receptor land uses (MDAQMD 2016). Land uses surrounding the proposed work areas consists primarily of undeveloped open space areas in the Mojave Desert. There is some development within the vicinity, generally consisting of scattered rural residences. Construction of the project would result in the temporary (approximately 16 months) generation of emissions associated with on-site equipment operation and off-site trucks and worker vehicles; however, emissions would be below the MDAQMD thresholds and would not result in substantial criteria air pollutant emissions. In addition, the construction activities would move along the transmission line corridor and would not result in extended exposure of individual residences to criteria air pollutants or toxic air contaminants (such as diesel particulate matter). Therefore, although rural residential land uses are located in the vicinity of the project area, the project would not expose residents to long-term substantial air pollutants or toxic air contaminant concentrations. Accordingly, the project would result in a less than less-than-significant impact.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

3.3.5 Would the Project Create Objectionable Odors Affecting a Substantial Number of People?

Odors are a form of air pollution that is most obvious to the general public and can present problems for both the source and surrounding community. Although offensive odors seldom cause physical harm, they can be annoying and cause concern. Odors would be potentially generated from vehicles and equipment exhaust emissions during construction of the project. Odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment. Such odors are temporary and generally occur at magnitudes that would not affect substantial numbers of people. In regards to long-term operations, the project would not change the routine inspection and maintenance of the existing transmission lines and would not result in any sources of substantial odors. Therefore, impacts associated with odors would be considered less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

4 GREENHOUSE GAS EMISSIONS ASSESSMENT

4.1 Thresholds of Significance

4.1.1 CEQA Guidelines

The CNRA adopted amendments to the CEQA Guidelines on December 30, 2009, which became effective on March 18, 2010. With respect to GHG emissions, the amended CEQA Guidelines state in Section 15064.4(a) that lead agencies should “make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate” GHG emissions. The CEQA Guidelines note that an agency may identify emissions by either selecting a “model or methodology" to quantify the emissions or by relying on "qualitative analysis or other performance based standards" (14 CCR 15064.4(a)). Section 15064.4(b) states that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment:

- The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- 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 GHG emissions (14 CCR 15064.4(b)).

In addition, Section 15064.7(c) of the CEQA Guidelines specifies that "[w]hen adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence." Similarly, the revisions to Appendix G, Environmental Checklist Form, which is often used as a basis for lead agencies' selection of significance thresholds, do not prescribe specific thresholds.

Rather, the CEQA Guidelines establish two new CEQA thresholds related to GHGs, and these will be used to discuss the significance of project impacts (14 CCR 15000 et seq.):

1. Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
2. Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

Accordingly, the CEQA Guidelines do not prescribe specific methodologies for performing an assessment, establish specific thresholds of significance, or mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance that are consistent with the manner in which other impact areas are handled in CEQA (CNRA 2009).

4.1.2 Local Guidance

MDAQMD

The CEQA guidelines for projects that fall within the MDAQMD boundary are found in the August 2016 version of the MDAQMD CEQA and Federal Conformity Guidelines. Under CEQA, the MDAQMD is an expert commenting agency on air quality and related matters within its jurisdiction or impacting on its jurisdiction. Under the Federal Clean Air Act the MDAQMD has adopted federal attainment plans for ozone and PM_{10}. The MDAQMD has dedicated assets to reviewing projects to ensure that they will not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any air quality standard; or (3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any federal attainment plan. These Guidelines are intended to assist persons preparing environmental analysis or review documents for any project within the jurisdiction of the MDAQMD by providing background information and guidance on the preferred analysis approach.

Any project is significant if it triggers or exceeds the most appropriate evaluation criteria. The criterion that is applicable to GHG emissions is presented below:

1. Generates total emissions (direct and indirect) in excess of the threshold

A significant project must incorporate mitigation sufficient to reduce its impact to a level that is not significant. A project that cannot be mitigated to a level that is not significant must incorporate all feasible mitigation. Note that the emission thresholds are given as a daily value and an annual value, so that multi-phased project (such as project with a construction phase and a separate operational phase) with phases shorter than one year can be compared to the daily value. The threshold of significance for GHG emissions for MDAQMD is 100,000 tons (90,718 MT) of CO_2E per year and 548,000 pounds of CO_2E per day.

County of San Bernardino

As discussed in Attachment A, the County has implemented a GHG Reduction Plan, which outlines strategies for the county to meet the reduction goals as set forth in AB 32. The County has implemented a review standard of 3,000 MT CO_2E per year to identify projects that require the use of Screening Tables or a project-specific technical analysis to quantify and mitigate project emissions. Projects that do not exceed the 3,000 MT CO_2E per year threshold are considered to be consistent with the GHG Reduction Plan and determined to have a less than significant individual and cumulative impact for GHG emissions.

To determine if the project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, estimated project-generated total construction emissions were amortized over 30 years and added to the estimated operational emissions and then compared to the County's 3,000 MT CO_2E per year threshold.

4.2 Impact Analysis

4.2.1 Would the Project Generate Greenhouse Gas Emissions, Either Directly or Indirectly, That May Have a Significant Impact on the Environment?

Construction Emissions

Construction of the project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, on-road vendor trucks, and worker vehicles. The County's GHG Reduction Plan recommends that construction emissions be amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies. Thus, the total construction GHG emissions were calculated, amortized over 30 years, and added to the total operational emissions for comparison with the GHG significance threshold of 3,000 MT CO_2E per year. The determination of significance, therefore, is addressed in the operational emissions discussion following the estimated construction emissions.

A spreadsheet-based model was used to calculate the annual GHG emissions based on the construction scenario described in Attachment A and B. Construction of the project is anticipated to commence in August 2019 and reach completion at the end of 2020, lasting a total of approximately 16 months. On-site sources of GHG emissions include off-road equipment and off-site sources include on-road vehicles (haul trucks, vendor trucks, and worker vehicles). Table 8 presents construction emissions for the project in 2019 and 2020 from on-site and off-site emission sources.

Table 8
Estimated Annual Construction GHG Emissions

Year	CO_2	CH_4	N_2O	CO_2E
	metric tons per year			
2019-Ord Mountain	946.47	0.19	0.15	994.88
2019-Calcite Substation	1,354.50	0.11	0.06	1,375.13
2019-Total	**2,300.97**	**0.30**	**0.21**	**2,370.01**
2020-Ord Mountain	328.33	0.11	0.11	364.08
2020-Calcite Substation	1,053.50	0.09	0.04	1,067.67

Table 8
Estimated Annual Construction GHG Emissions

Year	CO_2	CH_4	N_2O	CO_2E
2020-Total	**1,381.83**	**0.20**	**0.15**	**1,431.75**
Total	**3,682.80**	**0.50**	**0.36**	**3,801.76**
Annualized Emissions over 30 Years	—	—	—	*126.73*

Notes: CH_4 = methane; CO_2 = carbon dioxide; CO_2E = carbon dioxide equivalent; N_2O = nitrous oxide
See Attachment A and B for complete results.

As shown in Table 8, the estimated total GHG emissions during construction of would be approximately 2,370 MT CO_2E in 2019 and 1,432 MT CO_2E in 2020, for a total of 3,802 MT CO_2E over the construction period. Estimated project-generated construction emissions amortized over 30 years would be approximately 126.73 MT CO_2E per year. As with project-generated construction air quality pollutant emissions, GHG emissions generated during construction of the project would be short-term in nature, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions. Because there is no separate GHG threshold for construction, the evaluation of significance is discussed in the operational emissions analysis in the following text.

Operational Emissions

Operation of the project would generate GHG emissions through motor vehicle trips to and from the project site; energy use (natural gas and generation of electricity consumed by the project); solid waste disposal; and generation of electricity associated with water supply, treatment, and distribution and wastewater treatment. The spreadsheet model was used to calculate the annual GHG emissions based on the operational assumptions described in Section Attachment A and B. Similar to the criteria pollutants, no GHG emissions are estimated to be generated by the Calcite Substation phase during operation.

During O&M, one source of GHG emissions unique to electrical infrastructure would be fugitive emissions from equipment containing SF6 gas installed at the proposed Calcite Substation and on-site substation within the solar facility. These facilities would be air-insulated, as such the circuit breakers and 220 kV ground disconnect switches would have a maximum annual leak rate of 0.5%, based on the manufacturer's guaranteed specifications. The 220 kV ground disconnect switches are unique to the Proposed Project and are a maintenance requirement due to 220 kV fault duty (protection against abnormal electric current). The annual fugitive SF6 emissions anticipated from O&M of the proposed project are included in the Area source category in Table 9.

The estimated operational (year 2021) project-generated GHG emissions from area sources, energy usage, motor vehicles, solid waste generation, and water usage and wastewater generation are shown in Table 9.

Table 9
Estimated Annual Operational GHG Emissions

Emission Source	CO_2	CH_4	N_2O	CO_2E
	metric tons per year			
Energy	414.48	11.97	0.07	735.21
Area	0.00	0.00	0.00	4.07
Mobile	21.97	0.00	0.00	22.64
Total	**436.45**	**11.97**	**0.07**	**761.91**
Annualized Emissions over 30 Years	—	—	—	*126.73*
Operation + Amortized Construction Total	**—**	**—**	**—**	**888.64**

Notes: CH_4 = methane; CO_2 = carbon dioxide; CO_2E = carbon dioxide equivalent; N_2O = nitrous oxide
SF6 emissions are included in the Area source emissions.
See Attachment A and B for complete results.

As shown in Table 9, estimated annual project-generated GHG emissions would be approximately 762 MT CO_2E per year as a result of project operation. Estimated annual project-generated operational emissions in 2021 and amortized project construction emissions would be approximately 889 MT CO_2E per year. As shown, the total annual emissions would not exceed the GHG significance threshold of 3,000 MT CO_2E per year. Because the project's GHG emissions would not result in a cumulatively considerable contribution, the project would result in a cumulative impact in terms of climate change that is less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

GHG Emissions Benefits

In keeping with the renewable energy target under the Scoping Plan and as required by SB 350, the proposed project would provide a source of renewable energy to achieve the RPS of 50% by 2030. Renewable energy, in turn, potentially offsets GHG emissions generated by fossil-fuel power plants. Using the installed tracker capacity of 60 MW (60,000 kW) AC, the solar farm is anticipated to generate 160,000,000 kWh per year. This factor reflects the available daylight hours, conversion of direct current to alternating current, and various system losses. A GHG factor for fossil-fuel-generated electricity was developed based on reported CO_2 emissions and total fossil fuel generated electricity delivered for SCE in 2012 (SCE 2013 and SCE 2014).

The CO_2E factor for fossil-fuel-generated electricity would be 0.93 pounds CO_2E per kilowatt-hour as calculated in the following equations:

$$\text{2012 } CO_2E \text{ Fossil Fuel (lb)} \div \text{Fossil Fuel Electricity Delivered (kWh)} = \text{Fossil Fuel } CO_2E \text{ Factor (lb/kWh)}$$

$$56{,}438{,}272{,}000 \text{ lb } CO_2E \div 60{,}553{,}778{,}000 \text{ kWh} = 0.93 \text{ lb/kWh}$$

The contributions of CH_4 and N_2O are included in the CO_2E emission factor, including their respective GWPs. Thus, the project would provide a potential reduction of 67,495 MT CO_2E per year if the renewable electricity generated by the Project were to be used instead of electricity generated by fossil-fuel sources. Additional detail regarding these calculations can be found in Attachment A. The reduction of GHG from the production of solar energy by the proposed project compared to fossil-fuel sources for the equivalent amount of power is 2,250 MT CO_2E per year. Annualized construction and operational emissions are calculated to be 889 MT CO_2E per year, which includes assuming as a worst-case that back feed power from the grid is necessary for the lighting, security, and water pumps and that delivered power would be fossil fuel generated. Thus even assuming worst-case, the net reduction in GHG emissions would be 1,361 MT CO_2E per year. This reduction is not considered in the significance determination of the project's GHG emissions but is provided for disclosure purposes. It should be noted that due to the project featuring a battery storage facility, it is more likely to utilize all the generated electricity from the solar farm compared to projects without energy storage.

Carbon Sequestration

Carbon sequestration is the process by which CO_2 is removed from the atmosphere and deposited into a carbon reservoir (e.g., vegetation). Trees and vegetation take in CO_2 from the atmosphere during photosynthesis, break down the CO_2, store the carbon within plant parts, and release the oxygen back into the atmosphere. Arid ecosystems like that of the project site could be a substantial sink of atmospheric CO_2 (Evans et al. 2014), with the majority within the soil and not biomass. However, the study of soil as a carbon pool and the interaction with climate change is not fully understood.

For projects with a substantial change in vegetation from pre-development to post-development, there are measurable differences in the carbon stored on site. The Ord Mountain project site consists of arid desert with sparse vegetation. The existing site was toiled and tilled for agricultural purposes and thus it is difficult to make the direct comparison to Evans conclusion above. That said, the project would only result in a land disturbance during the temporary construction phase and the only remaining structures in the ground would be the energy storage building, PV array poles, fence poles, and gentie line poles, which consist of a small fraction of the project area. The project would not remove any soil from the site and the post-construction site conditions would be similar to pre-development. Therefore, the project would not have a significant impact on the project area's ability to remain a CO_2 sink and sequester additional carbon in the future.

4.2.2 Would the Project Conflict With an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases?

As discussed in Attachment A and as stated in the San Bernardino County Final GHG Reduction Plan (2011), with the application of the GHG performance standards, small projects that do not exceed 3,000 MT CO_2E per year are considered to be consistent with the GHG Plan and determined to have a less-than-significant individual and cumulative impact for GHG emissions.

As depicted in Tables 8 and 9, construction and operation of the project would not exceed the 3,000 MT CO_2E per year threshold adopted by San Bernardino County. Based on the guidance presented in the County's GHG Reduction Plan, the proposed project would be consistent with the applicable plan adopted to reduce GHG emissions; therefore, the project would result in a less-than-significant cumulative impact to GHG emissions and climate change.

As discussed in Attachment A, Section 3.2.2, the Scoping Plan, approved by CARB on December 12, 2008, provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. As such, the Scoping Plan is not directly applicable to specific projects. Relatedly, in the Final Statement of Reasons for the Amendments to the CEQA Guidelines, the CNRA observed that "[t]he [Scoping Plan] may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan" (CNRA 2009). Under the Scoping Plan, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., LCFS), among others.

The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32 and establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. Table 10 highlights measures that have been, or will be, developed under the Scoping Plan and the project's consistency with Scoping Plan measures. To the extent that these regulations are applicable to the project, its inhabitants, or uses, the project would comply with all regulations adopted in furtherance of the Scoping Plan to the extent required by law.

Table 10
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Transportation Sector		
Advanced Clean Cars	T-1	The project's employees would purchase vehicles in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase.
Low Carbon Fuel Standard	T-2	Motor vehicles driven by the project's employees would use compliant fuels.
Regional Transportation-Related GHG Targets	T-3	The project does not have any long-term operational transportation impact and thus this requirement does not apply.
Vehicle Efficiency Measures 1. Tire Pressure 2. Fuel Efficiency Tire Program 3. Low-Friction Oil 4. Solar-Reflective Automotive Paint and Window Glazing	T-4	Motor vehicles driven by the project's employees would maintain proper tire pressure when their vehicles are serviced. The project's employees would replace tires in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase. Motor vehicles driven by the project's employees would use low-friction oils when their vehicles are serviced. The project's employees would purchase vehicles in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase.
Ship Electrification at Ports (Shore Power)	T-5	Not applicable.
Goods Movement Efficiency Measures 1. Port Drayage Trucks 2. Transport Refrigeration Units Cold Storage Prohibition 3. Cargo Handling Equipment, Anti-Idling, Hybrid, Electrification 4. Goods Movement Systemwide Efficiency Improvements 5. Commercial Harbor Craft Maintenance and Design Efficiency 6. Clean Ships 7. Vessel Speed Reduction	T-6	Not applicable.

Table 10
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Heavy-Duty Vehicle GHG Emission Reduction 1. Tractor-Trailer GHG Regulation 2. Heavy-Duty Greenhouse Gas Standards for New Vehicle and Engines (Phase I)	T-7	The project would comply with CARB GHG emission limits established in the Heavy-Duty Tractor Trailer GHG Regulation, including all heavy duty vehicles used to transport materials to and from the site. Any required SmartWay features would be incorporated into the trucks in accordance with the GHG Regulation.
Medium- and Heavy-Duty Vehicle Hybridization Voucher Incentive Project	T-8	Not applicable.
High-Speed Rail	T-9	Not applicable.
Electricity and Natural Gas Sector		
Energy Efficiency Measures (Electricity)	E-1	The project would comply with current Title 24, Part 6, of the California Code of Regulations energy efficiency standards for electrical appliances and other devices at the time of building construction. The project would use high-efficiency lighting in the energy storage structure and for security lighting.
Energy Efficiency (Natural Gas)	CR-1	Not applicable.
Solar Water Heating (California Solar Initiative Thermal Program)	CR-2	Not applicable.
Combined Heat and Power	E-2	Not applicable.
Renewable Portfolios Standard (33% by 2020)	E-3	The project supports the RPS goal by providing renewable solar energy.
SB 1 Million Solar Roofs (California Solar Initiative, New Solar Home Partnership, Public Utility Programs) and Earlier Solar Programs	E-4	Not applicable.
Water Sector		
Water Use Efficiency	W-1	The project would utilize water for dust suppression and panel washing obtained on site from existing wells. The water would be used in an efficient manner to reduce impact to local water resources.
Water Recycling	W-2	Recycled water is not available to the site. Wells located on site would be used in place of potable water.
Water System Energy Efficiency	W-3	This is applicable for the transmission and treatment of water, but it is not applicable for the project.
Reuse Urban Runoff	W-4	The project would not consume substantial amounts of water that would generate runoff, which could be re-used.
Renewable Energy Production	W-5	Applicable for wastewater treatment systems. Not applicable for the project.
Green Buildings		
1. State Green Building Initiative: Leading the Way with State Buildings (Greening New and Existing State Buildings)	GB-1	The project, specifically the energy storage structure, would be required to be constructed in compliance with state or local green building standards in effect at the time of building construction.

Table 10
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
2. Green Building Standards Code (Greening New Public Schools, Residential and Commercial Buildings)	GB-1	The project's buildings (energy storage structure) would meet green building standards that are in effect at the time of design and construction.
3. Beyond Code: Voluntary Programs at the Local Level (Greening New Public Schools, Residential and Commercial Buildings)	GB-1	The project would be required to be constructed in compliance with local green building standards in effect at the time of building construction.
4. Greening Existing Buildings (Greening Existing Homes and Commercial Buildings)	GB-1	This is applicable for existing buildings only and is not applicable.
Industry Sector		
Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	I-1	Not applicable.
Oil and Gas Extraction GHG Emission Reduction	I-2	Not applicable.
GHG Emissions Reduction from Natural Gas Transmission and Distribution	I-3	Not applicable.
Refinery Flare Recovery Process Improvements	I-4	Not applicable.
Work with the local air districts to evaluate amendments to their existing leak detection and repair rules for industrial facilities to include methane leaks	I-5	This is not applicable to the project.
Recycling and Waste Management Sector		
Landfill Methane Control Measure	RW-1	Not applicable.
Increasing the Efficiency of Landfill Methane Capture	RW-2	Not applicable.
Mandatory Commercial Recycling	RW-3	During both construction and operation of the project, the project would comply with all state regulations related to solid waste generation, storage, and disposal, including the California Integrated Waste Management Act, as amended. During construction, all wastes would be recycled to the maximum extent possible.
Increase Production and Markets for Compost and Other Organics	RW-3	Not applicable.
Anaerobic/Aerobic Digestion	RW-3	Not applicable.
Extended Producer Responsibility	RW-3	Not applicable (applicable to product designer and producers).
Environmentally Preferable Purchasing	RW-3	Not applicable (applicable to product designer and producers).
Forests Sector		
Sustainable Forest Target	F-1	Not applicable.

Table 10
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
High GWP Gases Sector		
Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Servicing	H-1	The project's employees would be prohibited from performing air conditioning repairs and would be required to use professional servicing.
SF_6 Limits in Non-Utility and Non-Semiconductor Applications	H-2	Not applicable.
Reduction of Perfluorocarbons in Semiconductor Manufacturing	H-3	Not applicable.
Limit High GWP Use in Consumer Products	H-4	The project's employees would use consumer products that would comply with the regulations that are in effect at the time of manufacture.
Air Conditioning Refrigerant Leak Test During Vehicle Smog Check	H-5	Motor vehicles driven by the project's employees would comply with the leak test requirements during smog checks.
Stationary Equipment Refrigerant Management Program – Refrigerant Tracking/Reporting/Repair Program	H-6	Not applicable.
Stationary Equipment Refrigerant Management Program – Specifications for Commercial and Industrial Refrigeration	H-6	Not applicable.
SF_6 Leak Reduction Gas Insulated Switchgear	H-6	The project would comply with any and all applicable regulatory requirements for any SF_6 containing switchgear.
Agriculture Sector		
Methane Capture at Large Dairies	A-1	Not applicable.

Source: CARB 2014.
Notes: CARB = California Air Resources Board; CCR = California Code of Regulations; GHG = greenhouse gas; GWP = global warming potential; LEED = Leadership in Energy and Environmental Design; SB = Senate Bill; SF_6 = sulfur hexafluoride

Based on the analysis in Table 10, the project would be consistent with the applicable strategies and measures in the Scoping Plan.

The 2012 RTP/SCS incorporates local land use projections and circulation networks in city and county general plans. The 2012 RTP/SCS is not directly applicable to the project because the underlying purpose of the 2012 RTP/SCS is to provide direction and guidance by making the best transportation and land use choices for future development, though project would support the goals and policies of the 2012 RTP/SCS. Additionally, the project would not impact local transportation and land use during operation.

In regards to consistency with EO B-30-15 (goal of reducing GHG emissions to 40% below 1990 levels by 2030) and EO S-3-05 (goal of reducing GHG emissions to 80% below 1990 levels by 2050), there are no established protocols or thresholds of significance for that future year analysis. However, CARB forecasts that compliance with the current Scoping Plan puts the state on a trajectory of meeting these long-term GHG goals, although the specific path to compliance is unknown (CARB 2014). As discussed previously, the project is consistent with the GHG emission reduction measures in the Scoping Plan and would not conflict with the state's trajectory toward future GHG reductions. In addition, since the specific path to compliance for the state in regards to the long-term goals will likely require development of technology or other changes that are not currently known or available, specific additional mitigation measures for the project would be speculative and cannot be identified at this time. The project's consistency would assist in meeting the County's contribution to GHG emission reduction targets in California. With respect to future GHG targets under the EOs, CARB has also made clear its legal interpretation that it has the requisite authority to adopt whatever regulations are necessary, beyond the AB 32 horizon year of 2020, to meet EO S-3-05's 80% reduction target in 2050; this legal interpretation by an expert agency provides evidence that future regulations will be adopted to continue the state on its trajectory toward meeting these future GHG targets.

Finally, the project would not exceed the County's threshold of 3,000 MT CO_2E per year. Because the project would not exceed the threshold, this analysis provides support for the conclusion that the project would not conflict with EO S-3-05's GHG reduction goals for California. Therefore, this impact would be less than significant.

As such, the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and no mitigation is required. This impact would be less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

5 CONCLUSIONS

Emissions generated during construction of the proposed project would not exceed the MDAQMD's significance thresholds for VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$ with mitigation implemented. Operation of the proposed project would also not result in net criteria air pollutant emissions (VOC, NO_x, or PM_{10}) that would exceed the MDAQMD thresholds. Potential impacts related to TACs, siting health risk, odors, and consistency with the Clean Air Plan would be less than significant.

Estimated total GHG emissions generated during construction would be 3,791 MT CO_2E. Net estimated project-generated operational GHG emissions from area sources, energy usage, motor vehicles, and water consumption, and amortized construction emissions, would be approximately 888 MT CO_2E per year, which is below the County of San Bernardino's bright-line threshold of 3,000 MT CO_2E per year. The project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs as there are currently no mandatory GHG regulations or finalized agency guidelines that would apply to implementation of this project. Accordingly, potential cumulative GHG impacts would be less than significant.

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ATTACHMENT A

Air Quality and Greenhouse Gas Emissions Analysis Technical Report for the Ord Mountain Solar and Energy Storage Project, San Bernardino, California

DRAFT

Air Quality and Greenhouse Gas Emissions Analysis Technical Report for the Ord Mountain Solar and Energy Storage Project, San Bernardino County, California

Prepared for:

NextEra Energy Resources
700 Universe Boulevard
Juno Beach, Florida 33408
Contact: Andy Flajole

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
Contact: Jennifer Reed

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TABLE OF CONTENTS

Section **Page No.**

TABLE OF CONTENTS (CONTINUED)

Section | **Page No.**

APPENDIX

TABLE OF CONTENTS (CONTINUED)

Page No.

FIGURES

TABLES

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
°C	degrees Celsius
°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
AB	Assembly Bill
AC	alternating current
AQMP	Air Quality Management Plan
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CALGreen	California's Green Building Standards
CalRecycle	California Department of Resources Recycling and Recovery
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	methane
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
County	County of San Bernardino
CPUC	California Public Utilities Commission
CY	cubic yard
DPM	diesel particulate matter
EO	Executive Order
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gas
GWP	global warming potential
H_2S	hydrogen sulfide
HAPs	hazardous air pollutants
HFC	hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
KV	kilovolt
LCFS	Low Carbon Fuel Standard
LEED	Leadership in Energy and Environmental Design
LOS	level of service
LST	localized significance thresholds
MW	megawatt
MWh	megawatt-hour
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MMT	million metric ton
MT CO_2E	metric tons of CO_2 equivalent

Acronym/Abbreviation	Definition
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NHTSA	National Highway Traffic Safety Administration
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
O_3	ozone
PFC	perfluorocarbon
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
ppb	parts per billion
ppm	parts per million
PV	photovoltaic
RCP	Regional Comprehensive Plan
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
SF_6	sulfur hexafluoride
SO_2	sulfur dioxide
SO_4	sulfates
SO_x	sulfur oxides
TAC	toxic air contaminants
VOC	volatile organic compound

EXECUTIVE SUMMARY

The purpose of this technical report is to assess the potential air quality and greenhouse gas (GHG) emissions impacts associated with implementation of the proposed Ord Mountain Solar and Energy Storage Project (project). This assessment utilizes the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.).

Project Overview

NextEra ("Applicant") proposes to construct and operate the project on approximately 484-acres to produce approximately 160,000 megawatt-hours (MWh) of renewable energy annually. The proposed solar project would be a 60-megawatt (MW) alternating current (AC) photovoltaic (PV) solar energy facility with associated on-site substation, inverters, fencing, roads, and supervisory control and data acquisition (SCADA) system. The proposed solar and energy storage project would include a 60 MWac maximum capacity, 4-hour energy storage (battery) system. The proposed solar and energy storage project also includes a 220-kilovolt (kV) overhead generation tie line (gen-tie line), which would extend approximately 0.6 mile southwest to Southern California Edison's (SCE) proposed Calcite Substation.

Air Quality

The air quality impact analysis evaluated the potential for adverse impacts to air quality due to construction and operation of the project. Impacts were evaluated for their significance based on the Mojave Desert Air Quality Management District (MDAQMD) mass daily criteria air pollutant thresholds of significance (MDAQMD 2016). Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. Criteria air pollutants include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and lead. Pollutants that are evaluated include volatile organic compounds (VOCs) (also referred to as reactive organic gases), oxides of nitrogen (NO_x), CO, sulfur oxides (SO_x), PM_{10}, and $PM_{2.5}$. VOCs and NO_x are important because they are precursors to O_3.

Air Quality Plan Consistency

Implementation of the project would not exceed the demographic growth forecasts in the Southern California Association of Governments (SCAG) *2012 Regional Transportation Plan/Sustainable Communities Strategy* (2012 RTP/SCS) and would also be consistent with the MDAQMD Attainment Plans for PM_{10} and Ozone (O_3). In addition, 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. Based on these considerations, impacts related to the project's potential to conflict with or obstruct implementation of the applicable air quality plan would be less than significant.

Construction Criteria Air Pollutant Emissions

Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and VOC off-gassing) and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Maximum daily construction emissions would not exceed the MDAQMD significance thresholds for VOC, NO_x. CO, SO_x, or $PM_{2.5}$ during construction in all construction years (2019–2020). The Project is estimated to exceed the PM_{10} significance threshold in 2019. However, with mitigation, the PM_{10} emissions would be reduced to below the significance threshold.

Operational Criteria Air Pollutant Emissions

Operation of the project would generate operational criteria air pollutants from mobile sources (vehicles), area sources (architectural coatings), and energy. Maximum operational emissions would not exceed the MDAQMD operational significance thresholds for VOC, NO_x. CO, SO_x, PM_{10}, or $PM_{2.5}$.

Exposure of Sensitive Receptors

Construction activities would not generate emissions in excess of the MDAQMD site-specific localized significance thresholds (LSTs); therefore, site-specific construction impacts during construction of the project would be less than significant. In addition, diesel equipment would also be subject to the California Air Resources Board (CARB) air toxic control measures for in-use off-road diesel fleets, which would minimize diesel particulate matter (DPM) emissions. No residual toxic air contaminants (TAC) emissions and corresponding cancer risk are anticipated after construction, and no long-term sources of TAC emissions are anticipated during operation of the project. Therefore, the exposure of project-related TAC emission impacts to sensitive receptors would be less than significant. The project would not negatively affect the level of service (LOS) of intersections on the project site and would not significantly contribute to a CO hotspot. In addition, no sensitive receptor land uses are located near the only study area intersection that would operate at an unacceptable LOS. As such, potential project-generated impacts associated with CO hotspots would be less than significant.

Odors

Potential odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment, architectural coatings, and asphalt pavement application, which would disperse rapidly from the project site and generally occur at magnitudes that would not affect substantial numbers of people. Impacts associated with odors during construction would be less than significant. The project is a solar development that would not include land uses with sources that have the potential to generate substantial odors and impacts associated with odors during operation would be less than significant.

Cumulative Impacts

The potential for the project to result in a cumulatively considerable impact, per the MDAQMD guidance and thresholds, is based on the project's impact with all other solar photovoltaic projects in the MDAB. As discussed previously, maximum construction and operational emissions with mitigation would not exceed the MDAQMD significance thresholds for VOC, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$. Therefore, the project would not result in a cumulatively considerable increase in criteria air pollutants.

Greenhouse Gas Emissions

Global climate change is primarily considered a cumulative impact but must also be evaluated on a project-level under CEQA. A project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHG emissions. GHGs are gases that absorb infrared radiation in the atmosphere. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect. Principal GHGs regulated under state and federal law and regulations include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). GHG emissions are measured in metric tons of CO_2 equivalent (MT CO_2E), which account for weighted global warming potential (GWP) factors for CH_4 and N_2O.

Project-Generated Construction and Operational Greenhouse Gas Emissions

The threshold applied to assess the potential for the project to generate GHG emissions either directly or indirectly that may have a significant impact on the environment was the County of San Bernardino's (County) 2011 Greenhouse Gas Emissions Reductions Plan threshold of 3,000 MT of CO_2E per year. Pursuant to the County's GHG Emission Reduction Plan, construction emissions were amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies (San Bernardino County 2011).

Construction of the project would result in GHG emissions primarily associated with use of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. Total project-generated GHG emissions during construction were estimated to be 1,359 MT CO_2E over the construction period. Estimated project-generated construction emissions amortized over 30 years would be approximately 45.3 MT CO_2E per year.

The project would generate operational GHG emissions from vehicular sources from routine maintenance of the site. Estimated annual project-generated operational GHG emissions would be approximately 762 MT CO_2E per year. Estimated annual project-generated operational emissions in 2021 and amortized project construction emissions would be approximately 807 MT CO_2E per year, well below the 3,000 MT threshold established by the County. Therefore, the project's GHG contribution would not be cumulatively considerable and is less than significant.

GHG Emissions Benefits

Renewable energy production potentially offsets GHG emissions generated by fossil-fuel power plants. The project would provide a potential reduction of 67,495 MT CO_2E per year if the electricity generated by the Ord Mountain Solar Energy Project were to be used instead of electricity generated by fossil-fuel sources. After accounting for the annualized construction and annual operational emissions of 807 MT CO_2E per year, and the annualized reduction in GHG from the production of solar energy of 2,250 MT CO_2E, the net reduction in GHG emissions would be 1,443 MT CO_2E per year. It should be noted that due to the project featuring a battery storage facility, it is more likely to utilize all the generated electricity from the solar farm compared to projects without energy storage.

Consistency with Applicable Greenhouse Gas Reduction Plans

The County's GHG Plan presents a comprehensive set of actions to reduce the County's internal and external GHG emissions to 15% below current levels by 2020, consistent with the AB 32 Scoping Plan. The project falls in line with the County GHG Goal EE 1: Reduce GHG emissions from the generation of electricity by reducing electricity use through increased efficiency and project design that incorporates renewable energy and GHG Goal EE 2: Reduce GHG emissions from the generation of electricity by promoting and supporting the siting of new renewable energy generation facilities. As such, the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs and no mitigation is required. This impact would be less than significant.

1 INTRODUCTION

1.1 Report Purpose and Scope

The purpose of this technical report is to assess the potential air quality and greenhouse gas (GHG) emissions impacts associated with implementation of the proposed Ord Mountain Solar and Energy Storage Project (project). This assessment uses the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.), and is based on the emissions-based significance thresholds recommended by the Mojave Desert Air Quality Management District (MDAQMD) and the County of San Bernardino (County).

This introductory section provides a description of the project and the project location. Section 2, Air Quality, describes the air quality–related environmental setting, regulatory setting, existing air quality conditions, and thresholds of significance and analysis methodology and presents an air quality impact analysis per Appendix G of the CEQA Guidelines. Section 3, Greenhouse Gas Emissions, follows the same format as Section 2 and similarly describes the GHG emissions–related environmental setting, regulatory setting, existing climate changes conditions, and thresholds of significance and analysis methodology and presents a GHG emissions impact analysis per Appendix G of the CEQA Guidelines. Section 4, References Cited, includes a list of the references cited. Section 5, List of Preparers, includes a list of those who prepared this technical report.

1.2 Regional and Local Setting

1.2.1 Regional Location

The project site is located east of State Route (SR) 247; north of Haynes Road; and west of Meridian Road, approximately eight miles north of Lucerne Valley, in unincorporated San Bernardino County. The generation tie line (gen-tie) line would extend southwest from the proposed solar project site to the proposed Southern California Edison (SCE), Calcite Substation, west of SR 247. The project area is located in California United States Geological Survey 7.5 topographic quadrangle at approximately latitude 34°33'36.74"N and longitude 116°56'0.97"W.[1] (See Figure 2, Vicinity Map).

The project is located within the Mojave Desert Air Basin (MDAB) and is within the jurisdictional boundaries of the MDAQMD, which has jurisdiction over the desert portion of San Bernardino County and the far eastern end of Riverside County. The MDAB and the MDAQMD are discussed further in Section 2.1, Environmental Setting, and Section 2.2, Regulatory Setting, respectively.

1 The project area is situated roughly in the southern portion of Section 36, Township 6 North, Range 1 West, the northern portion of Section 1, Township 5 North, Range 1 West, and the southern portion of Section 2, Township 5 North, Ranch 1 West, San Bernardino Base and Meridian of the White Horse Mountain.

1.2.2 Project Setting

The location of the project was selected based on various favorable characteristics for a solar energy development, including (1) proximity to an existing transmission corridor and the SCE proposed Calcite Substation, (2) prior disturbance of the land by agriculture, (3) site access to existing roads, and (4) location in an area with excellent solar irradiance. The project site is predominantly flat with an overall gradient of approximately 1.5%. The site generally slopes from north-west to south-east with elevations of approximately 2,980 feet to 2,900 feet above mean sea level. Locally, the project would be accessed via SR 247 and an internally constructed road system. The project area would include an approximately 0.6-mile gen-tie overhead transmission line from the project's on-site substation to the SCE proposed Calcite Substation.

The project site is currently a fallow agricultural field with some early succession of saltbush scrub vegetation in isolated patches, which have primarily been degraded due to the agricultural use and livestock grazing on site. The project's gen-tie overhead transmission line would traverse undeveloped Mojave creosote bush scrub and desert saltbush scrub.

The project is located within Lucerne Valley groundwater basin, encompassed by the Este subarea of the Mojave Basin judgement area. The project site has 19 identified groundwater wells on-site in various conditions from prior agricultural activities. Of the existing 19 groundwater wells, six have production potential and two have been identified as potentially ideal for use as a water source(s) for project construction and operation. Improvements to the wells, such as new pumps, may be necessary or new wells may need to be drilled as replacement. Several of the existing pumps are provided electrical power via existing distribution lines; however, distribution power may need to be extended in the event that the preferred well is not currently being serviced or a generator may be stationed for pumping the wells as needed.

Existing land uses and land use zoning districts on and adjacent to the proposed solar project site are listed in Table 1.

Table 1
Existing Land Use and Land Use Zoning Districts

Location	Existing Land Use	Land Use Zoning District
Proposed Solar Site	Agriculture (fallow)	LV/AG (Lucerne Valley/Agriculture) LV/AG-40
Gen-Tie	Agriculture (fallow)/SCE Transmission	LV/AG; LV/AG-40
On-Site Substation	Vacant	LV/AG-40
North	Agriculture (fallow)	LV/AG-20/-40
South	Agriculture (fallow)	LV/AG-20/-40

Table 1
Existing Land Use and Land Use Zoning Districts

Location	Existing Land Use	Land Use Zoning District
East	Agriculture (fallow)	LV/RL/RC (Rural Living/Resource Conservation)
West	Agriculture (fallow)	LV/AG-20/-40; LV/RC

Source: SANBAG 2016

1.3 Proposed Project Description

1.3.1 Project Characteristics

The project consists of the following components:

- Solar system
- On-site Substation
- Energy storage system
- Gen-tie line

These components are described in detail below.

Solar System

The project would be a 60-megawatt (MW) alternating current (AC) solar power generating installation. The 484-acre site would house all structures including solar panels, tracking and support structures, inverters, supervisory control and data acquisition (SCADA) system, and interconnection facilities (on-site substation), which would be enclosed by a perimeter security fence approximately 7-feet high.

Solar energy would be captured by an array of approximately 250,000 photovoltaic (PV) panels mounted to a single-axis tracking system. The high-efficiency commercially available PV panels convert incoming sunlight to direct current electrical energy. The panels are arranged in series to effectively increase output voltage to approximately 1,500 volts. These series chains of panels are called “strings” in industry terms, and provide the basic building block of power conversion in the solar array. The strings are combined in the solar field via an above- or below-ground direct current collection system, and then further ganged together at the inverter stations, where the energy is converted to AC and then stepped to an intermediate voltage, typically 34.5 kilovolt (kV). The chosen PV panel would either be crystalline silicon or thin film, which are both well suited for the desert environment due to their durability and reliability.

The tracking system would be parallel to the ground and would be supported, when practical, by driven piers (piles) directly embedded into the ground. The system would rotate slowly throughout the day at a range of ± 60 degrees facing east to west to stay perpendicular to the incoming solar rays and optimize production. Each tracker would hold approximately 80-90 panels (depending on final configuration) and is anticipated to have a maximum height of approximately twelve feet above grade at its highest rotated edge. The minimum clearance from the lower edge of the panel to ground level is anticipated to be approximately 18 to 24 inches. The actual maximum height and minimum clearance would be determined during final design and is dependent on the dimensions of the chosen panel; however, it is not anticipated that the dimensions would vary substantially.

The inverter stations would be up to 12 feet in height and perform three critical functions for the solar plant: (1) collect direct current (DC) power in a central location, (2) convert the direct current power into AC power, and, (3) convert low-voltage AC power to medium-voltage AC power. The inverter stations are typically open-air and well suited for the desert environments. The stations consist of direct current collection equipment, utility-scale inverters, and a low-to medium-voltage transformer. The output power from the inverter stations is then fed to the AC collection system via an above- or below-ground collection system. This AC collection system would deliver the electricity to the on-site substation, where the voltage would be stepped up to the interconnection voltage.

On-site Substation

The project’s on-site substation is the termination point of the collection system of 34.5 kV AC electricity. The output of the entire field is passed through a final interconnection step-up transformer to convert it to the grid tie voltage at 220 kV. Additionally, the project’s on-site substation would host the grid intertie safety equipment and switches required to interconnect to the high voltage transmission system. The open-air substation would likely be constructed on the southern border of the solar array. The footprint of the on-site substation would be approximately 150-feet by 230-feet. The project on-site substation would consist of components up to 55 feet in height and feeders would be overhead lines constructed with 45 foot and 60-foot-tall poles for the single and double circuits respectively.

Energy Storage System

Adjacent to the project’s on-site substation an energy storage system is proposed to provide a maximum capacity of 60 MW over a 4-hour period (240 megawatt-hours (MWh). The energy storage batteries would be housed in an agricultural style, metal framed and steel structure of approximately 35,000 square feet. The building height (including any screening for heating, ventilation and air conditioning (HVAC)) would be approximately 20 feet. The batteries are housed in open air style racking (similar to computer racking) that would be 7-9 feet high. The associated inverters, transformers, and switchgear would be located immediately adjacent to the structure on concrete pads.

The energy storage structure would also have a fire rating in conformance with County standards and have specialized fire suppression systems installed for the battery rooms. All non-battery rooms would have County approved standard sprinkler systems. The building would also have HVAC cooling in the battery room to maintain energy efficiency. Power to the HVAC, lighting, and well pumps would be provided via a connection to the on-site station service transformer with connection lines installed above and/or below ground. The energy storage system would be unmanned with remote operational control; period inspections and maintenance would be performed as necessary.

Generation Tie Line

Project-generated energy would be transported from the on-site substation to SCE's proposed Calcite Substation via a gen-tie transmission line. The transmission line would extend approximately 0.6 mile to the southwest, from the facility's on-site substation to SCE's proposed Calcite Substation. The 220 kV gen-tie transmission line would consist of approximately seven single circuits, up to 150-foot tall concrete or steel poles, spaced on an average of every 500 feet. The poles would carry 336 aluminum conductor steel-reinforced conductors, one conductor per phase, and would allow the line to maintain a minimum 30-foot vertical clearance to ground. The number of and height of the poles as well as the type of conductor will be finalized during detailed design. The right-of-way is expected to consist of a width of up to 50 feet for the maintenance road and gen-tie line. Less width may be required for portions of the right-of-way where access to the transmission line is facilitated by existing roads, such as those associated with the existing SCE transmission lines.

Other Characteristics

The perimeter of the project site would be enclosed by a 6-foot-tall chain-link fence topped with 1 foot of 3-inch strands of barbed wire. The fence will also have slats interwoven between the links to minimize dust movement off-site. The total above-grade height of the fence would be approximately 7 feet. Tortoise mesh will be attached to the fence fabric that will extend from approximately 12 inches below grade to approximately 24 inches above grade. The main purpose of the fence is to prevent unauthorized access to the site. Authorized access into the project site would be provided through a drive through gate.

Low-elevation (less than 14 foot) controlled security lighting would be installed at primary access gates, the on-site substation, and entrance to energy storage structure. The lighting is only switched on when personnel enter the area (either motion-sensor or manual activation (switch)) and would be only in areas where it is required for safety, security, or operations. All safety and emergency services signs would be illuminated when the lights are on. Electrical power to supply the access gate and lighting would be obtained from SCE. All lighting would be directed downwards and towards the site and would include shielding as necessary to minimize illumination of the night sky or potential impacts to surrounding viewers.

1.3.2 Construction

This project is anticipated to be built over an approximately 10-month timeframe from the onset of perimeter fence installation through testing and commissioning of the facility. It is anticipated that the work would be completed in eight or ten hour shifts, with a total of five shifts per week (Monday – Friday). Overtime and weekend work would be used only as necessary to meet scheduled milestones or accelerate schedule and will comply with all applicable California labor laws.

Peak daily construction employees would be approximately 250 with an average of 150 workers daily. In addition to the workers traveling to the site, there would be haul truck and vendor (i.e., delivery) truck trips traveling to and from the site. Delivery of material and supplies would reach the site via on-road truck delivery via SR-247. The majority of the truck deliveries would be for the PV system installation, as well as any aggregate material that may be required for road base. The heaviest delivery loads to the site would also consist of the tracker structures, rock truck deliveries, and the delivery of the generator step up.

Because the project site is fairly level, the grading and associated intensity of earth movement is expected to be minor. However, site preparation and grading would occur throughout the site, specifically for the construction of roads, on-site substation, energy storage system, and inverter pads. Vegetation on the site would be modified only where necessary. Water consumption during construction is estimated to be approximately 75 acre-feet (AF) for dust suppression and earthwork over an approximately 10-month period. Existing electrical power distribution lines on site that serve existing facilities including well pumps would be removed to allow for the solar project development.

Assumptions used to estimate project-generated construction emissions are discussed in Section 2.4.2, Approach and Methodology.

1.3.3 Operation

The project would be unmanned and no operation and maintenance building would be constructed. The operations would be monitored remotely via the SCADA system and periodic inspections and maintenance activities would occur. During project operations, solar panel washing is expected to occur one to four times per year and general labor (up to 10 individuals) may assist in the panel cleaning. Based on the size of the project, panel washing is anticipated to require 15 days to complete per wash cycle. Water consumption is expected to be around 0.28 gallons per square yard of panel, based on other similar operations. Given a 60 MWac plant, with 4 cycles per year, the annual water usage is expected to consume up to approximately 6.0 AF of water. While the Applicant only expects to wash the PV panels once per year, the panels may need to be washed more frequently (up to four times per year) based on site conditions. Conditions that may necessitate increased wash requirements include unusual weather occurrences, forest fires, local air pollutants, and other similar conditions. Therefore, the proposed solar project is requesting the use of up to 6.0 AF per year for the explicit use of washing panels. This amount is in addition to the amount of water necessary for the operations, fire suppression, and site maintenance which is a small amount of groundwater (i.e., approximately 0.6 AF) to be used for this purpose. In the event that electrical power distribution cannot be delivered to the groundwater pump, a generator would be located adjacent to the well pump to provide power.

Assumptions used to estimate project-generated operational emissions are discussed in Section 2.4.2, Approach and Methodology.

1.3.4 Decommissioning

The PV system and energy storage system (including structure) would be recycled to the extent feasible when the project's life is over. The project materials typically consist of the following, which are generally recyclable: silicon, glass, and a metal frame for PV panels, aluminum and steel for the tracking systems (not counting the motors and control systems), steel or wood and concrete for the site structures, and additional concrete from deconstruction activities. The project would also include batteries that contain lithium-ion, which degrades, but could be recycled and/or repurposed. Local recyclers that accept the project decommissioning materials are currently available. Metal and scrap equipment and parts that do not have free flowing oil may be sent for salvage.

Fuel, hydraulic fluids and oils would be transferred directly to a tanker truck from the respective tanks and vessels. Storage tanks/vessels would be rinsed and transferred to tanker trucks. Other items that are not feasible to remove at the point of generation, such as smaller containers lubricants, paints, thinners, solvents, cleaners, batteries and sealants would be kept in a locked utility building with integral secondary containment that meets Certified Unified Program Agencies and Resource Conservation and Recovery Act requirements for hazardous waste storage until removal for proper disposal and recycling. It is anticipated that all oils and batteries would be recycled at an appropriate facility. Site personnel involved in handling these materials would be trained to properly handle them. Containers utilized to store hazardous materials would be inspected regularly for any signs of failure or leakage. Additional procedures would be specified in the Hazardous Materials Business Plan closure plan submitted to the Certified Unified Program Agencies. Transportation of the removed hazardous materials would comply with regulations for transporting hazardous materials, including those set by the Department of Transportation, EPA, California Department of Toxic Substances Control, California Highway Patrol, and California State Fire Marshal.

Upon removal of the project components, the site would be left as disturbed dirt generally consistent with the existing (pre-project development) conditions.

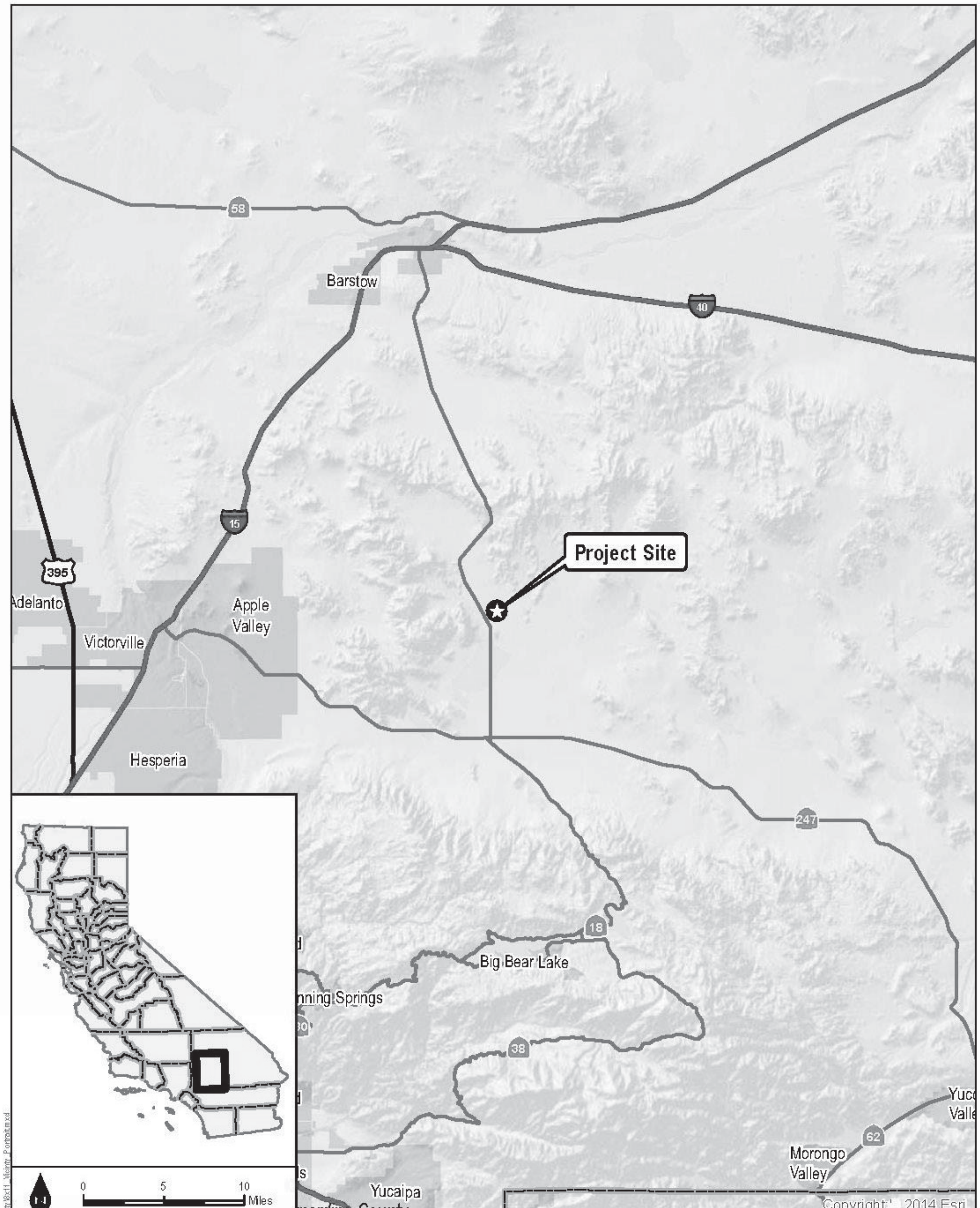

FIGURE 1
Regional Map

Ord Mountain Solar and Energy Storage Project

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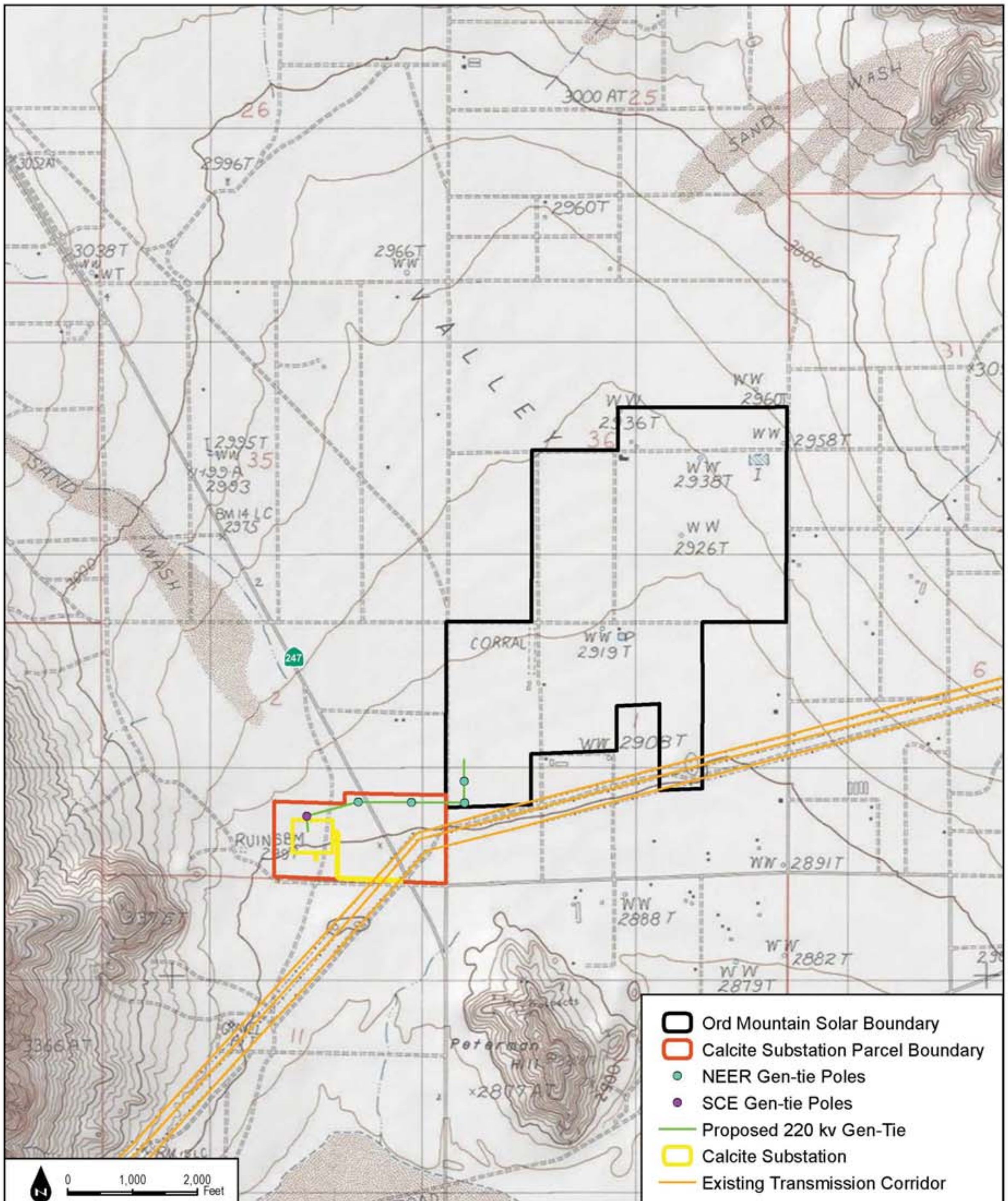

SOURCE: USGS 7.5-Minute Series White Horse Mountain Quadrangle

DUDEK

FIGURE 2
Vicinity Map

Ord Mountain Solar Energy Storage Project and Calcite Substation Project

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2 AIR QUALITY

2.1 Environmental Setting

2.1.1 Climate and Topography

As discussed in Section 1, the project is located within the MDAB.[2] The MDAB includes the desert portions of Los Angeles, Kern, San Bernardino, and Riverside Counties. Most of this area is commonly referred to as the high desert because elevations range from approximately 2,000 to 5,000 feet above mean sea level. The MDAB is generally above the regional inversion layer and experiences relatively good dispersion conditions.

The MDAB is separated from Southern California coastal regions and central California valley regions by mountains extending up to 10,000 feet above mean sea level. As a result, the Mojave Desert is removed from the cooling effects of the Pacific Ocean and is characterized by extreme temperatures. The MDAB consists of an assemblage of mountain ranges interspersed with valleys that often contain dry lakes. Lower-elevation mountains scattered throughout the basin are generally 1,000 feet to 4,000 feet high. Mountain passes form channels for air masses flowing from the west and southwest and the prevailing winds from the west and southwest are caused by the proximity of the MDAB to coastal and central regions and to the blocking effect of the Sierra Nevada to the north.

This MDAQMD region is characterized by hot, dry summers and cool winters, with little precipitation. During the summer, the MDAB is generally influenced by a Pacific subtropical high cell that resides off the coast of California. This high pressure cell prevents cloud formation and engenders daytime solar heating. The MDAB is rarely influenced by the cold air masses that move south from Canada and Alaska, as these frontal systems diffuse by the time they reach the basin. Most moisture arrives in frequent warm, moist, and unstable air masses from the south. The MDAB averages between 3 and 7 inches of precipitation per year (from 16 to 30 days with at least 0.01 inches of precipitation). The Victorville California Irrigation Management Information System station estimates an average annual precipitation of 7.3 inches over an average of 29 days of precipitation per year. The MDAB is classified as a dry-hot desert climate, with portions classified as dry-very hot desert, to indicate at least three months have maximum average temperatures over 100.4° F.

[2] The description of the MDAB climate and topography is based on the MDAQMD 2016 CEQA and Federal Conformity Guidelines (MDAQMD 2016). The description of the WMDONA is based the MDAQMD Federal 8-Hour Ozone Attainment Plan for the Western Mojave Desert Non-Attainment Area (MDAQMD 2008).

The project is also located within the MDAQMD portion of the Western Mojave Desert ozone (O_3) nonattainment area (WMDONA), which includes the following San Bernardino County communities: Phelan, Hesperia, Adelanto, Victorville, Apple Valley, Barstow, Joshua Tree, Yucca Valley and Twenty-nine Palms (the southwestern portion of the MDAQMD).

2.1.2 Pollutants and Effects

2.1.2.1 Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include O_3, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter equal to or less than 2.5 microns ($PM_{2.5}$), and lead. These pollutants, as well as toxic air contaminants (TACs), are discussed in the following text.[3] In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants.

Ozone. O_3 is a strong-smelling, pale blue, reactive, toxic chemical gas consisting of three oxygen atoms. It is a secondary pollutant formed in the atmosphere by a photochemical process involving the sun's energy and O_3 precursors, such as hydrocarbons and NO_x[4]. These precursors are mainly NO_x and volatile organic compounds (VOCs). The maximum effects of precursor emissions on O_3 concentrations usually occur several hours after they are emitted and many miles from the source. Meteorology and terrain play major roles in O_3 formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. O_3 exists in the upper atmosphere ozone layer as well as at the Earth's surface in the troposphere. The O_3 that the EPA and CARB regulate as a criteria air pollutant is produced close to the ground level, where people live, exercise, and breathe. Ground-level ozone is a harmful air pollutant that causes numerous adverse health effect and is thus, considered "bad" ozone. Stratospheric ozone, or "good" ozone, occurs naturally in the upper atmosphere, where it reduces the amount of ultraviolet light (i.e., solar radiation) entering the

3 The descriptions of each of the criteria air pollutants and associated health effects are based on the EPA's Criteria Air Pollutants (2016a) and the CARB Glossary of Air Pollutant Terms (2016a).

4 NO_x is a general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide (NO_2) and other oxides of nitrogen.

earth's atmosphere. Without the protection of the beneficial stratospheric ozone layer, plant and animal life would be seriously harmed.

O_3 in the troposphere causes numerous adverse health effects; short-term exposures (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. These health problems are particularly acute in sensitive receptors such as the sick, the elderly, and young children.

Nitrogen Dioxide. NO_2 is a brownish, highly reactive gas that is present in all urban atmospheres. The major mechanism for the formation of NO_2 in the atmosphere is the oxidation of the primary air pollutant nitric oxide, which is a colorless, odorless gas. NO_x plays a major role, together with VOCs, in the atmospheric reactions that produce O_3. NO_x is formed from fuel combustion under high temperature or pressure. In addition, NO_x is an important precursor to acid rain and may affect both terrestrial and aquatic ecosystems. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.

NO_2 can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections.

Carbon Monoxide. CO is a colorless, odorless gas formed by the incomplete combustion of hydrocarbon, or fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the project location, automobile exhaust accounts for the majority of CO emissions. CO is a nonreactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions—primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, which is a typical situation at dusk in urban areas from November to February. The highest levels of CO typically occur during the colder months of the year, when inversion conditions are more frequent.

In terms of adverse health effects, CO competes with oxygen, often replacing it in the blood, reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can include dizziness, fatigue, and impairment of central nervous system functions.

Sulfur Dioxide. SO_2 is a colorless, pungent gas formed primarily from incomplete combustion of sulfur-containing fossil fuels. The main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels.

SO_2 is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. When combined with particulate matter, SO_2 can injure lung tissue and reduce visibility and the level of sunlight. SO_2 can also yellow plant leaves and erode iron and steel.

Particulate Matter. Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Coarse particulate matter (PM_{10}) is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. Fine particulate matter ($PM_{2.5}$) is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., from motor vehicles and power generation and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SO_x), NO_x, and VOCs.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the blood stream, causing damage elsewhere in the body. Additionally, these substances can transport adsorbed gases such as chlorides or ammonium into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissue. Suspended particulates also damage and discolor surfaces on which they settle and produce haze and reduce regional visibility.

People with influenza, people with chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death as a result of breathing particulate matter. People with bronchitis can expect aggravated symptoms from breathing in particulate matter. Children may experience a decline in lung function due to breathing in PM_{10} and $PM_{2.5}$.

Other groups considered sensitive are smokers, people who cannot breathe well through their noses, and exercising athletes (because many breathe through their mouths).

Lead. Lead in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline; the manufacturing of batteries, paints, ink, ceramics, and ammunition; and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phaseout of leaded gasoline reduced the overall inventory of airborne lead by nearly 95%. With the phaseout of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emissions sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient performance, psychomotor performance, reaction time, and growth. Children are highly susceptible to the effects of lead.

Volatile Organic Compounds. Hydrocarbons are organic gases that are formed from hydrogen and carbon and sometimes other elements. Hydrocarbons that contribute to formation of O_3 are referred to and regulated as VOCs (also referred to as reactive organic gases). Combustion engine exhaust, oil refineries, and fossil-fueled power plants are the sources of hydrocarbons. Other sources of hydrocarbons include evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint.

The primary health effects of VOCs result from the formation of O_3 and its related health effects. High levels of VOCs in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons, such as benzene, are considered TACs. There are no separate health standards for VOCs as a group.

2.1.2.2 Non-Criteria Air Pollutants

Toxic Air Contaminants. A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic noncancer health effects. A toxic substance released into the air is considered a TAC. TACs are identified by federal and state agencies based on a review of available scientific evidence. In the state of California, TACs are identified through a two-step process that was established in 1983 under the Toxic Air Contaminant Identification and Control Act. This two-step process of risk identification and risk management and reduction was designed to protect residents from the health effects of toxic substances in the air. In addition, the California Air Toxics "Hot Spots" Information and Assessment Act, Assembly Bill (AB) 2588, was enacted by the legislature in 1987 to address public concern over the release of TACs into the atmosphere. The law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years.

Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources, such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources, such as automobiles; and area sources, such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and noncarcinogenic effects. Noncarcinogenic effects typically affect one or more target organ systems and may be experienced on either short-term (acute) or long-term (chronic) exposure to a given TAC.

Diesel Particulate Matter. Diesel particulate matter (DPM) is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is composed of two phases, gas and particle, both of which contribute to health risks. The California Air Resources Board (CARB) classified "particulate emissions from diesel-fueled engines" (i.e., DPM; 17 CCR 93000) as a TAC in August 1998. DPM is emitted from a broad range of diesel engines: on-road diesel engines of trucks, buses, and cars and off-road diesel engines including locomotives, marine vessels, and heavy-duty construction equipment, among others. Approximately 70% of all airborne cancer risk in California is associated with DPM (CARB 2000). To reduce the cancer risk associated with DPM, CARB adopted a diesel risk reduction plan in 2000 (CARB 2000).

2.1.3 Sensitive Receptors

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. People most likely to be affected by air pollution include children, the elderly, athletes, and people with cardiovascular and chronic respiratory diseases. Facilities and structures where these air pollution-sensitive people live or spend considerable amounts of time are known as sensitive receptors. Land uses where air pollution-sensitive individuals are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (sensitive sites or sensitive land uses) (CARB 2005). The MDAQMD considers residences, schools, daycare centers, playgrounds and medical facilities as sensitive receptor land uses (MDAQMD 2016).

The greatest potential for exposure of sensitive receptors to air contaminants would occur during the temporary construction phase, when soil would be disturbed and equipment would be used for site grading, materials delivery, and PV solar panel installation. Potential exposure to emissions would vary substantially from day to day, depending on the amount of work being conducted, weather conditions, location of receptors, and exposure time. The construction-phase emissions in this analysis are estimated conservatively based on worst-case conditions, with maximum levels of construction activity occurring simultaneously within a short period of time. The nearest sensitive receptors are scattered rural residential land uses. Residential land uses have the highest potential to be affected by the project, in particular single-family or multiple-family residences located in the surrounding community within 1 mile (5,280 feet) of the project site. There are several rural residential properties adjacent to the project site. Other residential structures within one mile of the project site include several rural residences to the north, east, and south of the site. There are no other sensitive receptor type properties within the 1-mile radius.

2.2 Regulatory Setting

2.2.1 Federal Regulations

2.2.1.1 Criteria Air Pollutants

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The U.S. Environmental Protection Agency (EPA) is responsible for implementing most aspects of the Clean Air Act, including setting National Ambient Air Quality Standards (NAAQS) for major air pollutants; setting hazardous air pollutant (HAP) standards; approving state attainment plans; setting motor vehicle emission standards; issuing stationary source emission standards and permits; and establishing acid rain control measures, stratospheric O_3 protection measures, and enforcement provisions. Under the Clean Air Act, NAAQS are established for the following criteria pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The NAAQS (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a state implementation plan that demonstrates how those areas will attain the standards within mandated time frames.

2.2.1.2 Hazardous Air Pollutants

The 1977 federal Clean Air Act amendments required the EPA to identify National Emission Standards for Hazardous Air Pollutants (HAPs) to protect public health and welfare. HAPs include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 federal Clean Air Act Amendments, which expanded the control program for HAPs, 189 substances and chemical families were identified as HAPs.

2.2.2 State Regulations

2.2.2.1 Criteria Air Pollutants

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. Air quality is considered “in attainment” if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, 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. The NAAQS and CAAQS are presented in Table 2.

Table 2
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary*[c,d]	*Secondary*[c,e]
O_3	1 hour	0.09 ppm (180 μg/m^3)	—	Same as Primary Standard[f]
	8 hours	0.070 ppm (137 μg/m^3)	0.070 ppm (137 μg/m^3)[f]	
NO_2[g]	1 hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3)	Same as Primary

Table 2
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary[c,d]*	*Secondary[c,e]*
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Standard
CO	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
SO_2[h]	1 hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	—
	3 hours	—	—	0.5 ppm (1,300 µg/m^3)
	24 hours	0.04 ppm (105 µg/m^3)	0.14 ppm (for certain areas)[g]	—
	Annual	—	0.030 ppm (for certain areas)[g]	—
PM_{10}[i]	24 hours	50 µg/m^3	150 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m^3	—	
$PM_{2.5}$[i]	24 hours	—	35 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
Lead[j,k]	30-day Average	1.5 µg/m^3	—	—
	Calendar Quarter	—	1.5 µg/m^3 (for certain areas)[k]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 µg/m^3	
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m^3)	—	—
Vinyl chloride[j]	24 hours	0.01 ppm (26 µg/m^3)	—	—
Sulfates	24- hours	25 µg/m^3	—	—
Visibility reducing particles	8 hour (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to the number of particles when the relative humidity is less than 70%	—	—

Source: CARB 2016b.

Notes: µg/m^3 = micrograms per cubic meter; CO = carbon monoxide; mg/m^3= milligrams per cubic meter; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; ppm = parts per million by volume; SO_2 = sulfur dioxide

a California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter (PM_{10}, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{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 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

c Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on 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.

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

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

f On October 1, 2015, the EPA Administrator signed the notice for the final rule to revise the primary and secondary NAAQS for O_3. The EPA is revising the levels of both standards from 0.075 ppm to 0.070 ppm and retaining their indicators (O_3), forms (fourth-highest daily maximum, averaged across 3 consecutive years) and averaging times (8 hours). The EPA is in the process of submitting the rule for publication in the Federal Register. The final rule will be effective 60 days after the date of publication in the Federal Register. The lowered national 8-hour standards are reflected in the table.

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

h 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 national 1-hour standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

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

j CARB has identified lead and vinyl chloride as TACs 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.

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

2.2.2.2 Toxic Air Contaminants

The state Air Toxics Program was established in 1983 under AB 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and noncarcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the (federal) HAPs. The Air Toxics “Hot Spots” Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. TAC emissions from individual facilities are quantified and prioritized. “High-priority” facilities are required to perform a health risk assessment, and if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. The regulation is anticipated to result in an 80% decrease in statewide diesel health risk in 2020 compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-

Ignition (Diesel) Engines and Equipment program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel powered equipment. Several Airborne Toxic Control Measures that reduce diesel emissions including In-Use Off-Road Diesel-Fueled Fleets (13 CCR 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025).

California Health and Safety Code Section 41700

This section of the Health and Safety Code states that a person shall not discharge from any source whatsoever quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any of those persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property. This section also applies to sources of objectionable odors.

2.2.3 Local Regulations

2.2.3.1 Mojave Desert Air Quality Management District

The MDAQMD attains and maintains air quality conditions for the desert portion of San Bernardino County and the far eastern end of Riverside County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of MDAQMD includes preparing plans and programs for the attainment of ambient air-quality standards, adopting and enforcing the rules and regulations concerning sources of air pollution, and issuing permits for stationary sources of air pollution. MDAQMD also inspects stationary sources of air pollution, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations aimed at bringing the region into compliance with the NAAQS and/or CAAQS. Air quality plans applicable to the project are summarized in Table 3.

Table 3
Summary of MDAQMD Air Quality Attainment Plans

Plan Title	Applicable Area	Pollutants Targeted	Adoption Date	Status
1991 Air Quality Attainment Plan	San Bernardino County portion	NO_X and VOC	August 26, 1991	Adopted by MDAQMD and CARB in August 26, 1991.
Reasonable Further Progress Rate-Of-Progress Plan	Southeast Desert Modified AQMA	NO_X and VOC	October 26, 1994	Adopted by MDAQMD and CARB in October 26, 1994.

Table 3
Summary of MDAQMD Air Quality Attainment Plans

Plan Title	Applicable Area	Pollutants Targeted	Adoption Date	Status
Post 1996 Attainment Demonstration and Reasonable Further Progress Plan	Southeast Desert Modified AQMA	NO_X and VOC	October 26, 1994	Adopted by MDAQMD and CARB in October 26, 1994.
Mojave Desert Planning Area Federal Particulate Matter Attainment Plan	Mojave Desert Planning Area	PM_{10} and $PM_{2.5}$	July 25, 1995	Adopted by MDAQMD and CARB in July 25, 1995.
Triennial Revision to the 1991 Air Quality Attainment Plan	Entire District	NO_X and VOC	January 22, 1996	Adopted by MDAQMD and CARB in January 22, 1996.
2004 Ozone Attainment Plan (State and Federal)	Entire District	NO_X and VOC	April 26, 2004	Adopted by MDAQMD and CARB in April 26, 2004.
Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)	MDAQMD portion of the WMDONA	NO_X and VOC	June 9, 2008	Adopted by MDAQMD and CARB in June 9, 2008.

Source: MDAQMD 2016
Notes: The project is not located within the Searles Valley Planning Area; therefore, attainment plans for the Searles Valley Planning Area are not included in the above table.

Applicable Rules

Emissions that would result from mobile, area, and stationary sources during construction and operation of the project are subject to the rules and regulations of the MDAQMD. The MDAQMD rules applicable to the project may include the following:

- **Rule 401 – Visible Emissions:** A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is:
  a) As dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or
  b) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subsection (a) of this rule.
- **Rule 402 – Nuisance:** A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

- **Rule 403 – Fugitive Dust:**

  a) A person shall not cause or allow the emissions of fugitive dust from any transport, handling, construction or storage activity so that the presence of such dust remains visible in the atmosphere beyond the property line of the emission source. (Does not apply to emissions emanating from unpaved roadways open to public travel or farm roads. This exclusion shall not apply to industrial or commercial facilities).

  b) A person shall take every reasonable precaution to minimize fugitive dust emissions from wrecking, excavation, grading, clearing of land and solid waste disposal operations.

  c) A person shall not cause or allow particulate matter to exceed 100 micrograms per cubic meter when determined as the difference between upwind and downwind samples collected on high volume samplers at the property line for a minimum of five hours.

  d) A person shall take every reasonable precaution to prevent visible particulate matter from being deposited upon public roadways as a direct result of their operations. Reasonable precautions shall include, but are not limited to, the removal of particulate matter from equipment prior to movement on paved streets or the prompt removal of any material from paved streets onto which such material has been deposited.

  e) Subsections (a) and (c) shall not be applicable when the wind speed instantaneously exceeds 40 kilometers (25 miles) per hour, or when the average wind speed is greater than 24 kilometers (15 miles) per hour. The average wind speed determination shall be on a 15 minute average at the nearest official air-monitoring station or by wind instrument located at the site being checked.

  f) The provisions of this rule shall not apply to agricultural operations.

- **Rule 403.2 – Fugitive Dust Control for the Mojave Desert Planning Area:**

  C) Requirements

    1) The owner or operator of a source in an affected source category shall comply with the applicable requirements contained in this subsection unless and until the owner or operator has applied for and obtained a District-approved ACP [Alternative PM_{10} Control Plan] pursuant to section (G).

    2) The owner or operator of any Construction/Demolition source shall: (a) Use period watering for short-term stabilization of Disturbed Surface Area to minimize visible fugitive dust emissions. For purposes of this Rule, use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance;

       b) Take actions sufficient to prevent project-related Trackout onto paved surfaces;

c) Cover loaded haul vehicles while operating on Publicly Maintained paved surfaces;

d) Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than thirty days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate Visible Fugitive Dust emissions;

e) Clean-up project-related Trackout or spills on Publicly Maintained paved surfaces within twenty-four hours; and

f) Reduce non-essential Earth-Moving Activity under High Wind conditions. For purposes of this Rule, a reduction in Earth-Moving Activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance.

3) The owner/operator of a Construction/Demolition source disturbing 100 or more acres shall, in addition to the provisions of subsection (2):

a) Prepare and submit to the MDAQMD, prior to commencing Earth-Moving Activity, a dust control plan that describes all applicable dust control measures that will be implemented at the project;

b) Provide Stabilized access route(s) to the project site as soon as is feasible. For purposes of this Rule, as soon as is feasible shall mean prior to the completion of Construction/Demolition activity;

c) Maintain natural topography to the extent possible;

d) Construct parking lots and paved roads first, where feasible; and

e) Construct upwind portions of project first, where feasible.

4) The Owner or Operator of a site undergoing weed abatement activity shall not:

a) Disrupt the soil crust to the extent that Visible Fugitive Dust is created due to wind erosion.

E) Recordkeeping

1) The owner or operator of an affected source shall maintain a Dust Control Plan as required by Sections (C)(3) and (C)(7) on site, or readily accessible, for at least two years after the date of each entry. Such records shall be provided to the District upon request.

Test methods, compliance methods, requirements for alternate PM_{10} Control Plans, and other requirements are detailed in the text of the Rule, which is available at the MDAQMD website.

- **Rule 404 – Particulate Matter Concentration:**
  a) A person shall not discharge into the atmosphere from any source, particulate matter except liquid sulfur compounds, in excess of the concentration at standard conditions, shown in Table 404(a) of Rule 404. Where the volume discharged is between figures listed in the table, the exact concentration permitted to be discharged shall be determined by linear interpolation.
  b) The provisions of this rule shall not apply to emissions resulting from the combustion of liquid or gaseous fuels in steam generators or gas turbines.
  c) For the purposes of this rule, emissions shall be averaged over one complete cycle of operation or one hour, whichever is the lesser time period.

Refer to the official text of the Rule at the MDAQMD website to see Table 404(a) of Rule 404.

- **Rule 405 – Solid Particulate Matter Weight:**
  a) A person shall not discharge into the atmosphere from any source, solid particulate matter including lead and lead compounds, in excess of the rate shown in Table 405 (a) of Rule 405.

     Where the process weight per hour is between figures listed in the table, the exact weight of permitted discharge shall be determined by linear interpolation.
  b) For the purposes of this rule, emissions shall be averaged over one complete cycle of operation or one hour, whichever is the lesser time period.

Refer to the official text of the Rule at the MDAQMD website to see Table 405(a) of Rule 405.

- **Rule 409 – Combustion Contaminants:** A person shall not discharge into the atmosphere from the burning of fuel, combustion contaminants exceeding 0.23 gram per cubic meter (0.1 grain per cubic foot) of gas calculated to 12% of carbon dioxide (CO_2) at standard conditions averaged over a minimum of 25 consecutive minutes.

2.2.3.2 Southern California Association of Governments

The SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. SCAG serves as the federally designated metropolitan planning organization for the Southern California region and is the largest metropolitan planning organization in the United States. With respect to air quality planning and other regional issues, SCAG has prepared the *2008 Regional Comprehensive Plan: Helping Communities Achieve a Sustainable Future* (2008 RCP) for the region (SCAG 2008). The 2008 RCP is a problem-solving guidance document that directly responds to what SCAG has learned about Southern California's challenges through the annual State of the Region report card. It responds to SCAG's Regional Council directive in the 2002 Strategic Plan to develop a strategic plan for defining and solving our interrelated housing, traffic, water, air quality, and other regional challenges (SCAG 2008).

In regards to air quality, the 2008 RCP sets the policy context in which SCAG participates in and responds to the air districts air quality plans and builds off the air districts air quality plans processes that are designed to meet health-based criteria pollutant standards in several ways (SCAG 2008). First, it complements air quality plans by providing guidance and incentives for public agencies to consider best practices that support the technology-based control measures in air quality plans. Second, the 2008 RCP emphasizes the need for local initiatives that can reduce the region's GHG emissions that contribute to climate change, an issue that is largely outside the focus of local attainment plans, which is assessed in Section 3. Third, the 2008 RCP emphasizes the need for better coordination of land use and transportation planning, which heavily influences the emissions inventory from the transportation sectors of the economy. This also minimizes land use conflicts, such as residential development near freeways, industrial areas, or other sources of air pollution.

On April 7, 2016, SCAG's Regional Council adopted the 2016–2040 RTP/SCS (2016 RTP/SCS). The 2016 RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The 2016 RTP/SCS charts a course for closely integrating land use and transportation so that the region can grow smartly and sustainably. The 2016 RTP/SCS was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, nonprofit organizations, businesses, and local stakeholders within the Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. In June 2016, SCAG received its conformity determination from the Federal Highway Administration and the Federal Transit Administration indicating that all air quality conformity requirements for the 2016 RTP/SCS and associated 2015 Federal Transportation Improvement Program Consistency Amendment through Amendment 15-12 have been met (SCAG 2016).

2.3 Regional and Local Air Quality Conditions

2.3.1 Mojave Desert Air Basin Attainment Status

Pursuant to the 1990 federal Clean Air Act amendments, the EPA classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether the NAAQS have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as "attainment" for that pollutant. If an area exceeds the standard, the area is classified as "nonattainment" for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as "unclassified" or "unclassifiable." The designation of "unclassifiable/attainment" means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are re-designated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the standards. The California Clean Air Act, like its federal counterpart, called for the designation of areas as "attainment" or "nonattainment," but based on CAAQS rather than the NAAQS. Table 4 depicts the current attainment status of the project site with respect to the NAAQS and CAAQS. The attainment classifications for the criteria pollutants are outlined in Table 4. As the project is located within the federal WMDONA portion of the MDAQMD, the WMDONA attainment designation is presented if different from the MDAB attainment designation.

Table 4
Mojave Desert Air Basin Attainment Status (San Bernardino County)

Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
Ozone (O_3) – 1-hour	No federal standard	Nonattainment (Moderate)
Ozone (O_3) – 8-hour	0.075 ppm (2008): Nonattainment (Severe 15) 0.070 ppm (2015): Expected Nonattainment	Nonattainment (Moderate)
Nitrogen dioxide (NO_2)	Unclassifiable/attainment	Attainment
Carbon monoxide (CO)	Unclassifiable/attainment	Attainment
Sulfur dioxide (SO_2)	Unclassified	Attainment
Respirable particulate matter (PM_{10})	Nonattainment (Moderate)	Nonattainment
Fine particulate matter ($PM_{2.5}$)	Unclassifiable/attainment	WMDONA: Nonattainment Remainder of MDAB: Unclassified
Lead (Pb)[1]	Unclassifiable/attainment	Attainment
Sulfates (SO_4)	No federal standard	Attainment
Hydrogen sulfide (H_2S)	No federal standard	Unclassified
Vinyl chloride[1]	No federal standard	No designation

Table 4
Mojave Desert Air Basin Attainment Status (San Bernardino County)

Pollutant	Designation/Classification	
Visibility-reducing particles	No federal standard	Unclassified

Sources: EPA 2016 (federal); CARB 2016 (state).
Note: Attainment = meets the standards; Nonattainment = does not meet the standards; Unclassified = insufficient data to classify; Unclassified/Attainment = meets the standard or is expected to be meet the standard despite a lack of monitoring data.[1] CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined.

In summary, the San Bernardino portion of the MDAB is currently designated as an attainment or an unclassifiable/attainment area for all of the NAAQS with the exception of the federal 8-hour O_3 standard and the PM_{10} standard (EPA 2016). The updated Federal O_3 standard became effective December 28, 2015 at 0.070 ppm; however, the EPA has not released formal attainment designations regarding the updated standard. The County is currently designated as a nonattainment area for the state 1-hour and 8-hour O_3 standards and the state PM_{10} and $PM_{2.5}$ standards, but it is designated as attainment or unclassified for all other CAAQS (CARB 2016).

2.3.2 Local Ambient Air Quality

Under authority and oversight from the EPA pursuant to 40 CFR Part 58, the MDAQMD and CARB maintain ambient air quality monitoring stations throughout the MDAB, and the MDAQMD currently operates six monitoring sites[5]. In addition, the MDAQMD gathers air quality data from a variety of monitoring sites from other contracted agencies (e.g., United States Marine Corps). Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. Not all air pollutants are monitored at each station; thus, data from the closest representative station that monitors a specific pollutant are summarized.

The closest ambient air quality monitoring station to the project site that monitors O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ is the Victorville monitoring station, located at 14306 Park Avenue, Victorville, California 92392, approximately 35 miles to the west of the proposed project. The data collected at this station are considered representative of the air quality experienced in the project vicinity. The most recent background ambient air quality data from 2013 to 2015 and the number of days exceeding the ambient air quality standards are presented in Table 5. The Barstow Monitoring station, located at 1301 W. Mountain View Street, Barstow, California 92311, is the nearest air quality monitoring station that monitors CO, located approximately 28 miles to the north of the project site.

5 Barstow, Hesperia, Phelan, Lucerne Valley, Trona, and Victorville,

Table 5
Local Ambient Air Quality Data

Concentration or Exceedances	Ambient Air Quality Standard	2013	2014	2015
Ozone (O_3) Victorville, CA Monitoring Station)[c]				
Maximum 1-hour concentration (ppm)	0.09 ppm (state)	0.120	0.122	0.132
Number of days exceeding state standard (days)		9	3	8
Maximum 8-hour concentration (ppm)	0.070 ppm (state)	0.097	0.097	0.106
	0.070 ppm (federal)	0.097	0.096	0.105
Number of days exceeding state standard (days)		*60*	*40*	*39*
Number of days exceeding federal standard (days)		*31*	*18*	*21*
Nitrogen Dioxide (NO_2) Victorville, CA Monitoring Station)[c]				
Maximum 1-hour concentration (ppm)	0.18 ppm (state)	0.064	0.066	0.118
	0.100 ppm (federal)	0.0646	0.0666	0.1181
Number of days exceeding state standard (days)		*0*	*0*	*0*
Number of days exceeding federal standard (days)		*0*	*0*	*1*
Annual concentration (ppm)	0.030 ppm (state)	0.014	0.013	0.010
	0.053 ppm (federal)	0.014	0.013	0.011
Carbon Monoxide (CO) Barstow, CA Monitoring Station)[c]				
Maximum 1-hour concentration (ppm)	20 ppm (state)	—	—	—
	35 ppm (federal)	0.9	301	2.2
Number of days exceeding state standard (days)		—	—	—
Number of days exceeding federal standard (days)		*0*	*1*	*0*
Maximum 8-hour concentration (ppm)	9.0 ppm (state)	—	—	—
	9 ppm (federal)	0.6	37.8	0.6
Number of days exceeding state standard (days)		—	—	—
Number of days exceeding federal standard (days)		*0*	*8*	*0*
Sulfur Dioxide (SO_2) Victorville, CA Monitoring Station)[c]				
Maximum 1-hour concentration (ppm)	0.075 ppm (federal)	0.0044	0.0048	0.1785
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Maximum 24-hour concentration (ppm)	0.14 ppm (federal)	0.0022	0.0019	0.018
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Annual concentration (ppm)	0.030 ppm (federal)	0.0012	0.0012	0.00063
Coarse Particulate Matter (PM_{10}) Victorville, CA Monitoring Station)[c]				
Maximum 24-hour concentration ($\mu g/m^3$)	50 $\mu g/m^3$ (state)	70.6	ND	ND
	150 $\mu g/m^3$ (federal)	77.9	246.2	100.8
Number of days exceeding state standard (days)[b]		*ND (2)*	*ND (ND)*	*ND (ND)*
Number of days exceeding federal standard (days) [b]		*ND (0)*	*1.0 (1)*	*ND (0)*
Annual concentration (state method) ($\mu g/m^3$)	20 $\mu g/m^3$ (state)	ND	ND	ND
Fine Particulate Matter ($PM_{2.5}$) Victorville, CA Monitoring Station)[c]				
Maximum 24-hour concentration ($\mu g/m^3$)	35 $\mu g/m^3$ (federal)	13.1	24.1	50.2
Number of days exceeding federal standard (days) [b]		*ND (0)*	*ND (0)*	*6.6 (1)*

Table 5
Local Ambient Air Quality Data

Concentration or Exceedances	Ambient Air Quality Standard	2013	2014	2015
Annual concentration (μg/m³)	12 μg/m³ (state)	6.9[a]	7.7[a]	6.7
	12.0 μg/m³ (federal)	6.9[a]	7.7[a]	6.7

Sources: CARB 2016d; EPA 2016c.
Notes: — = not available; μg/m3 = micrograms per cubic meter; ND = insufficient data available to determine the value; ppm = parts per million
Data taken from CARB iADAM (http://www.arb.ca.gov/adam) and EPA AirData (http://www.epa.gov/airdata/) represent the highest concentrations experienced over a given year.
Exceedances of federal and state standards are only shown for O_3, particulate matter, and Carbon Monoxide. Daily exceedances for particulate matter are estimated days because PM_{10} and $PM_{2.5}$ are not monitored daily. All other criteria pollutants did not exceed federal or state standards during the years shown. There is no federal standard for 1-hour ozone, annual PM_{10}, or 24-hour SO_2, nor is there a state 24-hour standard for $PM_{2.5}$.
Barstow Monitoring Station is located 200 E. Buena Vista Barstow, California12312
Victorville Monitoring Station is located 14306 Park Avenue, Victorville California, 92392
a Mean does not satisfy minimum data completeness criteria.
b Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

2.4 Significance Criteria and Methodology

2.4.1 Thresholds of Significance

2.4.1.1 CEQA Guidelines

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the CEQA Guidelines, which provides guidance that a project would have a significant environmental impact if it would (14 CCR 15000 et seq.):

1. Conflict with or obstruct implementation of the applicable air quality plan.
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
4. Expose sensitive receptors to substantial pollutant concentrations.
5. Create objectionable odors affecting a substantial number of people.

Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) indicates that, where available, the significance criteria established by the applicable air quality management district or pollution control district may be relied upon to determine whether the project would have a significant impact on air quality.

2.4.1.2 MDAQMD

The MDAQMD has adopted thresholds to address the significance of air quality impacts resulting from a proposed project. As outlined in the MDAQMD's CEQA and Federal Conformity Guidelines (MDAQMD 2016), a project would result in a significant environmental impact if it:

1. Would generate total emissions (direct and indirect) in excess of the established significance thresholds (indicated in Table 6)
2. Would generate a violation of any ambient air quality standard when added to the local background
3. Does not conform with the applicable attainment or maintenance plan
4. Would expose sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million (10×10^{-6}) and/or a Hazard Index (noncarcinogenic) greater than or equal to 1.

A project is deemed to be in conformance with the applicable attainment or maintenance plans, and hence not be significant, if it is consistent with the existing land use plan. Zoning changes, specific plans, general plan amendments and similar land use plan changes that do not increase dwelling unit density, do not increase vehicle trips, and do not increase vehicle miles traveled are also deemed to be in conformance and would not exceed threshold number 3 (MDAQMD 2016).

Residences, schools, daycare centers, playgrounds, and medical facilities are considered sensitive receptor land uses. The following project types proposed for sites within the specified distance to an existing or planned sensitive receptor land use must be evaluated using significance threshold number 4:

- Any industrial project within 1,000 feet
- A distribution center (40 or more trucks per day) within 1,000 feet
- A major transportation project (50,000 or more vehicles per day) within 1,000 feet
- A dry cleaner using perchloroethylene within 500 feet
- A gasoline dispensing facility within 300 feet.

The MDAQMD *CEQA Air and Federal Conformity Guidelines* (MDAQMD 2016), sets forth quantitative emission significance thresholds for criteria air pollutants below which a project would not have a significant impact on ambient air quality. Project-related air quality emissions estimated in this environmental analysis would be considered significant if any of the applicable significance thresholds presented in Table 6, MDAQMD Air Quality Significance Thresholds, are exceeded. The emission-based thresholds for O_3 precursors are intended to serve as a surrogate for an "ozone significance threshold" (i.e., the potential for adverse O_3 impacts to occur) because O_3 itself is not emitted directly, and the effects of an individual project's emissions of O_3 precursors (VOC and NO_x) on O_3 levels in ambient air cannot be determined through air quality models or other quantitative methods. MDAQMD recommends that its quantitative air pollution thresholds be used to determine the significance of project emissions.

Table 6
MDAQMD Air Quality Significance Thresholds

Pollutant	Annual Threshold (tons per year)	Daily Threshold (pounds per day)
VOC	25	137
NO_x	25	137
CO	100	548
SO_x	25	137
PM_{10}	15	82
$PM_{2.5}$	12	65
Hydrogen Sulfide[a]	10	54
Lead[a]	0.6	3

Source: MDAQMD 2016
[a] The project includes typical construction equipment and on-road vehicles, which result in negligible (if any) emissions of hydrogen sulfide and lead. Therefore, these pollutants are not discussed in this analysis.

2.4.2 Approach and Methodology

2.4.2.1 Construction

Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and VOC off-gassing) and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Emissions from the construction phase of the project were estimated using a spreadsheet based model and emissions factors from the CARB Mobile Source Emissions Inventory Model (EMFAC; version 2014), CARB Off-road Emissions Inventory Model (OFFROAD2011), and the EPA AP-42. Emission calculations were based on assumptions derived from CalEEMod.

Construction scenario assumptions, including phasing, equipment mix, and vehicle trips, were based on information provided by the project applicant. For purposes of estimating project emissions, and based on information provided by the project applicant, it is assumed that construction of the project would commence in August 2019[6] and would last approximately 12 months, ending in July 2020. The analysis contained herein is based on the following assumptions (duration of phases is approximate):

- Perimeter Fence Installation: 2 months (August 2019–October 2019)
- Site Preparation and Grading: 1.5 months (August 2019–September 2019)
- Demolition of Existing Structures: 2 weeks (September 2019)
- Trenching: 3 months (October 2019–December 2019)
- Solar PV System Installation: 4 months (October 2019–January 2020)
- Generation Tie-In Installation: 1 month (February 2020)
- Energy Storage System: 7 months (August 2019–March 2020)
- Testing and Commissioning: 3 months (March 2020–May 2020)
- Site Clean-up and Restoration: 1 month (June 2020)

As shown above, several of the construction phases will run concurrently. The commissioning of the solar PV system is not dependent on the energy storage system being built; therefore, the energy storage system can be constructed along a concurrent schedule. For the analysis, it was generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 5 days per week (22 days per month), during project construction. Because the site has a very low slope, mass grading is not proposed under this project. There will be minor grading associated with the energy storage and on-site substation phases.

Peak daily construction employees would be approximately 250 (generating 500 one-ways trips) with an average of 90 workers daily. As shown in Table 7 below, in addition to the 250 maximum daily workers traveling to the site there would be up to 19 truck trips per day at peak construction activity (trenching and system installation phases overlap). A total of up to 279 trips per day are anticipated during peak construction activities.

[6] The analysis assumes a construction start date of August 2019, which represents the earliest date construction would initiate. Assuming the earliest start date for construction represents the worst-case scenario for criteria air pollutant and GHG emissions because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, as well as fleet turnover replacing older equipment and vehicles in later years.

Delivery of material and supplies would reach the site via on-road truck delivery via SR-247. The majority of the truck deliveries would be for the PV system installation, as well as any aggregate material that may be required for road base. It is estimated that a total of up to 440 truck trips are required to complete the project. It is estimated that there would be an average of 44 truck deliveries per month (about 2 per work day). These truck trips would be intentionally spread out throughout the construction day to optimize construction efficiency as is practical by scheduling deliveries at predetermined times.

The heaviest delivery loads to the site would also consist of the tracker structures, rock truck deliveries, and the delivery of the generator step up. These loads would typically be limited to total weight of 80,000 pounds (lbs), with a cargo load of approximately 25 tons or 50,000 lbs of rock or tracker structures. The generator step up could be up to 160,000 lbs. Typically, the rock is delivered in “bottom dump trucks” or ”transfer trucks” with six axles and the tracker structures will be delivered on traditional flatbed trucks with a minimum of five axles. Low bed transport trucks would transport the construction equipment to the site as needed. The size of the low bed truck (axles for weight distribution) would depend on the equipment transported.

Because the site is fairly level, grading is expected to be minor in most instances. However, grading would occur throughout the site especially for the construction of roads, on-site substation, energy storage system, and inverter pads. This would be accomplished with scrapers, motor graders, water trucks, dozers, and compaction equipment. The PV modules would be off-loaded and installed using small cranes, boom trucks, forklifts, rubber tired loaders, rubber tired backhoes, and other small to medium sized construction equipment as needed. Construction equipment would be delivered to the site on “low bed” trucks unless the equipment can be driven to the site (for example the boom trucks).

The construction equipment mix and vehicle trips used for estimating the project-generated construction emissions are shown in Table 7.

Table 7
Construction Scenario Assumptions

Construction Phase	One-way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor Truck Trips*	*Total Haul Truck Trips*	*Equipment Type*	*Quantity*	*Usage Hours*
Perimeter Fence Installation	300	10	0	Skid Loader with Auger Attachment (Skid Steer Loader)	1	8
Site Preparation and Grading[1]	500	0	0	Grader	2	8
				Bulldozer (Rubber Tired Dozer)	1	8
				Scraper	1	8

Table 7
Construction Scenario Assumptions

Construction Phase	One-way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor Truck Trips*	*Total Haul Truck Trips*	*Equipment Type*	*Quantity*	*Usage Hours*
				10-Ton Roller (Roller)	1	8
				Sheepsfoot Roller (Roller)	1	8
				Tractor (Crawler Tractor)	1	8
Demolition of Existing Structures	500	0	8	Backhoe (Tractor/Loader/Backhoe)	1	8
				Bulldozer (Rubber Tired Dozer)	1	8
				Front End Loader (Rubber Tired Loader)	1	8
Underground Work	500	0	0	Excavator	2	8
				Sheepsfoot Roller (Roller)	1	8
				5kW Generator (Generator Set)	1	8
				Aussie Padder	1	8
				4x4 Forklift (Rough Terrain Forklift)	1	8
System Installation	500	8	0	4x4 Forklift (Rough Terrain Forklift)	8	8
				Small Crane (80 Ton) (Crane)	1	8
				Pile Driver (Bore/Drill Rig)	4	8
				5kW Generator (Generator Set)	2	8
Gen-tie Installation	300	4	0	80 Ton Crane (Crane)	1	8
Energy Storage System	500	2	0	Crane	1	8
				Forklift	2	8
				Generator	1	8
				Tractor	1	8
				Welder	3	8
Testing & Commissioning	300	8	0	NA	NA	NA
Site Cleanup and Restoration	300	4	0	Skid Steer Loader	1	8
				Grader	1	8

Notes: [1] The construction of the on-site substation is included in the site preparation and grading phase.
See Appendix A for details.

Water consumption during construction is estimated to be approximately 75 acre-feet (AF) for dust suppression and earthwork over an approximately 10-month period. Panel rinsing is expected to be conducted up to four times annually as performance testing and weather and site conditions dictate. Construction as well as operational water for panel rinsing would be provided by on-site groundwater through an improved existing well or a new well permitted and drilled (if necessary). An on-site diesel generator may be used to power pumps for well water use. In addition, during construction, water may be pumped directly into 2,000-4,000 gallon tanked water trucks or water may be stored in up to three overhead temporary, approximately 12,000 gallon water storage tower/tanks (up to 16 feet tall), to assist in the availability of water for trucks and expedient filling thereof. The existing wells on-site that would not be used for the proposed project would be capped in place in accordance with County requirements.

2.4.2.2 Operation

Emissions from the operational phase of the project were estimated using a spreadsheet based model and emissions factors from EMFAC (version 2014), OFFROAD, and the US EPA AP-42. Emission calculations were based on assumptions derived from CalEEMod. Operational emissions include area, energy, and mobile source emissions.

Area Sources

CalEEMod emission factors were used to estimate operational emissions from area sources, which include architectural coatings. VOC off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers using during building maintenance. The VOC evaporative emissions from application of residential and nonresidential surface coatings were calculated based on the VOC emission factor, the building square footage, the assumed fraction of surface area, and the reapplication rate. The VOC emission factor is based on the VOC content of the surface coatings, and MDAQMD's Rule 1113 (Architectural Coatings Rule) governs the VOC content for interior and exterior coatings. The reapplication rate of 10% of area per year is assumed. Based on the type of structure for the energy storage structure, it is assumed that the surface area for painting equals 2.0 times the floor square footage, with 75% assumed for interior coating and 25% assumed for exterior surface coating (CAPCOA 2013).

Energy Sources

Energy sources include emissions associated with project electricity usage and on-site power generation. The groundwater well pumps are operated by a diesel generator. The generator emits criteria pollutants from the combustion of diesel fuel. The generator will be regulated by an operating permit under the MDAQMD's Rule 1160 for Internal Combustion Engines.

Electricity use would contribute indirectly to criteria air pollutant emissions; however, the emissions from electricity use were only quantified for GHGs, since criteria pollutant emissions occur at the site of the power plant, which is typically off site. Energy use was provided by the applicant for security lighting and any ancillary use for the energy storage structure.

Mobile Sources

Mobile sources for the project would primarily be motor vehicles (automobiles and light-duty trucks) traveling to and from the project site. Motor vehicles may be fueled with gasoline, diesel, or alternative fuels. Based on conservative estimates for vehicular movement, the project is anticipated to have up to 36 trips per year, for regular maintenance intervals, including panel washing, pole/structure brushing, herbicide application, and equipment repair. Emission factors representing the vehicle mix and emissions for 2019 and 2020 from EMFAC were used to estimate emissions associated with full buildout of the project.

2.5 Impact Analysis

The MDAQMD significance criteria described in Section 2.4, Significance Criteria and Methodology, was used to evaluate air quality impacts associated with the construction and operation of the project.

2.5.1 Would the project conflict with or obstruct implementation of the applicable air quality plan?

A project is non-conforming with an air quality plan if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable MDAQMD rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan). Zoning changes, specific plans, general plan amendments and similar land use plan changes which do not increase dwelling unit density, do not increase vehicle trips, and do not increase vehicle miles traveled are also deemed to comply with the applicable air quality plan (MDAQMD 2016).

The project would comply with all applicable MDAQMD rules and regulations, such as Rule 401 (Visible Emissions) and Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area). The project would not conflict with or propose to change existing land uses or result in population growth. In addition, the project would not result in a long-term increase in the number of trips or increase the overall vehicle miles traveled in the area. Haul truck, vendor truck, and worker vehicle trips would be generated during the proposed construction activities, but would cease after construction is completed. In regards to long-term operations, the project would have routine inspection and maintenance which would result in a net increase in emissions. However, the increase in emissions would not exceed any significance threshold or violate any MDAQMD rule or regulation. The project would not conflict with or delay the implementation of the

MDAQMD Federal 8-hour Ozone Attainment Plan. Based on these considerations, the project would result in a less-than-significant impact.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

2.5.2 Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Construction Emissions

Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and VOC off-gassing) and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts.

As discussed in Section 2.4.2.1, Construction, criteria air pollutant emissions associated with temporary construction activity were quantified using a spreadsheet based model. Construction emissions were calculated for the estimated worst-case day over the construction period associated with each phase and reported as the maximum daily emissions estimated during each year of construction (2019 and 2020). Construction schedule assumptions, including phase type, duration, and sequencing, were based on information provided by the project applicant and is intended to represent a reasonable scenario based on the best information available. Default values provided in CalEEMod were used where detailed project information was not available.

Implementation of the project would generate air pollutant emissions from entrained dust, off-road equipment, vehicle emissions, and architectural coatings. Entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in PM_{10} and $PM_{2.5}$ emissions. The project would be required to comply with MDAQMD Rule 403 to control dust emissions generated during the grading activities. Standard construction practices that would be employed to reduce fugitive dust emissions include watering of the active sites three times per day depending on weather conditions. Internal combustion engines used by construction equipment, vendor trucks (i.e., delivery trucks), and worker vehicles would result in emissions of VOCs, NO_x, CO, PM_{10}, and $PM_{2.5}$. The application of architectural coatings, such as exterior application/interior paint and other finishes, and application of asphalt pavement would also produce VOC emissions; however, the contractor is required to procure architectural coatings from a supplier in compliance with the requirements of MDAQMD's Rule 1113 (Architectural Coatings).

Table 8 presents the estimated maximum daily construction emissions generated during construction of the project. Details of the emission calculations are provided in Appendix A.

Table 8
Estimated Maximum Daily Unmitigated Construction Criteria Air Pollutant Emissions

Year	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	pounds per day					
2019	10.28	163.59	45.97	0.43	100.61	12.91
2020	7.10	29.28	16.31	0.24	72.36	8.37
Maximum Daily Emissions	10.28	163.59	45.97	0.43	100.61	12.91
MDAQMD Threshold	*137*	*548*	*137*	*137*	*82*	*65*
Threshold Exceeded?	No	No	No	No	Yes	No

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; MDAQMD = Mojave Desert Air Quality Management District; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxides; VOC = volatile organic compound
Watering three times daily surrogate for compliance with Rule 403.2
See Appendix A for complete results.

Maximum daily emissions of NO_x, CO, SO_x, and $PM_{2.5}$ emissions would occur during the construction phase in 2019 and 2020 as a result of off-road equipment operation and on-road vendor trucks and haul trucks. The overlap of the building construction phase and the architectural coatings phases in 2019 would produce the maximum daily VOC and PM_{10} emissions. As shown in Table 8, daily construction emissions would not exceed the MDAQMD significance thresholds for VOC, NO_x, CO, SO_x, or $PM_{2.5}$ during construction in all construction years. The project would exceed the MDAQMD significance threshold for PM_{10} in 2019. As such, mitigation is required.

Table 9 presents the estimated annual construction emissions generated during construction of the project in 2019 and 2020.

Table 9
Estimated Annual Unmitigated Construction Criteria Air Pollutant Emissions

Year	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	tons per year					
2019	0.73	10.19	2.33	0.03	5.33	0.67
2020	0.78	13.80	2.00	0.03	3.88	0.54
Maximum Annual Emissions	0.78	13.80	2.33	0.03	5.33	0.67
MDAQMD Threshold	*25*	*100*	*25*	*25*	*15*	*12*
Threshold Exceeded?	No	No	No	No	No	No

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; MDAQMD = Mojave Desert Air Quality Management District; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxides; VOC = volatile organic compound
Watering 3 times daily surrogate for compliance with Rule 403.2
See Appendix A for complete results.

As shown in Table 9, the project would not exceed the MDAQMD annual emissions thresholds for VOC, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$ in either construction year.

The project would be required to comply with MDAQMD Rule 403.2 to control fugitive dust emissions generated during grading activities. Standard construction practices that would be employed to reduce fugitive dust emissions include:

- Short-term dust control by a water truck and/or available water source on or near the drilling rig;
- Minimize and cleanup trackout onto paved roads;
- Cover haul trucks;
- Stabilize (chemical or vegetation) site upon completion of grading when subsequent development is delayed;
- Rapid cleanup of project-related trackout or spills on paved roads; and
- Minimize grading and soil movement when winds exceed 30 miles per hour.

Construction Mitigation Measures

As stated above, the project would exceed the MDAQMD daily significance threshold for PM_{10} in 2019.

MM-AQ-1 **Unpaved Road Vehicle Speed Limit Restrictions**. The project would implement a speed limit of 25 miles per hour during the construction phase for vehicles travelling on un-paved roads. According to the Western Region Air Partnership's

Fugitive Dust Handbook, this mitigation would result in a 44% reduction in PM_{10} emissions (WRAP 2006).

Construction Level of Significance After Mitigation

Table 10 presents the estimated maximum daily mitigated construction emissions generated during construction of the project.

Table 10
Estimated Maximum Daily Mitigated Construction Criteria Air Pollutant Emissions

Year	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	pounds per day					
2019	10.28	163.59	45.97	0.43	60.12	10.91
2020	7.10	29.28	16.31	0.24	42.96	8.08
Maximum Daily Emissions	10.28	163.59	45.97	0.43	60.12	10.91
MDAQMD Threshold	*137*	*548*	*137*	*137*	*82*	*65*
Threshold Exceeded?	No	No	No	No	No	No

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; MDAQMD = Mojave Desert Air Quality Management District; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxides; VOC = volatile organic compound
See Appendix A for complete results.

As shown in Table 10, with implementation of MM-AQ-1, the project would have a less than significant impact. In addition, construction-generated emissions would be temporary and would not represent a long-term source of criteria air pollutant emissions.

Operational Emissions

The project involves development of a 60 MW PV solar energy facility with an energy storage system and overhead gen-tie line. Operation of the project would generate VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$ emissions from mobile sources, including vehicle trips from maintenance vehicles. As discussed in Section 2.4.2.2, Operation, pollutant emissions associated with long-term operations were quantified using a spreadsheet model. Project-generated mobile source emissions were estimated based on project-specific trip rates.

Table 11 presents the maximum daily mobile source emissions associated with operation (year 2021) of the project. The values shown are the maximum daily emissions results from the operation of the project. Details of the emission calculations are provided in Appendix A.

Table 11
Estimated Maximum Daily Operational Criteria Air Pollutant Emissions

Year	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	pounds per day					
Area	0.31	0.00	0.00	0.00	0.00	0.00
Energy	0.02	0.19	0.04	0.00	0.01	0.01
Mobile	0.10	3.27	1.84	0.02	0.25	0.11
Total Daily Emissions	0.43	3.46	1.89	0.02	0.26	0.11
MDAQMD Threshold	*137*	*548*	*137*	*137*	*82*	*65*
Threshold Exceeded?	No	No	No	No	No	No

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; MDAQMD = Mojave Desert Air Quality Management District; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SO_x = sulfur oxides; VOC = volatile organic compound
Operational emissions in year 2021 presented.
See Appendix A for complete results.

As shown in Table 11, the combined daily area, energy, and mobile source emissions would not exceed the MDAQMD operational thresholds for VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$. Impacts associated with project-generated operational criteria air pollutant emissions would be less than significant.

Operational Mitigation Measures

No operational mitigation measures required.

Operational Level of Significance After Mitigation

Impacts would be less than significant with mitigation.

2.5.3 Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development, and the MDAQMD develops and implements plans for future attainment of ambient air quality standards. Based on these considerations, project-level thresholds of significance for criteria pollutants are relevant in the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality. As described in Section 2.5.2, the project would have a less than significant impact with mitigation for construction and a less than significant impact for operations.

The MDAB is a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$ under the NAAQS and/or CAAQS. The poor air quality in the MDAB is the result of cumulative emissions from motor vehicles, off-road equipment, commercial and industrial facilities, and other emission sources. Projects that emit these pollutants or their precursors (i.e., VOC and NO_x for O_3) potentially contribute to poor air quality. As indicated in Table 10, daily construction emissions associated with the project would not exceed the MDAQMD significance thresholds with mitigation. The project would not generate a long-term increase in operational emissions, as shown in Table 11. Furthermore, the project would not conflict with the MDAQMD 2004 or 2008 Ozone Attainment Plans, or the PM_{10} Attainment Plan, which address the cumulative emissions in the MDAB and account for emissions associated with construction activity in the MDAB. Accordingly, the project would not result in a cumulatively considerable increase in emissions of nonattainment pollutants. This impact would be less than significant.

Based on the previous considerations, the project would not result in a cumulatively considerable increase in emissions of nonattainment pollutants. Impacts would be less than significant.

Mitigation Measures

No mitigation measures required.

Level of Significance After Mitigation

Impacts would be less than significant with mitigation.

2.5.4 Would the project expose sensitive receptors to substantial pollutant concentrations?

The MDAQMD considers residences, schools, daycare centers, playgrounds and medical facilities to be sensitive receptor land uses (MDAQMD 2016). Land uses surrounding the proposed work areas consists primarily of undeveloped open space areas in the Mojave Desert. There is some development within the vicinity, generally consisting of scattered rural residences. Construction of the project would result in the temporary (12 months) generation of emissions associated with on-site equipment operation and off-site trucks and worker vehicles; however, emissions would be below the MDAQMD thresholds and would not result in substantial criteria air pollutant emissions. In addition, the construction activities would move along the transmission line corridor and would not result in extended exposure of individual residences to criteria air pollutants or toxic air contaminants (such as diesel particulate matter). Therefore, although rural residential land uses are located in the vicinity of the project area, the project would not expose residents to long-term substantial air pollutants or toxic air contaminant concentrations. Accordingly, the project would result in a less than less-than-significant impact.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

2.5.5 Would the project create objectionable odors affecting a substantial number of people?

Odors are a form of air pollution that is most obvious to the general public and can present problems for both the source and surrounding community. Although offensive odors seldom cause physical harm, they can be annoying and cause concern. Odors would be potentially generated from vehicles and equipment exhaust emissions during construction of the project. Odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment. Such odors are temporary and generally occur at magnitudes that would not affect substantial numbers of people. In regards to long-term operations, the project would not change the routine inspection and maintenance of the existing transmission lines and would not result in any sources of substantial odors. Therefore, impacts associated with odors would be considered less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

3 GREENHOUSE GAS EMISSIONS

3.1 Environmental Setting

3.1.1 The Greenhouse Effect

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period of time (decades or longer). A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. The greenhouse effect is the trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth, the Earth emits a portion of this energy in the form of long-wave radiation, and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Without it, the temperature of the Earth would be about 0°F (−18°C) instead of its present 57°F (14°C). If the atmospheric concentrations of GHGs rise, the average temperature of the lower atmosphere will gradually increase. Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect.

3.1.2 Greenhouse Gases and Global Warming Potential

GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), O_3, water vapor, hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as HFCs, HCFCs, PFCs, and SF_6, which are associated with certain industrial products and processes. A summary of the most common GHGs and their sources is included in the following text.[7]

Carbon Dioxide. CO_2 is a naturally occurring gas and a by-product of human activities and is the principal anthropogenic GHG that affects the Earth's radiative balance. Natural sources of CO_2 include respiration of bacteria, plants, animals, and fungus; evaporation from oceans,

[7] The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (1995), IPCC Fourth Assessment Report (2007), CARB's Glossary of Terms Used in GHG Inventories (2015), and EPA's Glossary of Climate Change Terms (2016d).

volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO_2 are from the combustion of coal, oil, natural gas, and wood.

Methane. CH_4 is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Nitrous Oxide. Sources of N_2O include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and the use of N_2O as a propellant (such as in rockets, racecars, aerosol sprays).

Fluorinated Gases. Fluorinated gases are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Several prevalent fluorinated gases include the following:

- **Hydrofluorocarbons:** HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals that are used as alternatives to ozone-depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.
- **Hydrochlorofluorocarbons:** HCFCs are compounds containing hydrogen, fluorine, chlorine, and carbon atoms. HFCs are synthetic chemicals that are used as alternatives to ozone depleting substances (chlorofluorocarbons).
- **Perfluorocarbons:** PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, along with HFCs, to the ozone depleting substances. The two main sources of PFCs are primarily aluminum production and semiconductor manufacturing. Since PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.
- **Sulfur Hexafluoride:** SF_6 is a colorless gas that is soluble in alcohol and ether and slightly soluble in water. SF_6 is used for insulation in electric power transmission and distribution equipment, semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.

Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA 2016e). The Intergovernmental Panel on Climate Change (IPCC) developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in metric tons of CO_2 equivalent (MT CO_2E).

It was assumed that the GWP for CH_4 is 25 (which means that emissions of 1 MT of CH_4 are equivalent to emissions of 21 MT of CO_2), and the GWP for N_2O is 298, based on the IPCC Fourth Assessment Report (IPCC 2007). The GWP used in EPA's 2016 Inventory of U.S Greenhouse Gas Emissions and Sinks and CARB's California 2016 GHG emissions inventory are based on the IPCC Fourth Assessment Report.

3.2 Regulatory Setting

3.2.1 Federal Regulations

Massachusetts vs. EPA. On April 2, 2007, in *Massachusetts v. EPA*, the Supreme Court directed the EPA Administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA Administrator is required to follow the language of Section 202(a) of the Clean Air Act. On December 7, 2009, the EPA Administrator signed a final rule with the following two distinct findings regarding GHGs under Section 202(a) of the CAA:

- The Administrator found that elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The Administrator further found the combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA.

Energy Independence and Security Act of 2007. On December 19, 2007, President George W. Bush signed the Energy Independence and Security Act of 2007. Among other key measures, the Act would do the following, which would aid in the reduction of national GHG emissions:

1. Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
2. Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020 and directs National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
3. Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy-efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

EPA and NHTSA Joint Final Rules for Vehicle Standards. On April 1, 2010, the EPA and NHTSA announced a joint final rule to establish a national program consisting of new standards for light-duty vehicles model years 2012 through 2016 that is intended to reduce GHG emissions and improve fuel economy. The EPA approved the first-ever national GHG emissions standards under the Clean Air Act, and NHTSA approved Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act (75 FR 25324–25728), which became effective on July 6, 2010. The EPA's GHG standards require new passenger cars, light-duty trucks, and medium-duty passenger vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile in model year 2016. The Corporate Average Fuel Economy standards for passenger cars and light trucks will be phased in between 2012 and 2016. The rules will simultaneously reduce GHG emissions, improve energy security, increase fuel savings, and provide clarity and predictability for manufacturers (EPA 2010). In August 2012, the EPA and NHTSA approved a second round of GHG and Corporate Average Fuel Economy standards for model years 2017 and beyond (77 FR 62624–63200). These standards will reduce motor vehicle GHG emissions for cars and light-duty trucks by model year 2025.

Federal Mandatory Reporting of Greenhouse Gases (Title 40 Code of Federal Regulations Part 98)

The EPA promulgated the Federal Mandatory Reporting of Greenhouse Gases rule in 2009 to require mandatory reporting of GHGs from large GHG emissions sources in 31 source categories in the U.S. In general, the threshold for reporting is 25,000 MT or more of CO_2E. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial GHGs, along with vehicle and engine manufacturers, report at the corporate level. Facilities and suppliers began collecting data on January 1, 2010. The first emissions report was due on March 31, 2011 for emissions during 2010. Manufacturers of vehicles and engines outside of the light-duty sector began reporting CO_2 for model year 2011 and other GHGs in subsequent model years as part of existing EPA certification programs.

Since 2012, EPA regulations also require the reporting of SF_6 emissions from certain electrical facilities (40 CFR Part 98, Subpart DD). SCE complies with these requirements. Furthermore, SCE has developed and would implement SF_6 Gas Management Guidelines, as described in SCE's document entitled "An Asset Management Approach for EPA/CARB SF_6 Regulations," dated April 2012. This document includes an overview of the tools and methods that SCE utilizes to comply with both EPA's Voluntary SF_6 Emission Reduction Partnership for Electric Power Systems program and CARB's SF_6 regulations.

Clean Power Plan and New Source Performance Standards for Electric Generating Units. On October 23, 2015, EPA published a final rule (effective December 22, 2015) establishing the Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (80 FR 64510–64660), also known as the Clean Power Plan. These guidelines prescribe how states must develop plans to reduce GHG emissions from existing fossil-fuel-fired electric generating units. The guidelines establish CO_2 emission performance rates representing the best system of emission reduction for two subcategories of existing fossil-fuel-fired electric generating units: (1) fossil-fuel-fired electric utility steam-generating units, and (2) stationary combustion turbines. Concurrently, EPA published a final rule (effective October 23, 2015) establishing Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (80 FR 64661–65120). The rule prescribes CO_2 emission standards for newly constructed, modified, and reconstructed affected fossil-fuel-fired electric utility generating units. Implementation of the Clean Power Plan has been stayed by the U.S. Supreme Court pending resolution of several lawsuits.

3.2.2 State Regulations

Title 24. Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes Building Energy Efficiency Standards that are designed to ensure new and existing buildings in the State of California achieve energy efficiency and preserve outdoor and indoor environmental quality. The California Energy Commission (CEC) is required by law to adopt standards every 3 years that are cost effective for homeowners over the 30-year lifespan of a building. These standards are updated to consider and incorporate new energy efficient technologies and construction methods. As a result, these standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment.

The current Title 24 standards are the 2013 standards, which became effective on July 1, 2014. Buildings constructed in accordance with the 2013 standards will use 25% less energy for lighting, heating, cooling, ventilation, and water heating than the 2008 standards (CEC 2012). The 2016 Title 24 building energy efficiency standards, which will be effective January 1, 2017, will further reduce energy used and associated GHG emissions. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and nonresidential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015). Although the project would be required to comply with 2016 Title 24 standards because it is anticipated to be constructed during or after 2017, this analysis conservatively does not quantify the increase energy efficiency associated with the more stringent 2016 Title 24 standards.

Title 24 also includes Part 11, known as California's Green Building Standards (CALGreen). The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings and schools and hospitals. The mandatory standards require the following (24 CCR Part 11):

- 20% mandatory reduction in indoor water use
- 50% of construction and demolition waste must be diverted from landfills
- Mandatory inspections of energy systems to ensure optimal working efficiency
- Low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and implemented at the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements; stricter water conservation, 65% diversion of construction and demolition waste, 10% recycled content in building materials, 20% permeable paving, 20% cement reduction, and cool/solar-reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements, stricter water conservation, 75% diversion of construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 30% cement reduction, and cool/solar-reflective roofs.

AB 939 and AB 341. In 1989, AB 939, known as the Integrated Waste Management Act (California Public Resources Code Sections 40000 et seq.), was passed because of the increase in waste stream and the decrease in landfill capacity. The statute established the California Integrated Waste Management Board, which oversees a disposal reporting system. AB 939 mandated a reduction of waste being disposed where jurisdictions were required to meet diversion goals of all solid waste through source reduction, recycling, and composting activities of 25% by 1995 and 50% by the year 2000. AB 341 (Chapter 476, Statutes of 2011 (Chesbro)) amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the state that not less than 75% of solid waste generated be source-reduced, recycled, or composted by the year 2020 and annually thereafter. In addition, AB 341 required the California Department of Resources Recycling and Recovery (CalRecycle) to develop strategies to achieve the state's policy goal. CalRecycle conducted several stakeholder workshops, and in May 2012, published a discussion document titled *California's New Goal: 75 Percent Recycling*, which identifies concepts that CalRecycle believes would assist the state in reaching the 75% goal by 2020 (CalRecycle 2012).

AB 1493. In a response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 (Pavley) was enacted in July 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles that are primarily used for noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30%.

Senate Bill (SB) 1078. SB 1078 (Sher) (September 2002) established the Renewable Portfolio Standard (RPS) program, which requires an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated, requiring utilities to obtain 20% of their power from renewable sources by 2010 (see SB 107, EOs S-14-08, and S-21-09.)

Executive Order (EO) S-3-05. EO S-3-05 (June 2005) established the following goals: GHG emissions should be reduced to 2000 levels by 2010, GHG emissions should be reduced to 1990 levels by 2020, and GHG emissions should be reduced to 80% below 1990 levels by 2050. Under EO S-3-05, the California Environmental Protection Agency is directed to report biannually on progress made toward meeting the GHG targets and the impacts to California due to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. The Climate Action Team was formed, which subsequently issued the *2006 Climate Action Team Report* to *Governor Schwarzenegger and the Legislature* (CAT 2006).

The *2009 Climate Action Team Biennial Report* (CAT 2010a) expands on the policy outlined in the 2006 assessment. The 2009 report identifies the need for additional research in several different aspects that affect climate change in order to support effective climate change strategies. Subsequently, the *2010 Climate Action Team Report to Governor Schwarzenegger and the California Legislature* (CAT 2010b) reviews past climate action milestones including voluntary reporting programs, GHG standards for passenger vehicles, the Low Carbon Fuel Standard (LCFS), a statewide renewable energy standard, and the cap-and-trade program.

AB 32. In furtherance of the goals established in EO S-3-05, the legislature enacted AB 32 (Núñez and Pavley), the California Global Warming Solutions Act of 2006 (September 27, 2006). AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020, representing a reduction of approximately 15% below emissions expected under a "business-as-usual" scenario.

AB 32 directs CARB to develop programs and requirements necessary to achieve the AB 32 goals; to adopt regulations requiring the reporting and verification of statewide GHG emissions; and to monitor compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted. AB 32 also directs Climate Action Team to coordinate the efforts set forth under EO S-3-05 to continue its role in coordinating overall climate policy. Pursuant to AB 32, CARB must adopt regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. Reductions in GHG emissions will come from virtually all sectors of the economy and will be accomplished from a combination of policies, planning, direct regulations, market approaches, incentives, and voluntary efforts. These efforts target GHG emission reductions from cars and trucks, electricity production, fuels, and other sources. The full implementation of AB 32 will help mitigate risks associated with climate change while improving energy efficiency, expanding the use of renewable energy resources and cleaner transportation, and reducing waste.

As required under AB 32, on December 6, 2007, CARB approved the 1990 GHG emissions inventory, establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 million metric tons (MMT) of CO_2E. In addition to the 1990 emissions inventory, CARB also adopted regulations requiring mandatory reporting of GHGs for the large facilities that account for 94% of GHG emissions from industrial and commercial stationary sources in California. AB 32 requires CARB to develop a scoping plan, which lays out California's strategy for meeting the goals and which must be updated every 5 years. On December 11, 2008, CARB approved the initial *Climate Change Scoping Plan: A Framework for Change* (Scoping Plan) (CARB 2008) to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for a suite of measures that will be adopted to sharply reduce California's GHG emissions. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction measures by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan include the following (CARB 2008):

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
2. Achieving a statewide renewable energy mix of 33%
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions
4. Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets
5. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard
6. Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation

In May 2014, CARB approved the First Update to the Climate Change Scoping Plan Building on the Framework Pursuant to AB 32 – The California Global Warming Solutions Act of 2006 (Scoping Plan Update; CARB 2014), which builds on the initial Scoping Plan with new strategies and recommendations and identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. Based on updated information, the Scoping Plan Update revises the 2020 emissions target to 431 MMT CO_2E (based on updated GWPs for GHGs) (CARB 2014).

The Scoping Plan Update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial Scoping Plan, summarizes the latest climate change science, defines CARB's climate change priorities for the next 5 years, and provides direction on how to achieve the long-term emission reduction goal described in EO S-3-05 and B-16-12 (see EO B-16-12). The Scoping Plan Update identified nine key focus areas, including energy, transportation, agriculture, water, waste management, and natural and working lands, along with short-lived climate pollutants, green buildings, and the cap-and-trade program. The update also recommends that a statewide mid-term target and mid-term and long-term sector targets be established toward meeting the 2050 goal established by EO S-3-05 (i.e., reduce California's GHG emissions to 80% below 1990 levels), although no specific recommendations are made.

SB 107. SB 107 (Simitian) (September 2006) requires investor-owned utilities, such as Pacific Gas and Electric, SCE, and San Diego Gas & Electric, to generate 20% of their electricity from renewable sources by 2010. Previously, state law required that this target be achieved by 2017 (see SB 1078).

SB 1368. SB 1368 (September 2006) requires the CEC to develop and adopt regulations for GHG emissions performance standards for the long-term procurement of electricity by local, publicly owned utilities. These standards must be consistent with the standards adopted by the California Public Utilities Commission (CPUC). This effort will help protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants that have GHG emissions that are as low or lower than new combined-cycle natural gas plants. This will be done by requiring imported electricity to meet GHG performance standards in California and by requiring that the standards be developed and adopted in a public process.

EO S-1-07. EO S-1-07 (January 2007) sets a declining LCFS for GHG emissions measured in CO_2E gram per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in April 2009. The regulation is expected to increase the production of biofuels, including those from alternative sources such as algae, wood, and agricultural waste. In addition, the LCFS would drive the availability of plug-in hybrid, battery electric, and fuel-cell power motor vehicles. The LCFS is anticipated to replace 20% of the fuel used in motor vehicles with alternative fuels by 2020.

SB 97. SB 97 (Dutton) (August 2007) directs the Governor's Office of Planning and Research to develop guidelines under CEQA for the mitigation of GHG emissions. The Governor's Office of Planning and Research was tasked to develop proposed guidelines by July 1, 2009, and the California Natural Resources Agency (CNRA) directed to adopt guidelines by January 1, 2010. On June 19, 2008, the Governor's Office of Planning and Research issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents (OPR 2008). The advisory indicated that a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities, should be identified and estimated. The advisory further recommended that the lead agency determine significance of the impacts and impose all mitigation measures that are necessary to reduce GHG emissions to a less-than-significant level.

On April 13, 2009, the Governor's Office of Planning and Research submitted to the CNRA its proposed amendments to the CEQA Guidelines relating to GHG emissions. On July 3, 2009, the CNRA commenced the Administrative Procedure Act rulemaking process for certifying and adopting the proposed amendments, starting the public comment period. The CNRA adopted CEQA Guidelines amendments on December 30, 2009, and transmitted them to the Office of Administrative Law on December 31, 2009. On February 16, 2010, the Office of Administrative Law completed its review and filed the amendments with the secretary of state. The amendments became effective on March 18, 2010. The amended guidelines establish several new CEQA requirements concerning the analysis of GHGs, including the following:

- Requiring a lead agency to "make a good faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of GHG emissions resulting from a project" (Section 15064.4(a))
- Providing a lead agency with the discretion to determine whether to use quantitative or qualitative analysis or performance standards to determine the significance of GHG emissions resulting from a particular project (Section 15064.4(a))
- Requiring a lead agency to consider the following factors when assessing the significant impacts from GHG emissions on the environment
  - The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting
  - Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project

  - o 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 GHG emissions (Section 15064.4(b))

- Allowing lead agencies to consider feasible means of mitigating the significant effects of GHG emissions, including reductions in emissions through the implementation of project features or off-site measures, including offsets that are not otherwise required (Section 15126.4(c))

The amended guidelines also establish two new guidance questions regarding GHG emissions in the Environmental Checklist set forth in CEQA Guidelines Appendix G (14 CCR 15000 et seq.):

- Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The adopted amendments do not establish a GHG emission threshold and instead allow a lead agency to develop, adopt, and apply its own thresholds of significance or those developed by other agencies or experts.[8] The CNRA also acknowledges that a lead agency may consider compliance with regulations or requirements implementing AB 32 in determining the significance of a project's GHG emissions.[9]

SB 375. SB 375 (Steinberg) (September 2008) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. Regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035, as determined by CARB, are required to consider the emission reductions associated with vehicle emission standards (see SB 1493), the composition of fuels (see EO S-1-07), and other CARB-approved measures to reduce GHG emissions. Regional metropolitan planning organizations will be responsible for preparing a Sustainable Communities Strategy (SCS) within their Regional Transportation Plan (RTP). The goal of the SCS is to establish a development plan for the region, which, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If an SCS is unable to achieve the GHG reduction target, a metropolitan planning organization must prepare an Alternative Planning Strategy demonstrating how the

8 "The CEQA Guidelines do not establish thresholds of significance for other potential environmental impacts, and SB 97 did not authorize the development of a statement threshold as part of this CEQA Guidelines update. Rather, the proposed amendments recognize a lead agency's existing authority to develop, adopt and apply their own thresholds of significance or those developed by other agencies or experts" (CNRA 2009c, p. 84).

9 "A project's compliance with regulations or requirements implementing AB 32 or other laws and policies is not irrelevant. Section 15064.4(b)(3) would allow a lead agency to consider compliance with requirements and regulations in the determination of significance of a project's greenhouse gas emissions" (CNRA 2009c, p. 100).

GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies. SB 375 provides incentives for streamlining CEQA requirements by substantially reducing the requirements for "transit priority projects," as specified in SB 375, and eliminating the analysis of the impacts of certain residential projects on global warming and the growth-inducing impacts of those projects when the projects are consistent with the SCS or Alternative Planning Strategy.

On September 23, 2010, CARB adopted the SB 375 targets for the regional metropolitan planning organizations. The targets for the SCAG are an 8% reduction in emissions per capita by 2020 and a 13% reduction by 2035. Achieving these goals through adoption of a SCS will be the responsibility of the metropolitan planning organizations. SCAG prepared its 2012 RTP/SCS, which was adopted by the SCAG Regional Council in April 2012. The plan quantified a 9% reduction by 2020 and a 16% reduction by 2035 (SCAG 2012). On June 4, 2012, the CARB executive officer issued an EO accepting SCAG's quantification of GHG reductions and the determination that the SCS would achieve the GHG emission reduction targets established by CARB.

EO S-13-08. EO Order S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea-level rise. It directs state agencies to take specified actions to assess and plan for such impacts. It directs the CNRA, in cooperation with the California Department of Water Resources, CEC, California's coastal management agencies, and the Ocean Protection Council, to request that the National Academy of Sciences prepare a Sea Level Rise Assessment Report by December 1, 2010. The Ocean Protection Council, California Department of Water Resources, and CEC, in cooperation with other state agencies, are required to conduct a public workshop to gather information relevant to the Sea Level Rise Assessment Report. The Business, Transportation, and Housing Agency was ordered to assess within 90 days of issuance of the EO the vulnerability of the state's transportation systems to sea-level rise. The Governor's Office of Planning and Research and the CNRA are required to provide land use planning guidance related to sea-level rise and other climate change impacts. The EO also required the other state agencies to develop adaptation strategies by June 9, 2009, to respond to the impacts of global climate change that are predicted to occur over the next 50 to 100 years. A discussion draft adaptation strategies report was released in August 2009, and the final *2009 California Climate Adaptation Strategy* report was issued in December 2009 (CNRA 2009a). To assess the state's vulnerability, the report summarizes key climate change impacts to the state for the following areas: public health, ocean and coastal resources, water supply and flood protection, agriculture, forestry, biodiversity and habitat, and transportation and energy infrastructure. The report then recommends strategies and specific responsibilities related to water supply, planning and land use, public health, fire protection, and energy conservation.

EO S-14-08. EO S-14-08 (November 2008) focuses on the contribution of renewable energy sources to meet the electrical needs of California while reducing the GHG emissions from the electrical sector. This EO requires that all retail suppliers of electricity in California serve 33% of their load with renewable energy by 2020. Furthermore, the EO directs state agencies to take appropriate actions to facilitate reaching this target. The CNRA, through collaboration with the CEC and California Department of Fish and Wildlife (formerly the California Department of Fish and Game), is directed to lead this effort. Pursuant to a Memorandum of Understanding between the CEC and California Department of Fish and Wildlife regarding creating the Renewable Energy Action Team, these agencies will create a "one-stop" process for permitting renewable energy power plants.

EO S-21-09. EO S-21-09 (September 2009) directed CARB to adopt a regulation consistent with the goal of EO S-14-08 by July 31, 2010. CARB is further directed to work with the CPUC and CEC to ensure that the regulation builds upon the RPS program and is applicable to investor-owned utilities, publicly owned utilities, direct access providers, and community choice providers. Under this order, CARB is to give the highest priority to those renewable resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health and can be developed the most quickly in support of reliable, efficient, cost-effective electricity system operations. On September 23, 2010, CARB adopted regulations to implement a Renewable Electricity Standard, which would achieve the goal of the EO with the following intermediate and final goals: 20% for 2012–2014, 24% for 2015–2017, 28% for 2018–2019, and 33% for 2020 and beyond. Under the regulation, wind; solar; geothermal; small hydroelectric; biomass; ocean wave, thermal, and tidal; landfill and digester gas; and biodiesel would be considered sources of renewable energy. The regulation would apply to investor-owned utilities and public (municipal) utilities.

SB X1 2. SB X1 2 (April 2011) expanded the RPS by establishing a goal of 20% of the total electricity sold to retail customers in California per year by December 31, 2013, and 33% by December 31, 2020, and in subsequent years. Under the bill, a renewable electrical generation facility is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 MWs or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and that meets other specified requirements with respect to its location. In addition to the retail sellers covered by SB 107, SB X1 2 adds local, publicly owned electric utilities to the RPS. By January 1, 2012, the CPUC is required to establish the quantity of electricity products from eligible renewable energy resources to be procured by retail sellers in order to achieve targets of 20% by December 31, 2013; 25% by December 31, 2016; and 33% by December 31, 2020. The statute also requires that the governing boards for local, publicly owned electric utilities establish the same targets, and the governing boards would be responsible for ensuring compliance with these targets. The CPUC will be responsible for enforcement of the RPS for retail sellers, while the CEC and CARB will enforce the requirements for local publicly owned electric utilities.

Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear (Title 17 California Code of Regulations Sections 95350 to 95359). CARB adopted the Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear (Title 17 California Code of Regulations Sections 95350 to 95359) rule in 2011 to reduce SF_6 emissions from gas insulated switchgear (GIS) and circuit breakers that use SF_6 as an electrical insulating medium. The rule specifies maximum annual SF_6 emission rates for each gas insulated switchgear owner's active gas insulated switchgear equipment. These emission rates decrease with time. The rule also specifies recordkeeping and reporting requirements.

EO B-16-12. EO B-16-12 (March 2012) directs state entities under the Governor's direction and control to support and facilitate development and distribution of zero-emission vehicles. This EO also sets a long-term target of reaching 1.5 million zero-emission vehicles on California's roadways by 2025. On a statewide basis, EO B-16-12 also establishes a GHG emissions reduction target from the transportation sector equaling 80% less than 1990 levels by 2050.

EO B-18-12. EO B-18-12 (April 2012) directs state agencies, departments, and other entities under the governor's executive authority to take action to reduce entity-wide GHG emissions by at least 10% by 2015 and 20% by 2020, as measured against a 2010 baseline. EO B-18-12 also established goals for existing state buildings for reducing grid-based energy purchases and water use.

SB 605. SB 605 (September 2014) requires CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the state no later than January 1, 2016. As defined in the statute, short-lived climate pollutant means "an agent that has a relatively short lifetime in the atmosphere, from a few days to a few decades, and a warming influence on the climate that is more potent than that of carbon dioxide" (SB 605). SB 605, however, does not prescribe specific compounds as short-lived climate pollutants or add to the list of GHGs regulated under AB 32. In developing the strategy, the CARB must complete an inventory of sources and emissions of short-lived climate pollutants in the state based on available data, identify research needs to address any data gaps, identify existing and potential new control measures to reduce emissions, and prioritize the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other air pollutants that impact community health and benefit disadvantaged communities. The draft strategy released by CARB in September 2015 focuses on methane, black carbon, and fluorinated gases, particularly HFCs, as important short-lived climate pollutants. The draft strategy recognizes emission reduction efforts implemented under AB 32 (e.g., refrigerant management programs) and other regulatory programs (e.g., in-use diesel engines, solid waste diversion) along with additional measures to be developed.

EO B-29-15. In response to the ongoing drought in California, EO B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the EO extended through February 28, 2016, although many of the directives have become permanent water-efficiency standards and requirements. The EO includes specific directives that set strict limits on water usage in the state. In response to EO B-29-15, the California Department of Water Resources has modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

EO B-30-15. EO B-30-15 (April 2015) identified an interim GHG reduction target in support of targets previously identified under S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80% below 1990 levels by 2050 as set forth in S-3-05. To facilitate achievement of this goal, B-30-15 calls for an update to CARB's Scoping Plan to express the 2030 target in terms of MMT CO_2E. The EO also calls for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets. Sector-specific agencies in transportation, energy, water, and forestry were required to prepare GHG reduction plans by September 2015, followed by a report on action taken in relation to these plans in June 2016. EO B-30-15 does not require local agencies to take any action to meet the new interim GHG reduction threshold. It is important to note that EO B-30-15 was not adopted by a public agency through a public review process that requires analysis pursuant to CEQA Guidelines Section 15064.4, and that it has not been subsequently validated by a statute as an official GHG reduction target of the State of California. EO B-30-15 itself states it is "not intended to create, and does not, create any rights of benefits, whether substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person."

SB 350. SB 350 (October 2015) expands the RPS by establishing a goal of 50% of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 includes the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses on which an energy-efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires the CPUC, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal. SB 350 also provides for the transformation of the California Independent System Operator into a regional organization to promote the development of regional electricity transmission markets in the western states and to improve the access of consumers served by the California Independent System Operator to those markets, pursuant to a specified process.

SB 1383. SB 1383 (September 2016) requires the CARB, no later than January 1, 2018, to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40%, hydrofluorocarbon gases by 40%, and anthropogenic black carbon by 50% below 2013 levels by 2030. The bill also establishes specified targets for reducing organic waste in landfills.

This bill requires the CARB, in consultation with the Department of Food and Agriculture, to adopt regulations to reduce methane emissions from livestock manure management operations and dairy manure management operations, as specified. This bill requires the regulations to take effect on or after January 1, 2024, if the state board, in consultation with the department, makes certain determinations. The bill requires state agencies to consider and, as appropriate, adopt policies and incentives to significantly increase the sustainable production and use of renewable gas.

California Air Pollution Control Officers Association. The California Air Pollution Control Officers Association is the association of air pollution control officers representing all 35 air quality agencies throughout California. The California Air Pollution Control Officers Association is not a regulatory body but has been an active organization in providing guidance in addressing the CEQA significance of GHG emissions and climate change, as well as other air quality issues.

3.2.3 Local Regulations

3.2.3.1 Mojave Desert AQMD

The MDAQMD is the local air quality regulatory authority for San Bernardino County's High Desert and the Blythe portion of Riverside County. The District is responsible for regulating air quality through multiple programs including as a permitting authority. The District regulates criteria emissions from stationary point sources of air pollution in order to help meet the State Implementation Plan. However, the MDAQMD does not regulate GHG emissions within its permitting program. The District does limit GHG emissions from development projects that are subject to the CEQA review process. The MDAQMD threshold of significance for projects going through the CEQA process is 100,000 tons of CO_2e per year, as discussed further in Section 3.4.1.3.

3.2.3.2 Southern California Association of Governments

SB 375 requires metropolitan planning organizations to prepare an SCS in their RTP. The SCAG Regional Council adopted the 2012 RTP/SCS in April 2012 (SCAG 2012), and the 2016–2040 RTP/SCS (2016 RTP/SCS) was adopted in April 2016. Both the 2012 and 2016 RTP/SCSs establish a development pattern for the region that, when integrated with the transportation network and other policies and measures, would reduce GHG emissions from transportation (excluding goods movement). Specifically, the 2012 RTP/SCS links the goals of sustaining mobility with the goals of fostering economic development; enhancing the environment; reducing energy consumption; promoting transportation-friendly development patterns; and encouraging all residents affected by socioeconomic, geographic, and commercial limitations to be provided with fair access. The 2012 and 2016 RTP/SCSs do not require that local general plans, specific plans, or zoning be consistent with it but provide incentives for consistency for governments and developers.

Please see Section 2.2.3.2, Southern California Association of Governments, for an additional discussion of the SCAG.

3.2.3.3 County of San Bernardino

The County developed and adopted a GHG Plan in September 2011, which presents a comprehensive set of actions to reduce its internal and external GHG emissions to 15% below current levels by 2020, consistent with the AB 32 Scoping Plan. The County's GHG Reduction Plan was prepared to accomplish the following specific objectives:

- Reduce emissions from activities over which the County has jurisdictional and operational control consistent with the target reductions of the AB 32 Scoping Plan;
- Provide estimated GHG reductions associated with the County's existing sustainability efforts and integrate the County's sustainability efforts into the discrete actions of the GHG Plan;
- Provide a list of discrete actions that will reduce GHG emissions; and
- Approve a GHG Plan that satisfies the requirements of Section 15183.5 of the CEQA Guidelines so that compliance with the GHG Plan can be used in appropriate situations to determine the significance of a project's effects relating to GHG emissions, thus providing streamlined CEQA analysis of future projects that are consistent with the approved GHG Plan (County of San Bernardino 2011).

As described in the GHG Plan, all development projects, including those otherwise determined to be exempt from CEQA, are subject to applicable Development Code provisions, including the GHG performance standards and state requirements. With the application of the GHG performance standards, projects that are exempt from CEQA and small projects that do not exceed 3,000 MT CO_2E per year are considered to be consistent with the GHG Reduction Plan and determined to have a less–than-significant individual and cumulative impact for GHG emissions (County of San Bernardino 2011). The development of this threshold implies that it should be applied to the total of a project's annual operational emissions plus its construction emissions annualized over the project life.

The GHG Reduction Plan includes goals and objectives aimed to reduce emissions generated during construction of projects. With respect to the proposed project, the GHG Reduction Plan specifies the following:

- GHG Goal TL 4: Reduce GHG emissions by regulating the idling of diesel-fueled vehicles and equipment and encouraging the use of alternative fuels and transportation technologies.
- Objective GHG TL 4.1: Reduce the exhaust emissions of diesel-fueled vehicles and equipment.

Other reduction strategies include an anti-idling enforcement policy, whereby the County requires that diesel-fueled vehicles and off-road equipment shall not be left idling on site for periods in excess of 5 minutes. The County will also continue to implement its diesel exhaust emissions control measures, which extend beyond the idling restriction described above in the anti-idling enforcement policy. The County's diesel exhaust control measures described in Development Code (County of San Bernardino 2015) Section 83.01.040 apply to all discretionary land use projects approved by the County on or after January 15, 2009. These measures include, but are not limited to:

*Off-Road Diesel Vehicle/Equipment Operations***.** All business establishments and contractors that use off-road diesel vehicle/equipment as part of their normal business operations shall adhere to the following measures during their operations in order to reduce diesel particulate matter emissions from diesel-fueled engines:

- Use reformulated ultra-low-sulfur diesel fuel in equipment and use equipment certified by the EPA or that pre-dates EPA regulations.
- Maintain engines in good working order to reduce emissions.
- Signs shall be posted requiring vehicle drivers to turn off engines when parked.

- Any requirements or standards subsequently adopted by the South Coast Air Quality Management District, the MDAQMD or CARB.
- Provide temporary traffic control during all phases of construction.
- On-site electrical power connections shall be provided for electric construction tools to eliminate the need for diesel-powered electric generators, where feasible.
- Maintain construction equipment engines in good working order to reduce emissions. The developer shall have each contractor certify that all construction equipment is properly serviced and maintained in good operating condition.
- Contractors shall use ultra-low sulfur diesel fuel for stationary construction equipment as required by MDAQMD Rules 431.1 and 431.2 to reduce the release of undesirable emissions.
- Substitute electric and gasoline-powered equipment for diesel-powered equipment, where feasible.

3.3 Climate Change Conditions and Inventories

3.3.1 Contributions to Greenhouse Gas Emissions

Per the EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014* (2016e), total United States GHG emissions were approximately 6,870.5 MMT CO_2E in 2014. The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 80.9% of total GHG emissions (5,556.0 MMT CO_2E). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.7% of CO_2 emissions in 2014 (5,208.2 MMT CO_2E). Total United States GHG emissions have increased by 7.4% from 1990 to 2014, and emissions increased from 2013 to 2014 by 1.0% (70.5 MMT CO_2E). Since 1990, United States GHG emissions have increased at an average annual rate of 0.3%; however, overall, net emissions in 2014 were 8.6% below 2005 levels (EPA 2016e).

According to California's 2000–2014 GHG emissions inventory (2016 edition), California emitted 441.5 MMT CO_2E in 2014, including emissions resulting from out-of-state electrical generation (CARB 2016e). The sources of GHG emissions in California include transportation, industry, electric power production from both in-state and out-of-state sources, residential and commercial activities, agriculture, high global-warming potential substances, and recycling and waste. The California GHG emission source categories and their relative contributions in 2014 are presented in Table 12.

Table 12
GHG Emissions Sources in California

Source Category	Annual GHG Emissions (MMT CO_2E)	Percent of Total[a]
Transportation	159.53	36%
Industrial uses	93.32	21%
Electricity generation[b]	88.24	20%
Residential and commercial uses	38.34	9%
Agriculture	36.11	8%
High global-warming potential substances	17.15	4%
Recycling and waste	8.85	2%
Totals	441.54	100%

Source: CARB 2016e.
Notes: Emissions reflect the 2014 California GHG inventory.
MMT CO_2E = million metric tons of carbon dioxide equivalent per year
a Percentage of total has been rounded, and total may not sum due to rounding.
b Includes emissions associated with imported electricity, which account for 36.51 MMT CO_2E annually.

During the 2000 to 2014 period, per capita GHG emissions in California have continued to drop from a peak in 2001 of 13.9 MT per person to 11.4 MT per person in 2014, representing an 18% decrease. In addition, total GHG emissions in 2014 were 2.8 MMT CO_2E less than 2013 emissions. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California is on track to meet the 2020 target of 431 MMT CO_2E (CARB 2016e).

County of San Bernardino

The County's Current and 2020 External Inventory emissions are 6,253,063 MT CO_2E and 7,586,908 MT CO_2E, respectively. The 2020 projection does not include any mitigation scenarios or statewide programs. Table 13 shows the breakdown of the current and projected emissions within the County.

Table 13
San Bernardino County GHG Emissions Summary

Sector		Current		2020	
		Emissions	*Percent*	*Emissions*	*Percent*
Stationary Sources		2,866,435	45.8	3,173,592	41.8
Transportation	On-road	1,631,666	26.1	2,176,132	28.7
	Off-road	157,185	2.5	235,054	3.1
Building Energy Use	Industrial	593,716	9.5	760,834	10.0
	Residential	440,841	7.1	467,217	6.2
	Commercial	246,364	3.9	314,603	4.1

Table 13
San Bernardino County GHG Emissions Summary

Sector		Current		2020	
		Emissions	*Percent*	*Emissions*	*Percent*
Solid Waste/Landfills		213,191	3.4	359,318	4.7
Agriculture		64,619	1.0	50,991	0.7
Water-related	Wastewater	27,994	0.4	35,525	0.5
	Water conveyance	10,696	0.2	13,211	0.2
Miscellaneous	Residential fires and cooking	346	0.01	431	0.01
	Total	6,253,053	100	7,586,908	100

Source: County of San Bernardino 2011

Stationary source emissions the County are substantially different compared to more industrialized counties like Los Angeles County. Cement plants constitute approximately 95% of the stationary source emissions in San Bernardino County, and represent nearly one half (45.8%) of all external emissions. There are 11 cement plants located in California, with four located in the County, and three of which are located in the unincorporated area of the County. These three cement plants represent approximately 30% of GHG emissions from cement production in California.

3.3.2 Potential Effects of Human Activity on Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The 2014 *Intergovernmental Panel on Climate Change Synthesis Report* (IPCC 2014) indicated that warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice, and rising sea levels (IPCC 2014).

In California, climate change impacts have the potential to affect sea-level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, and electricity demand and supply (CCCC 2006). The primary effect of global climate change has been a 0.2°C rise in average global tropospheric temperature per decade, determined from meteorological measurements worldwide between 1990 and 2005. Scientific modeling predicts that continued emissions of GHGs at or above current rates would induce more extreme climate changes during the twenty-first century than were observed during the twentieth century. A warming of about 0.2°C (0.36°F) per decade is projected, and there are identifiable signs that global warming could be taking place.

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The average temperatures in California have increased, leading to more extreme hot days and fewer cold nights. Shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year. Sea levels have risen, and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010a).

An increase in annual average temperature is a reasonably foreseeable effect of climate change. Observed changes over the last several decades across the western United States reveal clear signals of climate change. Statewide average temperatures increased by about 1.7°F from 1895 to 2011, and warming has been greatest in the Sierra Nevada (CCCC 2012). By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century. By 2100, average temperatures could increase by 4.1°F to 8.6°F, depending on emissions levels. Springtime warming—a critical influence on snowmelt—will be particularly pronounced. Summer temperatures will rise more than winter temperatures, and the increases will be greater in inland California, compared to the coast. Heat waves will be more frequent, hotter, and longer. There will be fewer extremely cold nights (CCCC 2012). A decline of Sierra Nevada snowpack, which accounts for approximately half of the surface water storage in California, by 30% to as much as 90% is predicted over the next 100 years (CAT 2006).

Model projections for precipitation over California continue to show the Mediterranean pattern of wet winters and dry summers with seasonal, year-to-year, and decade-to-decade variability. For the first time, however, several of the improved climate models shift toward drier conditions by the mid-to-late twenty-first century in central, and most notably, Southern California. By the late century, all projections show drying, and half of them suggest 30-year average precipitation will decline by more than 10% below the historical average (CCCC 2012).

Wildfire risk in California will increase as a result of climate change. Earlier snowmelt, higher temperatures, and longer dry periods over a longer fire season will directly increase wildfire risk. Indirectly, wildfire risk will also be influenced by potential climate-related changes in vegetation and ignition potential from lightning. However, human activities will continue to be the biggest factor in ignition risk. It is estimated that the long-term increase in fire occurrence associated with a higher emissions scenario is substantial, with increases in the number of large fires statewide ranging from 58% to 128% above historical levels by 2085. Under the same emissions scenario, estimated burned area will increase by 57% to 169%, depending on the location (CCCC 2012).

Reduction in the suitability of agricultural lands for traditional crop types may occur. While effects may occur, adaptation could allow farmers and ranchers to minimize potential negative effects on agricultural outcomes by adjusting timing of plantings or harvesting and changing crop types.

Public health-related effects of increased temperatures and prolonged temperature extremes, including heat stroke, heat exhaustion, and exacerbation of existing medical conditions, could be particular problems for the elderly, infants, and those who lack access to air conditioning or cooled spaces (CNRA 2009a).

3.4 Significance Criteria and Methodology

3.4.1 Thresholds of Significance

3.4.1.1 Office of Planning and Research's Guidance

The Office of Planning and Research's Technical Advisory titled *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review* (2008) states that "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to "a significant, cumulative climate change impact." Furthermore, the advisory document indicates that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice" (OPR 2008).

Section 15064.4 of the CEQA Guidelines, Determining the Significance of Impacts from Greenhouse Gas Emissions, states the following:

A. The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

    i. Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or

ii. Rely on a qualitative analysis or performance based standards.

B. A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

i. The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;

ii. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

iii. 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 requirements must be adopted by the relevant public agency through a public review process and must 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 [environmental impact report] must be prepared for the project (14 CCR 15064.4).

Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. There are currently no established thresholds for assessing whether the GHG emissions of a project in the SCAB, such as the proposed project, would be considered a cumulatively considerable contribution to global climate change; however, all reasonable efforts should be made to minimize a project's contribution to global climate change.

While the project would result in emissions of GHGs during construction and operation, no guidance exists to indicate what level of GHG emissions would be considered substantial enough to result in a significant adverse impact on global climate. However, it is generally believed that an individual project is of insufficient magnitude by itself to influence climate change or result in a substantial contribution to the global GHG inventory since scientific uncertainty regarding the significance of a project's individual and cumulative effects on global climate change remains.

Thus, GHG impacts are recognized exclusively as cumulative impacts; there are no noncumulative GHG emission impacts from a climate change perspective (CAPCOA 2008). This approach is consistent with that recommended by the CNRA, which noted in its public notice for the proposed CEQA amendments that the evidence before it indicates that, in most cases, the impact of GHG emissions should be considered in the context of a cumulative impact rather than a project-level impact (CNRA 2009b). Similarly, the *Final Statement of Reasons for Regulatory*

Action: Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB 97 (CNRA 2009c) confirm that an environmental impact report or other environmental document must analyze the incremental contribution of a project to GHG levels and determine whether those emissions are cumulatively considerable. Accordingly, further discussion of the project's GHG emissions and their impact on global climate are addressed in the following text.

3.4.1.2 CEQA Guidelines

The CNRA adopted amendments to the CEQA Guidelines on December 30, 2009, which became effective on March 18, 2010. With respect to GHG emissions, the amended CEQA Guidelines state in Section 15064.4(a) that lead agencies should "make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions. The CEQA Guidelines note that an agency may identify emissions by either selecting a "model or methodology" to quantify the emissions or by relying on "qualitative analysis or other performance based standards" (14 CCR 15064.4(a)). Section 15064.4(b) states that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment:

- The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- 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 GHG emissions (14 CCR 15064.4(b)).

In addition, Section 15064.7(c) of the CEQA Guidelines specifies that "[w]hen adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence." Similarly, the revisions to Appendix G, Environmental Checklist Form, which is often used as a basis for lead agencies' selection of significance thresholds, do not prescribe specific thresholds.

Rather, the CEQA Guidelines establish two new CEQA thresholds related to GHGs, and these will be used to discuss the significance of project impacts (14 CCR 15000 et seq.):

1. Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

2. Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

Accordingly, the CEQA Guidelines do not prescribe specific methodologies for performing an assessment, establish specific thresholds of significance, or mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency’s discretion to determine the appropriate methodologies and thresholds of significance that are consistent with the manner in which other impact areas are handled in CEQA (CNRA 2009c).

3.4.1.3 MDAQMD

The CEQA guidelines for projects that fall within the MDAQMD boundary are found in the August 2016 version of the MDAQMD CEQA and Federal Conformity Guidelines. Under CEQA, the MDAQMD is an expert commenting agency on air quality and related matters within its jurisdiction or impacting on its jurisdiction. Under the Federal Clean Air Act the District has adopted federal attainment plans for ozone and PM_{10}. The District has dedicated assets to reviewing projects to ensure that they will not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any air quality standard; or (3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any federal attainment plan. These Guidelines are intended to assist persons preparing environmental analysis or review documents for any project within the jurisdiction of the District by providing background information and guidance on the preferred analysis approach.

Any project is significant if it triggers or exceeds the most appropriate evaluation criteria. The District will clarify upon request which threshold is most appropriate for a given project; in general, the emissions comparison (criteria number 1) is sufficient:

1. Generates total emissions (direct and indirect) in excess of the threshold;
2. Generates a violation of any ambient air quality standard when added to the local background;
3. Does not conform with the applicable attainment or maintenance plan(s);
4. Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1.

A significant project must incorporate mitigation sufficient to reduce its impact to a level that is not significant. A project that cannot be mitigated to a level that is not significant must incorporate all feasible mitigation. Note that the emission thresholds are given as a daily value and an annual value, so that multi-phased project (such as project with a construction phase and a separate operational phase) with phases shorter than one year can be compared to the daily value. The threshold of significance for GHG emissions for MDAQMD is 100,000 tons (90,718 MT) of CO_2E per year and 548,000 pounds of CO_2E per day.

3.4.1.4 County of San Bernardino

As discussed in Section 3.2.3.4, the County has implemented a GHG Reduction Plan, which outlines strategies for the county to meet the reduction goals as set forth in AB 32. The County has implemented a review standard of 3,000 MT CO_2E per year to identify projects that require the use of Screening Tables or a project-specific technical analysis to quantify and mitigate project emissions. Projects that do not exceed the 3,000 MT CO_2E per year threshold are considered to be consistent with the GHG Reduction Plan and determined to have a less than significant individual and cumulative impact for GHG emissions.

To determine if the project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, estimated project-generated total construction emissions were amortized over 30 years and added to the estimated operational emissions and then compared to the County's 3,000 MT CO_2E per year threshold.

3.4.2 Approach and Methodology

As discussed in Section 3.1.2, this analysis assumes that the GWP for CH_4 is 25 and the GWP for N_2O is 298, based on the IPCC Fourth Assessment Report (IPCC 2007).

3.4.2.1 Construction

Project generated construction emissions of GHGs were quantified using emission factors derived from EMFAC and OFFROAD, which are the models used as the basis for on-road vehicle and construction equipment emissions in the CalEEMod model. Mobile-source emissions were modeled based on the net increase in daily vehicle trips and the net increase in regional vehicle miles traveled that would result from construction activities.

The combustion of diesel and gasoline in construction equipment generates GHGs. A spreadsheet model was generated to calculate the GHG emissions from construction equipment for the project. The model included equipment usage based on input from the project applicant for each phase of construction. Emission factors were derived from the OFFROAD model for each category of equipment.

3.4.2.2 Operation

Long-term (i.e., operational) regional emissions of GHGs were quantified using emission factors derived from EMFAC and OFFROAD2011, which are the models used as the basis for on-road vehicle and construction equipment emissions in the CalEEMod model. Mobile-source emissions were modeled based on the net increase in daily vehicle trips and the net increase in regional vehicle miles traveled that would result from maintenance activities.

Energy Sources

The estimation of operational energy emissions was based on electricity consumption for the security lighting, well pumps, and energy storage structure. This consumption was estimated using the CalEEMod, assuming the square footage for the energy storage structure, and a building type of a refrigerated warehouse. CalEEMod default energy intensity factors (CO_2, CH_4, and N_2O mass emissions per kilowatt-hour) for Southern Californian Edison are based on the value for Southern Californian Edison's energy mix in 2007. As explained in Section 3.2.2, SB X1 2 established a target of 33% from renewable energy sources for all electricity providers in California by 2020 and SB 350 calls for further development of renewable energy, with a target of 50% by 2030. The estimated energy usage and GHG emission factors for SCE were used to calculate GHG emissions from this source category.

Mobile Sources

All details for criteria air pollutants emissions estimates methodology discussed in Section 2.4.2.2 are also applicable for the estimation of operational mobile source GHG emissions. Regulatory measures related to mobile sources include AB 1493 (Pavley) and related federal standards. AB 1493 required that CARB establish GHG emission standards for automobiles, light-duty trucks, and other vehicles determined by CARB to be vehicles that are primarily used for noncommercial personal transportation in the state. In addition, the NHTSA and EPA have established corporate fuel economy standards and GHG emission standards, respectively, for automobiles and light-, medium-, and heavy-duty vehicles. Implementation of these standards and fleet turnover (replacement of older vehicles with newer ones) will gradually reduce emissions from the project's motor vehicles. In addition, the Low Carbon Fuel Standard calls for a 10% reduction in the "carbon intensity" of motor vehicle fuels by 2020. The project would have mobile source emissions generated from the maintenance vehicles travelling to and from the site. Estimated activity data from the project Applicant and emission factors from the EMFAC were used to calculate emissions from this source category.

Water

Supply, conveyance, treatment, and distribution of water for the project require the use of electricity, which would result in associated indirect GHG emissions. Water for dust suppression and cleaning the PV panels will come from on-site wells. The emissions associated with water use are generated from the generator used to power the water well pumps. The emissions from this generator are accounted for in the Energy source emissions estimates. There is no wastewater generated during the construction or operation of this project.

Area Sources

Gas-Insulated Switchgear

During O&M, one of the main sources of GHG emissions would be fugitive emissions from equipment containing SF_6 gas installed at the proposed on-site substation. This facility would be an air-insulated substation; therefore, the 500 kV, 220 kV, and 66 kV circuit breakers and 220 kV ground disconnect switches would be the only pieces of equipment on site containing SF_6. The Proposed Project's circuit breakers and 220 kV ground disconnect switches would have a maximum annual leak rate of 0.5%, based on the manufacturer's guaranteed specifications. The 220 kV ground disconnect switches are unique to the Proposed Project and are a maintenance requirement due to 220 kV fault duty (protection against abnormal electric current). Table 4.7-2: Annual Fugitive SF_6 Emissions summarizes the annual fugitive SF_6 emissions that are anticipated from O&M of the proposed on-site substation. The "delta" represents the estimated increase in emissions specifically due to the Proposed Project's new equipment containing SF_6 over existing equipment containing SF_6 currently located at the on-site substation.

At the present time, specific substation devices, such as transformers and circuit breakers, have not been identified; however, the substation may include gas-insulated switchgear (e.g., circuit breakers) that use SF_6, which is a GHG often associated with high-voltage switching devices. If the substation circuit breakers contain SF_6, they would potentially leak small amounts of SF_6 to the atmosphere. New circuit breakers are reported to have a potential upper-bound leakage rate of 0.5% (Blackman n.d.). For the 138 kV substation, the estimated total capacity of the circuit breakers could be up to 75 lbs (Mehl, pers. comm. 2013). SF_6 has a GWP of 23,900 using CO_2 at a reference value of 1 (UNFCCC 2012).

3.5 Impact Analysis

The County's significance criteria described in Section 3.4, Significance Criteria and Methodology, were used to evaluate GHG emissions impacts associated with the construction and operation of the project.

3.5.1 Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Construction Emissions

Construction of the project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, on-road vendor trucks, and worker vehicles. The County's GHG Reduction Plan recommends that construction emissions be amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies. Thus, the total construction GHG emissions were calculated, amortized over 30 years, and added to the total operational emissions for comparison with the GHG significance threshold of 3,000 MT CO_2E per year. The determination of significance, therefore, is addressed in the operational emissions discussion following the estimated construction emissions.

A spreadsheet-based model was used to calculate the annual GHG emissions based on the construction scenario described in Section 2.4.2.1. Construction of the project is anticipated to commence in August 2019 and reach completion at the end of June 2020, lasting a total of 10 months. On-site sources of GHG emissions include off-road equipment and off-site sources include on-road vehicles (haul trucks, vendor trucks, and worker vehicles). Table 14 presents construction emissions for the project in 2019 and 2020 from on-site and off-site emission sources.

Table 14
Estimated Annual Construction GHG Emissions

Year	CO_2	CH_4	N_2O	CO_2E
	metric tons per year			
2019	946.47	0.19	0.15	994.88
2020	328.33	0.11	0.11	364.08
Total	1,274.80	0.29	0.26	1,358.96
Annualized Emissions over 30 Years	—	—	—	*45.30*

Notes: CH_4 = methane; CO_2 = carbon dioxide; CO_2E = carbon dioxide equivalent; N_2O = nitrous oxide
See Appendix A for complete results.

As shown in Table 14, the estimated total GHG emissions during construction of would be approximately 995 MT CO_2E in 2019 and 364 MT CO_2E in 2020, for a total of 1,359 MT CO_2E over the construction period. Estimated project-generated construction emissions amortized over 30 years would be approximately 45.3 MT CO_2E per year. As with project-generated construction air quality pollutant emissions, GHG emissions generated during construction of the project would be short-term in nature, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions. Because there is no separate GHG threshold for construction, the evaluation of significance is discussed in the operational emissions analysis in the following text.

Operational Emissions

Operation of the project would generate GHG emissions through motor vehicle trips to and from the project site; energy use (natural gas and generation of electricity consumed by the project); solid waste disposal; and generation of electricity associated with water supply, treatment, and distribution and wastewater treatment. The spreadsheet model was used to calculate the annual GHG emissions based on the operational assumptions described in Section 3.4.2.2.

The estimated operational (year 2021) project-generated GHG emissions from area sources, energy usage, motor vehicles, solid waste generation, and water usage and wastewater generation are shown in Table 15.

Table 15
Estimated Annual Operational GHG Emissions

Emission Source	CO_2	CH_4	N_2O	CO_2E
	metric tons per year			
Energy	414.48	11.97	0.07	735.21
Area	0.00	0.00	0.00	4.07
Mobile	21.97	0.00	0.00	22.64
Total	436.45	11.97	0.07	761.91
Annualized Emissions over 30 Years	—	—	—	*45.30*
Operation + Amortized Construction Total	—	—	—	807.21

Notes: CH_4 = methane; CO_2 = carbon dioxide; CO_2E = carbon dioxide equivalent; N_2O = nitrous oxide
See Appendix A for complete results.

As shown in Table 15, estimated annual project-generated GHG emissions would be approximately 762 MT CO_2E per year as a result of project operation. Estimated annual project-generated operational emissions in 2021 and amortized project construction emissions would be approximately 807 MT CO_2E per year. As shown, the total annual emissions would not exceed the GHG significance threshold of 3,000 MT CO_2E per year. Because the project's GHG emissions would not result in a cumulatively considerable contribution, the project would result in a cumulative impact in terms of climate change that is less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

GHG Emissions Benefits

In keeping with the renewable energy target under the Scoping Plan and as required by SB 350, the proposed project would provide a source of renewable energy to achieve the RPS of 50% by 2030. Renewable energy, in turn, potentially offsets GHG emissions generated by fossil-fuel power plants. Using the installed tracker capacity of 60 MW (60,000 kW) alternating current, the solar farm is anticipated to generate 160,000,000 kWh per year. This factor reflects the available daylight hours, conversion of direct current to alternating current, and various system losses. A GHG factor for fossil-fuel-generated electricity was developed based on reported CO_2 emissions and total fossil fuel generated electricity delivered for SCE in 2012 (SCE 2013 and SCE 2014).

The CO_2E factor for fossil-fuel-generated electricity would be 0.93 pounds CO_2E per kilowatt-hour as calculated in the following equations:

$$\text{2012 } CO_2E \text{ Fossil Fuel (lb)} \div \text{Fossil Fuel Electricity Delivered (kWh)} = \text{Fossil Fuel } CO_2E \text{ Factor (lb/kWh)}$$

$$56{,}438{,}272{,}000 \text{ lb } CO_2E \div 60{,}553{,}778{,}000 \text{ kWh} = 0.93 \text{ lb/kWh}$$

The contributions of CH_4 and N_2O are included in the CO_2E emission factor, including their respective GWPs. Thus, the project would provide a potential reduction of 67,495 MT CO_2E per year if the electricity generated by the Ord Mountain Solar Energy Project were to be used instead of electricity generated by fossil-fuel sources. Additional detail regarding these calculations can be found in Appendix A. After accounting for the annualized construction and annual operational emissions of 807 MT CO_2E per year, and the annualized reduction in GHG from the production of solar energy of 2,250 MT CO_2E, the net reduction in GHG emissions would be 1,443 MT CO_2E per year. This reduction is not considered in the significance determination of the project's GHG emissions but is provided for disclosure purposes. It should be noted that due to the project featuring a battery storage facility, it is more likely to utilize all the generated electricity from the solar farm compared to projects without energy storage.

Carbon Sequestration

Carbon sequestration is the process by which CO_2 is removed from the atmosphere and deposited into a carbon reservoir (e.g. vegetation). Trees and vegetation take in CO_2 from the atmosphere during photosynthesis, break down the CO_2, store the carbon within plant parts, and release the oxygen back into the atmosphere. It has been shown that arid ecosystems like that of the project site are a significant sink of atmospheric CO_2 (Evans et al 2014), with the majority within the soil and not biomass. However, the study of soil as a carbon pool and the interaction with climate change is not fully understood.

For projects with a substantial change in vegetation from pre-development to post-development, there are measurable differences in the carbon stored onsite. The Ord Mountain project site consists of arid desert with sparse vegetation. The project would only result in a land disturbance during the temporary construction phase and the only remaining structures in the ground would be the energy storage building, PV array poles, fence poles, and gentie line poles, which consist of a small fraction of the project area. The project would not remove any soil from the site and the post-construction site conditions would be similar to pre-development. Therefore, the project would not have a significant impact on the project area's ability to remain a CO_2 sink and sequester additional carbon in the future.

3.5.2 Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

As discussed in 3.5.1 and as stated in the San Bernardino County Final GHG Reduction Plan (2011), with the application of the GHG performance standards, small projects that do not exceed 3,000 MT CO_2E per year are considered to be consistent with the GHG Plan and determined to have a less-than-significant individual and cumulative impact for GHG emissions.

As depicted in Tables 14 and 15, construction and operation of the project would not exceed the 3,000 MT CO_2E per year threshold adopted by San Bernardino County. Based on the guidance presented in the County's GHG Reduction Plan, the proposed project would be consistent with the applicable plan adopted to reduce GHG emissions; therefore, the project would result in a less-than-significant cumulative impact to GHG emissions and climate change.

As discussed in Section 3.2.2, the Scoping Plan, approved by CARB on December 12, 2008, provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. As such, the Scoping Plan is not directly applicable to specific projects. Relatedly, in the Final Statement of Reasons for the Amendments to the CEQA Guidelines, the CNRA observed that "[t]he

[Scoping Plan] may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan" (CNRA 2009c). Under the Scoping Plan, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., LCFS), among others.

The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32 and establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. Table 16 highlights measures that have been, or will be, developed under the Scoping Plan and the project's consistency with Scoping Plan measures. To the extent that these regulations are applicable to the project, its inhabitants, or uses, the project would comply will all regulations adopted in furtherance of the Scoping Plan to the extent required by law.

Table 16
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Transportation Sector		
Advanced Clean Cars	T-1	The project's employees would purchase vehicles in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase.
Low Carbon Fuel Standard	T-2	Motor vehicles driven by the project's employees would use compliant fuels.
Regional Transportation-Related GHG Targets	T-3	The project does not have any long-term operational transportation impact and thus this requirement does not apply.
Vehicle Efficiency Measures 1. Tire Pressure 2. Fuel Efficiency Tire Program 3. Low-Friction Oil 4. Solar-Reflective Automotive Paint and Window Glazing	T-4	Motor vehicles driven by the project's employees would maintain proper tire pressure when their vehicles are serviced. The project's employees would replace tires in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase. Motor vehicles driven by the project's employees would use low-friction oils when their vehicles are serviced. The project's employees would purchase vehicles in compliance with CARB vehicle standards that are in effect at the time of vehicle purchase.
Ship Electrification at Ports (Shore Power)	T-5	Not applicable.
Goods Movement Efficiency Measures 1. Port Drayage Trucks 2. Transport Refrigeration Units Cold	T-6	Not applicable.

Table 16
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Storage Prohibition 3. Cargo Handling Equipment, Anti-Idling, Hybrid, Electrification 4. Goods Movement Systemwide Efficiency Improvements 5. Commercial Harbor Craft Maintenance and Design Efficiency 6. Clean Ships 7. Vessel Speed Reduction		
Heavy-Duty Vehicle GHG Emission Reduction 1. Tractor-Trailer GHG Regulation 2. Heavy-Duty Greenhouse Gas Standards for New Vehicle and Engines (Phase I)	T-7	The project would comply with CARB GHG emission limits established in the Heavy-Duty Tractor Trailer GHG Regulation, including all heavy duty vehicles used to transport materials to and from the site. Any required SmartWay features would be incorporated into the trucks in accordance with the GHG Regulation.
Medium- and Heavy-Duty Vehicle Hybridization Voucher Incentive Project	T-8	Not applicable.
High-Speed Rail	T-9	Not applicable.
Electricity and Natural Gas Sector		
Energy Efficiency Measures (Electricity)	E-1	The project would comply with current Title 24, Part 6, of the California Code of Regulations energy efficiency standards for electrical appliances and other devices at the time of building construction. The project would use high-efficiency lighting in the energy storage structure and for security lighting.
Energy Efficiency (Natural Gas)	CR-1	Not applicable.
Solar Water Heating (California Solar Initiative Thermal Program)	CR-2	Not applicable.
Combined Heat and Power	E-2	Not applicable.
Renewable Portfolios Standard (33% by 2020)	E-3	The project supports the RPS goal by providing renewable solar energy.
SB 1 Million Solar Roofs (California Solar Initiative, New Solar Home Partnership, Public Utility Programs) and Earlier Solar Programs	E-4	Not applicable.
Water Sector		
Water Use Efficiency	W-1	The project would utilize water for dust suppression and panel washing obtained on site from existing wells. The water wouldl be used in an efficient manner to reduce impact to local water resources.
Water Recycling	W-2	Recycled water is not available to the site. Wells located on site would be used in place of potable water.
Water System Energy Efficiency	W-3	This is applicable for the transmission and treatment of water, but it is not applicable for the project.

Table 16
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
Reuse Urban Runoff	W-4	The project would not consume substantial amounts of water that would generate runoff, which could be re-used.
Renewable Energy Production	W-5	Applicable for wastewater treatment systems. Not applicable for the project.
	Green Buildings	
1. State Green Building Initiative: Leading the Way with State Buildings (Greening New and Existing State Buildings)	GB-1	The project, specifically the energy storage structure, would be required to be constructed in compliance with state or local green building standards in effect at the time of building construction.
2. Green Building Standards Code (Greening New Public Schools, Residential and Commercial Buildings)	GB-1	The project's buildings (energy storage structure) would meet green building standards that are in effect at the time of design and construction.
3. Beyond Code: Voluntary Programs at the Local Level (Greening New Public Schools, Residential and Commercial Buildings)	GB-1	The project would be required to be constructed in compliance with local green building standards in effect at the time of building construction.
4. Greening Existing Buildings (Greening Existing Homes and Commercial Buildings)	GB-1	This is applicable for existing buildings only and is not applicable.
	Industry Sector	
Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	I-1	Not applicable.
Oil and Gas Extraction GHG Emission Reduction	I-2	Not applicable.
GHG Emissions Reduction from Natural Gas Transmission and Distribution	I-3	Not applicable.
Refinery Flare Recovery Process Improvements	I-4	Not applicable.
Work with the local air districts to evaluate amendments to their existing leak detection and repair rules for industrial facilities to include methane leaks	I-5	This is not applicable to the project.
	Recycling and Waste Management Sector	
Landfill Methane Control Measure	RW-1	Not applicable.
Increasing the Efficiency of Landfill Methane Capture	RW-2	Not applicable.
Mandatory Commercial Recycling	RW-3	During both construction and operation of the project, the project would comply with all state regulations related to solid waste generation, storage, and disposal, including the California Integrated Waste Management Act, as amended. During construction, all wastes would be recycled to the maximum extent possible.
Increase Production and Markets for Compost	RW-3	Not applicable.

Table 16
Project Consistency with Scoping Plan GHG Emission Reduction Strategies

Scoping Plan Measure	Measure Number	Project Consistency
and Other Organics		
Anaerobic/Aerobic Digestion	RW-3	Not applicable.
Extended Producer Responsibility	RW-3	Not applicable (applicable to product designer and producers).
Environmentally Preferable Purchasing	RW-3	Not applicable (applicable to product designer and producers).
Forests Sector		
Sustainable Forest Target	F-1	Not applicable.
High GWP Gases Sector		
Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Servicing	H-1	The project's employees would be prohibited from performing air conditioning repairs and would be required to use professional servicing.
SF_6 Limits in Non-Utility and Non-Semiconductor Applications	H-2	Not applicable.
Reduction of Perfluorocarbons in Semiconductor Manufacturing	H-3	Not applicable.
Limit High GWP Use in Consumer Products	H-4	The project's employees would use consumer products that would comply with the regulations that are in effect at the time of manufacture.
Air Conditioning Refrigerant Leak Test During Vehicle Smog Check	H-5	Motor vehicles driven by the project's employees would comply with the leak test requirements during smog checks.
Stationary Equipment Refrigerant Management Program – Refrigerant Tracking/Reporting/Repair Program	H-6	Not applicable.
Stationary Equipment Refrigerant Management Program – Specifications for Commercial and Industrial Refrigeration	H-6	Not applicable.
SF_6 Leak Reduction Gas Insulated Switchgear	H-6	The project would comply with any and all applicable regulatory requirements for any SF_6 containing switchgear.
Agriculture Sector		
Methane Capture at Large Dairies	A-1	Not applicable.

Source: CARB 2010.
Notes: CARB = California Air Resources Board; CCR = California Code of Regulations; GHG = greenhouse gas; GWP = global warming potential; LEED = Leadership in Energy and Environmental Design; SB = Senate Bill; SF_6 = sulfur hexafluoride

Based on the analysis in Table 16, the project would be consistent with the applicable strategies and measures in the Scoping Plan.

The 2012 RTP/SCS incorporates local land use projections and circulation networks in city and county general plans. The 2012 RTP/SCS is not directly applicable to the project because the underlying purpose of the 2012 RTP/SCS is to provide direction and guidance by making the best transportation and land use choices for future development, though project would support the goals and policies of the 2012 RTP/SCS. Additionally, the project would not impact local transportation and land use during operation.

In regards to consistency with EO B-30-15 (goal of reducing GHG emissions to 40% below 1990 levels by 2030) and EO S-3-05 (goal of reducing GHG emissions to 80% below 1990 levels by 2050), there are no established protocols or thresholds of significance for that future year analysis. However, CARB forecasts that compliance with the current Scoping Plan puts the state on a trajectory of meeting these long-term GHG goals, although the specific path to compliance is unknown (CARB 2014). As discussed previously, the project is consistent with the GHG emission reduction measures in the Scoping Plan and would not conflict with the state's trajectory toward future GHG reductions. In addition, since the specific path to compliance for the state in regards to the long-term goals will likely require development of technology or other changes that are not currently known or available, specific additional mitigation measures for the project would be speculative and cannot be identified at this time. The project's consistency would assist in meeting the County's contribution to GHG emission reduction targets in California. With respect to future GHG targets under the EOs, CARB has also made clear its legal interpretation that it has the requisite authority to adopt whatever regulations are necessary, beyond the AB 32 horizon year of 2020, to meet EO S-3-05's 80% reduction target in 2050; this legal interpretation by an expert agency provides evidence that future regulations will be adopted to continue the state on its trajectory toward meeting these future GHG targets.

Finally, the project would not exceed the County's threshold of 3,000 MT CO_2E per year. Because the project would not exceed the threshold, this analysis provides support for the conclusion that the project would not conflict with EO S-3-05's GHG reduction goals for California. Therefore, this impact would be less than significant.

As such, the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and no mitigation is required. This impact would be less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Impacts would be less than significant without mitigation.

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4 REFERENCES CITED

13 CCR 2025. Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles.

13 CCR 2449–2449.3 and Appendix A. General Requirements for In-Use Off-Road Diesel-Fueled Fleets.14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

14 CCR 15064.4. Determining the Significance of Impacts from Greenhouse Gas Emissions.

17 CCR 93000. Substances Identified as Toxic Air Contaminants. In Subchapter 7, Toxic Air Contaminants.

24 CCR Part 6. California Energy Code. Sacramento, California: California Building Standards Commission. March 2010. ISBN 978-1-58001-976-7. Effective January 1, 2011. Accessed August 2016. http://www.documents.dgs.ca.gov/bsc/Title_24/documents/2010/Part%206/2010-CA-Energy.pdf.

75 FR 25324–25728. Final rule: “Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards.” May 7, 2010.

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5 LIST OF PREPARERS

Jennifer Reed, Air Quality Services Manager
Adam Poll, Air Quality Specialist
Devin Brookhart, Publications Specialist Lead
David Mueller, Publications Specialist

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APPENDIX A

Detailed Calculation Tables

Paved Road Fugitive Dust Emission Factors

Vehicle Type	sL (g/m^2)	Average Weight (tons)	PM10 Emission Factor (lb/VMT)	PM2.5 Emission Factor (lb/VMT)
Worker Vehicles and Delivery Trucks	0.031	3.4	0.00032	0.000080

1. Emission factors from AP-42, Section 13.2.1 (Paved Roads).
   $E = k * (sL)^{0.91} * (W)^{1.02}$
2. Silt loading from California Air Resources Board, Areawide Source Methodologies, Section 7.9, Entrained Paved Road Dust, Paved Road Travel (July 1997).
   http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9.pdf.
   Silt loading is for freeways, major, and collector roads in San Bernardino County.

2019 EMISSIONS

Vehicle Type	# of Units	VMT/Day (On-Road)	VMT/Day (Off-Road)	Duration (Days)	Category	2019 Emissions (lb/day)		2019 Emissions (ton/month)	
						PM10	PM2.5	PM10	PM2.5
August									
Skid Steer Loader[10]	1	0	0.50	22	Off-Road	0.13	0.02	0.00	0.00
Grader[11]	2	0	0.8	15	Off-Road	0.41	0.07	0.00	0.00
Bulldozer[12]	1	0	0.4	22	Off-Road	0.10	0.02	0.00	0.00
Scraper[11]	1	0	0.8	22	Off-Road	0.20	0.03	0.00	0.00
10-Ton Roller[13]	1	0	8	15	Off-Road	2.03	0.35	0.02	0.00
Sheepsfoot Roller[13]	1	0	8	15	Off-Road	2.03	0.35	0.02	0.00
Tractor[10]	1	0	0.5	5	Off-Road	0.13	0.02	0.00	0.00
Crane[10]	1	0	0.5	10	Off-Road	0.13	0.02	0.00	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.25	0.04	0.00	0.00
Tractor[10]	1	0	0.50	22	Off-Road	0.13	0.02	0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	36.64	6.62	0.40	0.07
Flatbed Truck[4]	1	200	0.50	22	On-Road	0.19	0.04	0.00	0.00
Water Trucks[3]	3	5	15.00	22	On-Road	11.44	1.95	0.13	0.02
Delivery Trucks[2]	1	200	0.50	22	On-Road	0.19	0.04	0.00	0.00
					Total	**54.00**	**9.59**	**0.58**	**0.10**
September									
Skid Steer Loader[10]	1	0	0.50	8	Off-Road	0.13	0.02	0.00	0.00
Bulldozer[12]	1	0	0.4	11	Off-Road	0.10	0.02	0.00	0.00
Scraper[11]	1	0	0.8	11	Off-Road	0.20	0.03	0.00	0.00
Backhoe	1	0	0.5	5	Off-Road	0.13	0.02	0.00	0.00
Bulldozer[12]	1	0	0.4	11	Off-Road	0.10	0.02	0.00	0.00
Front End Loader[10]	1	0	0.5	5	Off-Road	0.13	0.02	0.00	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.25	0.04	0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.20	0.03	0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	36.64	6.62	0.40	0.07
Flatbed Truck[4]	1	200	0.5	22	On-Road	0.19	0.04	0.00	0.00
Water Trucks[3]	3	5	15	22	On-Road	11.44	1.95	0.13	0.02
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.19	0.04	0.00	0.00
5 Cubic Yard Dump Truck[5]	4	60	0.5	10	On-Road	0.59	0.11	0.00	0.00
					Total	**50.29**	**8.97**	**0.54**	**0.10**
October									
Excavator[10]	2	0	0.5	22	Off-Road	0.25	0.04	0.00	0.00
Sheepsfoot Roller[13]	1	0	8	22	Off-Road	2.03	0.35	0.02	0.00
Aussie Padder	1	0	0.5	20	Off-Road	0.13	0.02	0.00	0.00
4x4 Forklift[10]	1	0	0.5	22	Off-Road	0.13	0.02	0.00	0.00
4x4 Forklift[10]	8	0	0.5	22	Off-Road	1.02	0.17	0.01	0.00
Small Crane (80 Ton)[10]	1	0	0.5	5	Off-Road	0.13	0.02	0.00	0.00
Pile Driver[14]	4	0	1	22	Off-Road	1.02	0.17	0.01	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.25	0.04	0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.20	0.03	0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	36.64	6.62	0.40	0.07
Pickup Truck[6]	4	60	0.5	22	On-Road	0.59	0.11	0.01	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.19	0.04	0.00	0.00
Water Trucks[3]	3	5	15	22	On-Road	11.44	1.95	0.13	0.02
ATV Vehicle[7]	20	2	0.5	22	On-Road	2.55	0.44	0.03	0.00
					Total	**56.57**	**10.03**	**0.62**	**0.11**
November									
Excavator[10]	2	0	0.5	22	Off-Road	0.25	0.04	0.00	0.00
Sheepsfoot Roller[13]	1	0	8	22	Off-Road	2.03	0.35	0.02	0.00
4x4 Forklift[10]	1	0	0.5	22	Off-Road	0.13	0.02	0.00	0.00
4x4 Forklift[10]	8	0	0.5	22	Off-Road	1.02	0.17	0.01	0.00
Pile Driver[14]	4	0	1	22	Off-Road	1.02	0.17	0.01	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.25	0.04	0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.20	0.03	0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	36.64	6.62	0.40	0.07
Pickup Truck[6]	4	60	0.5	22	On-Road	0.59	0.11	0.01	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.19	0.04	0.00	0.00
Water Trucks[3]	3	5	15	22	On-Road	11.44	1.95	0.13	0.02
ATV Vehicle[7]	20	2	0.5	22	On-Road	2.55	0.44	0.03	0.00
					Total	**56.31**	**9.99**	**0.62**	**0.11**
December									

Excavator[10]	2	0	0.5	22	Off-Road	0.25	0.04		0.00	0.00
Sheepsfoot Roller[13]	1	0	8	22	Off-Road	2.03	0.35		0.02	0.00
4x4 Forklift[10]	1	0	0.5	22	Off-Road	0.13	0.02		0.00	0.00
4x4 Forklift[10]	8	0	0.5	22	Off-Road	1.02	0.17		0.01	0.00
Pile Driver[14]	4	0	1	22	Off-Road	1.02	0.17		0.01	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.25	0.04		0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.20	0.03		0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	36.64	6.62		0.40	0.07
Pickup Truck[6]	4	60	0.5	22	On-Road	0.59	0.11		0.01	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.19	0.04		0.00	0.00
Water Trucks[3]	3	5	15	22	On-Road	11.44	1.95		0.13	0.02
ATV Vehicle[7]	20	2	0.5	22	On-Road	2.55	0.44		0.03	0.00
					Total	**56.31**	**9.99**		**0.62**	**0.11**
								2019 Total	**2.98**	**0.53**

2020 EMISSIONS

Vehicle Type	# of Units	VMT/Day (On-Road)	VMT/Day (Off-Road)	Duration (Days)	Category	2020 Emissions (lb/day)			2020 Emissions (lbs/month)	
						PM10	PM2.5		PM10	PM2.5
January										
4x4 Forklift[10]	8	0	0.5	22	Off-Road	1.02	0.17		0.01	0.00
Pile Driver[14]	4	0	1	22	Off-Road	1.02	0.17		0.01	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.25	0.04		0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.20	0.03		0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	36.64	6.62		0.40	0.07
Pickup Truck[6]	4	60	0.5	22	On-Road	0.59	0.11		0.01	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.19	0.04		0.00	0.00
ATV Vehicle[7]	20	2	0.5	22	On-Road	2.55	0.44		0.03	0.00
					Total	**42.46**	**7.62**		**0.47**	**0.08**
Feburary										
80 Ton Crane[10]	1	0	0.5	3	Off-Road	0.13	0.02		0.00	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.25	0.04		0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.20	0.03		0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	36.64	6.62		0.40	0.07
Line Truck[8]	1	60	0.6	22	On-Road	0.17	0.03		0.00	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.19	0.04		0.00	0.00
Boom Truck[8]	1	60	0.6	22	On-Road	0.17	0.03		0.00	0.00
					Total	**37.76**	**6.82**		**0.41**	**0.07**
March										
Worker Vehicles[1]	150	60	0.50	22	On-Road	21.98	3.97		0.24	0.04
Pickup Truck[6]	4	60	0.5	22	On-Road	0.59	0.11		0.01	0.00
					Total	**22.57**	**4.08**		**0.25**	**0.04**
April										
Worker Vehicles[1]	150	60	0.50	22	On-Road	21.98	3.97		0.24	0.04
Pickup Truck	4	60	0.5	22	On-Road	0.59	0.11		0.01	0.00
					Total	**22.57**	**4.08**		**0.25**	**0.04**
May										
Worker Vehicles[1]	150	60	0.50	22	On-Road	21.98	3.97		0.24	0.04
Pickup Truck[6]	4	60	0.5	22	On-Road	0.59	0.11		0.01	0.00
					Total	**22.57**	**4.08**		**0.25**	**0.04**
June										
Grader[11]	1	0	0.8	22	Off-Road	0.20	0.03		0.00	0.00
Skid Steer Loader[10]	1	0	0.5	22	Off-Road	0.13	0.02		0.00	0.00
Worker Vehicles[1]	150	60	0.50	22	On-Road	21.98	3.97		0.24	0.04
Pickup Truck[6]	2	60	0.5	22	On-Road	0.29	0.05		0.00	0.00
					Total	**22.61**	**4.08**		**0.25**	**0.04**
July										
Grader[11]	1	0	0.8	22	Off-Road	0.20	0.03		0.00	0.00
Skid Steer Loader[10]	1	0	0.5	22	Off-Road	0.13	0.02		0.00	0.00
Worker Vehicles[1]	150	60	0.50	22	On-Road	21.98	3.97		0.24	0.04
Pickup Truck[6]	2	60	0.5	22	On-Road	0.29	0.05		0.00	0.00
					Total	**22.61**	**4.08**		**0.25**	**0.04**
TOTAL Project (lb)						**466.61**	**83.40**	**Total 2020**	**2.12**	**0.38**
TOTAL Project (ton)									**5.10**	**0.91**

1. Employee commute distance of 30 miles is assumed based on local workforce and information from project applicant.
2. Gen-tie materials delivery coming from Port of Long Beach
3. Assumes water trucks during gen-tie construction will be making 3 passes per day at 5 miles per pass.

4. Materials delivery coming from Port of Long Beach
5. Assumes the dump trucks will have a 30 mile one-way trip to and from the site.
6. Assumes Pickup Trucks will have a similar commute to worker vehicels with a 30 mile one-way commute.
7. Assumes the ATV vehicles will drive 0.5 miles on pavement each day.
8. Assumes a one way commute of 30 miles for the Line Trucks and Boom Trucks.
9. Emission factors derived from the EMFAC 2014 database.
10. Assumed to cover 0.5 mile per day based on an 8 hour work day.
11. Assumed to cover 1 acre per day based on a mean vehicle speed of 5.82 mph and an 8 hour work day.
12. Assumed to cover 0.5 acre per day based on an 8 hour work day.
13. Assumes a mean vehicle speed of 1 mph and an 8 hour work day.
14. Assumed to cover 1 mile over an 8 hour work day.
15. Emission factors based on US EPA AP-42 Sections 13.2.1 for Paved Roads and 13.2.2 for Un-Paved Roads.
16. A 3x daily watering results in a 61% decrease in particulate matter, per URBEMIS default.

2019 EMISSIONS

Vehicle Type	# of Units	VMT/Day (On-Road)	VMT/Day (Off-Road)	Duration (Days)	Category	2019 Emissions (lb/day)		2019 Emissions (ton/month)	
						PM10	PM2.5	PM10	PM2.5
August									
Skid Steer Loader[10]	1	0	0.50	22	Off-Road	0.23	0.02	0.00	0.00
Grader[11]	2	0	0.8	15	Off-Road	0.73	0.07	0.01	0.00
Bulldozer[12]	1	0	0.4	22	Off-Road	0.18	0.02	0.00	0.00
Scraper[11]	1	0	0.8	22	Off-Road	0.36	0.04	0.00	0.00
10-Ton Roller[13]	1	0	8	15	Off-Road	3.63	0.36	0.03	0.00
Sheepsfoot Roller[13]	1	0	8	15	Off-Road	3.63	0.36	0.03	0.00
Tractor[10]	1	0	0.5	5	Off-Road	0.23	0.02	0.00	0.00
Crane[10]	1	0	0.5	10	Off-Road	0.23	0.02	0.00	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.45	0.05	0.00	0.00
Tractor[10]	1	0	0.50	22	Off-Road	0.23	0.02	0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	61.59	6.87	0.68	0.08
Flatbed Truck[4]	1	200	0.50	22	On-Road	0.29	0.04	0.00	0.00
Water Trucks[3]	3	5	15.00	22	On-Road	20.42	2.04	0.22	0.02
Delivery Trucks[2]	1	200	0.50	22	On-Road	0.29	0.04	0.00	0.00
					Total	**92.49**	**9.98**	**0.99**	**0.11**
September									
Skid Steer Loader[10]	1	0	0.50	8	Off-Road	0.23	0.02	0.00	0.00
Bulldozer[12]	1	0	0.4	11	Off-Road	0.18	0.02	0.00	0.00
Scraper[11]	1	0	0.8	11	Off-Road	0.36	0.04	0.00	0.00
Backhoe	1	0	0.5	5	Off-Road	0.23	0.02	0.00	0.00
Bulldozer[12]	1	0	0.4	11	Off-Road	0.18	0.02	0.00	0.00
Front End Loader[10]	1	0	0.5	5	Off-Road	0.23	0.02	0.00	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.45	0.05	0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.36	0.04	0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	61.59	6.87	0.68	0.08
Flatbed Truck[4]	1	200	0.5	22	On-Road	0.29	0.04	0.00	0.00
Water Trucks[3]	3	5	15	22	On-Road	20.42	2.04	0.22	0.02
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.29	0.04	0.00	0.00
5 Cubic Yard Dump Truck[5]	4	60	0.5	10	On-Road	0.99	0.11	0.00	0.00
					Total	**85.81**	**9.32**	**0.93**	**0.10**
October									
Excavator[10]	2	0	0.5	22	Off-Road	0.45	0.05	0.00	0.00
Sheepsfoot Roller[13]	1	0	8	22	Off-Road	3.63	0.36	0.04	0.00
Aussie Padder	1	0	0.5	20	Off-Road	0.23	0.02	0.00	0.00
4x4 Forklift[10]	1	0	0.5	22	Off-Road	0.23	0.02	0.00	0.00
4x4 Forklift[10]	8	0	0.5	22	Off-Road	1.82	0.18	0.02	0.00
Small Crane (80 Ton)[10]	1	0	0.5	5	Off-Road	0.23	0.02	0.00	0.00
Pile Driver[14]	4	0	1	22	Off-Road	1.82	0.18	0.02	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.45	0.05	0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.36	0.04	0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	61.59	6.87	0.68	0.08
Pickup Truck[6]	4	60	0.5	22	On-Road	0.99	0.11	0.01	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.29	0.04	0.00	0.00
Water Trucks[3]	3	5	15	22	On-Road	20.42	2.04	0.22	0.02
ATV Vehicle[7]	20	2	0.5	22	On-Road	4.55	0.46	0.05	0.01
					Total	**97.06**	**10.44**	**1.07**	**0.11**
November									
Excavator[10]	2	0	0.5	22	Off-Road	0.45	0.05	0.00	0.00
Sheepsfoot Roller[13]	1	0	8	22	Off-Road	3.63	0.36	0.04	0.00
4x4 Forklift[10]	1	0	0.5	22	Off-Road	0.23	0.02	0.00	0.00
4x4 Forklift[10]	8	0	0.5	22	Off-Road	1.82	0.18	0.02	0.00
Pile Driver[14]	4	0	1	22	Off-Road	1.82	0.18	0.02	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.45	0.05	0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.36	0.04	0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	61.59	6.87	0.68	0.08
Pickup Truck[6]	4	60	0.5	22	On-Road	0.99	0.11	0.01	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.29	0.04	0.00	0.00
Water Trucks[3]	3	5	15	22	On-Road	20.42	2.04	0.22	0.02
ATV Vehicle[7]	20	2	0.5	22	On-Road	4.55	0.46	0.05	0.01
					Total	**96.60**	**10.39**	**1.06**	**0.11**
December									

Excavator[10]	2	0	0.5	22	Off-Road	0.45	0.05		0.00	0.00
Sheepsfoot Roller[13]	1	0	8	22	Off-Road	3.63	0.36		0.04	0.00
4x4 Forklift[10]	1	0	0.5	22	Off-Road	0.23	0.02		0.00	0.00
4x4 Forklift[10]	8	0	0.5	22	Off-Road	1.82	0.18		0.02	0.00
Pile Driver[14]	4	0	1	22	Off-Road	1.82	0.18		0.02	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.45	0.05		0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.36	0.04		0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	61.59	6.87		0.68	0.08
Pickup Truck[6]	4	60	0.5	22	On-Road	0.99	0.11		0.01	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.29	0.04		0.00	0.00
Water Trucks[3]	3	5	15	22	On-Road	20.42	2.04		0.22	0.02
ATV Vehicle[7]	20	2	0.5	22	On-Road	4.55	0.46		0.05	0.01
					Total	**96.60**	**10.39**		**1.06**	**0.11**
								2019 Total	**5.11**	**0.55**

2020 EMISSIONS

Vehicle Type	# of Units	VMT/Day (On-Road)	VMT/Day (Off-Road)	Duration (Days)	Category	2020 Emissions (lb/day)			2020 Emissions (lbs/month)	
						PM10	PM2.5		PM10	PM2.5
January										
4x4 Forklift[10]	8	0	0.5	22	Off-Road	1.82	0.18		0.02	0.00
Pile Driver[14]	4	0	1	22	Off-Road	1.82	0.18		0.02	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.45	0.05		0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.36	0.04		0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	61.59	6.87		0.68	0.08
Pickup Truck[6]	4	60	0.5	22	On-Road	0.99	0.11		0.01	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.29	0.04		0.00	0.00
ATV Vehicle[7]	20	2	0.5	22	On-Road	4.55	0.46		0.05	0.01
					Total	**71.87**	**7.92**		**0.79**	**0.09**
Feburary										
80 Ton Crane[10]	1	0	0.5	3	Off-Road	0.23	0.02		0.00	0.00
Forklift[10]	2	0	0.5	22	Off-Road	0.45	0.05		0.00	0.00
Tractor[10]	1	0	0.8	22	Off-Road	0.36	0.04		0.00	0.00
Worker Vehicles[1]	250	60	0.50	22	On-Road	61.59	6.87		0.68	0.08
Line Truck[8]	1	60	0.6	22	On-Road	0.29	0.03		0.00	0.00
Delivery Trucks[2]	1	200	0.5	22	On-Road	0.29	0.04		0.00	0.00
Boom Truck[8]	1	60	0.6	22	On-Road	0.29	0.03		0.00	0.00
					Total	**63.51**	**7.08**		**0.70**	**0.08**
March										
Worker Vehicles[1]	150	60	0.50	22	On-Road	36.96	4.12		0.41	0.05
Pickup Truck[6]	4	60	0.5	22	On-Road	0.99	0.11		0.01	0.00
					Total	**37.94**	**4.23**		**0.42**	**0.05**
April										
Worker Vehicles[1]	150	60	0.50	22	On-Road	36.96	4.12		0.41	0.05
Pickup Truck	4	60	0.5	22	On-Road	0.99	0.11		0.01	0.00
					Total	**37.94**	**4.23**		**0.42**	**0.05**
May										
Worker Vehicles[1]	150	60	0.50	22	On-Road	36.96	4.12		0.41	0.05
Pickup Truck[6]	4	60	0.5	22	On-Road	0.99	0.11		0.01	0.00
					Total	**37.94**	**4.23**		**0.42**	**0.05**
June										
Grader[11]	1	0	0.8	22	Off-Road	0.36	0.04		0.00	0.00
Skid Steer Loader[10]	1	0	0.5	22	Off-Road	0.23	0.02		0.00	0.00
Worker Vehicles[1]	150	60	0.50	22	On-Road	36.96	4.12		0.41	0.05
Pickup Truck[6]	2	60	0.5	22	On-Road	0.49	0.05		0.01	0.00
					Total	**38.04**	**4.23**		**0.42**	**0.05**
July										
Grader[11]	1	0	0.8	22	Off-Road	0.36	0.04		0.00	0.00
Skid Steer Loader[10]	1	0	0.5	22	Off-Road	0.23	0.02		0.00	0.00
Worker Vehicles[1]	150	60	0.50	22	On-Road	36.96	4.12		0.41	0.05
Pickup Truck[6]	2	60	0.5	22	On-Road	0.49	0.05		0.01	0.00
					Total	**38.04**	**4.23**		**0.42**	**0.05**
TOTAL Project (lb)						**793.85**	**86.68**	**Total 2020**	**3.58**	**0.40**
TOTAL Project (ton)									**8.68**	**0.95**

1. Employee commute distance of 30 miles is assumed based on local workforce and information from project applicant.
2. Gen-tie materials delivery coming from Port of Long Beach
3. Assumes water trucks during gen-tie construction will be making 3 passes per day at 5 miles per pass.

4. Materials delivery coming from Port of Long Beach
5. Assumes the dump trucks will have a 30 mile one-way trip to and from the site.
6. Assumes Pickup Trucks will have a similar commute to worker vehicels with a 30 mile one-way commute.
7. Assumes the ATV vehicles will drive 0.5 miles on pavement each day.
8. Assumes a one way commute of 30 miles for the Line Trucks and Boom Trucks.
9. Emission factors derived from the EMFAC 2014 database.
10. Assumed to cover 0.5 mile per day based on an 8 hour work day.
11. Assumed to cover 1 acre per day based on a mean vehicle speed of 5.82 mph and an 8 hour work day.
12. Assumed to cover 0.5 acre per day based on an 8 hour work day.
13. Assumes a mean vehicle speed of 1 mph and an 8 hour work day.
14. Assumed to cover 1 mile over an 8 hour work day.
15. Emission factors based on US EPA AP-42 Sections 13.2.1 for Paved Roads and 13.2.2 for Un-Paved Roads.
16. A 3x daily watering results in a 61% decrease in particulate matter, per URBEMIS default.

Un-Paved Road Fugitive Dust Emission Factors (Mitigated)

Vehicle Type	Silt Content-S (%)	Average Weight-W (tons)	K (lb/VMT)		a		b		PM2.5 Emission Factor (lb/VMT)	PM10 Emission Factor (lb/VMT)
			PM2.5	PM10	PM2.5	PM10	PM2.5	PM10		
Worker Vehicles and Delivery Trucks	8.5	3.4	0.15	1.5	0.9	0.9	0.45	0.45	0.04338	0.25411

1. Emission factors from AP-42, Section 13.2.2 (Un-Paved Roads).
   $E = k * (s/12)^a * (W/3)^b$
2. 3x daily watering results in a 61% decrease in particulate matter, per URBEMIS default.
3. Onsite speed is limited to 25mph, decreasing particulate matter by 44%.

Un-Paved Road Fugitive Dust Emission Factors (Un-Mitigated)

Vehicle Type	Silt Content-S (%)	Average Weight-W	K (lb/VMT)		a		b		PM2.5 Emission	PM10 Emission
			PM2.5	PM10	PM2.5	PM10	PM2.5	PM10		
Worker Vehicles and Delivery Trucks	8.5	3.4	0.15	1.5	0.9	0.9	0.45	0.45	0.04538	0.45376

1. Emission factors from AP-42, Section 13.2.2 (Un-Paved Roads).
   $E = k * (s/12)^a * (W/3)^b$
2. 3x daily watering results in a 61% decrease in particulate matter, per URBEMIS default.

2019 EMISSIONS

Vehicle Type	# of Units	Hrs/Day	Duration (Days)	Category	2019 Emissions (lb/day) ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O'		2019 Emissions (ton/month) ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	GHG ($MTCO_2e$)
August																								
Skid Steer Loader	1	8	22	Off-Road	0.06	0.98	0.93	0.00	0.00	0.00	140.76	0.04	0.02		0.00	0.01	0.01	0.00	0.00	0.00	1.55	0.00	0.00	1.48
Grader	2	8	15	Off-Road	0.66	14.10	9.00	0.02	0.27	0.25	1976.81	0.64	0.29		0.00	0.11	0.07	0.00	0.00	0.00	14.83	0.00	0.00	14.14
Bulldozer	1	8	22	Off-Road	0.69	26.55	10.18	0.04	0.45	0.42	3723.16	1.20	0.54		0.01	0.29	0.11	0.00	0.00	0.00	40.95	0.01	0.01	39.06
Scraper	1	8	22	Off-Road	0.43	20.81	8.75	0.03	0.46	0.42	2996.24	0.97	0.43		0.00	0.23	0.10	0.00	0.01	0.00	32.96	0.01	0.00	31.43
10-Ton Roller	1	8	15	Off-Road	0.10	1.85	0.99	0.00	0.06	0.06	261.59	0.08	0.04		0.00	0.01	0.01	0.00	0.00	0.00	1.96	0.00	0.00	1.87
Sheepsfoot Roller	1	8	15	Off-Road	0.10	1.85	0.99	0.00	0.06	0.06	261.59	0.08	0.04		0.00	0.01	0.01	0.00	0.00	0.00	1.96	0.00	0.00	1.87
Tractor	1	8	5	Off-Road	0.04	1.54	0.72	0.00	0.05	0.04	230.99	0.07	0.03		0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.55
Crane	1	8	10	Off-Road	0.35	2.98	2.04	0.01	0.10	0.10	723.75	0.08	0.03		0.00	0.01	0.01	0.00	0.00	0.00	3.62	0.00	0.00	3.34
Forklift	2	8	22	Off-Road	0.17	3.67	1.66	0.01	0.00	0.00	528.79	0.17	0.08		0.00	0.04	0.02	0.00	0.00	0.00	5.82	0.00	0.00	5.55
Generator Set	1	8	22	Off-Road	0.03	0.37	0.04	0.00	0.00	0.00	74.17	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.74
Tractor	1	8	22	Off-Road	0.04	1.54	0.72	0.00	0.05	0.04	230.99	0.07	0.03		0.00	0.02	0.01	0.00	0.00	0.00	2.54	0.00	0.00	2.42
Welder	3	8	22	Off-Road	0.52	1.12	0.86	0.19	0.29	0.29	135.31	0.05	0.02		0.01	0.01	0.01	0.00	0.00	0.00	1.49	0.00	0.00	1.42
				Total	**3.19**	**77.34**	**36.89**	**0.30**	**1.80**	**1.69**	**11284.15**	**3.47**	**1.56**		**0.03**	**0.76**	**0.35**	**0.00**	**0.02**	**0.02**	**109.07**	**0.03**	**0.02**	**103.88**
September																								
Skid Steer Loader	1	8	8	Off-Road	0.06	0.98	0.93	0.00	0.00	0.00	140.76	0.04	0.02		0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.54
Bulldozer	1	8	11	Off-Road	0.69	26.55	10.18	0.04	0.45	0.42	3723.16	1.20	0.54		0.00	0.15	0.06	0.00	0.00	0.00	20.48	0.01	0.00	19.53
Scraper	1	8	11	Off-Road	0.43	20.81	8.75	0.03	0.46	0.42	2996.24	0.97	0.43		0.00	0.11	0.05	0.00	0.00	0.00	16.48	0.01	0.00	15.72
Backhoe	1	8	5	Off-Road	0.10	2.00	1.19	0.00	0.06	0.05	299.35	0.10	0.04		0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00	0.00	0.71
Bulldozer	1	8	11	Off-Road	0.69	26.55	10.18	0.04	0.45	0.42	3723.16	1.20	0.54		0.00	0.15	0.06	0.00	0.00	0.00	20.48	0.01	0.00	19.53
Front End Loader	1	8	5	Off-Road	0.10	2.00	1.19	0.00	0.06	0.05	299.35	0.10	0.04		0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00	0.00	0.71
Forklift	2	8	22	Off-Road	0.17	3.67	1.66	0.01	0.00	0.00	528.79	0.17	0.08		0.00	0.04	0.02	0.00	0.00	0.00	5.82	0.00	0.00	5.55
Generator Set	1	8	22	Off-Road	0.03	0.37	0.04	0.00	0.00	0.00	74.17	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.74
Tractor	1	8	22	Off-Road	0.04	1.54	0.72	0.00	0.05	0.04	230.99	0.07	0.03		0.00	0.02	0.01	0.00	0.00	0.00	2.54	0.00	0.00	2.42
Welder	3	8	22	Off-Road	0.52	1.12	0.86	0.19	0.29	0.29	135.31	0.05	0.02		0.01	0.01	0.01	0.00	0.00	0.00	1.49	0.00	0.00	1.42
				Total	**2.84**	**85.57**	**35.70**	**0.31**	**1.83**	**1.70**	**12151.27**	**3.91**	**1.75**		**0.02**	**0.49**	**0.21**	**0.00**	**0.01**	**0.01**	**70.16**	**0.02**	**0.01**	**66.88**
October																								
Excavator	2	8	22	Off-Road	0.09	6.04	2.46	0.01	0.13	0.12	874.29	0.28	0.13		0.00	0.07	0.03	0.00	0.00	0.00	9.62	0.00	0.00	9.17
Sheepsfoot Roller	1	8	22	Off-Road	0.10	1.85	0.99	0.00	0.06	0.06	261.59	0.08	0.04		0.00	0.02	0.01	0.00	0.00	0.00	2.88	0.00	0.00	2.74
5kW Generator	1	8	22	Off-Road	0.05	0.38	0.09	0.00	0.01	0.01	68.88	0.02	0.01		0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.00	0.00	0.72
Aussie Padder	1	8	20	Off-Road	0.08	3.58	1.10	0.01	0.04	0.04	612.95	0.20	0.09		0.00	0.04	0.01	0.00	0.00	0.00	6.13	0.00	0.00	5.85
4x4 Forklift	1	8	22	Off-Road	0.09	1.83	0.83	0.00	0.00	0.00	264.40	0.09	0.04		0.00	0.02	0.01	0.00	0.00	0.00	2.91	0.00	0.00	2.77
4x4 Forklift	8	8	22	Off-Road	0.68	14.67	6.63	0.02	0.00	0.00	2115.17	0.68	0.31		0.01	0.16	0.07	0.00	0.00	0.00	23.27	0.01	0.00	22.19
Small Crane (80 Ton)	1	8	5	Off-Road	0.35	2.98	2.04	0.01	0.10	0.10	723.75	0.08	0.03		0.00	0.01	0.01	0.00	0.00	0.00	1.81	0.00	0.00	1.67
Pile Driver	4	8	22	Off-Road	0.24	6.97	5.05	0.01	0.03	0.03	982.25	0.06	0.03		0.00	0.08	0.06	0.00	0.00	0.00	10.80	0.00	0.00	9.90
5kW Generator	2	8	22	Off-Road	0.09	0.77	0.17	0.00	0.02	0.02	137.77	0.04	0.02		0.00	0.01	0.00	0.00	0.00	0.00	1.52	0.00	0.00	1.45
Forklift	2	8	22	Off-Road	0.17	3.67	1.66	0.01	0.00	0.00	528.79	0.17	0.08		0.00	0.04	0.02	0.00	0.00	0.00	5.82	0.00	0.00	5.55
Generator Set	1	8	22	Off-Road	0.03	0.37	0.04	0.00	0.00	0.00	74.17	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.74
Tractor	1	8	22	Off-Road	0.04	1.54	0.72	0.00	0.05	0.04	230.99	0.07	0.03		0.00	0.02	0.01	0.00	0.00	0.00	2.54	0.00	0.00	2.42
Welder	3	8	22	Off-Road	0.52	1.12	0.86	0.19	0.29	0.29	135.31	0.05	0.02		0.01	0.01	0.01	0.00	0.00	0.00	1.49	0.00	0.00	1.42
				Total	**2.53**	**45.77**	**22.64**	**0.26**	**0.74**	**0.72**	**7010.30**	**1.84**	**0.82**		**0.02**	**0.47**	**0.23**	**0.00**	**0.01**	**0.01**	**70.35**	**0.02**	**0.01**	**66.61**
November																								
Excavator	2	8	22	Off-Road	0.09	6.04	2.46	0.01	0.13	0.12	874.29	0.28	0.13		0.00	0.07	0.03	0.00	0.00	0.00	9.62	0.00	0.00	9.17
Sheepsfoot Roller	1	8	22	Off-Road	0.10	1.85	0.99	0.00	0.06	0.06	261.59	0.08	0.04		0.00	0.02	0.01	0.00	0.00	0.00	2.88	0.00	0.00	2.74
5kW Generator	1	8	22	Off-Road	0.05	0.38	0.09	0.00	0.01	0.01	68.88	0.02	0.01		0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.00	0.00	0.72
4x4 Forklift	1	8	22	Off-Road	0.09	1.83	0.83	0.00	0.00	0.00	264.40	0.09	0.04		0.00	0.02	0.01	0.00	0.00	0.00	2.91	0.00	0.00	2.77
4x4 Forklift	8	8	22	Off-Road	0.68	14.67	6.63	0.02	0.00	0.00	2115.17	0.68	0.31		0.01	0.16	0.07	0.00	0.00	0.00	23.27	0.01	0.00	22.19
Pile Driver	4	8	22	Off-Road	0.24	6.97	5.05	0.01	0.03	0.03	982.25	0.06	0.03		0.00	0.08	0.06	0.00	0.00	0.00	10.80	0.00	0.00	9.90
5kW Generator	2	8	22	Off-Road	0.09	0.77	0.17	0.00	0.02	0.02	137.77	0.04	0.02		0.00	0.01	0.00	0.00	0.00	0.00	1.52	0.00	0.00	1.45
Forklift	2	8	22	Off-Road	0.17	3.67	1.66	0.01	0.00	0.00	528.79	0.17	0.08		0.00	0.04	0.02	0.00	0.00	0.00	5.82	0.00	0.00	5.55
Generator Set	1	8	22	Off-Road	0.03	0.37	0.04	0.00	0.00	0.00	74.17	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.74
Tractor	1	8	22	Off-Road	0.04	1.54	0.72	0.00	0.05	0.04	230.99	0.07	0.03		0.00	0.02	0.01	0.00	0.00	0.00	2.54	0.00	0.00	2.42
Welder	3	8	22	Off-Road	0.52	1.12	0.86	0.19	0.29	0.29	135.31	0.05	0.02		0.01	0.01	0.01	0.00	0.00	0.00	1.49	0.00	0.00	1.42
				Total	**2.11**	**39.21**	**19.49**	**0.25**	**0.60**	**0.58**	**5673.60**	**1.56**	**0.70**		**0.02**	**0.43**	**0.21**	**0.00**	**0.01**	**0.01**	**62.41**	**0.02**	**0.01**	**59.09**
December																								
Excavator	2	8	22	Off-Road	0.09	6.04	2.46	0.01	0.13	0.12	874.29	0.28	0.13		0.00	0.07	0.03	0.00	0.00	0.00	9.62	0.00	0.00	9.17
Sheepsfoot Roller	1	8	22	Off-Road	0.10	1.85	0.99	0.00	0.06	0.06	261.59	0.08	0.04		0.00	0.02	0.01	0.00	0.00	0.00	2.88	0.00	0.00	2.74
5kW Generator	1	8	22	Off-Road	0.05	0.38	0.09	0.00	0.01	0.01	68.88	0.02	0.01		0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.00	0.00	0.72
4x4 Forklift	1	8	22	Off-Road	0.09	1.83	0.83	0.00	0.00	0.00	264.40	0.09	0.04		0.00	0.02	0.01	0.00	0.00	0.00	2.91	0.00	0.00	2.77
4x4 Forklift	8	8	22	Off-Road	0.68	14.67	6.63	0.02	0.00	0.00	2115.17	0.68	0.31		0.01	0.16	0.07	0.00	0.00	0.00	23.27	0.01	0.00	22.19
Pile Driver	4	8	22	Off-Road	0.24	6.97	5.05	0.01	0.03	0.03	982.25	0.06	0.03		0.00	0.08	0.06	0.00	0.00	0.00	10.80	0.00	0.00	9.90
5kW Generator	2	8	22	Off-Road	0.09	0.77	0.17	0.00	0.02	0.02	137.77	0.04	0.02		0.00	0.01	0.00	0.00	0.00	0.00	1.52	0.00	0.00	1.45
Forklift	2	8	22	Off-Road	0.17	3.67	1.66	0.01	0.00	0.00	528.79	0.17	0.08		0.00	0.04	0.02	0.00	0.00	0.00	5.82	0.00	0.00	5.55
Generator Set	1	8	22	Off-Road	0.03	0.37	0.04	0.00	0.00	0.00	74.17	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.74
Tractor	1	8	22	Off-Road	0.04	1.54	0.72	0.00	0.05	0.04	230.99	0.07	0.03		0.00	0.02	0.01	0.00	0.00	0.00	2.54	0.00	0.00	2.42
Welder	3	8	22	Off-Road	0.52	1.12	0.86	0.19	0.29	0.29	135.31	0.05	0.02		0.01	0.01	0.01	0.00	0.00	0.00	1.49	0.00	0.00	1.42
				Total	**2.11**	**39.21**	**19.49**	**0.25**	**0.60**	**0.58**	**5673.60**	**1.56**	**0.70**		**0.02**	**0.43**	**0.21**	**0.00**	**0.01**	**0.01**	**62.41**	**0.02**	**0.01**	**59.09**
														Total 2019	0.12	2.59	1.21	0.01	0.05	0.05	339.64	0.10	0.04	355.55

2020 EMISSIONS

Vehicle Type	# of Units	Hrs/Day	Duration (Days)	Category	2020 Emissions (lb/day)										2020 Emissions (ton/month)									GHG ($MTCO_2e$)
					ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O		ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	
January																								
4x4 Forklift	8	8	22	Off-Road	0.68	14.67	6.63	0.02	0.00	0.00	2115.17	0.68	0.31		0.01	0.16	0.07	0.00	0.00	0.00	23.27	0.01	0.00	22.19
Pile Driver	4	8	22	Off-Road	0.24	6.97	5.05	0.01	0.03	0.03	982.25	0.06	0.03		0.00	0.08	0.06	0.00	0.00	0.00	10.80	0.00	0.00	9.90
5kW Generator	2	8	22	Off-Road	0.09	0.77	0.17	0.00	0.02	0.02	137.77	0.04	0.02		0.00	0.01	0.00	0.00	0.00	0.00	1.52	0.00	0.00	1.45
Forklift	2	8	22	Off-Road	0.17	3.67	1.66	0.01	0.00	0.00	528.79	0.17	0.08		0.00	0.04	0.02	0.00	0.00	0.00	5.82	0.00	0.00	5.55
Generator Set	1	8	22	Off-Road	0.03	0.37	0.04	0.00	0.00	0.00	74.17	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.74
Tractor	1	8	22	Off-Road	0.04	1.54	0.72	0.00	0.05	0.04	230.99	0.07	0.03		0.00	0.02	0.01	0.00	0.00	0.00	2.54	0.00	0.00	2.42
Welder	3	8	22	Off-Road	0.52	1.12	0.86	0.19	0.29	0.29	135.31	0.05	0.02		0.01	0.01	0.01	0.00	0.00	0.00	1.49	0.00	0.00	1.42
				Total	**1.78**	**29.10**	**15.13**	**0.23**	**0.40**	**0.39**	**4204.45**	**1.09**	**0.49**		**0.02**	**0.32**	**0.17**	**0.00**	**0.00**	**0.00**	**46.25**	**0.01**	**0.01**	**43.68**
Feburary																								
80 Ton Crane	1	8	3	Off-Road	0.35	2.98	2.04	0.01	0.10	0.10	723.75	0.08	0.03		0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	1.00
Forklift	2	8	22	Off-Road	0.17	3.67	1.66	0.01	0.00	0.00	528.79	0.17	0.08		0.00	0.04	0.02	0.00	0.00	0.00	5.82	0.00	0.00	5.55
Generator Set	1	8	22	Off-Road	0.03	0.37	0.04	0.00	0.00	0.00	74.17	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.74
Tractor	1	8	22	Off-Road	0.04	1.54	0.72	0.00	0.05	0.04	230.99	0.07	0.03		0.00	0.02	0.01	0.00	0.00	0.00	2.54	0.00	0.00	2.42
Welder	3	8	22	Off-Road	0.52	1.12	0.86	0.19	0.29	0.29	135.31	0.05	0.02		0.01	0.01	0.01	0.00	0.00	0.00	1.49	0.00	0.00	1.42
				Total	**1.12**	**9.67**	**5.32**	**0.21**	**0.44**	**0.44**	**1693.02**	**0.37**	**0.17**		**0.01**	**0.08**	**0.04**	**0.00**	**0.00**	**0.00**	**11.75**	**0.00**	**0.00**	**11.14**
March																								
NA	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
April																								
NA	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
May																								
NA	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
June																								
Grader	1	8	22	Off-Road	0.33	7.05	4.50	0.01	0.14	0.12	988.41	0.32	0.14		0.00	0.08	0.05	0.00	0.00	0.00	10.87	0.00	0.00	10.37
Skid Loader	1	8	22	Off-Road	0.47	5.99	8.25	0.41	0.50	0.50	352.31	0.08	0.04		0.01	0.07	0.09	0.00	0.01	0.01	3.88	0.00	0.00	3.65
				Total	**0.80**	**13.04**	**12.76**	**0.42**	**0.63**	**0.62**	**1340.71**	**0.40**	**0.18**		**0.01**	**0.14**	**0.14**	**0.00**	**0.01**	**0.01**	**14.75**	**0.00**	**0.00**	**14.02**
July																								
Grader	1	8	22	Off-Road	0.33	7.05	4.50	0.01	0.14	0.12	988.41	0.32	0.14		0.00	0.08	0.05	0.00	0.00	0.00	10.87	0.00	0.00	10.37
Skid Loader	1	8	22	Off-Road	0.47	5.99	8.25	0.41	0.50	0.50	352.31	0.08	0.04		0.01	0.07	0.09	0.00	0.01	0.01	3.88	0.00	0.00	3.65
				Total	**0.80**	**13.04**	**12.76**	**0.42**	**0.63**	**0.62**	**1340.71**	**0.40**	**0.18**		**0.01**	**0.14**	**0.14**	**0.00**	**0.01**	**0.01**	**14.75**	**0.00**	**0.00**	**14.02**
														Total 2020	**0.05**	**0.68**	**0.49**	**0.01**	**0.02**	**0.02**	**79.37**	**0.02**	**0.01**	**82.86**
TOTAL Project (lb)					**17.27**	**351.94**	**180.18**	**2.65**	**7.67**	**7.34**	**50,371.81**	**14.62**	**6.55**											
TOTAL Project (ton)															**0.17**	**3.27**	**1.70**	**0.03**	**0.07**	**0.07**	**419.02**	**0.12**	**0.05**	**438.40**

1. Equipment activity data supplied from Project Applicant.
2. Emission factors based on the OFFROAD 2011 database with applicable Load Factors and Fuel Correction Factors applied.
3. N2O emissions based on scaling factor between CH4 and N2O from the California Climate Action Registry's General Reporting Protocol for Construction Equipment.
4. For equipment not provided a specific schedule it was assumed they operated 22 days out of the month.

793.95

Off-Road Equipment Emission Rates

Equipment	HP	LF	Fuel Correction Nox	Fuel Correction PM10	Fuel Correction PM2.5	Category	2019 Emission Rates (lb/hr) ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Perimeter Fence Installation															
Skid Steer Loaders	40	0.37	0.948	0.104	0.095	Off-Road	0.007	0.122	0.116	0.000	0.001	0.000	17.595	0.006	0.002
Site Preparation and Grading															
Grader	259	0.41	0.948	0.287	0.264	Off-Road	0.041	0.881	0.563	0.001	0.017	0.016	123.551	0.040	0.018
Rubber Tired Dozer	1000	0.4	0.948	0.241	0.222	Off-Road	0.086	3.319	1.273	0.005	0.057	0.052	465.395	0.151	0.067
Scraper	750	0.48	0.948	0.139	0.128	Off-Road	0.053	2.601	1.094	0.004	0.057	0.053	374.530	0.121	0.054
10-Ton Roller	74	0.38	0.948	0.234	0.215	Off-Road	0.013	0.231	0.124	0.000	0.008	0.007	32.698	0.011	0.005
Sheepsfoot Roller	74	0.38	0.948	0.234	0.215	Off-Road	0.013	0.231	0.124	0.000	0.008	0.007	32.698	0.011	0.005
Tractor	75	0.37	0.948	0.16	0.147	Off-Road	0.005	0.192	0.090	0.000	0.006	0.005	28.874	0.009	0.004
Demolition of Existing Structures															
Backhoe	87	0.37	0.948	0.21	0.193	Off-Road	0.013	0.249	0.149	0.000	0.007	0.007	37.418	0.012	0.005
Rubber Tired Dozer	1000	0.4	0.948	0.241	0.222	Off-Road	0.086	3.319	1.273	0.005	0.057	0.052	465.395	0.151	0.067
Front End Loader	196	0.37	0.948	0.107	0.098	Off-Road	0.013	0.249	0.149	0.000	0.007	0.007	37.418	0.012	0.005
Underground Work (Trenching)															
Excavator	138	0.38	0.948	0.104	0.096	Off-Road	0.006	0.378	0.154	0.001	0.008	0.007	54.643	0.018	0.008
Sheepsfoot Roller	74	0.38	0.948	0.234	0.215	Off-Road	0.013	0.231	0.124	0.000	0.008	0.007	32.698	0.011	0.005
5kW Generator	10	0.74	0.948	0.176	0.176	Off-Road	0.006	0.048	0.011	0.000	0.001	0.001	8.611	0.003	0.001
Aussie Padder	175	0.42	0.948	0.199	0.183	Off-Road	0.010	0.448	0.137	0.001	0.005	0.005	76.619	0.025	0.011
4x4 Forklift	142	0.2	0.948	0.3	0.276	Off-Road	0.011	0.229	0.104	0.000	0.000	0.000	33.049	0.011	0.005
System Installation															
4x4 Forklift	142	0.2	0.948	0.3	0.276	Off-Road	0.011	0.229	0.104	0.000	0.000	0.000	33.049	0.011	0.005
Crane (80 Ton)	249	0.29	0.948	0.184	0.169	Off-Road	0.044	0.373	0.255	0.001	0.013	0.013	90.469	0.010	0.004
Pile Driver	49	0.5	0.948	0.046	0.042	Off-Road	0.007	0.218	0.158	0.000	0.001	0.001	30.695	0.002	0.001
5kW Generator	10	0.74	0.948	0.176	0.176	Off-Road	0.006	0.048	0.011	0.000	0.001	0.001	8.611	0.003	0.001
Gen-Tie Line Construction															
Crane	249	0.29	0.948	0.184	0.169	Off-Road	0.044	0.373	0.255	0.001	0.013	0.013	90.469	0.010	0.004
Energy Storage System															
Crane	249	0.29	0.948	0.184	0.169	Off-Road	0.044	0.373	0.255	0.001	0.013	0.013	90.469	0.010	0.004
Forklift	142	0.20	0.948	0.3	0.276	Off-Road	0.011	0.229	0.104	0.000	0.000	0.000	33.049	0.011	0.005
Generator Set	10	0.74	0.948	0.176	0.176	Off-Road	0.003	0.046	0.005	0.000	0.000	0.000	9.271	0.000	0.000
Tractor	87	0.37	0.948	0.16	0.147	Off-Road	0.005	0.192	0.090	0.000	0.006	0.005	28.874	0.009	0.004
Welder	10	0.45	0.948	0.199	0.183	Off-Road	0.022	0.047	0.036	0.008	0.012	0.012	5.638	0.002	0.001
Site Clean-Up & Restoration															
Grader	259	0.41	0.948	0.287	0.264	Off-Road	0.041	0.881	0.563	0.001	0.017	0.016	123.551	0.040	0.018
Skid Steer Loaders	95	0.37	0.948	0.104	0.095	Off-Road	0.059	0.749	1.032	0.051	0.062	0.062	44.038	0.011	0.005

Equipment	2020 Emission Rates (lb/hr) ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Perimeter Fence Installation									
Skid Steer Loaders	0.007	0.123	0.114	0.000	0.000	0.000	17.220	0.006	0.002
Site Preparation and Grading									
Grader	0.038	0.874	0.545	0.001	0.015	0.014	123.479	0.040	0.018
Rubber Tired Dozer	0.080	3.291	1.232	0.005	0.049	0.046	465.124	0.150	0.067
Scraper	0.050	2.601	1.033	0.004	0.051	0.047	374.585	0.121	0.054
10-Ton Roller	0.011	0.227	0.119	0.000	0.006	0.006	32.687	0.011	0.005
Sheepsfoot Roller	0.011	0.227	0.119	0.0003	0.006	0.006	32.687	0.011	0.005
Tractor	0.005	0.192	0.084	0.000	0.005	0.005	28.902	0.009	0.004
Demolition of Existing Structures									
Backhoe	0.013	0.249	0.146	0.000	0.007	0.006	37.429	0.012	0.005
Rubber Tired Dozer	0.080	3.291	1.232	0.0048	0.049	0.046	465.124	0.150	0.067
Front End Loader	0.013	0.249	0.146	0.0004	0.007	0.006	37.429	0.012	0.005
Underground Work (Trenching)									
Excavator	0.006	0.377	0.147	0.001	0.007	0.007	54.665	0.018	0.008
Sheepsfoot Roller	0.011	0.227	0.119	0.0003	0.006	0.006	32.687	0.011	0.005
5kW Generator	0.006	0.048	0.011	0.000	0.001	0.001	8.611	0.003	0.001
Aussie Padder	0.009	0.446	0.132	0.001	0.005	0.004	76.583	0.025	0.011
4x4 Forklift	0.021	0.147	0.136	0.000	0.000	0.000	35.581	0.004	0.002
System Installation									
4x4 Forklift	0.021	0.147	0.136	0.000	0.000	0.000	35.581	0.004	0.002
Crane (80 Ton)	0.044	0.372	0.255	0.001	0.013	0.013	90.469	0.010	0.004
Pile Driver	0.007	0.218	0.156	0.000	0.001	0.001	30.695	0.002	0.001
5kW Generator	0.006	0.048	0.011	0.000	0.001	0.001	8.611	0.003	0.001
Gen-Tie Line Construction									
Crane	0.044	0.372	0.255	0.001	0.013	0.013	90.469	0.010	0.004
Energy Storage System									
Crane	0.044	0.372	0.255	0.001	0.013	0.013	90.469	0.010	0.004
Forklift	0.021	0.147	0.136	0.000	0.000	0.000	35.581	0.004	0.002
Generator Set	0.028	0.064	0.045	0.012	0.015	0.015	9.271	0.003	0.001
Tractor	0.005	0.192	0.084	0.000	0.005	0.005	28.902	0.009	0.004
Welder	0.015	0.082	0.033	0.007	0.008	0.008	5.638	0.001	0.001
Site Clean-Up & Restoration									
Grader	0.038	0.874	0.545	0.001	0.015	0.014	123.479	0.040	0.018
Skid Steer Loaders	0.065	0.340	0.734	0.005	0.006	0.006	44.038	0.012	0.005

Equipment	Tier 3 % Reduction[1] ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Perimeter Fence Installation									
Skid Steer Loaders	0.500								
Site Preparation and Grading									
Grader	0.600		0.349		0.500	0.500			
Rubber Tired Dozer	0.778		0.609		0.556	0.556			
Scraper	0.643		0.450		0.333	0.333			
10-Ton Roller	0.500		0.440						
Sheepsfoot Roller	0.500		0.440						
Tractor	0.500	0.042	0.375						
Demolition of Existing Structures									
Backhoe	0.500	0.039	0.389						
Rubber Tired Dozer	0.778		0.609		0.556	0.556			
Front End Loader	0.333		0.412						
Underground Work (Trenching)									
Excavator	0.667		0.348						
Sheepsfoot Roller	0.500		0.440						
5kW Generator		0.200	0.800						
Aussie Padder	0.600	0.154	0.565		0.500	0.500			
4x4 Forklift	0.500		0.500		0.990	0.990			
System Installation									
4x4 Forklift	0.500		0.500		0.990	0.990			
Crane (80 Ton)	0.600		0.630		0.500	0.500			
Pile Driver	0.667	0.080	0.067						
5kW Generator		0.200	0.800						
Gen-Tie Line Construction									
Crane	0.600		0.630						
Energy Storage System									
Crane	0.600		0.630		0.500	0.500			
Forklift	0.500		0.500		0.990	0.990			
Generator Set		0.200	0.800						
Tractor	0.500	0.042	0.375						
Welder		0.143	0.750						
Site Clean-Up & Restoration									
Grader	0.600		0.349		0.500	0.500			
Skid Steer Loaders	0.500								

Source (Emission Factors): OFFROAD2011 - ROG, NOx, PM10; OFFROAD2007 - CO, SOx, CO2.
PM2.5 fraction = 92% of PM10 (http://www.arb.ca.gov/ei/speciate/pmsize_07242008.xls for "diesel vehicle exhaust")
[1] Tier 3 emission reductions were derived from CalEEMod model runs for each equipment category.

Ord Mountain Solar Project
On Road Equipment Emissions

2019 EMISSIONS

Vehicle Type	Trips/Day	No. of Units	Distance (mi)	Duration (days)	Category	2019 Emissions (lb/day)								2019 Emissions (lbs/month)									GHG
						ROG	CO	NOx	SOx	PM10	PM2.5	CO2		ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	($MTCO_2e$)
August																							
Worker Vehicles[1]	2	250	30.0	22	On-Road	1.88	74.53	8.58	0.11	1.58	0.68	11,288.71		41.25	1,639.75	188.67	2.51	34.71	14.89	248,351.60	36.38	43.65	118.96
Flatbed Truck[4]	2	1	100.0	22	On-Road	0.07	0.49	2.22	0.00	0.05	0.03	228.84		1.56	10.77	48.85	0.05	1.20	0.67	5,034.52	0.58	0.49	2.36
Water Trucks[3]	3	3	5.0	22	On-Road	0.01	0.04	0.27	0.00	0.02	0.01	109.22		0.26	0.91	5.84	0.02	0.50	0.31	2,402.85	0.13	0.11	1.11
Delivery Trucks[2]	2	1	100.0	22	On-Road	0.05	0.18	1.18	0.00	0.10	0.06	485.43		1.18	4.06	25.97	0.10	2.21	1.36	10,679.35	0.58	0.49	4.92
					Total	**2.01**	**75.25**	**12.24**	**0.12**	**1.76**	**0.78**	**12,112.20**		**44.25**	**1,655.49**	**269.34**	**2.68**	**38.61**	**17.24**	**266,468.33**	**37.67**	**44.73**	**127.34**
September																							
Worker Vehicles[1]	2	250	30.0	22	On-Road	1.88	74.53	8.58	0.11	1.58	0.68	11,288.71		41.25	1,639.75	188.67	2.51	34.71	14.89	248,351.60	36.38	43.65	118.96
Flatbed Truck[4]	2	1	100.0	22	On-Road	0.07	0.49	2.22	0.00	0.05	0.03	228.84		1.56	10.77	48.85	0.05	1.20	0.67	5,034.52	0.58	0.49	2.36
Water Trucks[3]	3	3	5.0	22	On-Road	0.01	0.04	0.27	0.00	0.02	0.01	109.22		0.26	0.91	5.84	0.02	0.50	0.31	2,402.85	0.13	0.11	1.11
Delivery Trucks[2]	2	1	100.0	22	On-Road	0.05	0.18	1.18	0.00	0.10	0.06	485.43		1.18	4.06	25.97	0.10	2.21	1.36	10,679.35	0.58	0.49	4.92
5 Cubic Yard Dump Truck[5]	2	4	30.0	10	On-Road	0.04	0.17	1.52	0.01	0.06	0.03	770.16		0.37	1.71	15.22	0.07	0.60	0.27	7,701.58	0.32	0.26	3.53
					Total	**2.05**	**75.42**	**13.76**	**0.13**	**1.82**	**0.81**	**12,882.35**		**44.62**	**1,657.19**	**284.56**	**2.75**	**39.21**	**17.50**	**274,169.91**	**37.99**	**44.99**	**130.87**
October																							
Worker Vehicles[1]	2	250	30.0	22	On-Road	1.88	74.53	8.58	0.11	1.58	0.68	11,288.71		41.25	1,639.75	188.67	2.51	34.71	14.89	248,351.60	36.38	43.65	118.96
Pickup Truck[6]	2	4	30.0	22	On-Road	0.03	1.19	0.14	0.00	0.03	0.01	180.62		0.66	26.24	3.02	0.04	0.56	0.24	3,973.63	0.58	0.70	1.90
Delivery Trucks[2]	2	1	100.0	22	On-Road	0.05	0.18	1.18	0.00	0.10	0.06	485.43		1.18	4.06	25.97	0.10	2.21	1.36	10,679.35	0.58	0.49	4.92
Water Trucks[3]	3	3	5.0	22	On-Road	0.01	0.04	0.27	0.00	0.02	0.01	109.22		0.26	0.91	5.84	0.02	0.50	0.31	2,402.85	0.13	0.11	1.11
ATV Vehicle[7]	4	20	0.5	22	On-Road	0.21	2.07	0.11	0.00	0.00	0.00	14.54		4.55	45.51	2.34	0.00	0.03	0.01	319.91	0.17	0.02	0.15
					Total	**2.18**	**78.02**	**10.27**	**0.12**	**1.73**	**0.76**	**12,078.52**		**47.91**	**1,716.46**	**225.84**	**2.68**	**38.00**	**16.82**	**265,727.34**	**37.85**	**44.96**	**127.04**
November																							
Worker Vehicles[1]	2	250	30.0	22	On-Road	1.88	74.53	8.58	0.11	1.58	0.68	11,288.71		41.25	1,639.75	188.67	2.51	34.71	14.89	248,351.60	36.38	43.65	118.96
Pickup Truck[6]	2	4	30.0	22	On-Road	0.03	1.19	0.14	0.00	0.03	0.01	180.62		0.66	26.24	3.02	0.04	0.56	0.24	3,973.63	0.58	0.70	1.90
Delivery Trucks[2]	2	1	100.0	22	On-Road	0.05	0.18	1.18	0.00	0.10	0.06	485.43		1.18	4.06	25.97	0.10	2.21	1.36	10,679.35	0.58	0.49	4.92
Water Trucks[3]	3	3	5.0	22	On-Road	0.01	0.04	0.27	0.00	0.02	0.01	109.22		0.26	0.91	5.84	0.02	0.50	0.31	2,402.85	0.13	0.11	1.11
ATV Vehicle[7]	4	20	0.5	22	On-Road	0.21	2.07	0.11	0.00	0.00	0.00	14.54		4.55	45.51	2.34	0.00	0.03	0.01	319.91	0.17	0.02	0.15
					Total	**2.18**	**78.02**	**10.27**	**0.12**	**1.73**	**0.76**	**12,078.52**		**47.91**	**1,716.46**	**225.84**	**2.68**	**38.00**	**16.82**	**265,727.34**	**37.85**	**44.96**	**127.04**
December																							
Worker Vehicles[1]	2	250	30.0	22	On-Road	1.88	74.53	8.58	0.11	1.58	0.68	11,288.71		41.25	1,639.75	188.67	2.51	34.71	14.89	248,351.60	36.38	43.65	118.96
Pickup Truck[6]	2	4	30.0	22	On-Road	0.03	1.19	0.14	0.00	0.03	0.01	180.62		0.66	26.24	3.02	0.04	0.56	0.24	3,973.63	0.58	0.70	1.90
Delivery Trucks[2]	2	1	100.0	22	On-Road	0.05	0.18	1.18	0.00	0.10	0.06	485.43		1.18	4.06	25.97	0.10	2.21	1.36	10,679.35	0.58	0.49	4.92
Water Trucks[3]	3	3	5.0	22	On-Road	0.01	0.04	0.27	0.00	0.02	0.01	109.22		0.26	0.91	5.84	0.02	0.50	0.31	2,402.85	0.13	0.11	1.11
ATV Vehicle[7]	4	20	0.5	22	On-Road	0.21	2.07	0.11	0.00	0.00	0.00	14.54		4.55	45.51	2.34	0.00	0.03	0.01	319.91	0.17	0.02	0.15
					Total	**2.18**	**78.02**	**10.27**	**0.12**	**1.73**	**0.76**	**12,078.52**		**47.91**	**1716.46**	**225.84**	**2.68**	**38.00**	**16.82**	**265,727.34**	**37.85**	**44.96**	**127.04**
													Total 2019 (tons)	**0.21**	**7.60**	**1.12**	**0.01**	**0.17**	**0.08**	**668.91**	**0.09**	**0.11**	
																			Total 2019 GHG (MT)	**606.83**	**0.09**	**0.10**	**639.33**

Ord Mountain Solar Project
On Road Equipment Emissions

2020 EMISSIONS

Vehicle Type	Trips/Day	No. of Units	Distance (mi)	Duration (days)	Category	2020 Emissions (lb/day) ROG	CO	NOx	SOx	PM10	PM2.5	CO2		2020 Emissions (lbs/month) ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	GHG ($MTCO_2e$)
January																							
Worker Vehicles[1]	2	250	30.0	22	On-Road	1.88	74.53	8.58	0.11	1.58	0.68	11,288.71		41.25	1,639.75	188.67	2.51	34.71	14.89	248,351.60	36.38	43.65	118.96
Pickup Truck[6]	2	4	30.0	22	On-Road	0.03	1.19	0.14	0.00	0.03	0.01	180.62		0.66	26.24	3.02	0.04	0.56	0.24	3,973.63	0.58	0.70	1.90
Delivery Trucks[4]	2	1	100.0	22	On-Road	0.05	0.18	1.18	0.00	0.10	0.06	485.43		1.18	4.06	25.97	0.10	2.21	1.36	10,679.35	0.58	0.49	4.92
ATV Vehicle[7]	4	20	0.5	22	On-Road	0.21	2.07	0.11	0.00	0.00	0.00	14.54		4.55	45.51	2.34	0.00	0.03	0.01	319.91	0.17	0.02	0.15
					Total	**2.17**	**77.98**	**10.00**	**0.12**	**1.70**	**0.75**	**11,969.29**		**47.64**	**1,715.55**	**220.00**	**2.65**	**37.51**	**16.51**	**263,324.48**	**37.71**	**44.85**	**125.93**
Feburary																							
Worker Vehicles[1]	2	250	30.0	22	On-Road	1.88	74.53	8.58	0.11	1.58	0.68	11,288.71		41.25	1,639.75	188.67	2.51	34.71	14.89	248,351.60	36.38	43.65	118.96
Line Truck[8]	2	1	30.0	22	On-Road	0.02	0.15	0.67	0.00	0.02	0.01	68.65		0.47	3.23	14.66	0.01	0.36	0.20	1,510.36	0.17	0.15	0.71
Delivery Trucks[4]	2	1	100.0	22	On-Road	0.05	0.18	1.18	0.00	0.10	0.06	485.43		1.18	4.06	25.97	0.10	2.21	1.36	10,679.35	0.58	0.49	4.92
Boom Truck[8]	2	1	30.0	22	On-Road	0.02	0.06	0.35	0.00	0.03	0.02	145.63		0.35	1.22	7.79	0.03	0.66	0.41	3,203.81	0.17	0.15	1.47
					Total	**1.97**	**74.92**	**10.78**	**0.12**	**1.72**	**0.77**	**11,988.41**		**43.25**	**1,648.25**	**237.09**	**2.65**	**37.94**	**16.87**	**263,745.12**	**37.31**	**44.43**	**126.06**
March																							
Worker Vehicles[1]	2	150	30.0	22	On-Road	1.13	44.72	5.15	0.07	0.95	0.41	53.63		24.75	983.85	113.20	1.50	20.83	8.94	1,179.78	21.83	26.19	4.32
Pickup Truck[6]	2	4	30.0	22	On-Road	0.03	1.19	0.14	0.00	0.03	0.01	180.62		0.66	26.24	3.02	0.04	0.56	0.24	3,973.63	0.58	0.70	1.90
					Total	**1.16**	**45.91**	**5.28**	**0.07**	**0.97**	**0.42**	**234.25**		**25.41**	**1,010.08**	**116.22**	**1.54**	**21.38**	**9.17**	**5,153.40**	**22.41**	**26.89**	**6.23**
April																							
Worker Vehicles[1]	2	150	30.0	22	On-Road	1.13	44.72	5.15	0.07	0.95	0.41	53.63		24.75	983.85	113.20	1.50	20.83	8.94	1,179.78	21.83	26.19	4.32
Pickup Truck[6]	2	4	30.0	22	On-Road	0.03	1.19	0.14	0.00	0.03	0.01	180.62		0.66	26.24	3.02	0.04	0.56	0.24	3,973.63	0.58	0.70	1.90
					Total	**1.16**	**45.91**	**5.28**	**0.07**	**0.97**	**0.42**	**234.25**		**25.41**	**1,010.08**	**116.22**	**1.54**	**21.38**	**9.17**	**5,153.40**	**22.41**	**26.89**	**6.23**
May																							
Worker Vehicles[1]	2	150	30.0	22	On-Road	1.13	44.72	5.15	0.07	0.95	0.41	53.63		24.75	983.85	113.20	1.50	20.83	8.94	1,179.78	21.83	26.19	4.32
Pickup Truck[6]	2	4	30.0	22	On-Road	0.03	1.19	0.14	0.00	0.03	0.01	180.62		0.66	26.24	3.02	0.04	0.56	0.24	3,973.63	0.58	0.70	1.90
					Total	**1.16**	**45.91**	**5.28**	**0.07**	**0.97**	**0.42**	**234.25**		**25.41**	**1,010.08**	**116.22**	**1.54**	**21.38**	**9.17**	**5,153.40**	**22.41**	**26.89**	**6.23**
June																							
Worker Vehicles[1]	2	150	30.0	22	On-Road	1.13	44.72	5.15	0.07	0.95	0.41	53.63		24.75	983.85	113.20	1.50	20.83	8.94	1,179.78	21.83	26.19	4.32
Pickup Truck[6]	2	2	30.0	22	On-Road	0.02	0.60	0.07	0.00	0.01	0.01	90.31		0.33	13.12	1.51	0.02	0.28	0.12	1,986.81	0.29	0.35	0.95
					Total	**1.14**	**45.32**	**5.21**	**0.07**	**0.96**	**0.41**	**143.94**		**25.08**	**996.97**	**114.71**	**1.52**	**21.10**	**9.06**	**3,166.59**	**22.12**	**26.54**	**5.27**
July																							
Worker Vehicles[1]	2	150	30.0	22	On-Road	1.13	44.72	5.15	0.07	0.95	0.41	53.63		24.75	983.85	113.20	1.50	20.83	8.94	1,179.78	21.83	26.19	4.32
Pickup Truck[6]	2	2	30.0	22	On-Road	0.02	0.60	0.07	0.00	0.01	0.01	90.31		0.33	13.12	1.51	0.02	0.28	0.12	1,986.81	0.29	0.35	0.95
					Total	**1.14**	**45.32**	**5.21**	**0.07**	**0.96**	**0.41**	**143.94**		**25.08**	**996.97**	**114.71**	**1.52**	**21.10**	**9.06**	**3,166.59**	**22.12**	**26.54**	**5.27**
TOTAL Project (lb)						**20.47**	**766.00**	**103.86**	**1.21**	**17.02**	**7.48**	**86,178.41**	**Total 2020 (ton)**	**0.11**	**4.19**	**0.52**	**0.01**	**0.09**	**0.04**	**274.43**	**0.09**	**0.11**	
TOTAL Project (ton)														**0.32**	**11.80**	**1.64**	**0.02**	**0.26**	**0.12**	**943.34**	**0.19**	**0.22**	
																			Total 2020 GHG (MT)	**248.96**	**0.08**	**0.10**	**281.22**
																						Total Project GHG (MTCO2e)	**920.55**

1. Employee commute distance of 30 miles is assumed based on local workforce and information from project applicant.
2. Gen-tie materials delivery coming from Port of Long Beach
3. Assumes water trucks during gen-tie construction will be making 3 passes per day at 5 miles per pass.
4. Materials delivery coming from Port of Long Beach
5. Assumes the dump trucks will have a 30 mile one-way trip to and from the site.
6. Assumes Pickup Trucks will have a similar commute to worker vehicels with a 30 mile one-way commute.
7. Assumes the ATV vehicles will drive 0.5 miles on pavement each day.
8. Assumes a one way commute of 30 miles for the Line Trucks and Boom Trucks.

9. Emission factors derived from the EMFAC 2014 database.

Ord Mountain Solar Energy Project
Operational Emissions

	Days/Year	Operating Hours per day		ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO2
				2021 Emissions (lbs/day)									MTCO2e/year[4]
Solar Farm													
Water Pump Generator	104	4		0.02	0.19	0.04	0.00	0.01	0.01	34.44	0.01	0.00	1.71

Electricity Usage					
Source	**MWhr**	CO2	CH4	N2O	MTCO2e
Battery Storage	1442.7	910,185.00	26,395.37	158.3722	733.5795
Total	1442.7	910,185.00	26,395.37	158.3722	733.5795

Notes:
CalEEMod was used to estimate energy usage for a 35,000 refrigerated warehouse.

GHG Factors for SCE (lb/MWhr)		
CO2	CH4	N2O
630.89	0.029	0.006

GHG Factors Based on CalEEMod default GHG factors for Southern California Edison.

Architectural VOC Emissions								
Construction								
E=EFxFA		810.54	lb VOC	5.26	lb VOC/day		0.41	VOC ton/year
EF=C/454(g/lb)x3.785(L/gal)/180(sqft)				0.011579				
C=	250	g/L						
A=	70000	sqft						
Operation								
E=EFxFAxReapplication			81.05	lb VOC/year		0.31	lb VOC/day	
Reapplication		10%						

Notes:

C based on MDAQMD Rule 1113.

Architectural emissions equations from CalEEMod Users Guide, Appendix A.

Ord Mountain GHG Benefits

MT CO_2E[1]	25,600,000.00
lb CO_2E[1]	56,438,272,000.00
Total 2012 MWh Delivered[2]	75,596,658.00
Renewable 2012 MWh Delivered[2]	15,042,880.00
Fossil Fuel MWh[2]	60,553,778.00
Fossil Fuel kWh	60,553,778,000.00
Fossil Fuel MT CO_2E/MWh	0.42
Fossil Fuel lb CO_2E/MWh	932.04
Fossil Fuel lb CO_2E/kWh	0.93
Maximum Installed Project Capacity (kW_{AC})[3]	60,000.00
Annual Output (kWh)[3]	160,000,000.00
Annual GHG Benefit (MT CO_2E)	67,494.62
Amortized GHG Benefit over 30 Years (MT CO_2E)	2,249.82

Notes: [1] GHG emissions for SCE taken from 2012 SCE Corporate Responsibility & Sustainability report.

[2] SCE energy delivered was taken from the SCE (U 338-E) 2013 Preliminary Annual 33% Report.

[3] Installed project capacity provided by project applicant.

ATTACHMENT B

Air Quality and Greenhouse Gas Technical Memorandum Report for the Calcite Substation Project in Lucerne Valley, San Bernardino County

Memorandum Report

Date:	October 21, 2016
To:	Lori Charpentier Tammy Yamasaki ***Southern California Edison*** Corporate Environmental Services Renewable Generation Interconnections Group
From:	Keith Cooper Senior Air Quality and Climate Change Specialist Phone: (213) 312-1752
Subject:	**Air Quality and Greenhouse Gas Technical Memorandum Report for the Calcite Substation Project in Lucerne Valley, San Bernardino County**

Introduction

Southern California Edison (SCE) proposes to construct the Calcite Substation and associated facilities to interconnect the NextEra Energy Resources (NEER) 20 megawatt (MW) Ord Mountain Solar Project to the existing SCE existing transmission line infrastructure in the Lucerne Valley area of San Bernardino County. This memo provides an evaluation of the criteria pollutant and greenhouse gas (GHG) emissions levels associated with the construction of four project elements that together, comprise the Calcite Substation Project (Project).

Please refer to the Project Description, attached, for detailed descriptions of each project element. A brief summary of the four major project elements is provided below:

- **Calcite Substation and Access Road.** The Calcite Substation would be a new regional 220 kilovolt (kV) collector station initially needed to support the Ord Mountain Solar Project, measuring approximately 620 feet by 480 feet. The Calcite Substation would be an unattended collector station surrounded by a prefabricated concrete wall with a visible loop of razor wire along the top and with two gates. The new access road would extend approximately 800 feet in length, and have a width of 24 feet.
- **Transmission Line and Related Structures.** This element has three components that include loop-in lines and a gen-tie line connection, the addition of two interest towers, and the construction of access and spur roads. The loop-in lines would require the installation of two new line segments of approximately 2,500 feet each, and require seven transmission structures. The gen-tie line connection would require that SCE construct two structures, with additional

structures to be constructed by NEER as part of their Ord Mountain Solar Project. A system of access and spur roads would be constructed to facilitate assess to new infrastructure improvements.

- **Distribution Line Extension.** An existing distribution line would need to be extended by approximately 2,000 feet, of which approximately 1,400 feet would be underground. Construction activities would require trenching and the installation of approximately 12 wooden poles.
- **Telecommunication Systems Improvements.** This element would require the installation of two approximately 1-mile long fiber optic cables. For both cables, there would be a combination of above ground and below ground cable installation.

This memorandum provides an assessment of criteria pollutant and GHG emissions that would occur due to construction of the Project. Following completion of construction activities, there would be no net increase in operations-period emissions associated with adding the Calcite Substation to the existing SCE Lugo-Pisgah No. 1 220 kilovolt (kV) transmission line infrastructure. As such, no operations-period emissions were evaluated for this project.

Provided below is 1) a discussion of the evaluation methodology used to quantify project emissions, and 2) an emissions evaluation for each of the four project elements. The emissions evaluation demonstrates that criteria pollutant and GHG emissions during Project construction would not exceed Mojave Desert Air Quality Management District (MDAQMD) daily or annual emissions thresholds.

Emissions Estimation Methodology

ICF developed a project-specific emissions estimation spreadsheet to calculate criteria pollutant and GHG emissions during Project construction. Spreadsheet development and modeling assumptions are detailed below:

- **Construction Activity Assumptions.** Estimates of construction schedule, construction equipment requirements and construction workforce requirements were provided by SCE (see Table A-1, attached).
- **Off-Road Emissions Factors.** Used CalEEMod defaults for horsepower and utilization rates, applied to year 2019 emissions factors.
- **On-Road Emissions Factors.** Used EMFAC-2014 emissions factors for the Mojave Desert portion of San Bernardino County, year 2019.
- **Trip Length.** 100 mile trips, each way, were assumed for calculation of employee and vendor trip mobile emissions. Furthermore, it was assumed that half of these emissions would occur within the Mojave Desert Air Basin (MDAB) and half would occur within the South Coast Air Basin (SCAB).
- **Re-Entrained Road Dust.** Used the USEPA-developed AP-42 calculations to estimate emissions for paved and unpaved roads.

- **Fugitive Dust from Earthwork.** Used the CalEEMod calculation formulas for grading, bulldozing and truck loading.

In addition to the modeling assumptions described above, each worksheet in the emissions estimation spreadsheet contains additional information about data sources, calculation details, etc. Emissions were estimated for each construction activity element, then summed to calculate daily and annual emissions totals for each of the four project elements described above.

Emissions Evaluation

Table 1 below details the major Project elements and each Project element component. Off-road equipment, on-road vehicles and fugitive dust emissions were estimated for each Project element component, then summed to calculate daily and annual emissions totals for each Project element component. The Project element components that have a check mark (✓) designation have been identified as likely to occur concurrently according to draft construction sequencing, and therefore represent an estimated peak activity level when maximum daily emissions totals would likely occur.

Table 1. Summary of Project Construction Elements

Major Project Element	Project Element Component	Duration (days)
Calcite Substation (220 kV Substation)	Survey	10
	Grading	40
	Fencing	25
	Civil	60
	MEER Install✓	25
	Electrical✓	70
	Wiring✓	65
	Maintenance and Testing	110
	Paving	40
Transmission Line and Related Structures (220 kV Transmission Line Loop-In & Gen-Tie2)	Site Prep/Restoration	16
	Structure Installation✓	96
	Conductor & GW Removal/Installation	20
Distribution Line Extension	Distribution Line Extension for Station Light & Power	21
Telecommunication Systems Improvements	Barstow Repeater and Calcite Tap✓	87

A summary of the Project's daily and annual emissions estimates for criteria pollutant and GHG emissions are provided in Table 2. See emissions estimation spreadsheet for details. For daily emissions, the worst case emissions are shown for each Project element component phase. For annual emissions, total emissions are shown for each Project element, as well as total Project emissions. Note that while Calcite Substation construction is anticipated to span two calendar years (9 months in year 2019 and 7 months in year 2020), emissions are conservatively assumed to occur in the same calendar year for purposes of comparing emissions to MDAQMD's annual significance criteria. As shown in Table 2, Project emissions during construction are not anticipated to exceed MDAQMD significance thresholds.

Table 2. Estimate of Project Construction Emissions

Project Element	ROG	NOX	CO	SO_2	PM10	PM2.5	CO_2e
Daily Emissions in Pounds per Day							
Calcite Substation	6	74	45	<1	25	13	10,972
Transmission Line and Related Structures	3	42	31	<1	1	<1	10,793
Distribution Line Extension	2	31	26	<1	2	1	10,978
Telecommunication Systems Improvements	2	34	28	<1	1	<1	12,189
Project Element Component Phase Overlap	7	129	81	<1	2	1	42,567
MDAQMD Significance Threshold	137	137	548	137	82	82	580,000
Annual Emissions in Tons per Year							
Calcite Substation	<1	5	2	<1	1	<1	941
Transmission Line and Related Structures	<1	3	2	<1	<1	<1	660
Distribution Line Extension	<1	2	<1	<1	<1	<1	537
Telecommunication Systems Improvements	<1	2	1	<1	<1	<1	543
Total Annual Construction Activity	1	11	5	<1	1	1	2,681
MDAQMD Significance Threshold	25	25	100	25	15	15	100,000

Attachments

Project Description. Calcite Substation and the Interconnection of Ord Mountain Solar Project

Table A-1. Proposed Calcite Substation Project Construction Duration, Equipment and Workers by Activity

Summary of Emissions Estimation Spreadsheet Modeling Outputs

SOUTHERN CALIFORNIA EDISON

PROJECT DESCRIPTION
CALCITE SUBSTATION AND THE INTERCONNECTION OF ORD MOUNTAIN SOLAR PROJECT

June 1, 2016

Table of Contents

List of Figures

CALCITE SUBSTATIONPROJECT DESCRIPTION

PROJECT OVERVIEW

Southern California Edison Company (“SCE”) proposes to construct the Calcite Substation and associated facilities to interconnect the NextEra Energy Resources (“NEER”) 60 MW Ord Mountain Solar Project to SCE’s existing Lugo-Pisgah No. 1 220 kV Transmission Line (collectively, the “Calcite Substation Project”). See FIGURE SCE-1 PROPOSED AND ALTERNATIVE CALCITE SUBSTATION, DISTRIBUTION AND TELECOMMUNICATION LINES. The following is a summary of the Calcite Substation Project major components:

- Calcite Substation: Construct a 220 kV switchyard on approximately 7 acres along with approximately 6 acres for drainage, grading, and an access road.
- Transmission Lines: Loop-in the Lugo-Pisgah No. 1 220 kV Transmission Line into Calcite Substation adding a total of approximately 5,000 feet of new transmission line (two lines of approximately 2,500 feet located side-by-side within a corridor approximately 2,500 feet long) creating the Calcite-Lugo and Calcite-Pisgah 220 kV Transmission Lines.
- Generation Tie Line Connection: Connect the NEER-built generation tie line (“gen-tie”) into the SCE-owned Calcite Substation property. SCE will construct two structures and three spans, starting at the generator’s closest structure to the Calcite Substation property, to connect to the new position within the switchyard.
- 500 kV Transmission Lines: The necessary crossing of the new 220 kV transmission loop-in lines under two existing SCE 500 kV lines would require two new 500 kV towers to be interset at mid-span of both the Eldorado-Lugo 500 kV Transmission Line and the Lugo-Mohave 500 kV Transmission Line. New lattice towers (types to be determined) would be built to accommodate the GO 95 Grade A crossing requirement.
- Distribution Line for Calcite Substation Light and Power: Construct approximately 2,000 feet of 12 kV overhead distribution line and approximately 2,100 feet of underground distribution line (connecting the existing distribution system along Haynes Road to Calcite Substation) to provide temporary power for construction and permanent substation light and power.
- Distribution line for Ord Mountain Solar Project (to be determined).
- Telecommunications Facilities: Install fiber optic communication cables, equipment, and associated structures for diverse path routing of communications required for the Project.

This project description is based on planning level assumptions. Further details will be made available upon completion of preliminary and final engineering, using the most current SCE design and construction practices, identification of field conditions, verification of availability of materials and equipment, and compliance with applicable environmental and permitting requirements. With regard to construction work activities, SCE anticipates working typical construction schedules; however, the actual construction hours may vary based on workforce resources and activities.

PROJECT LOCATION

The proposed Calcite Substation would be located on an approximately 75 acre parcel of land that extends on the west and east sides of California State Highway 247, directly north of Haynes Road, in the County of San Bernardino ("Calcite Substation Property") See FIGURE SCE-2 CALCITE PROPOSED AND ALTERNATIVE SUBSTATION PROPERTY BOUNDARIES. The proposed substation footprint would require approximately 7 acres along with approximately 6 acres for drainage, grading, and an access road, generally located within the western part of the approximately 75 acre parcel.

By looping the existing Lugo-Pisgah No.1 220 kV transmission line into Calcite Substation, two new 220 kV transmission lines would be created. These transmission lines (T/Ls) would depart from the existing Lugo-Pisgah No. 1 line approximately 2,500 feet south of Calcite Substation, cross under SCE's Eldorado-Lugo and Lugo-Mohave 500 kV lines, and enter Calcite Substation from the south.

The Ord Mountain Solar Project's portion of the 220 kV gen-tie line is currently anticipated to extend onto an easement within the Calcite Substation Property, just east of the proposed Lugo-Pisgah No. 1 220 kV loop-in. Beginning at the last structure to be constructed and owned by NEER (a dead-end structure) on the Calcite Substation Property but outside the walled area of proposed Calcite Substation, SCE would construct all remaining electrical facilities to extend the remainder of the gen-tie into the Substation.[1] See FIGURE SCE-3 CALCITE SUBSTATION AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES. The Calcite Substation would require the extension of the existing 12 kV distribution circuit in order to provide temporary power and permanent substation light and power. The existing 12 kV overhead circuit would extend westward overhead on Haynes Road, for approximately 2,000 feet. The circuit would then continue underground for approximately 2,100 feet by heading westward under the existing transmission right-of-way (ROW) along Haynes Road and then north along the new Calcite Substation access road into the station light and power rack within Calcite Substation. See FIGURE SCE-3 CALCITE SUBSTATION AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES.

The telecommunication facilities to support the Calcite Substation would require two new fiber optic cables. The fiber optic cables would connect Calcite Substation to SCE's Barstow Repeater Communication Site ("CS") and to a splice box on tower M29-T3 on

[1] The portion of the gen-tie running from the Ord Mountain Solar Project to this last NEER structure is anticipated to be described elsewhere by NEER, not in this description of the work to be undertaken by SCE.

SCE's Lugo Mohave 500 kV T/L. See FIGURE SCE-1 PROPOSED AND ALTERNATIVE CALCITE SUBSTATION, DISTRIBUTION AND TELECOMMUNICATION LINES.

PROJECT DESCRIPTION

I. CALCITE SUBSTATION

The Calcite Substation would be a new regional 220 kV collector station initially needed to support the Ord Mountain Solar Project, measuring approximately 620 feet by 480 feet. The Calcite Substation would be an unattended collector station (no power transformation) surrounded by a prefabricated concrete wall with a visible loop of razor wire along the top and with two gates.

Substation Design and Equipment

SCE would engineer, design, construct, and test the proposed Calcite Substation. The Substation would be designed to accommodate a total of eight 220 kV positions, with four positions initially constructed. Two positions would be utilized in the initial design: one position shared between the Ord Mountain Solar Project gen-tie and the Pisgah 220 kV transmission line, and one position for the Lugo 220 kV transmission line. The remaining two positions would be available for future network or generation tie-lines.

Calcite Substation would be initially equipped with:

- Two (2) overhead 220 kV buses
- Five (5) circuit breakers
- Ten (10) group-operated disconnect switches
- One (1) Mechanical Electrical Equipment Room (MEER)
- Light and power transformers and associated equipment
- Station lighting
- Permanent wall
- Microwave tower

Grading and Land Disturbance

The Calcite Substation Property would be prepared by clearing existing vegetation and installing a temporary chain-link fence to surround the construction site. The Property would be graded in accordance with approved grading plans. The area to be enclosed by the proposed substation perimeter wall would be graded to a slope that varies between one and two percent. To protect the substation from flooding, and to keep the existing drainage patterns, drainage conveyances would be constructed around the substation.

These features would disturb an area approximately 50 feet wide around the substation (approximately four acres) resulting in a total permanent disturbance area of approximately 13 acres. Final site grading and drainage would be subject to the conditions of the grading permit obtained from the County of San Bernardino (see Table SCE – 1 below).

Additional temporary land disturbance (up to approximately 5 acres) within the proposed Calcite Substation Property may be necessary for temporary equipment storage and material staging areas (see Table SCE – 2 below).

The Calcite Substation access road would be 24 feet wide and composed of asphalt concrete. This road would connect to Highway 247 (Barstow Road) and would require the improvement of approximately 1,100 feet of the existing Haynes Road and the establishment of approximately 800 feet of new road. Permanent land disturbance would be approximately 2 acres on the Calcite Substation Property. Any permits needed for the access road would be acquired from the local agencies.

Table SCE - 1

Substation Ground Surface Improvement Materials and Estimated Volumes

Element	**Material**	**Approximate Surface Area (ft^2)**	**Approximate Volume (yd^3)**
Site Fill (import)	Soil	450,000	22,000
Waste Removal (export)	Soil/Vegetation	450,000	3,000
Replacement fill (import)	Soil	450,000	4,000
Substation Equipment Foundations	Concrete	4,000	700
Equipment and cable trench excavations *	Soil	270,000	1,200
Cable Trenches**	Concrete	6,300	25
Internal Driveway ***	Asphalt concrete Class II aggregate base	48,000 48,000	600 900
Access Road****	Asphalt concrete Class II aggregate base Concrete	48,000 48,000 48,000	800 900 100
Substation Rock Surfacing	Rock, nominal 1 to 1-1/2 inch per SCE Standard	230,000	3,000

Notes to Table SCE - 1

* Excavation “spoils” would be placed on site during the below-ground construction phase and used to the extent possible for the required on-site grading.

** Standard cable trench elements are factory fabricated, delivered to the Property and installed by crane. Intersections are cast in place concrete.

*** Internal Driveway refers to all paved roads within the substation walls.

**** Access Road refers to the paved road from the public right of way to the primary entrance gate.

Table SCE - 2 below provides the approximate area of land disturbance at the Calcite Substation Property, within the substation wall and the required drainage structures. This includes the area immediately outside the substation, as well as the approximate volume and type of earth materials proposed to be used or disposed.

Table SCE – 2
Land Disturbance for Substation Construction

Project Feature	Project Quantity	Disturbed Acreage Calculation	Construction Disturbance Acreage	Temporary Disturbance Acreage	Permanent Disturbance Acreage
Calcite Substation	1	620' x 480'	7.0	0.0	7.0
Drainage and Grading	1	Varies	4.0	0.0	4.0
New Access Roads	1	linear miles x 24' wide	2.0	0.0	2.0
Material & Equipment Staging Yard - (Calcite)	1	approx. 5 acres	5.0	5.0	0.0
Total Estimated Disturbance Acreage (5)			**18.0**	**5.0**	**13.0**

Below Grade Construction

After the Calcite Substation Property is graded, below grade facilities would be installed. Below grade facilities include a ground grid, underground conduit, trenches, and all required foundations. The design of the ground grid would be based on soil resistivity measurements collected during a geotechnical investigation that would be conducted prior to construction.

Equipment Installation

Above grade installation of substation facilities (*i.e.*, buses, circuit breakers, steel structures, and the MEER) would commence after the below grade structures are in place.

Hazards and Hazardous Materials

Construction and operation of the Calcite Substation would require the limited use of hazardous materials such as fuels, lubricants, and cleaning solvents. SCE would comply with all applicable laws relating to hazardous materials use, storage, and disposal. A Stormwater Pollution Prevention Plan (SWPPP) would also be prepared for the Calcite Substation Project.

Waste Management

Construction of the Calcite Substation would result in the generation of various waste materials including soil, vegetation, and sanitation waste (portable toilets). Soil excavated for the Calcite Substation would either be used as fill or disposed of off-site at an appropriately licensed waste facility. Sanitation waste (*i.e.*, human generated waste) would be disposed of according to sanitation waste management practices.

Post-Construction Cleanup

During construction, water trucks may be used to minimize the quantity of airborne dust created by construction activities. Any damage to existing roads as a result of construction would be repaired once construction is completed in accordance with local agency requirements. Following completion of construction activities, SCE would also restore all areas that were temporarily disturbed by construction of the Calcite Substation to as close to preconstruction conditions as possible or where applicable to the conditions agreed upon between the landowner and SCE. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of off-site. SCE would conduct a final inspection to ensure that cleanup activities were successfully completed.

Operations and Maintenance

The proposed Calcite Substation would be unstaffed, and electrical equipment within the substation would be remotely monitored and controlled by an automated system from SCE's Lugo Substation Switching Center. SCE personnel would typically visit for electrical switching and routine maintenance purposes. Routine maintenance would include equipment testing, monitoring and repair.

Geotechnical Studies

Prior to the start of construction, SCE would conduct a geotechnical study of the Calcite Substation Property and the transmission line routes that would include an evaluation of the depth to the water table, evidence of faulting, liquefaction potential, physical properties of subsurface soils, soil resistivity, slope stability, and the presence of hazardous materials. Geotechnical borings would take place at various depths throughout the Calcite Substation Property.

Construction Equipment Personnel and Temporary Facilities

The estimated elements, materials, number of personnel and equipment required for construction of the Calcite Substation are summarized below in Table SCE - 3. In addition to the information provided in Table SCE - 3, a temporary contractor office trailer and equipment trailer would be placed within the proposed substation construction area during the construction phase of the project.

Construction would be performed by either SCE construction crews or its contractors. Contractor construction personnel would be managed by SCE construction management personnel. SCE anticipates a total of approximately 30 construction personnel working on any given day. SCE anticipates that crews would work concurrently whenever possible; however, the estimated deployment and number of crew members would be dependent upon county permitting, material availability and construction scheduling. For example, installation of electrical equipment (such as the MEER, wiring, and circuit breaker) installation may occur while the transmission line construction proceeds.

Table SCE - 3

Calcite Substation Project
Construction Equipment and Workforce Estimates by Activity
Construct 220 kV Substation & Access Road

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Survey (1)				**4**	**10**		**Substation, Laydown Yard & Access Road**
1-Ton Truck, 4x4	300	Gas	2		10	8	
Grading				**10**	**40**		**Substation, Laydown Yard & Access Road**
1-Ton Truck, 4x4	300	Gas	1		40	8	
Dozer	350	Diesel	1		40	7	
Loader	350	Diesel	2		40	7	
Scraper	350	Diesel	2		40	7	
Grader	350	Diesel	1		40	7	
Dump Truck	350	Diesel	2		40	7	
Backhoe	200	Diesel	2		40	7	
Tamper	350	Diesel	1		35	7	
Tool Truck	300	Gas	1		40	7	
Utility Cart	50	Diesel	2		40	7	
Water Truck	300	Diesel	3		40	8	
Fencing				**5**	**25**		**Substation & Laydown Yard**
1-Ton Truck, 4x4	300	Gas	1		25	8	
Bobcat	200	Diesel	1		25	8	
Flatbed Truck	300	Gas	1		15	3	
Utility Cart	50	Diesel	1		25	7	
Water Truck	300	Diesel	1		25	8	
Civil				**10**	**60**		**Substation & Access Road**
1-Ton Truck, 4x4	300	Gas	1		60	8	
Excavator	60	Diesel	1		45	4	

Calcite Substation Project Construction Equipment and Workforce Estimates by Activity Construct 220 kV Substation & Access Road							
WORK ACTIVITY				**ACTIVITY ESTIMATES**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Lo-Drill/Auger	350	Diesel	1		30	4	
Backhoe	200	Diesel	2		60	7	
Bobcat	200	Diesel	1		60	8	
Dump Truck	350	Diesel	2		50	7	
Skip Loader	350	Diesel	1		60	8	
Forklift	200	Diesel	1		45	4	
Concrete Truck	300	Diesel	2		30	4	
Generator	50	Gas			60	7	
Tool Truck	300	Gas	1		60	7	
Utility Cart	50	Diesel	2		60	7	
Water Truck	300	Diesel	2		60	8	
MEER Install (Drop In)				**7**	**25**		**Substation**
1-Ton Truck, 4x4	300	Gas	1		25	8	
Manlift/Bucket Truck	150	Diesel	2		20	7	
Stake Truck	350	Gas	1		20	3	
Crane	350	Diesel	1		15	4	
Forklift	250	Diesel	1		25	4	
Tool Truck	300	Gas	1		25	7	
Electrical				**10**	**70**		**Substation**
1-Ton Truck, 4x4	300	Gas	2		3	8	
Scissor Lift	60	Diesel	1		70	7	
Manlift/Bucket Truck	150	Diesel	2		60	7	
Reach Manlift	250	Diesel	1		45	7	
Crane	400	Diesel	1		20	4	
Forklift	250	Diesel	1		70	4	
Generator	50	Gas	1		70	7	
Utility Cart	50	Diesel	2		70	7	
Tool Truck	300	Gas	1		70	7	
Wiring				**4**	**65**		**Substation**
1-Ton Truck, 4x4	300	Gas	1		65	8	
Manlift/Bucket Truck	150	Diesel	1		25	4	
Utility Cart	50	Diesel	1		65	7	
Maintenance Crew				**2**	**30**		**Substation**
1-Ton Truck, 4x4	300	Gas	1		30	8	
Testing				**4**	**80**		**Substation**
Test Truck	300	Gas	2		80	8	

Calcite Substation Project Construction Equipment and Workforce Estimates by Activity Construct 220 kV Substation & Access Road							
WORK ACTIVITY				**ACTIVITY ESTIMATES**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
	Asphalt			**6**	**40**		**Substation & Access Road**
1-Ton Truck, 4x4	300	Gas	2		40	4	
Stake Truck	350	Gas	1		30	4	
Dump Truck	350	Diesel	1		35	7	
Asphalt Paver	350	Diesel	1		35	7	
Tractor	350	Diesel	1		40	4	
Paving Roller	150	Diesel	2		40	6	
Asphalt Curb Machine	50	Diesel	1		30	4	
Utility Cart	50	Diesel	1		40	7	

Crew Size Assumptions For:

1) Survey – one 4-man crew
2) Grading – one 10-man crew
3) Fencing – one 5-man crew
4) Civil – one 10-man crew
5) MEER – one 7-man crew
6) Electrical – one 10-man crew
7) Wiring – two 2-man crews (4 total)
8) Maintenance – one 2-man crew
9) Testing – two 2-man crews (four total)
10) Asphalt/Paving – one 6-man crew

Construction of the transmission lines would require the establishment of an approximately 5-acre staging yard within the Calcite Substation Property. This staging yard would be used as a reporting location for workers, vehicle and equipment parking, and material storage.[2] The yard may also have construction trailers for supervisory and

[2] Transmission line construction materials commonly stored at construction staging yards typically include, but not be limited to: construction trailers; construction equipment; portable sanitation facilities; steel bundles; steel/wood poles; conductor reels; overhead ground wire (OHGW); hardware; insulators; cross arms; signage; consumables (such as fuel and filler compound); waste materials for salvaging, recycling, or disposal; and BMP materials (such as straw wattles, gravel, and silt fences). Substation construction materials commonly stored at the construction staging area would include, but not be limited to: portable construction trailers; sanitation facilities; electrical and construction equipment such as circuit breakers, disconnect switches, lightning arresters, transformers, vacuum switches, steel beams, rebar, foundation cages, conduit, insulators, conductor and cable reels, pull boxes and line hardware; and BMP materials (such as straw wattles, gravel, and silt fences).

clerical personnel. The staging yard may be lit for staging and security. Normal maintenance and refueling of construction equipment would also be conducted at the yard. All refueling and storage of fuels would be in accordance with the Storm Water Pollution Prevention Plan (SWPPP).

Preparation of the staging yard would include temporary perimeter fencing and depending on existing ground conditions at the Property, include the application of gravel or crushed rock.

The majority of the materials associated with construction efforts would be delivered by truck to the staging yard, although some materials may be delivered directly to the temporary construction laydown/ work areas.

Any land that may be disturbed at the staging yard could be restored to preconstruction conditions if there is no longer a need for the staging yard.

II. TRANSMISSION LINE (T/L) AND RELATED STRUCTURES

SCE's transmission line requirements for the Ord Mountain Solar Project interconnection to the Lugo-Pisgah No. 1 220 kV Transmission Line are defined by the following three components: loop-in lines, a gen-tie line connection, and the addition of two 500 kV interset towers. Each of these components is described below.

220 kV Transmission Line Loop-In Design

The proposed Calcite Substation would connect to the Lugo-Pisgah No. 1 220 kV Transmission Line transmission source line via a loop-in T/L. The loop-in would modify the Lugo-Pisgah No. 1 220 kV Transmission Line creating two new line segments: the Calcite-Lugo 220 kV T/L and the Calcite-Pisgah 220 kV T/L. Each new T/L segment entering into the Calcite Substation would be approximately 2,500 feet long. See FIGURE SCE-3 CALCITE SUBSTATION AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES.

The proposed routes for these new T/Ls would require crossing under SCE's Eldorado-Lugo and Lugo-Mohave 500 kV lines. Crossing under the 500 kV lines would require the addition of one 500 kV interset tower for each of the Eldorado-Lugo and Lugo-Mohave 500 kV lines to comply with GO 95 requirements. See FIGURE SCE-4 220 KV AND 500 KV LATTICE STEEL TOWER CONFIGURATION and FIGURE SCE-5 220 KV TUBULAR STEEL POLE CONFIGURATION.

The new 220 kV T/Ls would require approximately seven transmission structures, consisting of six single-circuit structures and one double-circuit structure. See FIGURE SCE-3 CALCITE SUBSTATION AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES. Four single-circuit structures with heights ranging from approximately 50 feet to approximately 100 feet would be used to cross underneath the Eldorado-Lugo 500 kV and Lugo-Mohave 500 kV transmission lines. The path would then continue north to two single-circuit structures with approximate heights between 110 feet and 160 feet. From there, the alignment turns northeast to one 220 kV double-circuit structure with a height ranging from approximately 130 feet to approximately 180 feet. See FIGURE SCE-4 220 KV AND 500 KV LATTICE STEEL TOWER CONFIGURATION and FIGURE SCE-5 220 KV TUBULAR STEEL POLE CONFIGURATION for possible 220 kV structure configurations. The 220 kV double-circuit TSP or LST would be located just outside of the substation wall (but still within the proposed Calcite Substation Property boundaries). The conductor utilized would be 2B-1590 kcmil "Lapwing" Aluminum Conductor Steel Reinforced ("ACSR") conductor or similar.

Additionally, one existing 220 kV lattice steel tower in the existing ROW would be removed since it would not be in use in the proposed configuration. The final combination of poles and towers will be determined during detailed engineering.

The seven new structures would require a new ROW ranging between approximately 250 and 400 feet wide (depending on structure types and line crossings) from SCE's existing ROW to the Calcite Substation Property. See FIGURE SCE-3 CALCITE SUBSTATION AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES.

220 kV Generation Tie Line Extension Design

The proposed Calcite Substation design includes terminating the Ord Mountain 220 kV gen-tie line into the switchrack. See FIGURE SCE-3 CALCITE SUBSTATION AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES. There would be two double-circuit lattice or TSP dead-end structures with heights ranging from approximately 130 feet to approximately 180 feet on the Calcite Substation Property for the connection of Ord Mountain's gen-tie line to a 220 kV position inside Calcite Substation. While the Ord Mountain 220 kV gen-tie line would carry 60 MW, the TSP or LST would be designed for additional future load, utilizing 2B-1590 kcmil "Lapwing" Aluminum Conductor Steel Reinforced ("ACSR") conductor.

The first two structures outside the proposed Calcite Substation would be constructed by SCE and would be dead-end structures. NEER would be responsible for construction of all structures beyond that second dead-end structure. SCE would construct, own, operate, and maintain the circuit to the tower connection at the first Ord Mountain structure. SCE would work with NEER to integrate final design. See FIGURE SCE-3 CALCITE SUBSTATION AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES.

500 kV Transmission Line Structure Interset Design

At the point of the proposed 220 kV line undercrossing, the existing Lugo-Mohave and Eldorado-Lugo 500 kV T/Ls would require the addition of one 500 kV interset tower per line to comply with applicable engineering standards and specifications (including GO 95). The preferred approach at this time would be to determine the appropriate crossing structures and position the interset towers within the 500 kV ROW. The current structures are slightly less than 150 feet tall. It should be assumed that the interset tower would be approximately 15-30 feet taller to facilitate the proposed undercrossing.

Transmission Line Access and Spur Roads

This portion of the Calcite Substation Project involves construction within existing and new ROW. Existing public roads as well as existing transmission line roads would be used as much as possible during construction. However, the Calcite Substation Project would require new transmission line roads to access the new 220 kV transmission line segments and structure locations between the Calcite Substation and existing SCE ROW.

Transmission line roads are classified into two groups: access roads and spur roads. Access roads are through roads that run between tower sites and serve as the main transportation route. Spur roads are roads that lead from access roads and terminate at one or more structure sites.

Rehabilitation work may be necessary in some locations along the existing transmission line roads to accommodate construction activities. This work may involve the re-grading and repair of existing access and spur roads, including work such as: clearing of vegetation; grading to remove potholes, ruts, and other surface irregularities; widening of the drivable surface of the road; improving drainage across access roads; and over-excavation and re-compaction to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The actual widening would vary between approximately 1 foot and approximately 10 feet, in order to provide a minimum drivable width for safe vehicle operation.

Portions of the drivable surface would be widened along curved sections of the access road. Access road gradients would be leveled so that sustained grades generally do not exceed approximately 12 percent. Along curves in the road, a minimum radius of curvature of 50 feet measured at the center line of the usable road surface is typically required.

New access road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities; fill material would be deposited where necessary; and roads would be re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width that will vary between 14 feet and 22 feet with 2 feet of shoulder on each side as required by the existing land terrain, but may be wider depending on final engineering requirements and field conditions. The minimum center line turning radius required along a curve is 50 feet (the minimum turning radius required to meet construction and maintenance vehicle requirements) and berm and swale drainage improvements may be required for erosion control along the road. This width is increased by a factor 400/Radius along curvatures to accommodate the vehicle envelope as it turns (resulting in a maximum drivable width of 22 feet). Some new spur access roads have a modified roundabouts configuration around structure locations.

Construction of New 500 kV and 220 kV Transmission Structures

The new structure pad locations and laydown/work areas (see Table SCE - 4) would first be graded and/or cleared of vegetation as required to provide a reasonably level and vegetation-free surface for structure installation. Property would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the structure footings. The graded area would be compacted to at least 90 percent relative density, and would be capable of supporting heavy vehicular traffic.

Erection of the structures may also require establishment of a permanent equipment pad to support a crane. The equipment pad would occupy an area of approximately 50 feet by 50 feet and would be located adjacent to each applicable structure within the laydown/work area used for structure assembly. The pad may be cleared of vegetation and/or graded as necessary to provide a level surface for equipment operation. The decision to utilize an equipment pad would be determined during final engineering.

Structure foundations would be engineered to satisfy the soil/rock profile at each location as needed based on final engineering results. Typical structure foundations for each LST would consist of four poured-in-place concrete footings; TSPs would require a single drilled poured-in-place concrete footing; and TSP H-Frames would require a two drilled poured-in-place concrete footings. Actual footing diameters and depths for each of the structure foundations would depend on the soil conditions and topography at each property and would be determined during final engineering.

The foundation process begins with the drilling of the holes for each type of structure. The holes would be drilled using truck- or track-mounted excavators with various diameter augers to match the diameter requirements of the structure type. The excavated material would be distributed at the structure site, used as fill for new roads or substation property or used in the rehabilitation of existing access roads. Alternatively, the excavated soil may be disposed of at an off-site disposal facility in accordance with all applicable laws.

Following excavation of foundation footings, steel reinforced rebar cages would be set, survey positioning of anchor bolts and/or stub angles would be verified, and concrete would then be poured. The steel reinforced rebar cages would be assembled off-site and delivered to the structure location by flatbed truck. A typical transmission structure foundation would require approximately 45 to 65 cubic yards of concrete delivered to the structure location depending upon the type of structure being constructed and each footing would project approximately 1 to 4 feet above the ground level. During construction, existing concrete supply facilities would be used where feasible.

Lattice Steel Towers ("LSTs") would be assembled within the temporary laydown areas at each tower location. See Table SCE - 4 for approximate laydown dimensions. Structure assembly begins with the hauling and stacking of steel bundles from a staging yard to each structure location. This activity involves the use of trucks with trailers and a rough terrain forklift. After steel is delivered and stacked within the structure laydown/work area, crews would proceed with the assembly of leg extensions, body panels, boxed sections, and cages/bridges. Assembled sections would be lifted into place with a crane and secured by a combined erection and torqueing crew.

Tubular Steel Poles ("TSPs") and H-Frames consist of multiple sections. The pole sections would be placed in temporary laydown areas at each pole location. See Table SCE - 4 for approximate laydown dimensions. Structure assembly begins with the hauling of steel pole sections from a staging yard to each structure location. This activity involves the use of trucks with trailers and a rough terrain crane. After the steel pole sections are delivered and placed within the structure laydown/work area, crews would proceed with the assembly of the structure. A crane would be used to set each steel pole base section on top of the previously prepared foundations. When the base section is secured, the remaining sections of the TSP and H-Frames would be lifted into place with a crane and secured by an erection crew.

After construction is completed, the transmission structure site would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could damage the structure footing. The graded area would be compacted and capable of supporting heavy vehicular traffic.

Wire Stringing of 220 kV Conductor

Wire stringing activities would be in accordance with SCE common practices and are similar to process methods detailed in the IEEE Standard 524-2003 (Guide to the Installation of Overhead Transmission Line Conductors).

To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire stringing activities. Advanced planning by supervision is required to determine circuit outages, pulling times, and safety protocols for ensuring that the safe installation of wire is accomplished. Wire stringing includes all activities associated with the installation of the primary conductors onto transmission line structures. These activities include the installation of conductor, ground wire ("OHGW/OPGW"), insulators, stringing sheaves (rollers or travelers), vibration dampeners, weights, suspension and dead-end hardware assemblies for the entire length of the route.

The following five steps describe typical wire stringing activities:

- Step 1: Planning: A wire stringing plan would be developed to determine the sequence of wire pulls and the set-up locations for the wire pull/tensioning/splicing equipment.
- Step 2: Sock Line Threading: A helicopter would fly a lightweight sock line from structure to structure, which would be threaded through rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a wire pull.
- Step 3: Pulling: The sock line would be used to pull in the conductor pulling rope and/or cable. The pulling rope or cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel.
- Step 4: Splicing, Sagging, and Dead-Ending: Once the conductor is pulled in, if necessary, all mid-span splicing would be performed at dead end tower locations. Once the conductor is to proper tension and dead-ended to the structures, the splicing would be completed.
- Step 5: Clipping-In: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called "clipping in." Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

The puller, tensioner, and splicing set-up locations associated with the Calcite Substation Project's transmission facilities would be temporary and the land would be restored to its previous condition following completion of pulling and splicing activities. The set-up locations require level areas to allow for maneuvering of the equipment and, when possible, these locations would be located on existing roads and level areas to minimize the need for grading and cleanup. The number and location of these sites would be determined during final engineering. The approximate area needed for stringing set-ups associated with wire installation is variable and depends upon terrain. See Table SCE - 4 for approximate size of pulling, tensioning and splicing equipment set-up areas and laydown dimensions.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected based on availability of dead-end structures, conductor size, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment set-up locations. Generally, pulling locations and equipment set-ups would be in direct line with the direction of the overhead conductors and established approximately a distance of three times the height away from the adjacent structure.

Each stringing operation consists of a puller set-up positioned at one end and a tensioner set-up with wire reel stand truck positioned at the other end of the wire pull. Temporary splices may be used during stringing since permanent splices that join the conductor together cannot travel through the rollers. Splicing set-up locations are used to remove temporary pulling splices and install permanent splices once the conductor is strung through the rollers located on each structure.

Land Disturbance

Table SCE - 4 below provides information on temporary and permanent land disturbance areas related to construction of the transmission loop-in lines.

Table SCE - 4 Land Disturbance for Transmission Loop-In and SCE Portion of Gen-tie Construction

Project Feature	Project Quantity	Disturbed Acreage Calculation	Construction Disturbance Acreage	Temporary Disturbance Acreage	Permanent Disturbance Acreage
Guard Structures	4	150' x 50'	0.7	0.7	0
Remove Existing Lattice Steel Tower (1)	1	220' x 220'	1.1	1.1	0
Construct New Lattice Steel Tower (2)	3	220' x 220'	3.3	2.6	0.8
Construct New Steel H-Frame Pole (2)	2	200' x 200'	1.8	1.7	0.1
Construct New 3-Pole Structure (2)	2	200' x 200'	1.8	1.7	0.1
Construct New Gen-Tie Structure (2)	2	220' x 220'	2.2	1.7	0.5
220 kV Conductor Stringing Area (3)	9	500' x 150'	15.5	15.5	0
500 kV Conductor Stringing Area (3)	2	850' x 150'	5.9	5.9	0
Existing Tower Work Area	6	100' x 100'	1.4	1.4	0
New Access Roads (4)	0.6	linear miles x 18' wide	1.4	0.0	1.4
Access Road and Tower Buffers	1.7	linear miles x 10' wide buffer	2.1	2.1	0
Material & Equipment Staging Yard - (Calcite)	1	approx. 5 acres	5	5	0
Total Estimated Disturbance Acreage (5)			**42.2**	**39.3**	**2.9**

Notes:
1. Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2' below ground surface.
2. Includes structure assembly & erection, conductor & OHGW installation. Area to be restored after construction. Portion of R/W within 20' of ALL structures to remain cleared of vegetation. Permanently disturbed areas for H-Frame/3-Pole=0.08 acre.
3. Based on standard conductor reel lengths, conductor size, number of circuits, route design, and terrain.
4. Based on approximate length of road in miles X drivable road width of 14'-22' w/ 2' of berm on each side of road.
5. The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.

Foundation / Base Volume and Area Calculations (approximate):
LST: 4 per structure, 32-ft deep, 3.5-ft diameter; Earth removed for footings = 45.6 cu.yds; Surface area = 38.5 sqft
H-Frame: 2 per structure, 30-ft deep, 6-ft diameter; Earth removed for footings = 62.8 cu.yds; Surface area = 56.5 sqft
3-Pole: 3 per structure, 30-ft deep, 6-ft diameter; Earth removed for footings = 94.2 cu.yds; Surface area = 84.8 sqft

Construction Site Cleanup

During construction, water trucks may be used to minimize the quantity of airborne dust created by construction activities. Any damage to existing roads as a result of construction would be repaired once construction is complete.

SCE would restore all areas that are temporarily disturbed by project activities (including the staging yard, pull and tension sites, and structure laydown and assembly sites) to preconstruction conditions following the completion of construction.

Restoration may include grading and restoration of sites to original contours and reseeding where appropriate. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of at an off-site disposal facility in accordance with all applicable laws. SCE would conduct a final inspection to ensure that cleanup activities are successfully completed.

Operations and Maintenance

Operations and Maintenance ("O&M") activities are necessary to ensure reliable service, as well as the safety of the utility worker and the general public, as mandated by the CPUC. SCE facilities are subject to Federal Energy Regulatory Commission jurisdiction. SCE transmission facilities are under operational control of the California Independent System Operator.

The transmission lines would be maintained in a manner consistent with CPUC G.O. 95 and G.O. 128 as applicable. Normal operation of the lines would be controlled remotely through SCE control systems and manually, in the field, as required. SCE inspects overhead transmission facilities in a manner consistent with CPUC G. O. 165 a minimum of once per year via ground and/or aerial observation, but this usually occurs more frequently based on system reliability.

Maintenance is performed as needed to maintain circuit reliability. A majority of regular O&M activities related to overhead facilities are performed from existing access roads with no surface disturbance. These activities could include repairing/re-stringing conductors to repair damage, washing/replacing insulators, repairing/replacing hardware components, replacing poles/towers, tree trimming, brush and weed control, and access road maintenance. Repairs to existing facilities, such as repairing/replacing existing poles/towers or conductor re-stringing, could occur in undisturbed areas.

Insulators could require periodic washing with water to prevent the buildup of contaminants (dust, salts, droppings, smog, condensation, etc.) and reduce the possibility of electrical arcing which can result in circuit outages and potential fire. Frequency of insulator washing is based on local conditions and build-up of contaminants.

Routine access road maintenance is conducted on an annual and/or as-needed basis to maintain a vegetation-free corridor to facilitate access to existing facilities and to aide in fire prevention. Road maintenance activities could include: blading to smooth over washouts, eroded areas, and washboard surfaces; cleaning ditches; moving/establishing berms; clearing/installing functional drain inlets to culverts; repairing culverts; clearing/establishing water bars; and cleaning/repairing over-side drains. Access road maintenance could include the repair, replacement and/or installation of storm water diversion devices on an as-needed basis.

O&M activities could also include brushing and tree pruning activities in order to maintain vegetation-free access roads and clearances around electrical lines. Brushing (*i.e.*, trimming or shrub removal) approximately two to five feet beyond road's edge or berm is necessary to keep vegetation from intruding into the roadway. In addition, the clearance of brush and weeds around pole and transmission tower pads is necessary for fire protection and may be required by applicable regulations on fee owned ROWs. In accordance with Public Resources Code section 4292, a 10-foot radial clearance around non-exempt poles (as defined by California Code of Regulations Title 14, Article 4) and a 25- to 50-foot radial clearance around non-exempt towers (as defined by California Code of Regulations Title 14, Article 4) would be maintained.

Regular tree pruning must be performed to be in compliance with existing state and federal laws, rules, and regulations and is crucial for maintaining reliable service, especially during severe weather or disasters. Tree pruning standards for distances from overhead lines have been set by the CPUC (G. O. 95, Rule 35), California Public Resources Code section 4293, California Code of Regulations Title 14, Article 4, and other government and regulatory agencies. SCE's standard approach to tree pruning is to remove at least the minimum required by law, plus one years' growth (species dependent).

In addition to regular O&M activities, emergency repairs could be required at any time. SCE conducts a wide variety of emergency infrastructure repairs due to damage resulting from high winds, storms, fires, and other natural disasters and accidents. Such repairs could include replacement of towers, poles, or conductors.

Labor and Equipment

Construction would be performed by SCE Crews or its contract personnel. The estimated number of persons and types of equipment required for each phase of transmission line construction is shown in Table SCE - 5 below.

Table SCE - 5

Calcite Substation Project
Construction Equipment and Workforce Estimates by Activity
Construct 220 kV Transmission Line Loop-In & Gen-Tie

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Survey (1)				**4**	**4**		**4 Miles**
1-Ton Truck, 4x4	300	Gas	2		4	8	1 Mile
Staging/Material Yard (2)				**4**			**1 Yard**
1-Ton Truck, 4x4	300	Gas	2			4	
R/T Forklift	125	Diesel	1			4	
Ranger	50	Diesel	1		Duration of Project	4	
Generator	49	Diesel	1			8	
Water Truck	300	Diesel	2			8	
Road Work & Structure Pads (3)				**5**	**5**		**2 Miles & 9 Pads**
1-Ton Truck, 4x4	300	Gas	1		5	8	
Backhoe/Front Loader	125	Diesel	1		5	4	
Tracked Dozer	150	Diesel	1		5	8	
Motor Grader	250	Diesel	1		5	8	
Water Truck	300	Diesel	2		5	8	
Drum Compactor	100	Diesel	1		5	4	
Excavator	250	Diesel	1		2	4	
Lowboy Truck/Trailer	450	Diesel	1		5	2	
Guard Structure Installation (4)				**6**	**2**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		2	8	
Compressor Trailer	60	Diesel	1		2	4	
Manlift/Bucket Truck	250	Diesel	1		2	4	
Boom/Crane Truck	350	Diesel	1		2	8	
Auger Truck	210	Diesel	1		2	4	
Flat Bed Truck	400	Diesel	1		2	8	
Conductor & GW Removal (5)				**14**	**3**		**4,000 Feet**
1-Ton Truck, 4x4	300	Gas	4		3	4	
Manlift/Bucket Truck	250	Diesel	2		3	8	
Boom/Crane Truck	350	Diesel	2		3	8	
Puller	350	Diesel	1		2	8	
Static Truck/ Tensioner	350	Diesel	1		2	8	

Calcite Substation Project
Construction Equipment and Workforce Estimates by Activity
Construct 220 kV Transmission Line Loop-In & Gen-Tie

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Dump/Stake Bed Truck	350	Diesel	1		3	8	
LST Removal (6)				**6**	**2**		**1 Structure**
1-Ton Truck, 4x4	300	Gas	2		2	4	
Compressor Trailer	60	Diesel	1		2	8	
R/T Crane (M)	215	Diesel	1		1	8	
R/T Crane (L)	275	Diesel	1		1	8	
Dump Truck	350	Diesel	1		2	8	
Flat Bed Truck	400	Diesel	1		2	2	
LST Foundation Removal (7)				**4**	**2**		**1 Structure**
1-Ton Truck, 4x4	300	Gas	2		2	4	
Compressor Trailer	60	Diesel	1		2	8	
Backhoe/Front Loader	125	Diesel	1		2	8	
Dump Truck	350	Diesel	1		2	8	
Excavator	250	Diesel	1		2	2	
LST Foundation Installation (8)				**7**	**15**		**5 Structures**
1-Ton Truck, 4x4	300	Gas	2		15	4	
Boom/Crane Truck	350	Diesel	1		15	4	
Backhoe/Front Loader	125	Diesel	1		15	8	
Drill Rig	275	Diesel	1		8	8	
Dump Truck	350	Diesel	1		15	4	
Concrete Truck	350	Diesel	3		8	6	
LST Steel Haul (9)				**4**	**3**		**5 Structures**
1-Ton Truck, 4x4	300	Gas	1		3	8	
R/T Forklift	125	Diesel	1		3	4	
Flat Bed Truck	400	Diesel	1		3	8	
LST Steel Assembly (10)				**10**	**15**		**5 Structures**
1-Ton Truck, 4x4	300	Gas	3		15	4	
Compressor Trailer	60	Diesel	1		15	8	
R/T Forklift	125	Diesel	1		15	8	
R/T Crane (M)	215	Diesel	1		15	4	
LST Erection (11)				**12**	**15**		**5 Structures**
1-Ton Truck, 4x4	300	Gas	4		15	4	
Compressor Trailer	60	Diesel	1		15	8	
R/T Crane (L)	275	Diesel	1		8	8	

Calcite Substation Project
Construction Equipment and Workforce Estimates by Activity
Construct 220 kV Transmission Line Loop-In & Gen-Tie

WORK ACTIVITY				**ACTIVITY ESTIMATES**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Crane	400	Diesel	1		8	8	
H-Frame/3-Pole Foundation Installation (12)				**6**	**22**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		22	4	
Boom/Crane Truck	350	Diesel	1		22	4	
Backhoe/Front Loader	125	Diesel	1		22	8	
Drill Rig	275	Diesel	1		11	8	
Water Truck	300	Diesel	1		22	8	
Dump Truck	350	Diesel	1		22	8	
Concrete Truck	350	Diesel	3		10	6	
H-Frame/3-Pole Structure Haul (13)				**4**	**2**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	1		2	8	
Boom/Crane Truck	350	Diesel	1		2	4	
Flat Bed Truck	400	Diesel	1		2	8	
H-Frame/3-Pole Structure Assembly (14)				**6**	**8**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		8	4	
Compressor Trailer	60	Diesel	1		8	8	
Manlift/Bucket Truck	250	Diesel	1		8	8	
R/T Crane (L)	275	Diesel	1		8	8	
H-Frame/3-Pole Structure Erection (15)				**6**	**10**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		10	4	
Compressor Trailer	60	Diesel	1		10	4	
Manlift/Bucket Truck	250	Diesel	1		10	8	
Crane	400	Diesel	1		10	8	
500 kV Conductor Transfer (16)				**16**	**6**		**.75 Circuit Miles**
1-Ton Truck, 4x4	275	Gas	4		6	4	
Manlift/Bucket Truck	250	Diesel	2		6	8	
Boom/Crane Truck	350	Diesel	2		6	8	
R/T Crane (L)	275	Diesel	2		6	4	
Backhoe/Front Loader	125	Diesel	1		6	4	
Sag Cat w/ Winches	350	Diesel	2		6	2	
Water Truck	300	Diesel	1		6	8	
Lowboy Truck/Trailer	450	Diesel	2		6	2	
220 kV Conductor & OHGW Installation (17)				**28**	**8**		**32,200 Feet**
1-Ton Truck, 4x4	275	Gas	8		8	4	

Calcite Substation Project
Construction Equipment and Workforce Estimates by Activity
Construct 220 kV Transmission Line Loop-In & Gen-Tie

WORK ACTIVITY				**ACTIVITY ESTIMATES**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Manlift/Bucket Truck	250	Diesel	4		8	8	
Boom/Crane Truck	350	Diesel	2		8	8	
R/T Crane (M)	215	Diesel	2		8	4	
Dump Truck	350	Diesel	1		8	4	
Wire Truck/Trailer	350	Diesel	2		6	8	
Sock Line Puller	300	Diesel	1		3	8	
Bullwheel Puller	350	Diesel	1		6	8	
Static Truck/ Tensioner	350	Diesel	1		8	8	
R/T Forklift	125	Diesel	1		6	8	
Spacing Cart	10	Diesel	3		2	8	
Backhoe/Front Loader	125	Diesel	1		8	4	
Sag Cat w/ Winches	350	Diesel	2		8	2	
Water Truck	300	Diesel	1		8	8	
Lowboy Truck/Trailer	450	Diesel	2		8	2	
Guard Structure Removal (18)				**6**	**2**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		2	8	
Compressor Trailer	60	Diesel	1		2	4	
Manlift/Bucket Truck	250	Diesel	1		2	4	
Boom/Crane Truck	350	Diesel	1		2	8	
Flat Bed Truck	400	Diesel	1		2	8	
Restoration (19)				**7**	**5**		**3 Miles**
1-Ton Truck, 4x4	300	Gas	2		5	4	
Backhoe/Front Loader	125	Diesel	1		5	8	
Motor Grader	250	Diesel	1		5	4	
Water Truck	300	Diesel	1		5	8	
Drum Compactor	100	Diesel	1		5	4	
Lowboy Truck/Trailer	450	Diesel	1		5	2	

Crew Size Assumptions For:

1) Survey = one 4-man crew
2) Staging/Material Yards = one 4-man crew per yard
3) Roads & Pad Work = one 5-man crew
4) Guard Structure Installation = one 6-man crew
5) Conductor/GW Removal = one 14-man crew

6) LST Removal = one 6-man crew
7) LST Foundation Removal = one 4-man crew
8) LST Foundation Installation = one 7-man crew
9) LST Steel Haul = one 4-man crew
10) LST Steel Assembly = one 10-man crew
11) LST Erection = one 12-man crew
12) H-Frame/3-Pole Foundation Installation = one 6-man crew
13) H-Frame/3-Pole Haul = one 4-man crew
14) H-Frame/3-Pole Assembly = one 6-man crew
15) H-Frame/3-Pole Erection = one 6-man crew
16) Conductor Transfer = one 16-man crew
17) Conductor & GW Installation = one 28-man crew
18) Guard Structure Removal = one 6-man crew
19) Restoration = one 7-man crew
Note: All data provided in this table is based on planning level assumptions and may change following completion of more detailed engineering, identification of field conditions, availability of labor, material, and equipment, and any environmental and permitting requirements.

III. DISTRIBUTION SYSTEM FOR STATION LIGHT AND POWER

An extension of an existing 12 kV distribution circuit would be required to provide the temporary power for construction and permanent station light and power for Calcite Substation. The Calcite Substation Project calls for extending the existing 12 kV distribution circuit overhead westward on Haynes Road for approximately 2,000 feet by installing approximately 12 wood poles. See FIGURE SCE-6 POLE CONFIGURATION, and FIGURE SCE-7 POLE AND CROSSARM CONFIGURATION WITH RAPTOR GUARD.

The 12 kV distribution circuit would then extend underground heading west along Haynes Road under the existing California Highway 247 and transmission ROW and then turn north along the Calcite Substation driveway and into Calcite Substation. The total underground circuit extension length would be approximately 1700 ft. of which 1400 hundred feet is forecasted to have surface disturbance - See FIGURE SCE-1 PROPOSED AND ALTERNATIVE CALCITE SUBSTATION, DISTRIBUTION AND TELECOMMUNICATION LINES. These new facilities would also be utilized for installation of the required telecommunication fiber optic cables into Calcite Substation (described below in Section IV. Telecommunication Facilities).

The overhead conductor size is proposed to be 1/0 ACSR and the underground cable size is proposed to be a 1/0 aluminum jacketed concentric neutral cable. Circuit modification may be required to provide support for voltage regulating requirements such as new capacitors or voltage regulators. A pad-mount transformer would be installed on the Calcite Substation Property outside the Calcite Substation for temporary construction power. Additionally, new station light and power transformers would be installed within the Calcite Substation wall.

Materials needed for distribution construction activities would be stored at the proposed staging yard within the Calcite Substation Property described above. Two line trucks with three-person crews (6 people total) would be called upon to perform the work.

Construction Activities for Distribution Lines and Related Structures

For the locations that require overhead construction, components would be shipped by truck to the staging yard and then trucked to the individual sites. Poles and associated equipment would then be erected along the required routes. The permanent ground disturbance for each pole installation would be approximately 4.9 sq. ft. per pole and 0.1 sq. ft. per pole anchor. At some structure locations, vegetation may be removed and/or trimmed to accommodate the installation of overhead and/or underground distribution facilities.

Wire stringing includes all activities associated with installation of the distribution circuit conductors onto the distribution poles. This would include the installation of primary conductor, insulators, and dead-end hardware assemblies. These installations may also include vibration dampeners, weights, spacers and fault indicators. Insulators and stringing sheaves (rollers or travelers) may be attached to the conductors as part of the stringing activity, during the distribution pole erection process. The dimensions of the area needed for the stringing setups associated with conductor installation will vary depending on structure height and terrain conditions, but will not extend beyond the limits of the temporary construction use areas. At some wire stringing locations, vegetation may be removed and/or trimmed to accommodate the wiring stringing process.

For the locations that require the construction of a trench or underground structure, excavation activities would generally be done using a backhoe. The anticipated dimensions for the trench would be approximately 24 inches wide by approximately 51 inches deep, and by the lengths identified earlier in this section. Shields or trench shoring would then be temporarily installed for safety to brace the walls of the trench. The conduits would then be installed using spacers to create a duct bank consisting of two columns of three stacked 5-inch conduits apiece. The temporary shoring would be removed.

Underground structure excavation would typically be a maximum of three feet greater than the structure's width and length dimensions, as well as a maximum of four feet deeper than the structure's height. The backhoe would be used to place the excavated soil into the dump truck to haul away. The area of disturbance would be approximately 30 feet on either side of trench and on all sides of the underground structures. The conduits would then be encased in concrete with a minimum encasement of three inches on all sides. After the concrete encasement has hardened, the trench would be backfilled with 1.5 sack and sand slurry (which is a mix of sand and water with 1.5 bags of cement added with no aggregate). If repaving is necessary, this work would be performed in accordance with San Bernardino County permit requirements. Precast underground structures would typically be installed and backfilled with slurry.

Table SCE - 6

Distribution System Construction Activities
Construction Equipment and Workforce Estimates by Activity
Construct Distribution Line Extension for Station Light & Power

WORK ACTIVITY				ACTIVITY PRODUCTION			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Down Guys (2)				**6**	**2**		**Approx 2 Down Guys**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		2	8	1 Down Guy /Day
Bucket Truck	300	Diesel	1		2	8	
Install New Poles (2)				**6**	**6**		**12 Wood Poles**
1-Ton Pick-up Truck, 4x4	300	Diesel	2		6	8	2-Wood Pole/Day
30-Ton Crane Truck	300	Diesel	1		6	8	
Bucket Truck	300	Diesel	2		6	8	
40' Flat Bed Truck/ Trailer	350	Diesel	1		6	8	
Install Overhead Wire (2)				**6**	**2**		**2,000 Circuit Feet**
1-Ton Crew Cab Pick-up Truck, 4x4	300	Diesel	1		2	8	1,000 feet / Day
55’ Double Bucket Truck	350	Diesel	1		2	8	
Underground Cable Pulling (3) **& Transformer Installation**				**4**	**2**		**1,700 Circuit Feet**
1 - Ton Pick-up Truck, 4x4	300	Diesel	1		2	8	1,000 feet/Day
55’ Double Bucket Truck	350	Diesel	1		2	8	
Hydraulic Rewind Puller	300	Diesel	1		2	8	

DISTRIBUTION SYSTEM CONSTRUCTION ACTIVITIES CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY CONSTRUCT DISTRIBUTION LINE EXTENSION FOR STATION LIGHT & POWER							
WORK ACTIVITY				**ACTIVITY PRODUCTION**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Underground Cable Makeup (4)				**3**	**2**		
1- Ton Crew Cab, 4x4	300	Diesel	1		2	8	
55’ Double Bucket Truck	350	Diesel	1				
Underground Trenching, Structure Excavation Conduit				**4**	**3**		**Approx. 1,400 ft.**
1-Ton Pick-up Truck, 4x4	300	Diesel	1		3	8	500 ft./Day
Backhoe/Front Loader	200	Diesel	1		3	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	8	
4000 gallon Water Truck	350	Diesel	1		3	8	
Concrete Truck	350	Diesel	1		3	8	
Underground Boring, Casing and Conduit Installation				**4**	**3**		**Approx. 300 ft.**
1-Ton Pick-up Truck, 4x4	300	Diesel	1		3	8	100 ft./Day
Backhoe/Front Loader	200	Diesel	1		3	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	8	
Excavation and Boring Equipment	300	Diesel	1		3	8	
Restoration (4)				**7**	**1**		**1,400 feet**
1-Ton Crew Cab, 4x4	300	Diesel	2		1	2	1 Mile/Day
Water Truck	300	Diesel	1		1	8	

Project Feature	Project Qty.	Disturbed Acreage Calculation	Construction Disturbance Acreage	Temporary Disturbance Acreage	Acres Permanently Disturbed
Underground trench/duct for conduit	1	1,200 ft. x 2 ft.	0.055	0.055	0
Underground construction equipment work space	1	1,200 ft. x 28 ft.	0.771	0.771	0
Distribution line excavation pits	5	10 ft. x 24 ft.	0.0275	0.0275	0
Underground Highway crossing	1	No surface disturbance	No surface disturbance	No surface disturbance	No surface disturbance
Distribution line vault covers	3	4 ft. x 5 ft.	0.0005	0	0.0005
New Poles	12	2.5 ft. diameter (5.0 sq. ft.)	0.005	0	0.005
Down Guys	2	1 ft. x 1.25 ft.	0.0002	0	0.0002
Overhead construction equipment work space	1	125 ft. x 60 ft.	0.172	0.172	0
Total Estimated Disturbance Acreage			**1.0237**	**1.018**	**0.0057**

Distribution System for Station Light & Power	
Distribution Circuit Extension Length (Proposed)	3,400 ft. (0.65 miles)
Total Length Underground (U.G.)	1,400 ft.
-New U.G. Conduits Needed	1,400 ft
Total Length Overhead (O.H.)	2,000 ft.
-New Poles – O.H.	2,000 ft.
-New Poles Required	10
New Down Guys Required	2
Time and Resources to Construct(4 men per crew)	21 Crew Days
Total Man Days Required	105 Man Days

Crew Size Assumptions:
1. Trenching and Conduit Installation = one 4-man crew
2. Overhead Line Work = one 3-man crew
3. Underground Cable Makeup = one 3-man crew
4. Underground Cable Pulling = one 4-man crew
5. Pole replacement crew = one 4-man crew

IV. TELECOMMUNICATION FACILITIES

A telecommunication system would be required in order to provide monitoring and remote operation capabilities of the electrical equipment at Calcite Substation, transmission line protection, and Remedial Action Scheme (or “RAS”).

The SCE telecommunication facilities expected to be constructed as part of the Calcite Substation Project would include two approximately 1-mile long fiber optic cables to the nearest splice points on an OPGW that is expected to already be in place on the 500 kV Lugo-Mohave T/L by the time any work associated with the Calcite Substation Project commences.[3] See Figure SCE-1 PROPOSED AND ALTERNATIVE CALCITE SUBSTATION, DISTRIBUTION AND TELECOMMUNICATION LINES.

The first proposed fiber optic cable would start from Calcite Substation and would be installed along the new 12 kV distribution path previously described in Section III, including the new underground section under Haynes road, and the overhead along 12 new poles. The proposed line would turn north along an un-named dirt road for approximately 1,100 feet attaching to existing wood poles and arriving at the Barstow Repeater Communication Site ("CS"). The line would drop down in a new riser and continue underground for approximately 150 feet into an existing communication room within the CS.

The second proposed fiber optic cable would start from Calcite Substation and exit the substation to the south for approximately 400 feet in new underground conduit and then turn east onto Haynes Road for approximately 1,200 feet. The conduit would turn south-west on an existing access road for approximately 4,000 feet and then turn northwest to get to tower M29-T3 on the Lugo-Mohave T/L where the existing splice box is located. This underground conduit route would be built exclusively for telecommunications use.

Telecommunications Equipment

- New overhead/underground 96-strand fiber optic cable to connect the Calcite Substation to Barstow Repeater CS and to connect Calcite Substation to an existing splice box on M29-T3 on Lugo Mohave 500 kV T/L.
- The Calcite Substation MEER would also include a communication room for telecommunication equipment. The communication room would be equipped

[3] That OPGW is expected to be in place as a result of the anticipated completion of SCE's anticipated Eldorado Lugo Mohave ("ELM") Series Capacitors project. The ELM Series Capacitors project is a distinct and independent project being separately undertaken by SCE that has independent utility from the Calcite Substation Project. Completion and operation of the ELM Series Capacitors project would include OPGW which would be tapped in order to connect to the proposed Calcite Substation. Similarly, SCE also has another distinct and independent project with telecommunications equipment that, if constructed, would obviate the need to construct any other telecommunication facilities to support the Calcite Substation, namely, the Lugo-Victorville 500 kV Transmission Line Special Protection Scheme ("SPS") Project. In fact, SCE has already submitted a Standard Form 299 application to the U.S. Bureau of Land Management for authorization to complete the Lugo-Victorville 500 kV Transmission Line SPS Project, which also has independent utility from the Calcite Substation Project. In light of the fact that both the ELM Series Capacitors Project and the Lugo-Victorville 500 kV Transmission Line SPS Project, currently planned by SCE, would be constructed and placed into operation prior to the operation of Calcite Substation, SCE would not need to construct any further telecommunication facilities to support the Calcite Substation (other than the two 1-mile taps described above).

with AC power, AC-DC rectifiers, DC power, battery, overhead cable tray, redundant air conditioners, fiber terminating shelves, lightwave terminals, microwave terminals, channel equipment, communications alarm/switch equipment, data equipment and diverse fiber entry conduits for connection to outside plant fiber optic cables.

- New fiber optic multiplex equipment and channel equipment at Lugo, Pisgah, Victor, Kramer and Gale Substations and any other location necessary to support the communication requirements for the Calcite Substation Project.
- Replacement of existing poles if required, to be determined by final engineering.

Laydown Areas and Access Roads

Laydown areas may include the following existing SCE facilities:

- Victorville Service Center - Hesperia Rd, Victorville
- Apple Valley Sub – Deep Creek Rd, Apple Valley
- Calcite Substation Property – Barstow Rd. (Hwy. 247), Lucerne Valley
- Barstow Service Center – Rimrok Rd, Barstow

Construction Activities

SCE or its contractor crews would use standard construction methods to construct the required fiber optic cables. The crews would comply with all rules, regulations and standards while in their performance of the construction phase. Portions of the fiber optic cable would be constructed on existing overhead distribution and transmission wood and light duty steel poles. In addition, portions of the cable would be constructed on new overhead structures and newly constructed underground conduit system(s), subject to determination through final engineering. This project description is based on planning level assumptions. Exact details would be determined following completion of preliminary and final engineering, identification of field conditions, availability of labor, material, and equipment, and compliance with applicable environmental and permitting requirements.

Generally no hazardous material would be used in installing underground conduit, new wood communication poles, and the stringing of fiber-optic cables. There is generally no need for local services or utilities (such as water). Waste generated (which typically would include empty cable reels, cut-off pieces of fiber cable) would be disposed of at existing SCE facilities.

The cable crew would use existing roads or previously established roads to proceed with the function of cable installation when possible. Workforce estimates, equipment details, and disturbance totals are provided in Tables SCE – 7A through – 7D.

All Dielectric Self Supporting (ADSS) Installation on Poles

The overhead fiber optic cable would be installed by attaching cross arms on distribution poles. This would require the use of a bucket truck. One four-man crew and two trucks would be used. A crew can install up to 2,000 feet of cable in one day. A crew can complete three splices in one day.

Overhead ADSS stringing includes all activities associated with the installation of cables onto cross arms on existing wood pole structures. This activity includes the installation of vibration dampeners, and suspension and dead-end hardware assemblies. Stringing sheaves (rollers or travelers) are attached during the framing process. A standard wire stringing plan includes a sequenced program of events starting with determination of cable pulls and cable pulling equipment set-up positions. Advanced planning by supervision determines pulling locations, times, and safety protocols needed for ensuring that safe and quick installation of cable is accomplished.

Fiber optic cable pulls typically occur every 1,000 feet to 2,000 feet over flat or mountainous terrain. Fiber optic cable splices are required at the ends of each cable pull. Fiber optic cable pulls are the length of any given continuous cable installation process between two selected points along the existing overhead or underground structure line. Fiber optic cable pulls are selected, where possible, based on availability of pulling equipment and designated dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of fiber optic cable stringing and splicing equipment set ups. The dimensions of the area needed for stringing set ups varies depending upon the terrain; however, a typical stringing set up is 40 feet by 60 feet. Where necessary due to space limitations, crews can work from within a smaller area.

Distribution line poles would be replaced or inter-set poles would be installed if a pole does not meet wind load or ground clearance requirements with addition of fiber cable. Replacing distribution line poles requires a five-man crew, one pole trailer truck, one pole digger truck, and one crew truck. An approximate 30-foot x 40-foot work area is required for the work. A hole about eight feet in depth would be drilled next to the existing pole, and a new pole would be erected. A conductor would be transferred from the existing pole to the new pole and the old pole would be cut or removed.

Installation in Conduit

For the installation of the fiber optic cable in existing and new underground conduit, a high density polyethylene smooth wall innerduct would be used. Innerduct facilitates the installation of the fiber optic cable, provides protection, and helps identify the cable. The innerduct is installed first inside the conduit. The fiber optic cable is then installed inside the innerduct. For splicing OPGW cables, special Outside Plant Splicing Lab Vehicles and Foreman Trucks would be used. The work space required would be an approximately 30-foot by 40-foot area. The crew would bring the OPGW cable ends into the Splice Labs and splice together the two ends. After the cables are spliced, the splice case would be placed inside the OPGW splice cabinet. The slack loop would be coiled around the back of the cabinet.

Operation and Maintenance

Following the completion of project construction, operation of the new telecommunication facilities would commence. Inspection and maintenance activities would occur at least once per year. The frequency of inspection and maintenance activities would be on an as-needed basis.

Table SCE – 7A
Telecommunication Systems Construction Activities
Construction Equipment and Workforce Estimates by Activity
Construct Barstow Repeater CS - Calcite Fiber Optic Cable

Work Activity				**Activity Production**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install 5 foot Crossarm(1)				**4**	**3**		**4,500 ft**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	8	24 Crossarms /Day
Bucket Truck	300	Diesel	2		3	8	
Install Down Guys				**2**	**1**		**Approx 2 Down Guys**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		1	4	1 Down Guy /Day
Bucket Truck	300	Diesel	1		1	4	
Install Fiber Optic Cable (3)				**4**	**2**		**2 Circuit Miles**
¾-Ton Pick-up Truck, 4x4	300	Diesel	2		2	8	3,000 ft./Day
Bucket Truck	350	Diesel	2		2	8	
Splice Fiber Optic Cable				**4**	**4**		**2 Splices**
Splicing Lab	300	Diesel	2	2	8	4	
Underground Conduit				**5**	**2**		**Approx. 150 ft.**
¾-Ton Pick-up Truck, 4x4	300	Diesel	1		2	8	100 ft./Day
Backhoe/Front Loader	200	Diesel	1		2	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		2	8	
4000 gallon Water Truck	350	Diesel	1		2	8	
Concrete Truck	350	Diesel	1		1	8	**700 ft.**
Restoration (4)				**7**	**1**		**2 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		1	2	1 Mile/Day
Water Truck	300	Diesel	1		1	8	

Table SCE – 7B
Telecommunication Systems Construction Activities
Construction Equipment and Workforce Estimates by Activity
Construct Calcite tap to M29-T3 splice on OPGW

Work Activity				**Activity Production**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Fiber Optic Cable (3)				**4**	**8**		**2 Circuit Miles**
¾-Ton Pick-up Truck, 4x4	300	Diesel	2		8	8	3,000 ft./Day
Bucket Truck	350	Diesel	2		8	8	
Splice Fiber Optic Cable				**4**	**4**		**2 Splices**
Splicing Lab	300	Diesel	2	2	8	4	
Underground Conduit				**5**	**28**		**Approx. 6,000 ft.**
¾-Ton Pick-up Truck, 4x4	300	Diesel	1		28	8	200 ft./Day
Backhoe/Front Loader	200	Diesel	1		28	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		28	8	
4000 gallon Water Truck	350	Diesel	1		28	8	
Concrete Truck	350	Diesel	1		4	8	**700 ft.**
Restoration (4)				**7**	**34**		**2 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		34	2	1 Mile/Day
Water Truck	300	Diesel	1		34	8	

Table SCE - 7C
Telecommunication Fiber Optic Cable Summary

	Calcite to Repeater		**Calcite to M29-T3**
Fiber-Optic Cable Length (Proposed)	4,5000 ft. (1 mile)		5,600 ft. (1 mile)
Total Length Underground (U.G.)	1,700 ft.		5,600 ft.
-Existing U.G. Conduits	0 ft.		0 ft.
-New U.G. Conduits Needed	1,700 ft.		5,600 ft.
Total Length Overhead (O.H.)	2,800 ft.		0ft.
-On Existing Poles - O.H.	800 ft.		0 ft.
-On New Poles – O.H.	2,000 ft.		0 ft.
-Existing Poles	4		0
-New Poles Required	12		0
New Down Guys Required	2		0
Time and Resources to Construct(4 men per crew)	13 Crew Days		78 Crew Days

Total Man Days Required	52 Man Days		213 Man Days

Table SCE – 7D
Telecommunication Ground Disturbance Calculations

Telecommunication Route Project Feature	Qty.	Disturbed Acreage Calculation	Acres Disturbed During Construction	Acres To Be Restored	Acres Permanently Disturbed
Calcite – M29-T3					
Trenching	1	3ft X 5,600	.38 (16,800 sq. ft.)	.38 (16,800 sq. ft.)	.38 (16,800 sq. ft.)

V. PROJECT ALTERNATIVE

As a result of the project screening process, SCE identified one substation site alternative ("Alternative Substation Property"). See FIGURE SCE-2 CALCITE PROPOSED AND ALTERNATIVE SUBSTATION PROPERTY BOUNDARIES. Below are project components that would differ if the Alternative Substation Property were utilized instead of the proposed Calcite Substation Property.

Alternative Substation Property Location

The Alternative Substation Property is located on approximately 40 acres of land on the west side of California State Highway 247 in the County of San Bernardino. The substation would be constructed within the central portion of the parcel. Access to Highway 247 is anticipated to be provided via Waalew Road along the northern boundary of the parcel and approximately 1,000 feet of new access road to the Alternative Substation Property. See FIGURE SCE-2 CALCITE PROPOSED AND ALTERNATIVE SUBSTATION PROPERTY BOUNDARIES.

220 kV Transmission Line Loop-in

If constructed on the Alternative Substation Property, the Calcite Substation would be connected to the Lugo-Pisgah No. 1 220 kV Transmission Line transmission source line via a loop-in T/L. The loop-in would modify the Lugo-Pisgah No. 1 220 kV Transmission Line creating two new line segments: the Calcite-Lugo 220 kV T/L and the Calcite-Pisgah 220 kV T/L. Each new T/L segment entering into the Calcite Substation would be approximately 2,500 feet long. See FIGURE SCE-8 ALTERNATIVE SUBSTATION SITE-PROPOERTY AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES.

The routes for these new T/Ls would require crossing under SCE's Eldorado-Lugo and Lugo-Mohave 500 kV lines. Crossing under the 500 kV lines would require the addition of one 500 kV interset tower for each of the Eldorado-Lugo and Lugo-Mohave 500 kV lines to comply with GO 95 requirements. See FIGURE SCE-4 220 KV AND 500 KV LATTICE STEEL TOWER CONFIGURATION.

The new 220 kV T/Ls would require approximately 13 transmission structures, (*i.e.*, 12 single-circuit structures and one double-circuit structure). See FIGURE-8 ALTERNATIVE SUBSTATION SITE-PROPERTY AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES. Four single-circuit structures with heights ranging from approximately 50 feet to approximately 100 feet would be used to cross underneath the Eldorado-Lugo 500 kV and Lugo-Mohave 500 kV transmission lines. The path would then continue north to eight single-circuit structures with heights ranging from approximately 110 feet to approximately 160 feet. From there, the alignment turns north to one 220 kV double-circuit structure with an approximate height between 130 to 180 feet. See Figure SCE-4 220 AND 500 kV LATTICE STEEL TOWER CONFIGURATION for possible 220 kV Structure Configurations. The 220 kV double circuit TSP or LST would be located just outside of the substation wall (but within the proposed Calcite Substation Property). The conductor utilized would be 2B-1590 kcmil "Lapwing" Aluminum Conductor Steel Reinforced (ACSR) conductor or similar.

Additionally, one existing 220 kV LST in the existing SCE ROW would be removed since it would not be in use in the proposed configuration. The final combination of poles and towers will be determined during detailed engineering.

The 13 new structures would require a new ROW ranging between approximately 250 and 400 feet wide (depending on structure types and line crossings) from SCE's existing ROW to the new proposed Calcite Substation Property See FIGURE SCE-8 ALTERNATIVE SUBSTATION SITE-PROPERTY AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES.

Tables SCE – 8A and SCE – 8B below provide land disturbance and equipment work force estimates, respectively, for the alternative option.

Table SCE – 8A
Land Disturbance for Transmission Loop-In and SCE Portion of Gen-tie Construction (Alternative)

Project Feature	Project Quantity	Disturbed Acreage Calculation	Construction Disturbance Acreage	Temporary Disturbance Acreage	Permanent Disturbance Acreage
Guard Structures	4	150' x 50'	0.7	0.7	0
Remove Existing Lattice Steel Tower (1)	1	220' x 220'	1.1	1.1	0
Construct New Lattice Steel Tower (2)	9	220' x 220'	10.0	7.7	2.3
Construct New Steel H-Frame Pole (2)	2	200' x 200'	1.8	1.6	0.2
Construct New 3-Pole Structure (2)	2	200' x 200'	1.8	1.6	0.2
Construct New Gen-Tie Structure (2)	2	220' x 220'	2.2	1.7	0.5
220 kV Conductor Stringing Area (3)	9	500' x 150'	15.5	15.5	0
500 kV Conductor Stringing Area (3)	2	850' x 150'	5.9	5.9	0
Existing Tower Work Area	6	100' x 100'	1.4	1.4	0
New Access Roads (4)	0.9	linear miles x 18' wide	2.0	0	2.0
Access Road and Tower Buffers	2.3	linear miles x 10' wide buffer	2.8	2.8	0
Material & Equipment Staging Yard - (Calcite)	1	approx. 5 acres	5	5	0
Total Estimated Disturbance Acreage (5)			**50.2**	**45.0**	**5.2**

Notes:
1. Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2' below ground surface.
2. Includes structure assembly & erection, conductor & OHGW installation. Area to be restored after construction. Portion of R/W within 20' of ALL structures to remain cleared of vegetation. Permanently disturbed areas for H-Frame/3-Pole=0.08 acre.
3. Based on standard conductor reel lengths, conductor size, number of circuits, route design, and terrain.
4. Based on approximate length of road in miles X drivable road width of 14'-22' w/ 2' of berm on each side of road.
5. The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.

Foundation / Base Volume and Area Calculations (approximate):
LST: 4 per structure, 32-ft deep, 3.5-ft diameter; Earth removed for footings = 45.6 cu.yds; Surface area = 38.5 sqft
H-Frame: 2 per structure, 30-ft deep, 6-ft diameter; Earth removed for footings = 62.8 cu.yds; Surface area = 56.5 sqft
3-Pole: 3 per structure, 30-ft deep, 6-ft diameter; Earth removed for footings = 94.2 cu.yds; Surface area = 84.8 sqft

Table SCE - 8B

Construction Equipment And Workforce Estimates By Activity (Alternative)

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV TRANSMISSION LINE LOOP-IN & GEN-TIE (ALTERNATE)

WORK ACTIVITY				**ACTIVITY ESTIMATES**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Survey (1)				**4**	**4**		**4 Miles**
1-Ton Truck, 4x4	300	Gas	2		4	8	1 Mile
Staging/Material Yard (2)				**4**			**1 Yard**
1-Ton Truck, 4x4	300	Gas	2			4	
R/T Forklift	125	Diesel	1			4	
Ranger	50	Diesel	1		Duration of Project	4	
Generator	49	Diesel	1			8	
Water Truck	300	Diesel	2			8	
Road Work & Structure Pads (3)				**5**	**8**		**3 Miles & 15 Pads**
1-Ton Truck, 4x4	300	Gas	1		8	8	
Backhoe/Front Loader	125	Diesel	1		8	4	
Tracked Dozer	150	Diesel	1		8	8	
Motor Grader	250	Diesel	1		8	8	
Water Truck	300	Diesel	2		8	8	
Drum Compactor	100	Diesel	1		8	4	
Excavator	250	Diesel	1		4	4	
Lowboy Truck/Trailer	450	Diesel	1		8	2	
Guard Structure Installation (4)				**6**	**2**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		2	8	
Compressor Trailer	60	Diesel	1		2	4	
Manlift/Bucket Truck	250	Diesel	1		2	4	
Boom/Crane Truck	350	Diesel	1		2	8	
Auger Truck	210	Diesel	1		2	4	
Flat Bed Truck	400	Diesel	1		2	8	
Conductor & GW Removal (5)				**14**	**3**		**4,000 Feet**
1-Ton Truck, 4x4	300	Gas	4		3	4	
Manlift/Bucket Truck	250	Diesel	2		3	8	
Boom/Crane Truck	350	Diesel	2		3	8	
Puller	350	Diesel	1		2	8	

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV TRANSMISSION LINE LOOP-IN & GEN-TIE (ALTERNATE)

WORK ACTIVITY				**ACTIVITY ESTIMATES**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Static Truck/ Tensioner	350	Diesel	1		2	8	
Dump/Stake Bed Truck	350	Diesel	1		3	8	
LST Removal (6)				**6**	**2**		**1 Structure**
1-Ton Truck, 4x4	300	Gas	2		2	4	
Compressor Trailer	60	Diesel	1		2	8	
R/T Crane (M)	215	Diesel	1		1	8	
R/T Crane (L)	275	Diesel	1		1	8	
Dump Truck	350	Diesel	1		2	8	
Flat Bed Truck	400	Diesel	1		2	2	
LST Foundation Removal (7)				**4**	**2**		**1 Structure**
1-Ton Truck, 4x4	300	Gas	2		2	4	
Compressor Trailer	60	Diesel	1		2	8	
Backhoe/Front Loader	125	Diesel	1		2	8	
Dump Truck	350	Diesel	1		2	8	
Excavator	250	Diesel	1		2	2	
LST Foundation Installation (8)				**7**	**33**		**11 Structures**
1-Ton Truck, 4x4	300	Gas	2		33	4	
Boom/Crane Truck	350	Diesel	1		33	4	
Backhoe/Front Loader	125	Diesel	1		33	8	
Drill Rig	275	Diesel	1		17	8	
Dump Truck	350	Diesel	1		33	4	
Concrete Truck	350	Diesel	3		17	6	
LST Steel Haul (9)				**4**	**6**		**11 Structures**
1-Ton Truck, 4x4	300	Gas	1		6	8	
R/T Forklift	125	Diesel	1		6	4	
Flat Bed Truck	400	Diesel	1		6	8	
LST Steel Assembly (10)				**10**	**33**		**11 Structures**
1-Ton Truck, 4x4	300	Gas	3		33	4	
Compressor Trailer	60	Diesel	1		33	8	
R/T Forklift	125	Diesel	1		33	8	
R/T Crane (M)	215	Diesel	1		33	4	
LST Erection (11)				**12**	**33**		**11 Structures**
1-Ton Truck, 4x4	300	Gas	4		33	4	

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV TRANSMISSION LINE LOOP-IN & GEN-TIE (ALTERNATE)

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Compressor Trailer	60	Diesel	1		33	8	
R/T Crane (L)	275	Diesel	1		17	8	
Crane	400	Diesel	1		17	8	
H-Frame/3-Pole Foundation Installation (12)				**6**	**22**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		22	4	
Boom/Crane Truck	350	Diesel	1		22	4	
Backhoe/Front Loader	125	Diesel	1		22	8	
Drill Rig	275	Diesel	1		11	8	
Water Truck	300	Diesel	1		22	8	
Dump Truck	350	Diesel	1		22	8	
Concrete Truck	350	Diesel	3		10	6	
H-Frame/3-Pole Structure Haul (13)				**4**	**2**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	1		2	8	
Boom/Crane Truck	350	Diesel	1		2	4	
Flat Bed Truck	400	Diesel	1		2	8	
H-Frame/3-Pole Structure Assembly (14)				**6**	**8**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		8	4	
Compressor Trailer	60	Diesel	1		8	8	
Manlift/Bucket Truck	250	Diesel	1		8	8	
R/T Crane (L)	275	Diesel	1		8	8	
H-Frame/3-Pole Structure Erection (15)				**6**	**10**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		10	4	
Compressor Trailer	60	Diesel	1		10	4	
Manlift/Bucket Truck	250	Diesel	1		10	8	
Crane	400	Diesel	1		10	8	
500 kV Conductor Transfer (16)				**16**	**6**		**.75 Circuit Miles**
1-Ton Truck, 4x4	275	Gas	4		6	4	
Manlift/Bucket Truck	250	Diesel	2		6	8	
Boom/Crane Truck	350	Diesel	2		6	8	
R/T Crane (L)	275	Diesel	2		6	4	
Backhoe/Front Loader	125	Diesel	1		6	4	
Sag Cat w/ Winches	350	Diesel	2		6	2	
Water Truck	300	Diesel	1		6	8	
Lowboy Truck/Trailer	450	Diesel	2		6	2	

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV TRANSMISSION LINE LOOP-IN & GEN-TIE (ALTERNATE)

WORK ACTIVITY				**ACTIVITY ESTIMATES**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
220 kV Conductor & OHGW Installation (17)				**28**	**10**		**54,250 Feet**
1-Ton Truck, 4x4	275	Gas	8		10	4	
Manlift/Bucket Truck	250	Diesel	4		10	8	
Boom/Crane Truck	350	Diesel	2		10	8	
R/T Crane (M)	215	Diesel	2		10	4	
Dump Truck	350	Diesel	1		10	4	
Wire Truck/Trailer	350	Diesel	2		8	8	
Sock Line Puller	300	Diesel	1		5	8	
Bullwheel Puller	350	Diesel	1		8	8	
Static Truck/ Tensioner	350	Diesel	1		8	8	
R/T Forklift	125	Diesel	1		8	8	
Spacing Cart	10	Diesel	3		2	8	
Backhoe/Front Loader	125	Diesel	1		8	4	
Sag Cat w/ Winches	350	Diesel	2		8	2	
Water Truck	300	Diesel	1		10	8	
Lowboy Truck/Trailer	450	Diesel	2		10	2	
Guard Structure Removal (18)				**6**	**2**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		2	8	
Compressor Trailer	60	Diesel	1		2	4	
Manlift/Bucket Truck	250	Diesel	1		2	4	
Boom/Crane Truck	350	Diesel	1		2	8	
Flat Bed Truck	400	Diesel	1		2	8	
Restoration (19)				**7**	**6**		**3.5 Miles**
1-Ton Truck, 4x4	300	Gas	2		6	4	
Backhoe/Front Loader	125	Diesel	1		6	8	
Motor Grader	250	Diesel	1		6	4	
Water Truck	300	Diesel	1		6	8	
Drum Compactor	100	Diesel	1		6	4	
Lowboy Truck/Trailer	450	Diesel	1		6	2	

Distribution System for Substation Light and Power

To provide service for substation light and power at the Alternative Substation Property, approximately 4,000 feet of 12 kV overhead distribution line and approximately 1,000 feet of underground distribution line would be constructed in multiple sections to connect the existing distribution system along Waalew Road to the substation. This would require extending the 12 kV circuit overhead along Waalew Road (west-bound) approximately 3,000 feet and then extending approximately 300 feet underground to cross California Highway 247. The circuit would then extend approximately 1,000 feet overhead (south bound) towards the substation. Finally, approximately 700 feet of underground distribution line would then be constructed to serve the Alternative Substation Property. See FIGURE SCE-1 PROPOSED AND ALTERNATIVE CALCITE SUBSTATION, DISTRIBUTION AND TELECOMMUNICATION LINES.

The requirement for conductor sizes and types, circuit modifications for voltage regulation, substation light and power transformer size, the need for a laydown location or staging yard and workforce times and requirements would be the same as for the proposed Calcite Substation Project. To provide access to the new overhead distribution lines, a new access road approximately 2,000 feet long and approximately 16 feet wide would be constructed from Waalew Road and travel southbound to the Alternate Substation Property to the substation.

Table SCE – 9
Distribution System for Station Light and Power (Alternative)

DISTRIBUTION SYSTEM CONSTRUCTION ACTIVITIES CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY CONSTRUCT DISTRIBUTION LINE EXTENSION FOR STATION LIGHT & POWER							
WORK ACTIVITY				**ACTIVITY PRODUCTION**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Down Guys (2)				**6**	**10**		**Approx 10 Down Guys**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		10	8	1 Down Guy /Day
Bucket Truck	300	Diesel	1		10	8	
Install New Poles (2)				**6**	**13**		**25 Wood Poles**
1-Ton Pick-up Truck, 4x4	300	Diesel	2		13	8	2-Wood Pole/Day

30-Ton Crane Truck	300	Diesel	1		13	8	
Bucket Truck	300	Diesel	2		13	8	
40' Flat Bed Truck/ Trailer	350	Diesel	1		13	8	

DISTRIBUTION SYSTEM CONSTRUCTION ACTIVITIES
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT DISTRIBUTION LINE EXTENSION FOR STATION LIGHT & POWER

WORK ACTIVITY				**ACTIVITY PRODUCTION**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Overhead Wire (2)				**6**	**4**		**4,000 Circuit Feet**
1-Ton Crew Cab Pick-up Truck, 4x4	300	Diesel	1		4	8	1,000 feet / Day
55’ Double Bucket Truck	350	Diesel	1		4	8	
Underground Cable Pulling (3) **& Transformer Installation**				**4**	**1**		**700 Circuit Feet**
1 - Ton Pick-up Truck, 4x4	300	Diesel	1		1	8	1,000 feet/Day
55’ Double Bucket Truck	350	Diesel	1		1	8	
Hydraulic Rewind Puller	300	Diesel	1		1	8	
Underground Cable Makeup (4)				**3**	**2**		
1- Ton Crew Cab, 4x4	300	Diesel	1		2	8	
55’ Double Bucket Truck	350	Diesel	1				
Underground Trenching, Structure Excavation Conduit				**4**	**2**		**Approx. 700 ft.**
1-Ton Pick-up Truck, 4x4	300	Diesel	1		2	8	500 ft./Day

Backhoe/Front Loader	200	Diesel	1		2	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		2	8	
4000 gallon Water Truck	350	Diesel	1		2	8	
Concrete Truck	350	Diesel	1		2	8	

DISTRIBUTION SYSTEM CONSTRUCTION ACTIVITIES
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT DISTRIBUTION LINE EXTENSION FOR STATION LIGHT & POWER

WORK ACTIVITY				**ACTIVITY PRODUCTION**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Underground Boring, Casing and Conduit Installation				**4**	**3**		**Approx. 300 ft.**
1-Ton Pick-up Truck, 4x4	300	Diesel	1		3	8	100 ft./Day
Backhoe/Front Loader	200	Diesel	1		3	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	8	
Excavation and Boring Equipment	300	Diesel	1		3	8	
Restoration (4)				**7**	**1**		**700 feet**
1-Ton Crew Cab, 4x4	300	Diesel	2		1	2	1 Mile/Day
Water Truck	300	Diesel	1		1	8	

Project Feature	Project Qty.	Disturbed Acreage Calculation	Construction Disturbance Acreage	Temporary Disturbance Acreage	Acres Permanently Disturbed
Underground trench/duct for conduit	1	700 ft. x 2 ft.	0.032	0.032	0
Underground construction equipment work space	1	700 ft. x 28 ft.	0.449	0.449	0

Distribution line excavation pits	10	10 ft. x 24 ft.	0.055	0.055	0
Underground Highway crossing	1	No surface disturbance	No surface disturbance	No surface disturbance	No surface disturbance
Distribution line vault covers	8	4 ft. x 5 ft.	0.0036	0	0.0036
New Poles	25	2.5 ft. diameter (5.0 sq. ft.)	0.0028	0	0.0028
Down Guys	10	1 ft. x 1.25 ft.	0.0002	0	0.0002
Overhead construction equipment work space	5	125 ft. x 60 ft.	0.86	0.86	0
Total Estimated Disturbance Acreage			**1.4026**	**1.396**	**0.0066**

Distribution System for Station Light & Power	
Distribution Circuit Extension Length (Proposed)	5000 ft. (0.95 miles)
Total Length Underground (U.G.)	1,000 ft.
-New U.G. Conduits Needed	1,000 ft
Total Length Overhead (O.H.)	4,000 ft.
-New Poles – O.H.	4,000 ft.
-New Poles Required	25
New Down Guys Required	10
Time and Resources to Construct(4 men per crew)	36 Crew Days
Total Man Days Required	199 Man Days

Crew Size Assumptions:
1. Trenching and Conduit Installation = one 4-man crew
2. Overhead Line Work = one 3-man crew
3. Underground Cable Makeup = one 3-man crew
4. Underground Cable Pulling = one 4-man crew
5. Pole replacement crew = one 4-man crew

Telecommunication Facilities

Except as discussed below, the telecommunication facilities associated with a project at the Alternative Substation Property instead of the Calcite Substation Property would be the same:

The first proposed fiber optic cable would start from the substation and would be installed overhead along the new 12 kV distribution path previously described in the alternative distribution section above, and then continue east approximately 1,400 feet, then south approximately 4,000 feet along existing poles, and finally arriving at the Barstow Repeater CS. The line would dip down into a new riser and continue underground for approximately 150 feet into an existing communication room within the CS.

For the splice box tap, the underground conduits would extend along the new ROW under the proposed 220 kV loop-in lines for approximately 2,000 feet.

The cable crew would use existing roads or previously established roads to proceed with the function of cable installation when possible. Workforce estimates, equipment details, and disturbance totals are provided in Tables SCE – 10A through – 10D.

Table SCE – 10A
Telecommunication Systems Construction Activities
Construction Equipment and Workforce Estimates by Activity
Construct Barstow Repeater CS - Calcite Fiber Optic Cable (Alternative)

Work Activity				**Activity Production**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install 5 foot Crossarm(1)				**4**	**6**		**7,500 ft**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		6	8	24 Crossarms /Day
Bucket Truck	300	Diesel	2		6	8	
Install Down Guys				**4**	**2**		**Approx 2 Down Guys**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		2	4	1 Down Guy /Day
Bucket Truck	300	Diesel	1		2	4	
Install Fiber Optic Cable (3)				**8**	**4**		**2 Circuit Miles**
¾-Ton Pick-up Truck, 4x4	300	Diesel	2		4	8	3,000 ft./Day
Bucket Truck	350	Diesel	2		4	8	
Splice Fiber Optic Cable				**4**	**4**		**Splices**
Splicing Lab	300	Diesel	2	2	10	4	
Underground Conduit				**5**	**12**		**Approx. 1,150 ft.**
¾-Ton Pick-up Truck, 4x4	300	Diesel	1		12	8	100 ft./Day
Backhoe/Front Loader	200	Diesel	1		12	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		12	8	
4000 gallon Water Truck	350	Diesel	1		12	8	
Concrete Truck	350	Diesel	1		11	8	**700 ft.**
Restoration (4)				**7**	**10**		**2 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		10	2	1 Mile/Day
Water Truck	300	Diesel	1		10	8	

Table SCE – 10B
Telecommunication Systems Construction Activities
Construction Equipment and Workforce Estimates by Activity
Construct Calcite tap to M29-T3 splice on OPGW (Alternative)

Work Activity				**Activity Production**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Fiber Optic Cable (3)				**4**	**11**		**2 Circuit Miles**
¾-Ton Pick-up Truck, 4x4	300	Diesel	2		11	8	3,000 ft./Day
Bucket Truck	350	Diesel	2		11	8	
Splice Fiber Optic Cable				**4**	**4**		**2 Splices**
Splicing Lab	300	Diesel	2	2	10	4	
Underground Conduit				**5**	**38**		**Approx. 7,6000 ft.**
¾-Ton Pick-up Truck, 4x4	300	Diesel	1		38	8	200 ft./Day
Backhoe/Front Loader	200	Diesel	1		38	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		38	8	
4000 gallon Water Truck	350	Diesel	1		38	8	
Concrete Truck	350	Diesel	1		6	8	**700 ft.**
Restoration (4)				**7**	**40**		**2 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		40	2	1 Mile/Day
Water Truck	300	Diesel	1		40	8	

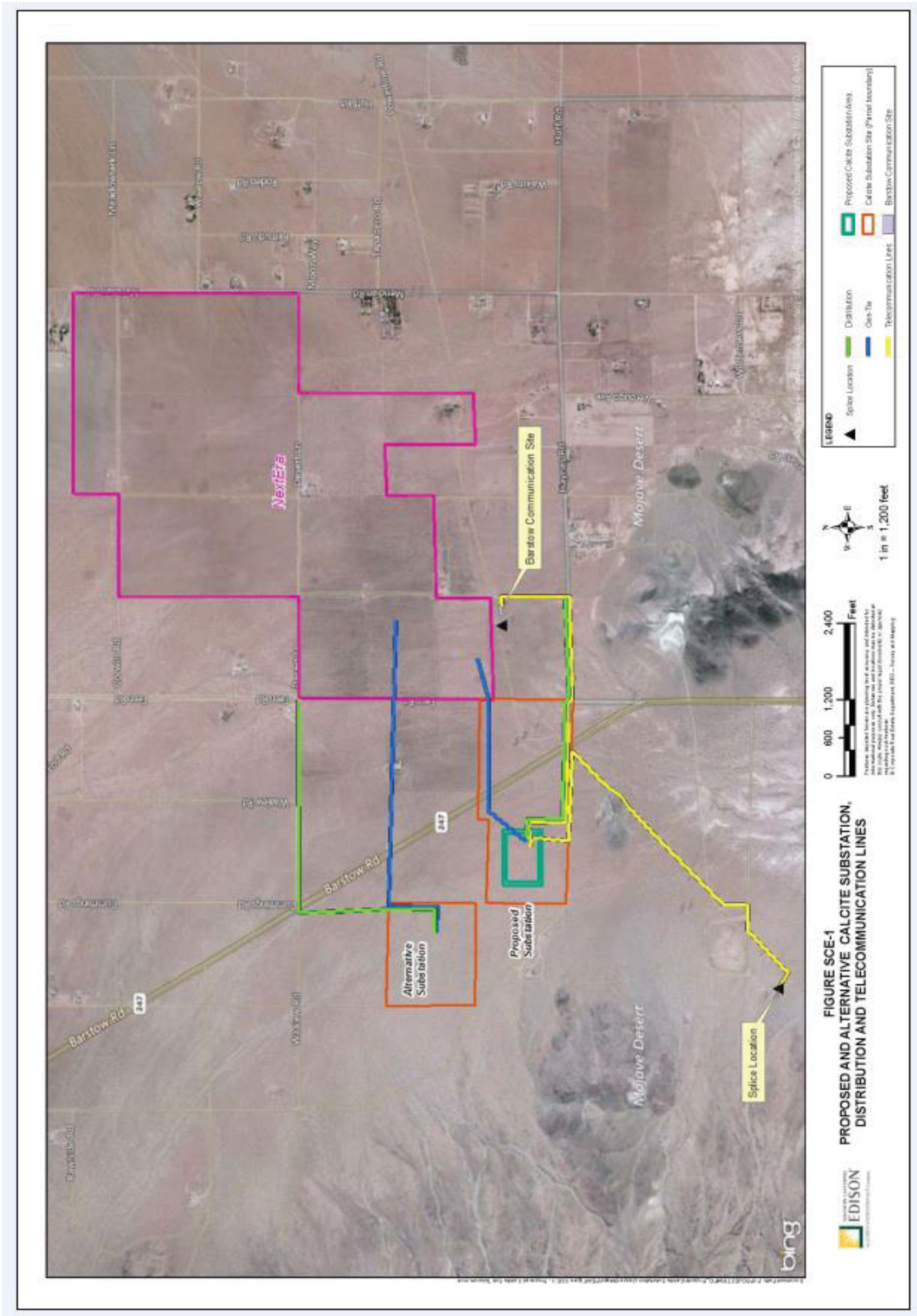
Table SCE - 10C
Telecommunication Fiber Optic Cable Summary (Alternative)

	Calcite to Repeater		**Calcite to M29-T3**
Fiber-Optic Cable Length (Proposed)	7,5000 ft. (1.5 mile)		7,600 ft. (1.5 mile)
Total Length Underground (U.G.)	1,000 ft.		5,600 ft.
-Existing U.G. Conduits	0 ft.		0 ft.
-New U.G. Conduits Needed	1,000 ft.		7,600 ft.
Total Length Overhead (O.H.)	6,500 ft.		0ft.
-On Existing Poles - O.H.	3500 ft.		0 ft.

-On New Poles – O.H.	4,000 ft.		0 ft.
-Existing Poles	25		0
-New Poles Required	25		0
New Down Guys Required	2		0
Time and Resources to Construct(4 men per crew)	44 Crew Days		103 Crew Days
Total Man Days Required	176 Man Days		412 Man Days

Table SCE – 10D
Telecommunication Ground Disturbance Calculations (Alternative)

Telecommunication Route Project Feature	Qty.	Disturbed Acreage Calculation	Acres Disturbed During Construction	Acres To Be Restored	Acres Permanently Disturbed
Calcite – M29-T3					
Trenching	1	3ft X 7,600	0.523 (22,800 sq. ft.)	0.523 (22,800 sq. ft.)	0.523 (22,800 sq. ft.)


NextEra
Barstow Communication Site
Mojave Desert
Proposed Substation
Alternative Substation
Splice Location
Barstow Rd
247
Mojave Desert
LEGEND
Splice Location
Distribution
Gen-Tie
Telecommunication Lines
Proposed Calcite Substation Area
Calcite Substation Site (Parcel boundary)
Barstow Communication Site
1 in = 1,200 feet
0 600 1,200 2,400 Feet
FIGURE SCE-1
PROPOSED AND ALTERNATIVE CALCITE SUBSTATION, DISTRIBUTION AND TELECOMMUNICATION LINES
EDISON
bing

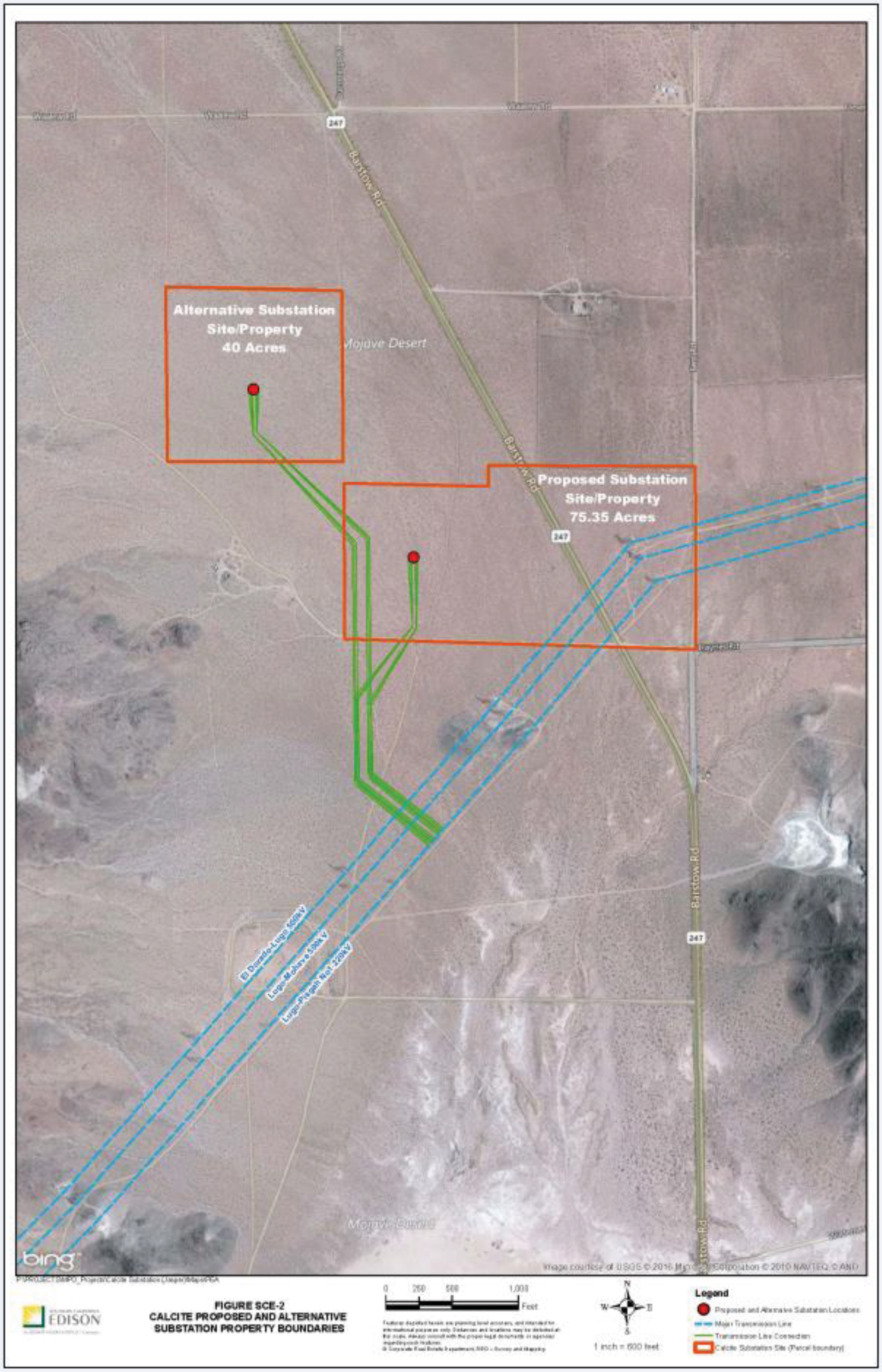


FIGURE SCE-2
CALCITE PROPOSED AND ALTERNATIVE SUBSTATION PROPERTY BOUNDARIES

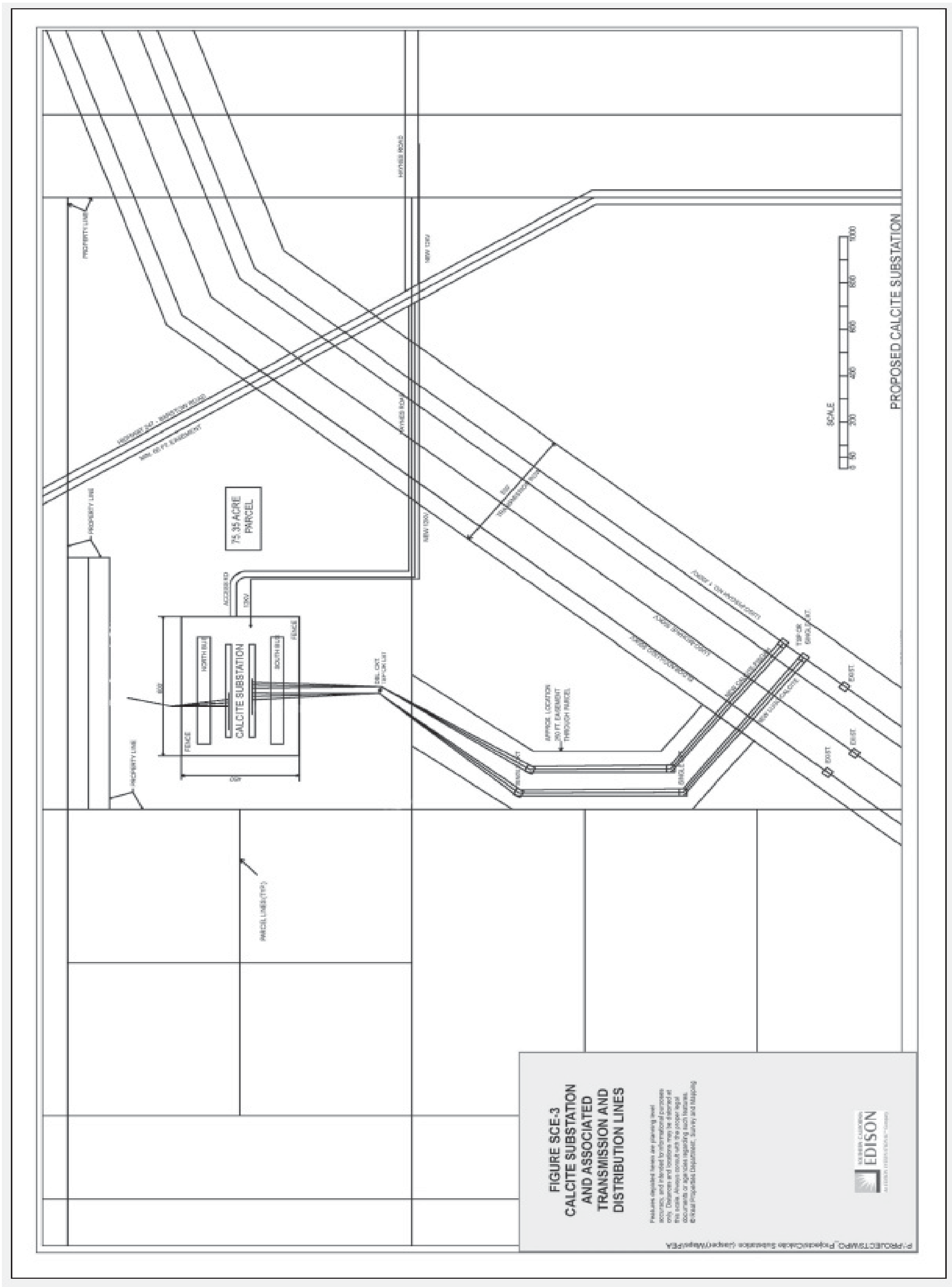
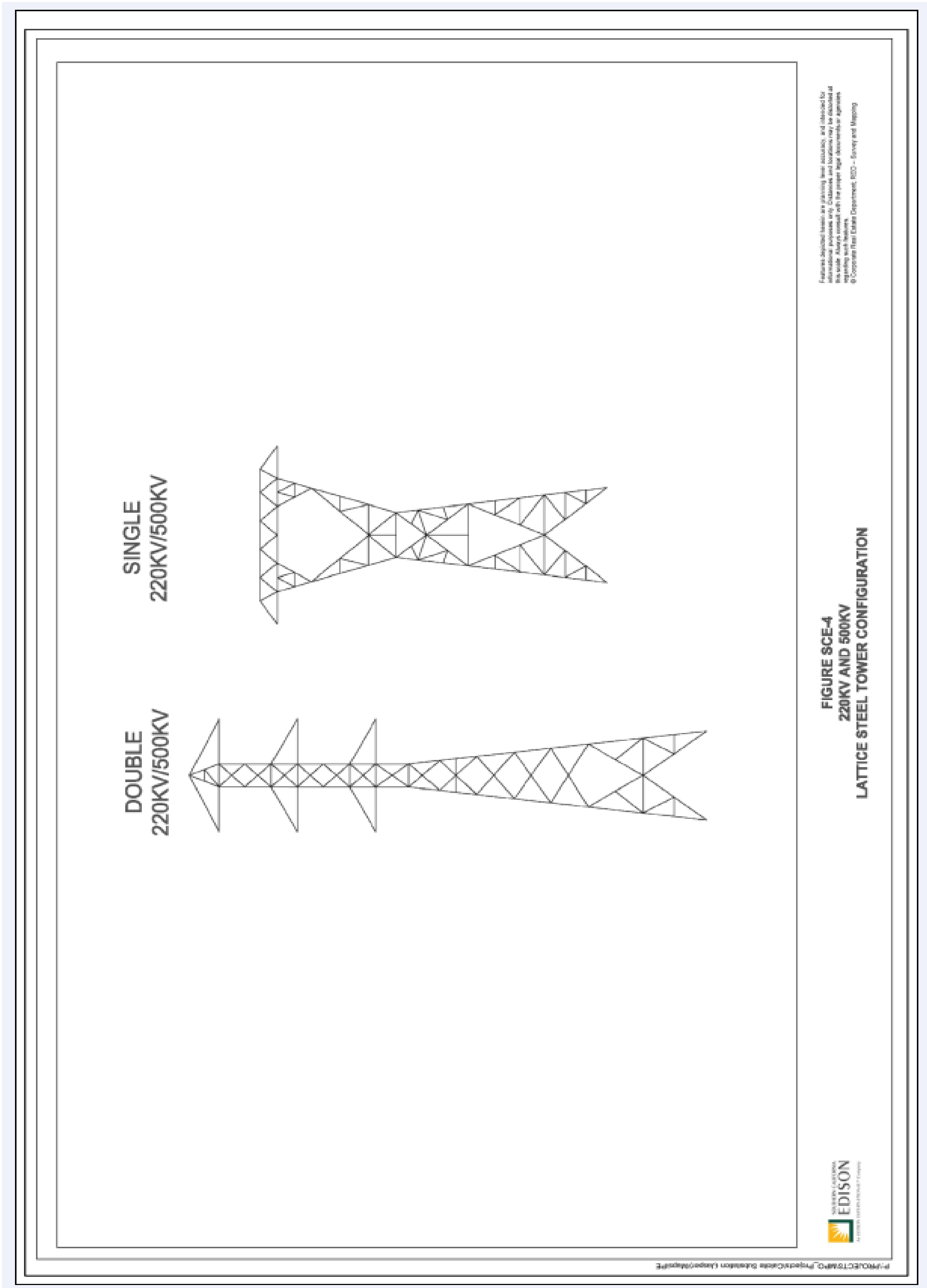
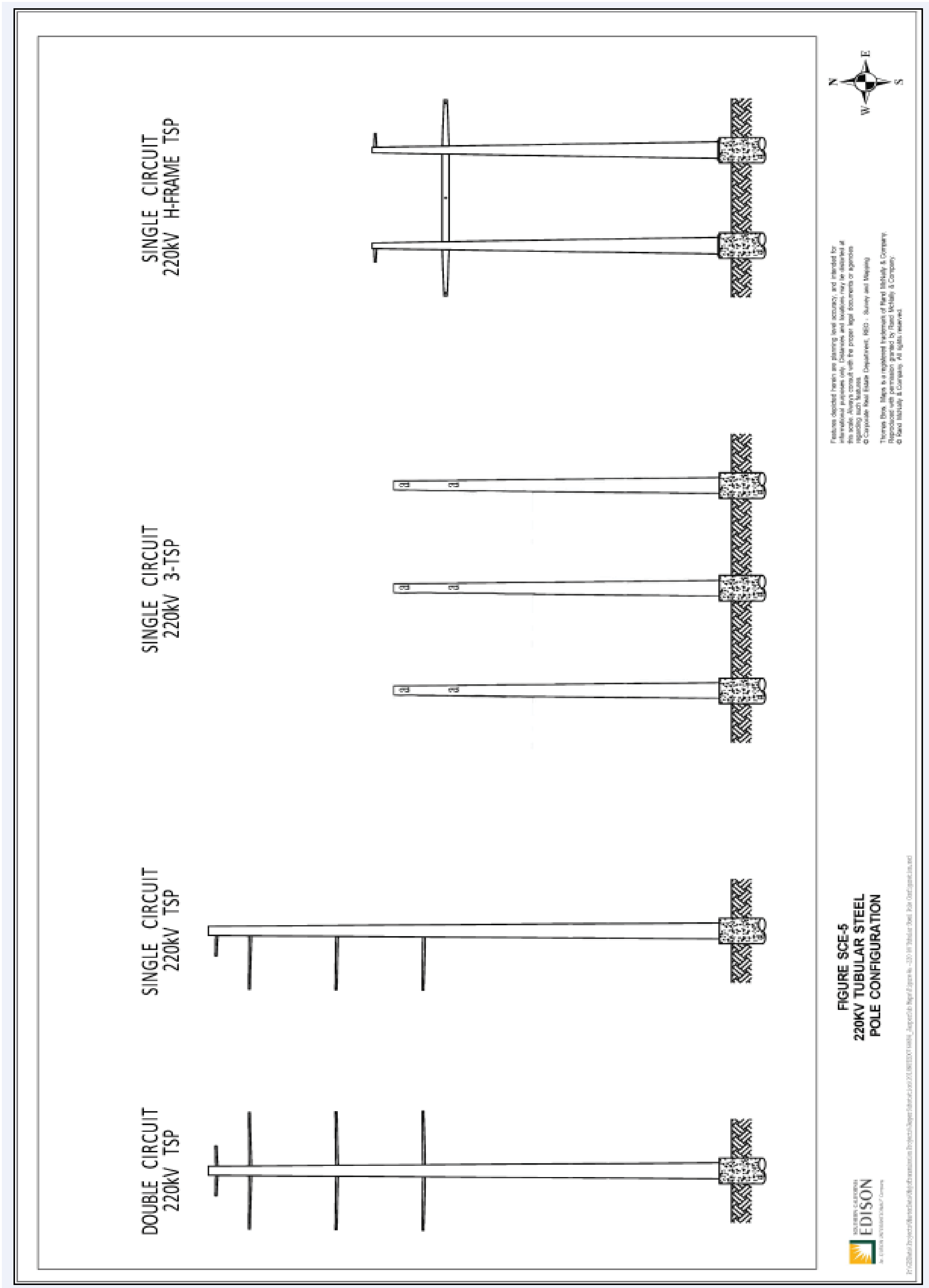


FIGURE SCE-3
CALCITE SUBSTATION
AND ASSOCIATED
TRANSMISSION AND
DISTRIBUTION LINES
PROPOSED CALCITE SUBSTATION
SCALE
CALCITE SUBSTATION
75.35 ACRE PARCEL
EDISON

1102

1103


DOUBLE
220KV/500KV
SINGLE
220KV/500KV
FIGURE SCE-4
220KV AND 500KV
LATTICE STEEL TOWER CONFIGURATION
EDISON


DOUBLE CIRCUIT
220kV TSP
SINGLE CIRCUIT
220kV TSP
SINGLE CIRCUIT
220kV 3-TSP
SINGLE CIRCUIT
220kV H-FRAME TSP
FIGURE SCE-5
220KV TUBULAR STEEL
POLE CONFIGURATION
EDISON
N
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1104

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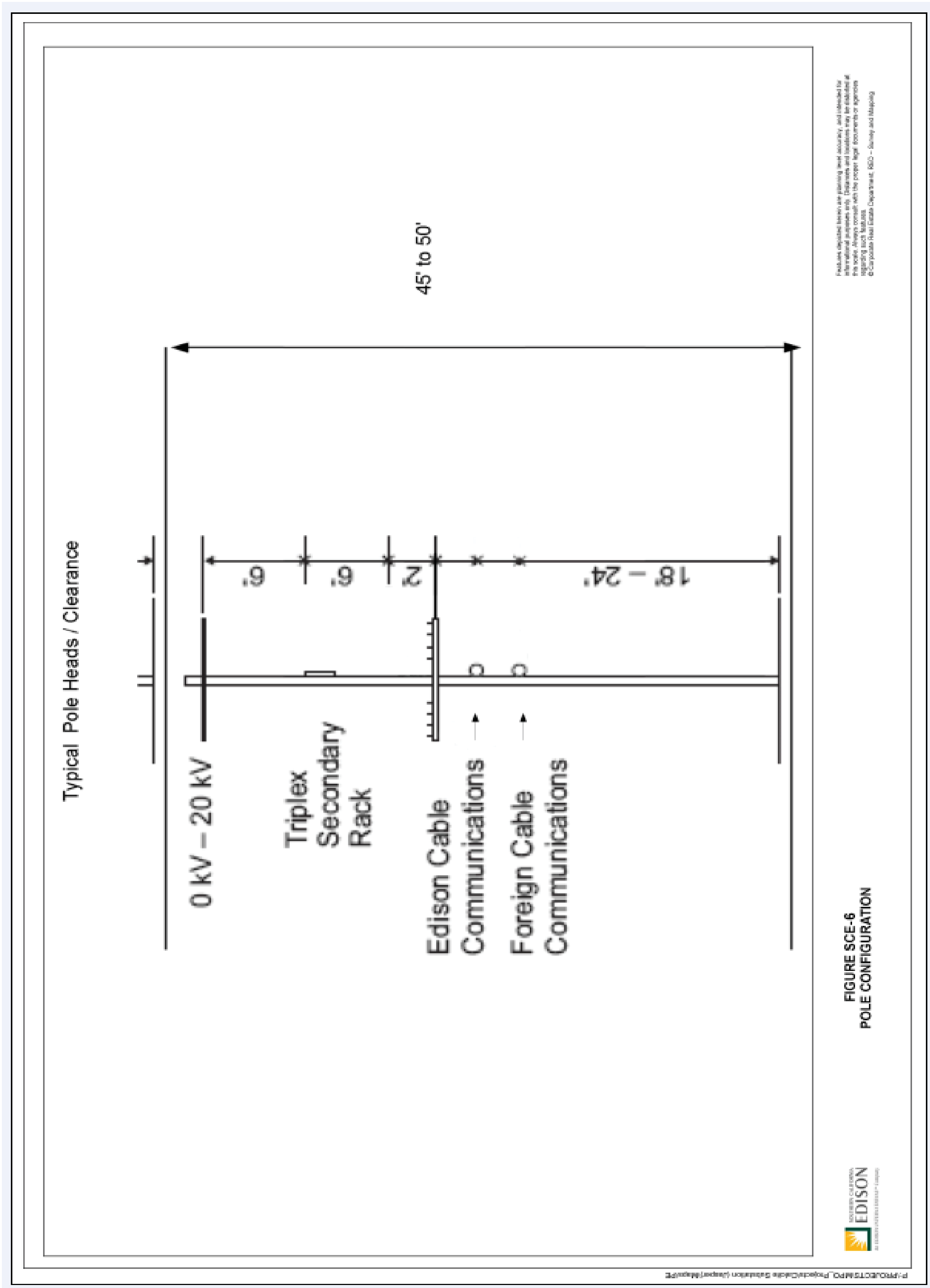
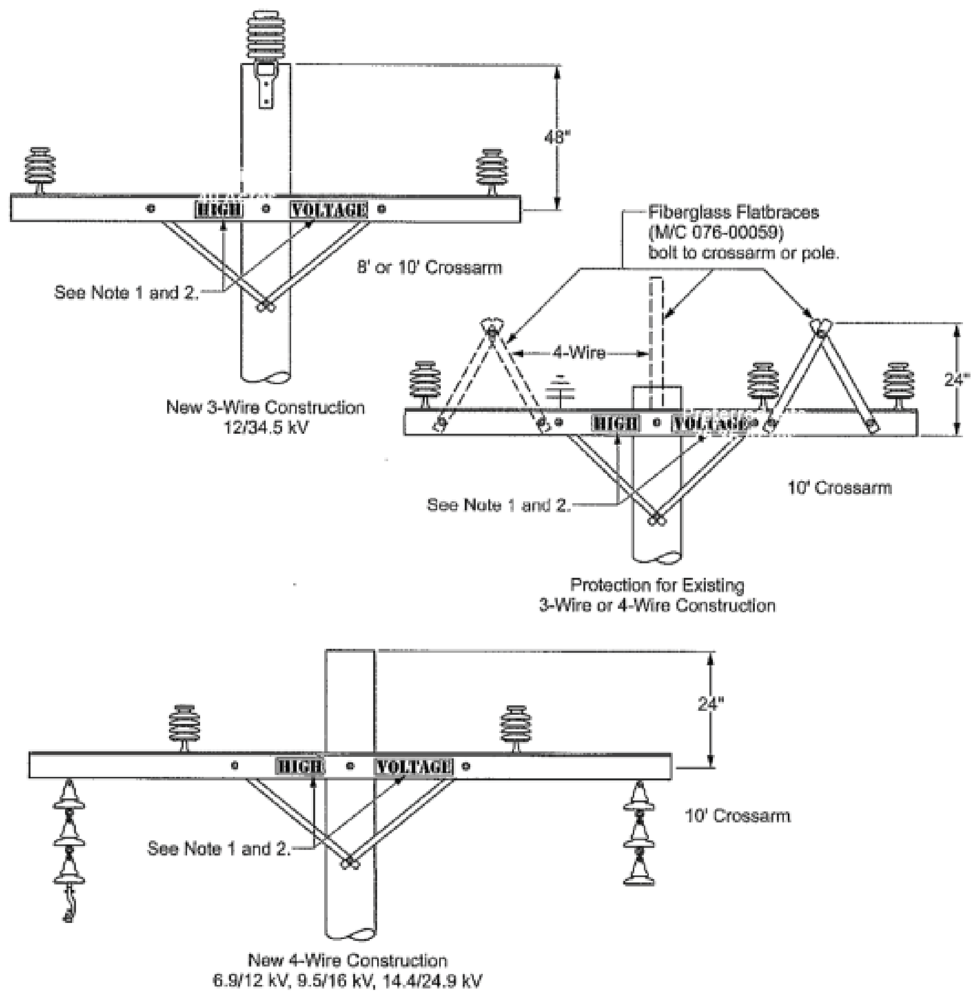


FIGURE SCE-6
POLE CONFIGURATION

DC 535 Raptor Construction

Scope DC 535.1 Construction for Protection of Bald or Golden Eagles and Other Large, Rare, Predatory Birds

Figure DC 535–1: Raptor Construction



Note(s):

1. HIGH VOLTAGE signs mounted on crossarm are for existing installations only. For new or replacement of deteriorated sign installations, encircle the pole with HIGH VOLTAGE sign per PO 120.

EDISON

FIGURE SCE-7
POLE AND CROSSARM CONFIGURATION
WITH RAPTOR GUARD

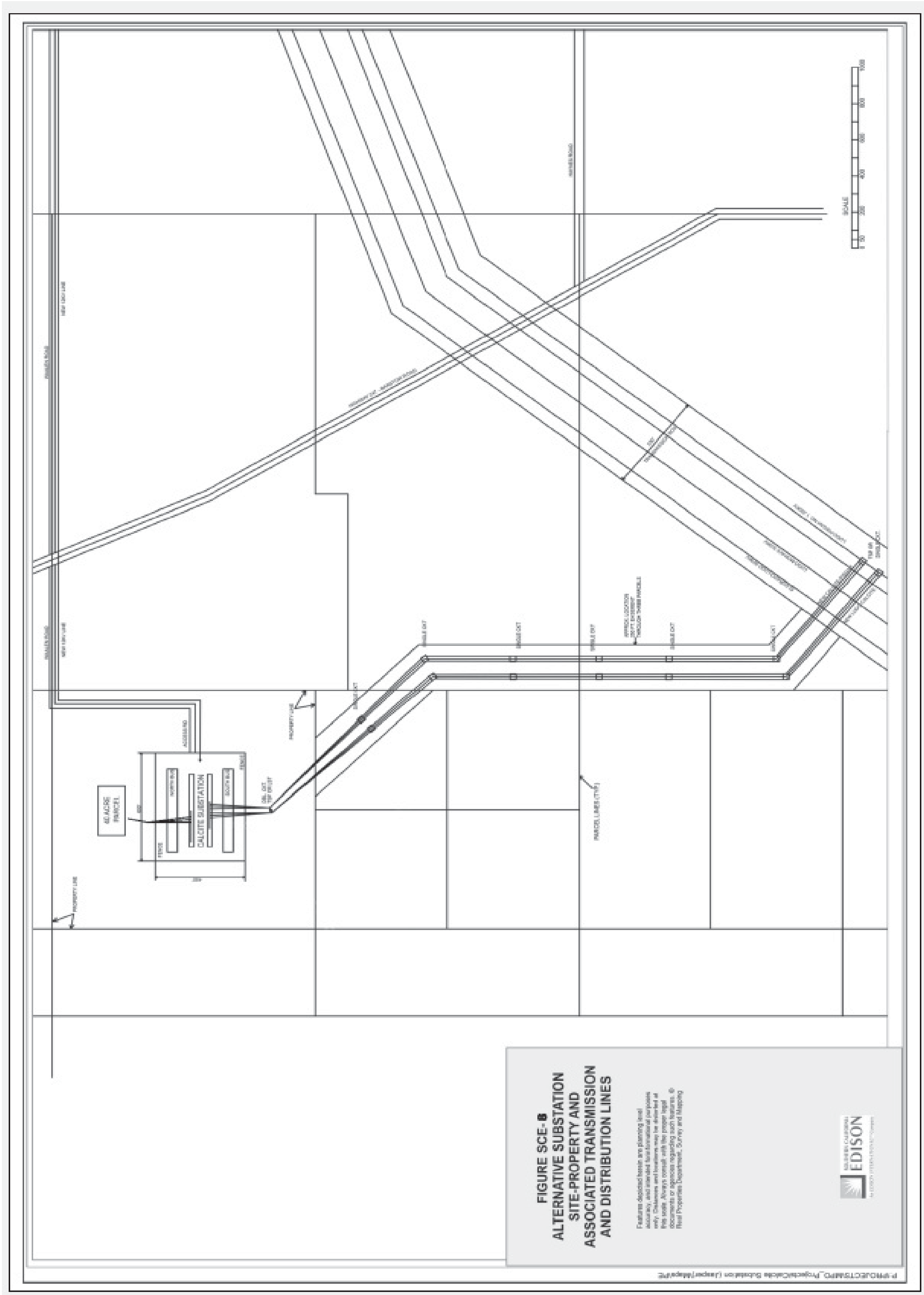


FIGURE SCE- 8
ALTERNATIVE SUBSTATION SITE-PROPERTY AND ASSOCIATED TRANSMISSION AND DISTRIBUTION LINES
EDISON

1107

Table A-1. Proposed Calcite Substation Project Construction Duration, Equipment and Workers by Activity

SCE Work Area	Activity	Duration	Equipment	Pieces	Workers
220 kV Substation	Survey	10 days	Pick-up Truck	2	4
	Grading	40 days	Pick-up Truck	1	10
			Dozer	1	
			Loader	2	
			Scraper	2	
			Grader	1	
			Dump Truck	2	
			Backhoe	2	
			Tamper	1	
			Tool Truck	1	
			Utility Cart	1	
			Water Truck	3	
	Fencing	25 days	Pick-up Truck	1	5
			Bobcat	1	
			Flatbed ruck	1	
			Utility Cart	1	
			Water Truck	1	
	Civil	60 days	Pick-up Truck	1	10
			Excavator	1	
			Lo-Drill/Auger	1	
			Backhoe	2	
			Bobcat	1	
			Dump Truck	2	
			Skip Loader	1	
			Forklift	1	
			Concrete Truck	2	
			Generator	1	
			Tool Truck	1	
			Utility Cart	2	
			Water Truck	2	
	MEER Install (Drop In)[1]	25 days	Pick-up Truck	1	7
			Bucket Truck	2	
			Stake Truck	1	
			Crane	1	
			Forklift	1	
			Tool Truck	1	
	Electrical[1]	70 days	Pick-up truck	2	10
			Scissor Lift	1	
			Bucket Truck	2	
			Reach Manlift	1	
			Crane	1	
			Forklift	1	
			Generator	1	
			Utility Cart	2	
			Tool Truck	1	
	Wiring[1]	65 days	Pick-up Truck	1	4
			Bucket Truck	1	
			Utility Cart	1	
	Maintenance and Testing	110 days	Pick-up Truck	1	6
			Test Truck	2	
	Paving	40 days	Pick-up Truck	2	6
			Stake Truck	1	
			Dump Truck	1	
			Asphalt Paver	1	
			Tractor	1	
			Paving Roller	2	
			Asphalt Curb Machine	1	
			Utility Cart	1	

Table A-1. Proposed Calcite Substation Project Construction Duration, Equipment and Workers by Activity

SCE Work Area	Activity	Duration	Equipment	Pieces	Workers
220 kV Transmission Line Loop-In & Gen-Tie[2]	Site Prep/Restoration	16 days	Pick-up Truck	5	15
			Forklift	1	
			Ranger	1	
			Generator	1	
			Backhoe	1	
			Dozer	1	
			Excavator	1	
			Grader	1	
			Drum Compactor	1	
			Dump Truck	1	
			Compressor Trailer	1	
			Water Truck	2	
			Lowboy Truck/Trailer	1	
	Structure Installation[1]	96 days	Pick-up Truck	10	32
			Compressor Trailer	2	
			Bucket Truck	2	
			Boom/Crane Truck	1	
			R/T Crane (M)	1	
			R/T Crane (L)	1	
			Crane	1	
			Drill Rig	1	
			Backhoe/Front Loader	1	
			Forklift	1	
			Dump Truck	2	
			Concrete Truck	3	
			Water Truck	2	
			Flatbed Truck	2	
	Conductor & GW Removal/Installation	20 days	Pick-up truck	10	30
			Bucket Truck	2	
			Boom/Crane Truck	2	
			Crane	1	
			Sockline Puller	1	
			Bullwheel Puller	1	
			Static Truck/ Tensioner	1	
			Sag Cat w/ Winches	2	
			Wire Truck/Trailer	1	
			R/T Forklift	1	
			Backhoe/Front Loader	1	
			Dump/Stake Bed Truck	1	
			Water Truck	2	
			Spacing Cart	3	
			Lowboy Truck/Trailer	2	
Distribution	Distribution Line Extension for Station Light & Power	21 days	Pick-up Truck	10	40
			Bucket Truck	6	
			30-Ton Crane Truck	1	
			Flat Bed Truck	3	
			Hydraulic Rewind Puller	1	
			Backhoe/Front Loader	2	
			Water Truck	2	
			Concrete Truck	1	
			Excavation and Boring Equipment	1	
Telecommunication Systems	Barstow Repeater and Calcite Tap[1]	87 days	Pick-up Truck	10	46
			Bucket Truck	7	
			Splicing Lab	4	
			Backhoe/Front Loader	2	
			Water Truck	4	
			Concrete Truck	2	
			Flat Bed Truck	4	

Table A-1. Proposed Calcite Substation Project Construction Duration, Equipment and Workers by Activity

SCE Work Area	Activity	Duration	Equipment	Pieces	Workers

[1]The following construction activities have been identified as likely to occur concurrently according to draft construction sequencing, and therefore represent an estimated peak activity level: 220 kV Substation MEER Installation, Electrical, and Wiring, Transmission Structure Installation, and Telecommunication Barstow Repeater and Calcite Tap. The maximum amount of workers is estimated based on the sum of workers from each of these concurrent activites: 99 workers

[2]The three general activity categories listed under 220 kV Transmission Line (Site Prep/Restoration, Structure Installation and Conductor & GW Removal/Installation) were developed for the purposes of the Air Quality Analysis, in order to estimate reasonable concurrent activities, and maximum amount of workers during Transmission Line construction. For detailed equipment and workforce estimates for a specific work activity/crew size at any given time, please refer to Appendix xx, "Construction Equipment and Workforce Estimates by Activity, Construct 220 kV Transmission Line Loop-In & Gen-Tie."

Emissions by Phases by area

			Emissions (pounds per day)							
			ROG	NOx	CO	SO2	PM10	PM2.5	PM10 dust	PM2.5 dust
onsite	220 kV Substation	Survey	0.0	0.0	0.0	0.0	0.0	0.0		
		Grading	6.2	70.1	41.5	0.1	2.8	2.6		
		Fencing	0.5	5.7	2.8	0.0	0.3	0.2		
		Civil	2.6	28.6	15.5	0.0	1.2	1.1		
		MEER Install (Drop In)1	0.4	5.4	3.3	0.0	0.2	0.2		
		Electrical1	1.1	11.9	9.6	0.0	0.6	0.6		
		Wiring1	0.2	1.6	1.2	0.0	0.1	0.1		
		Maintenance and Testing	0.0	0.1	0.0	0.0	0.0	0.0		
		Paving	1.2	14.4	10.1	0.0	0.7	0.6		
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	3.6	37.1	24.6	0.0	1.7	1.6		
		Structure Installation1	2.7	29.8	20.7	0.0	1.3	1.2		
		Conductor & GW Removal/Installation	2.8	31.5	21.3	0.0	1.3	1.2		
	Distribution	Distribution Line Extension for Station Light & Power	1.5	17.6	12.6	0.0	0.7	0.6		
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	1.5	17.7	12.6	0.0	0.7	0.6		
Employees	220 kV Substation	Survey	0.1	1.4	1.3	0.0	0.0	0.0	0.5	0.1
		Grading	0.1	3.5	3.3	0.0	0.0	0.0	1.2	0.3
		Fencing	0.1	1.7	1.6	0.0	0.0	0.0	0.6	0.1
		Civil	0.1	3.5	3.3	0.0	0.0	0.0	1.2	0.3
		MEER Install (Drop In)1	0.1	2.4	2.3	0.0	0.0	0.0	0.8	0.2
		Electrical1	0.1	3.5	3.3	0.0	0.0	0.0	1.2	0.3
		Wiring1	0.1	1.4	1.3	0.0	0.0	0.0	0.5	0.1
		Maintenance and Testing	0.1	2.1	2.0	0.0	0.0	0.0	0.7	0.2
		Paving	0.1	2.1	2.0	0.0	0.0	0.0	0.7	0.2
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	0.2	5.2	4.9	0.0	0.0	0.0	1.7	0.4
		Structure Installation1	0.4	11.1	10.4	0.0	0.1	0.1	3.7	0.9
		Conductor & GW Removal/Installation	0.4	10.4	9.8	0.0	0.1	0.1	3.5	0.9
	Distribution	Distribution Line Extension for Station Light & Power	0.5	13.8	13.0	0.0	0.1	0.1	4.6	1.2
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	0.6	15.9	15.0	0.1	0.1	0.1	5.3	1.3
Earthwork	220 kV Substation	Grading							5.8	3.0
	220 kV Transmission Line Loop-In & Gen-Tie2	Grading							8.8	3.6
	Distribution	Grading							6.1	3.3
Deliveries	-	-	0.1	28.7	1.2	0.1	0.0	0.0	1.5	0.4

Emissions by Phases by area

			Emissions (Metric Tons/day)				Emissions (Short Tons/day)			
			CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
onsite	220 kV Substation	Survey	0	0.0	0.0	0	0	0.0	0.0	0
		Grading	4	0.0	0.0	4	4	0.0	0.0	5
		Fencing	0	0.0	0.0	0	0	0.0	0.0	0
		Civil	2	0.0	0.0	2	2	0.0	0.0	2
		MEER Install (Drop In)1	0	0.0	0.0	0	0	0.0	0.0	0
		Electrical1	1	0.0	0.0	1	1	0.0	0.0	1
		Wiring1	0	0.0	0.0	0	0	0.0	0.0	0
		Maintenance and Testing	0	0.0	0.0	0	0	0.0	0.0	0
		Paving	1	0.0	0.0	1	1	0.0	0.0	1
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	2	0.0	0.0	2	2	0.0	0.0	2
		Structure Installation1	2	0.0	0.0	2	2	0.0	0.0	2
		Conductor & GW Removal/Installation	2	0.0	0.0	2	2	0.0	0.0	2
	Distribution	Distribution Line Extension for Station Light & Power	1	0.0	0.0	1	2	0.0	0.0	2
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	1	0.0	0.0	1	2	0.0	0.0	2
Employees	220 kV Substation	Survey	0	0.0	0.0	0	0	0.0	0.0	0
		Grading	1	0.0	0.0	1	1	0.0	0.0	1
		Fencing	0	0.0	0.0	0	0	0.0	0.0	0
		Civil	1	0.0	0.0	1	1	0.0	0.0	1
		MEER Install (Drop In)1	1	0.0	0.0	1	1	0.0	0.0	1
		Electrical1	1	0.0	0.0	1	1	0.0	0.0	1
		Wiring1	0	0.0	0.0	0	0	0.0	0.0	0
		Maintenance and Testing	1	0.0	0.0	1	1	0.0	0.0	1
		Paving	1	0.0	0.0	1	1	0.0	0.0	1
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	1	0.0	0.0	1	1	0.0	0.0	1
		Structure Installation1	3	0.0	0.0	3	3	0.0	0.0	3
		Conductor & GW Removal/Installation	3	0.0	0.0	3	3	0.0	0.0	3
	Distribution	Distribution Line Extension for Station Light & Power	4	0.0	0.0	4	4	0.0	0.0	4
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	4	0.0	0.0	4	4	0.0	0.0	5
Earthwork	220 kV Substation	Grading								
	220 kV Transmission Line Loop-In & Gen-Tie2	Grading								
	Distribution	Grading								
Deliveries	-	-	6	0.0	0.0	6	6	0.0	0.0	6

Total by Phase

			Emissions (pounds per day)							
			ROG	NOx	CO	SO2	PM10	PM2.5	PM10 dust	PM2.5 dust
Summary by Phase (including daily deliveries)	220 kV Substation	Survey	0.1	1.4	1.3	0.0	0.0	0.0	0.5	0.1
		Grading	6.3	73.5	44.8	0.1	2.8	2.6	21.8	10.2
		Fencing	0.6	7.5	4.4	0.0	0.3	0.2	0.6	0.1
		Civil	2.7	32.0	18.8	0.1	1.2	1.1	1.2	0.3
		MEER Install (Drop In)1	0.5	7.8	5.5	0.0	0.2	0.2	0.8	0.2
		Electrical1	1.3	15.4	12.9	0.0	0.6	0.6	1.2	0.3
		Wiring1	0.2	3.0	2.5	0.0	0.1	0.1	0.5	0.1
		Maintenance and Testing	0.1	2.2	2.0	0.0	0.0	0.0	0.7	0.2
		Paving	1.3	16.5	12.0	0.0	0.7	0.6	0.7	0.2
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	3.8	42.3	29.5	0.1	1.7	1.6	1.7	0.4
		Structure Installation1	3.1	40.9	31.1	0.1	1.4	1.3	3.7	0.9
		Conductor & GW Removal/Installation	3.2	41.8	31.1	0.1	1.3	1.2	3.5	0.9
	Distribution	Distribution Line Extension for Station Light & Power	2.0	31.4	25.6	0.1	0.8	0.7	4.6	1.2
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	2.1	33.6	27.6	0.1	0.8	0.7	5.3	1.3
		Overlap (lb/day)	7.4	129.4	80.8	0.3	3.2	2.9	12.9	3.3

Total by Phase

			Emissions (Metric Tons/day)				Emissions (Short Tons/day)			
			CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
Summary by Phase (including daily deliveries)	220 kV Substation	Survey	0	0.0	0.0	0	0	0.0	0.0	0
		Grading	5	0.0	0.0	5	5	0.0	0.0	5
		Fencing	1	0.0	0.0	1	1	0.0	0.0	1
		Civil	3	0.0	0.0	3	3	0.0	0.0	3
		MEER Install (Drop In)1	1	0.0	0.0	1	1	0.0	0.0	1
		Electrical1	2	0.0	0.0	2	2	0.0	0.0	2
		Wiring1	0	0.0	0.0	0	0	0.0	0.0	0
		Maintenance and Testing	1	0.0	0.0	1	1	0.0	0.0	1
		Paving	2	0.0	0.0	2	2	0.0	0.0	2
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	3	0.0	0.0	3	4	0.0	0.0	4
		Structure Installation1	5	0.0	0.0	5	5	0.0	0.0	5
		Conductor & GW Removal/Installation	5	0.0	0.0	5	5	0.0	0.0	5
	Distribution	Distribution Line Extension for Station Light & Power	5	0.0	0.0	5	5	0.0	0.0	5
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	5	0.0	0.0	6	6	0.0	0.0	6
		Overlap (lb/day)	19	0.0	0.0	19	21	0.0	0.0	21

Emissions by Phases by area

			ROG	NOx	CO	SO2	PM10	PM2.5	PM10 dust	PM2.5 dust
			Emissions (tones per year)							
onsite	220 kV Substation	Survey	0.0	0.0	0.0	0.0	0.0	0.0		
		Grading	0.1	1.4	0.8	0.0	0.1	0.1		
		Fencing	0.0	0.1	0.0	0.0	0.0	0.0		
		Civil	0.1	0.9	0.5	0.0	0.0	0.0		
		MEER Install (Drop In)1	0.0	0.1	0.0	0.0	0.0	0.0		
		Electrical1	0.0	0.4	0.3	0.0	0.0	0.0		
		Wiring1	0.0	0.1	0.0	0.0	0.0	0.0		
		Maintenance and Testing	0.0	0.0	0.0	0.0	0.0	0.0		
		Paving	0.0	0.3	0.2	0.0	0.0	0.0		
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	0.0	0.3	0.2	0.0	0.0	0.0		
		Structure Installation1	0.0	0.5	0.3	0.0	0.0	0.0		
		Conductor & GW Removal/Installation	0.0	0.5	0.3	0.0	0.0	0.0		
	Distribution	Distribution Line Extension for Station Light & Power	0.0	0.4	0.3	0.0	0.0	0.0		
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	0.0	0.4	0.3	0.0	0.0	0.0		
Employees	220 kV Substation	Survey	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Grading	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
		Fencing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Civil	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
		MEER Install (Drop In)1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Electrical1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
		Wiring1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Maintenance and Testing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Paving	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Structure Installation1	0.0	0.5	0.5	0.0	0.0	0.0	0.2	0.0
		Conductor & GW Removal/Installation	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
	Distribution	Distribution Line Extension for Station Light & Power	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	0.0	0.7	0.7	0.0	0.0	0.0	0.2	0.1
Earthwork	220 kV Substation	Grading							0.1	0.1
	220 kV Transmission Line Loop-In & Gen-Tie2	Grading							0.1	0.0
	Distribution	Grading							0.1	0.0
Deliveries	-	-	0.0	4.3	0.2	0.0	0.0	0.0	0.2	0.1

Emissions by Phases by area

			Metric Tons/yr CO2	Metric Tons/yr CH4	Metric Tons/yr N2O	Metric Tons/yr CO2e	Short Tons/yr CO2	Short Tons/yr CH4	Short Tons/yr N2O	Short Tons/yr CO2e
onsite	220 kV Substation	Survey	0	0.0	0.0	0	0	0.0	0.0	0
		Grading	161	0.1	0.0	163	177	0.1	0.0	180
		Fencing	9	0.0	0.0	9	10	0.0	0.0	10
		Civil	122	0.0	0.0	124	134	0.0	0.0	136
		MEER Install (Drop In)1	7	0.0	0.0	7	8	0.0	0.0	8
		Electrical1	63	0.0	0.0	64	69	0.0	0.0	70
		Wiring1	5	0.0	0.0	5	5	0.0	0.0	5
		Maintenance and Testing	1	0.0	0.0	1	2	0.0	0.0	2
		Paving	47	0.0	0.0	48	52	0.0	0.0	53
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	33	0.0	0.0	33	36	0.0	0.0	37
		Structure Installation1	64	0.0	0.0	65	71	0.0	0.0	72
		Conductor & GW Removal/Installation	66	0.0	0.0	67	72	0.0	0.0	74
	Distribution	Distribution Line Extension for Station Light & Power	56	0.0	0.0	57	62	0.0	0.0	62
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	65	0.0	0.0	66	72	0.0	0.0	73
Employees	220 kV Substation	Survey	0	0.0	0.0	0	0	0.0	0.0	0
		Grading	1	0.0	0.0	1	1	0.0	0.0	1
		Fencing	0	0.0	0.0	0	0	0.0	0.0	0
		Civil	1	0.0	0.0	1	1	0.0	0.0	1
		MEER Install (Drop In)1	1	0.0	0.0	1	1	0.0	0.0	1
		Electrical1	1	0.0	0.0	1	1	0.0	0.0	1
		Wiring1	0	0.0	0.0	0	0	0.0	0.0	0
		Maintenance and Testing	1	0.0	0.0	1	1	0.0	0.0	1
		Paving	1	0.0	0.0	1	1	0.0	0.0	1
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	1	0.0	0.0	1	1	0.0	0.0	1
		Structure Installation1	3	0.0	0.0	3	3	0.0	0.0	3
		Conductor & GW Removal/Installation	3	0.0	0.0	3	3	0.0	0.0	3
	Distribution	Distribution Line Extension for Station Light & Power	4	0.0	0.0	4	4	0.0	0.0	4
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	0	0.0	0.0	0	0	0.0	0.0	0
Earthwork	220 kV Substation	Grading								
	220 kV Transmission Line Loop-In & Gen-Tie2	Grading								
	Distribution	Grading								
Deliveries	-	-	1694	0.0	0.0	1707	1868	0.0	0.0	1882

Total by Phase

			Emissions (tones per year)							
			ROG	NOx	CO	SO2	PM10	PM2.5	PM10 dust	PM2.5 dust
Summary by Phase (including daily deliveries)	220 kV Substation	Survey	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Grading	0.1	1.5	0.9	0.0	0.1	0.1	0.2	0.1
		Fencing	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
		Civil	0.1	1.0	0.6	0.0	0.0	0.0	0.0	0.0
		MEER Install (Drop In)1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
		Electrical1	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0
		Wiring1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
		Maintenance and Testing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Paving	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0
		Structure Installation1	0.1	1.0	0.8	0.0	0.0	0.0	0.2	0.0
		Conductor & GW Removal/Installation	0.0	0.6	0.4	0.0	0.0	0.0	0.0	0.0
	Distribution	Distribution Line Extension for Station Light & Power	0.0	0.5	0.4	0.0	0.0	0.0	0.0	0.0
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	0.1	1.1	0.9	0.0	0.0	0.0	0.2	0.1
		Total Emissions	0.6	11.4	5.4	0.0	0.2	0.2	1.1	0.3

Total by Phase

			Emissions (Metric Tons/yr)				Emissions (Short Tons/yr)			
			CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
Summary by Phase (including daily deliveries)	220 kV Substation	Survey	0	0.0	0.0	0	0	0.0	0.0	0
		Grading	162	0.1	0.0	164	178	0.1	0.0	181
		Fencing	9	0.0	0.0	10	10	0.0	0.0	11
		Civil	123	0.0	0.0	124	135	0.0	0.0	137
		MEER Install (Drop In)1	8	0.0	0.0	8	9	0.0	0.0	9
		Electrical1	64	0.0	0.0	65	70	0.0	0.0	71
		Wiring1	5	0.0	0.0	5	6	0.0	0.0	6
		Maintenance and Testing	2	0.0	0.0	2	2	0.0	0.0	2
		Paving	48	0.0	0.0	48	53	0.0	0.0	53
	220 kV Transmission Line Loop-In & Gen-Tie2	Site Prep/Restoration	34	0.0	0.0	35	38	0.0	0.0	38
		Structure Installation1	67	0.0	0.0	68	74	0.0	0.0	75
		Conductor & GW Removal/Installation	68	0.0	0.0	69	75	0.0	0.0	76
	Distribution	Distribution Line Extension for Station Light & Power	59	0.0	0.0	60	65	0.0	0.0	66
	Telecommunication Systems	Barstow Repeater and Calcite Tap1	65	0.0	0.0	66	72	0.0	0.0	73
		Total Emissions	2408	0.2	0.1	2432	2655	0.2	0.1	2681

Material Handling (dust) Emission Calculations

Emissions based on Calculation Details in CalEEMod Users Guide. Refer to the "Demo-Grading Quantities" tab in the Construction Assumptions spreadsheet for source quantities

	total area (acres)	Dirt Volume (yd3)	bulldozing hr/day	#day	daily area (acres/d)	Daily dirt Volume (yd3/day)
220 kV Substation	18.00	33925.00	7.00	40	0.45	848.13
220 kV Transmission Line Loop-In & Gen-Tie2	42.20	202.60	8.00	16	2.64	12.66
Distribution	1.02	207.41	8.00	21	0.05	9.88

PM Emissions from Grading

E = A * EF

	Substation	Transmission	Distribution
PM10 E (lbs/day)	0.48	2.80	0.05
PM10 E (tons/year)	0.01	0.02	0.00
EF (lbs/acre)	1.06	1.06	1.06

	Substation	Transmission	Distribution
PM2.5 E (lbs/day)	0.05	0.30	0.01
PM2.5 E (tons/year)	0.00	0.00	0.00
EF (lbs/acre)	0.11	0.11	0.11

PM Emissions from Bulldozing

E = Hours * EF

	Substation	Transmission	Distribution
PM10 E (lbs/day)	5.27	6.02	6.02
PM10 E (tons/year)	0.04	0.05	0.06
EF (lbs/hr)	0.75	0.75	0.75

	Substation	Transmission	Distribution
PM2.5 E (lbs/day)	2.90	3.31	3.31
PM2.5 E (tons/year)	0.06	0.03	0.03
EF (lbs/hr)	0.41	0.41	0.41

PM Emissions from Truck Loading (soil only)

E = Ton Dirt * EF

	Substation	Transmission	Distribution
PM10 E (lbs/day)	0.04	0.00	0.00
PM10 E (tons/year)	0.00	0.00	0.00
EF (lbs/ton)	0.00	0.00	0.00

	Substation	Transmission	Distribution
PM2.5 E (lbs/day)	0.01	0.00	0.00
PM2.5 E (tons/year)	0.00	0.00	0.00
EF (lbs/ton)	0.00	0.00	0.00

Fugitive Dust Emission Factors from Earthwork and Demo Activities

Grading

Section 11.9, Western Surface Coal Mining

http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s09.pdf

Method

E = EF x VMT, and

VMT = As / Wb x 43560 / 5280

Variables

EF PM15	2.57091	lbs/VMT
EF PM10	1.542546	lbs/VMT
EF tsp	5.372864191	lbs/VMT
EF pm2.5	0.16655879	lbs/VMT
multiplier	0.051	-
multiplier	0.04	-
S, mean speed	7.1	Caleemod default
Fpm2.5, scaling factor	0.031	-
Fpm10 scaling	0.6	-
PM10EF (lbs/VMT from above)	1.542546	
W blade width (ft), use default	12	Caleemod default
conversion	43560	
conversion	5280	
acres (for lbs/acre emission rate)	1	
PM10 Emision Factor	1.060500375	lbs/acre uncontrolled
PM2.5 Emision Factor	0.114509168	lbs/acre uncontrolled

Bulldozing

Section 11.9, Western Surface Coal Mining

http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s09.pdf

Method

$$EF_{TSP} = \frac{C_{TSP} \times s^{1.2}}{M^{1.3}}, \text{ and } EF_{PM2.5} = EF_{TSP} \times F_{PM2.5}$$

$$EF_{PM15} = \frac{C_{PM15} \times s^{1.5}}{M^{1.4}}, \text{ and } EF_{PM10} = EF_{PM15} \times F_{PM10}$$

EF tsp	3.94	lbs/hr	
EF PM15	1.00	lbs/hr	
EF PM10	0.75	lbs/hr uncon	
EF PM2.5	0.41	lbs/hr uncon	
Ctsp	5.7		
CPM15	1.0		
Moisture	7.9	Caleemod default for bulldozing	
Silt	*6.9*	Caleemod default	
Fpm10	0.75		
Fpm2.5	0.105		
	0.75		
	7.169150089		9.558866786

Truck Loading

Section 13.2.4, Aggregate Handling and Storage Piles

http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0204.pdf

Method

E in lbs/ton = k(0.0032) (x) $\frac{(U/5)^{1.3}}{(M/2)^{1.4}}$

k pm10	0.35	AP-42 default
kpm2.5	0.053	AP-42 default
U	2.6	(m/s for San Diego County, caleemod)
M	12	Caleemod default for truck loading
	0.0032	
typical ton per cy of dirt	1.2641662	caleemod default
EF PM10	0.000039	lbs/ton of material
EF PM2.5	0.000006	lbs/ton of material
EF PM10	0.000031	lbs/CY
EF PM2.5	0.000005	lbs/CY

lbs/CY = lbs/ton / 1.2641662 tons per cy

Demo (dismemberment)

EF PM10	0.0011	lbs/ton
EF PM2.5	0.00017	lbs/ton

straight from caleemod appx A pg11

Demo loading

$EF_L = k \times EF_{L-TSP}$ 0.058 TSP lbs/ton

k pm10	0.35	AP-42 default
kpm2.5	0.053	AP-42 default
EF PM10	0.020300	lbs/ton of material
EF PM2.5	0.003074	lbs/ton of material

Summary (all uncontrolled)

	PM10	PM2.5		
Grading	1.061	0.115	lbs/acre	
Bulldozing	0.753	0.414	lbs/hour of construction	
Truck Loading/Piles	0.000039	0.000006	lbs/ton	
Demo (dismemberment)	0.0011	0.00017	lbs/ton	straight from caleemod appx A pg11
Demo (loading)	0.020300	0.003074	lbs/ton	converted from lbs/TSP as shown in caleemod appx A pg12

Re-entrained Paved Road Dust Emission Factor Calculation

Methodology

Calculation Methodology: USEPA AP-42, Paved Roads, Section 13.2.1, Revised January 2011:
http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf
Precip days:
http://www.wrcc.dri.edu/cgi-bin/cliGCStP.pl?ca7740
Avg Vehicle Weight and Silt Loading from ARB's method update (2014):
http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2014.pdf

Emission Factor Calculation

$$E_{ext} = [\, k\,(sL)^{0.91} \times (W)^{1.02}\,]\,(1 - P/4N)$$

Pollutant	Variables					Emission Factor
	k	sL	W	P	N	(grams per VMT)
PM10	1.00	0.1000	2.4	32	365	0.29389
PM2.5	0.25	0.1000	2.4	32	365	0.07347

E = particulate emission factor (grams of particulate matter/VMT)	
k = particle size multiplier (lb/VMT)	*default from AP-42*
sL = roadway silt loading (g/m2)	*ARB 2014 Table 8, see below*
W = average weight of vehicles on the road (tons)	*ARB 2014*
P = number of wet days with at least 0.254mm of precipitation	*CalEEmod Appx D*
N = number of days in the averaging period	*annual days (365)*

Re-entrained Unpaved Road Dust Emission Factors

Methodology

Calculation Methodology: USEPA AP-42,Unpaved Roads, Section 13.2.2, Revised November 2006

http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0202.pdf

Equation 1a (unpaved roads dominated by trucks)

Workers

	Pollutant	Variables					
		k	s	W	a	b	E (g/mile)
Uncontrolled	PM10	1.50	6.9%	2.40	0.90	0.45	5.9
	PM.25	0.15	6.9%	2.40	0.90	0.45	0.6
With Natural	PM10		deliveries	23.00			5.4
SB-Mojave	PM.25						0.5

Deliveries

	Pollutant	Variables					
		k	s	W	a	b	E (g/mile)
Uncontrolled	PM10	1.50	6.9%	23.20	0.90	0.45	16.5
	PM.25	0.15	6.9%	23.20	0.90	0.45	1.6
With Natural	PM10		deliveries				15.0
SB-Mojave	PM.25						1.5

k = particle size multiplier (lb/VMT)	AP-42, Table 13.2.2-2
s = surface material silt content (%)	CalEEMod
W = vehicle weight (tons)	Avg. of 33k and 60k for T6 and T7 for deliveries; light-duty truck for workers
a	AP-42, Table 13.2.2-2
b	AP-42, Table 13.2.2-2
g to lb conversion	0.002204623

Natural Precipitation Reduction

Equation 2, Section 13.2.2, page 13.2.2-7, based on number of days with measurable (more than 0.254 mm [0.01 inch]) precipitation

Eext = E[(365 - P) / 365]		reduction
PM10	5	9%
PM2.5	1	9%

p= precipitation Days greater than 0.254mm (0.01 in) 32

OFFROAD Equipment Type	Horsepower	CMOD High HP in bin	Load Factor
Aerial Lifts	63	50	0.31
Air Compressors	78	120	0.48
Bore/Drill Rigs	206	250	0.50
Cement and Mortar Mixers	9	15	0.56
Concrete/Industrial Saws	81	120	0.73
Cranes	226	250	0.29
Crawler Tractors	208	250	0.43
Crushing/Proc. Equipment	85	120	0.78
Dumpers/Tenders	16	15	0.38
Excavators	163	175	0.38
Forklifts	89	120	0.20
Generator Sets	84	120	0.74
Graders	175	175	0.41
Off-Highway Tractors	123	120	0.44
Off-Highway Trucks	400	500	0.38
Other Construction Equipment	172	175	0.42
Other General Industrial Equipment	88	120	0.34
Other Material Handling Equipment	167	175	0.40
Pavers	126	120	0.42
Paving Equipment	131	120	0.36
Plate Compactors	8	15	0.43
Pressure Washers	13	15	0.30
Pumps	84	120	0.74
Rollers	81	120	0.38
Rough Terrain Forklifts	100	120	0.40
Rubber Tired Dozers	255	250	0.40
Rubber Tired Loaders	200	250	0.36
Scrapers	362	500	0.48
Signal Boards	6	15	0.82
Skid Steer Loaders	65	75	0.37
Surfacing Equipment	254	250	0.30
Sweepers/Scrubbers	64	75	0.46
Tractors/Loaders/Backhoes	98	120	0.37
Trenchers	81	120	0.50
Welders	46	50	0.45
Chainsaws (gasoline)	1	5	0.5
Trimmers/Edgers/Brush Cutters (gasoline)	1	5	0.5
Chippers/Stump Grinders (gasoline)	18	25	0.78

Source: CalEEMOd Users Guide (UPDATED SEPTEMBER 2013)

General Assumptions

N2O_CO2 Diesel Equipment	0.000026	Climate Registry 2015	Gasoline	N2O = 4.16% * NOX	4.16%
CH4_CO2 Diesel Equipment	0.000057	Climate Registry 2015	Diesel	N2O = 0.3316 g/gallon fuel	0.000026
CH4_N2O Other	0.050000	EPA (included HFC)			
N2O_NOX Gasoline	0.041600	ARB EMFAC FAQs'			
lbs/gram	0.002204622				
kg/mt	1000				
mt/gram	0.000001				
mt/lbs	0.000453592				
ton/lbs	0.0005				
ton/gram	1.10E-06				
ton per cy conversion	1.2641662	CalEEMod			
ton per SF conversion	0.046	CalEEMod			
acre per SF conversion	2.30E-05				

CH4 GWP	25	AR4
N2O GWP	298	AR4

Employee Trip Milage	80	one-way
Haul Truck Trip Milage	80	one-way

	one way	r/t	mph
Distance by speed,	70	140	50
miles	9.75	19.5	25
	0.25	0.5	5

Paving ROG EF	2.62	lbs/acre	CalEEMod (no mitigation)	from AQMD
Grading PM10 EF	1.060500375	lbs/acre	CalEEMod (no mitigation)	
Grading PM2.5 EF	0.114509168	lbs/acre	CalEEMod (no mitigation)	
Bulldozing PM10 EF	0.752760759	lbs/hr	CalEEMod (no mitigation)	
Bulldozing PM2.5 EF	0.413778428	lbs/hr	CalEEMod (no mitigation)	
Truck loading PM10 EF	0.000039	lb/ton	CalEEMod (no mitigation)	
Truck loading PM2.5 EF	0.000006	lb/ton	CalEEMod (no mitigation)	
Demo PM10 EF	0.021400	lb/ton	CalEEMod (no mitigation)	
Demo PM2.5 EF	0.003244	lb/ton	CalEEMod (no mitigation)	

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