AIR QUALITY AND GHG IMPACT ANALYSES

PINON HILLS SOLAR PROJECT

COUNTY OF SAN BERNARDINO, CALIFORNIA

Prepared for:

EPD Solutions, Inc.
Attn: Rafik Albert
450 Newport Center Drive, Suite 300
Newport Beach, CA 92660

Prepared by:

Hans Giroux & Associates
1820 E. Garry Avenue #211
Santa Ana, CA 92705

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METEOROLOGY CLIMATE

The climate of the Victor Valley, technically called an interior valley subclimate of Southern California's Mediterranean-type climate, is characterized by hot summers, mild winters, infrequent rainfall, moderate afternoon breezes, and generally fair weather. The clouds and fog that form along the Southern California coastline rarely extend across the mountains to Victorville and surrounding high desert communities. The most important local weather pattern is associated with the funneling of the daily onshore sea breeze through El Cajon Pass into the upper desert to the northeast of the heavily developed portions of the Los Angeles Basin. This daily airflow brings polluted air into the area late in the afternoon from late spring to early fall. This transport pattern creates both unhealthful air quality as well as destroying the scenic vistas of the mountains surrounding the Victor Valley.

The low annual humidity, moderate temperature swings, very low rainfall and frequent breezy conditions are typical of California's "Upper Desert" subclimate. Most years do not see temperatures drop below about 20°F or above about 105°F. Occasionally, however, there are some very hot temperatures over 105°F with a record high of 113°F in 1995, and some colder temps down to a record low of -1°F in December, 1949.

The Victor Valley is located in a transition area between the semi-arid conditions of the Los Angeles Basin and the completely arid portions of the Mojave Desert. The Valley's location in the "rainshadow" of the San Gabriel Mountains further enhances its dryness. Rainfall averages around 6 inches per year .with light to moderate rain falling on only 10 days per year. Because of Southern California's location on the edge of the mid-latitude storm track, a shift in the jet stream aloft of a few hundred miles north or south can mean the difference between a year with twice the annual average rainfall and one with drought conditions where less than one-half of the normal rainfall is observed. The project area may occasionally experience a light winter snowfall (1-2 inches per year), but temperatures do not remain cold enough for the snow to stay on the ground for very long.

Winds blow primarily from south to north and from west to east in response to the regional pattern of airflow from the cool ocean to the heated interior. A large portion of the airflow across the proposed project area therefore has its origin in more developed areas of the Los Angeles Basin. Over 50 percent of all airflow derives from a narrow sector from south through west. These winds are moderately strong, averaging from 8-12 mph, but become light and variable at night with about 10 percent of all hours almost complete calm. Afternoon winds may, at times, exceed 20 mph and begin to pick up fine dust and other loose material.

The wind distribution is an important atmospheric parameter because it controls both the initial rate of pollutant dispersal near the source as well as the ultimate regional trajectory of air pollution. These prevailing winds provide a vehicle for visible smog to be transported from the South Coast Air Basin through the mountain passes to the Mojave Desert Air Basin (MDAB). The rapid daytime heating of the lower air leads to convective activity. This exchange of upper air tends to accelerate surface winds during the warm part of the day when convection is at a maximum. During the winter, the rapid cooling of the surface layers at night retards this exchange of momentum which often results in calm winds.

In addition to winds which govern the horizontal dispersion of locally generated emissions, vertical temperature structure controls the depth through which pollutants can be mixed. The strong surface heating by day in the Mojave Desert usually creates a vertical temperature distribution that decreases rapidly with height (unstable). At night, especially in winter, cool air settles in low-lying areas and forms shallow radiation-induced temperature inversions (stable) that may temporarily restrict the dispersion of low-level pollutant emissions. Such inversions "burn off" rapidly after sunrise. The elevated subsidence/marine inversions that create major air quality problems in coastal environments are rarely observed in the desert. When they do form, their bases are from 6 - 8,000 feet mean sea level and thus do not impede vertical dispersion. The low-level radiation inversions, however, play an important role in limiting the dispersive capacity of the local airshed from late evening to the next morning. Because they burn off rapidly in the morning, their importance to the dispersion of air contaminants is limited to localized effects.

AIR QUALITY SETTING

AMBIENT AIR QUALITY STANDARDS (AAQS)

In order to gauge the significance of the air quality impacts of the proposed Pinon Hills Solar project, those impacts, those impacts, together with existing background air quality levels, must be compared to the applicable ambient air quality standards. These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare. They are designed to protect those people most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise, called "sensitive receptors." Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed. Recent research has shown, however, that chronic exposure to ozone (the primary ingredient in photochemical smog) may lead to adverse respiratory health even at concentrations close to the ambient standard.

National AAQS were established in 1971 for six pollution species with states retaining the option to add other pollutants, require more stringent compliance, or to include different exposure periods. The initial attainment deadline of 1977 was extended several times in air quality problem areas like Southern California. In 2003, the Environmental Protection Agency (EPA) adopted a rule, which extended and established a new attainment deadline for ozone for the year 2021. Because the State of California had established AAQS several years before the federal action and because of unique air quality problems introduced by the restrictive dispersion meteorology, there is considerable difference between state and national clean air standards. Those standards currently in effect in California are shown in Table 1. Sources and health effects of various pollutants are shown in Table 2.

The Federal Clean Air Act Amendments (CAAA) of 1990 required that the U.S. Environmental Protection Agency (EPA) review all national AAQS in light of currently known health effects. EPA was charged with modifying existing standards or promulgating new ones where appropriate. EPA subsequently developed standards for chronic ozone exposure (8+ hours per day) and for very small diameter particulate matter (called "PM-2.5"). New national AAQS were adopted in 1997 for these pollutants.

Planning and enforcement of the federal standards for PM-2.5 and for ozone (8-hour) were challenged by trucking and manufacturing organizations. In a unanimous decision, the U.S. Supreme Court ruled that EPA did not require specific congressional authorization to adopt national clean air standards. The Court also ruled that health-based standards did not require preparation of a cost-benefit analysis. The Court did find, however, that there was some inconsistency between existing and "new" standards in their required attainment schedules. Such attainment-planning schedule inconsistencies centered mainly on the 8-hour ozone standard. EPA subsequently agreed to downgrade the attainment designation for a large number of communities to “non-attainment” for the 8-hour ozone standard.

Table 1

Ambient Air Quality Standards						
Pollutant	**Averaging Time**	**California Standards** [1]		**National Standards** [2]		
		Concentration [3]	**Method** [4]	**Primary** [3,5]	**Secondary** [3,6]	**Method** [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[9]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[9]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[9]	—	
Lead[10,11]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[11]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[12]	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page …

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Table 1 (continued)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

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

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

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

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

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

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

9. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

   Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

11. 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 one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

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

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Table 2
Health Effects of Major Criteria Pollutants

Pollutants	Sources	Primary Effects
Carbon Monoxide (CO)	• Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust. • Natural events, such as decomposition of organic matter.	• Reduced tolerance for exercise. • Impairment of mental function. • Impairment of fetal development. • Death at high levels of exposure. • Aggravation of some heart diseases (angina).
Nitrogen Dioxide (NO_2)	• Motor vehicle exhaust. • High temperature stationary combustion. • Atmospheric reactions.	• Aggravation of respiratory illness. • Reduced visibility. • Reduced plant growth. • Formation of acid rain.
Ozone (O_3)	• Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	• Aggravation of respiratory and cardiovascular diseases. • Irritation of eyes. • Impairment of cardiopulmonary function. • Plant leaf injury.
Lead (Pb)	• Contaminated soil.	• Impairment of blood function and nerve construction. • Behavioral and hearing problems in children.
Fine Particulate Matter (PM-10)	• Stationary combustion of solid fuels. • Construction activities. • Industrial processes. • Atmospheric chemical reactions.	• Reduced lung function. • Aggravation of the effects of gaseous pollutants. • Aggravation of respiratory and cardio respiratory diseases. • Increased cough and chest discomfort. • Soiling. • Reduced visibility.
Fine Particulate Matter (PM-2.5)	• Fuel combustion in motor vehicles, equipment, and industrial sources. • Residential and agricultural burning. • Industrial processes. • Also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.	• Increases respiratory disease. • Lung damage. • Cancer and premature death. • Reduces visibility and results in surface soiling.
Sulfur Dioxide (SO_2)	• Combustion of sulfur-containing fossil fuels. • Smelting of sulfur-bearing metal ores. • Industrial processes.	• Aggravation of respiratory diseases (asthma, emphysema). • Reduced lung function. • Irritation of eyes. • Reduced visibility. • Plant injury. • Deterioration of metals, textiles, leather, finishes, coatings, etc.

Source: California Air Resources Board, 2002.

Evaluation of the most current data on the health effects of inhalation of fine particulate matter prompted the California Air Resources Board (ARB) to recommend adoption of the statewide PM-2.5 standard that is more stringent than the federal standard. This standard was adopted in 2002. The State PM-2.5 standard is more of a goal in that it does not have specific attainment planning requirements like a federal clean air standard, but only requires continued progress towards attainment.

Similarly, the ARB extensively evaluated health effects of ozone exposure. A new state standard for an 8-hour ozone exposure was adopted in 2005, which aligned with the exposure period for the federal 8-hour standard. The California 8-hour ozone standard of 0.07 ppm is more stringent than the federal 8-hour standard of 0.075 ppm. The state standard, however, does not have a specific attainment deadline. California air quality jurisdictions are required to make steady progress towards attaining state standards, but there are no hard deadlines or any consequences of non-attainment. During the same re-evaluation process, the ARB adopted an annual state standard for nitrogen dioxide ($NO_{2)}$ that is more stringent than the corresponding federal standard, and strengthened the state one-hour NO_2 standard.

As part of EPA's 2002 consent decree on clean air standards, a further review of airborne particulate matter (PM) and human health was initiated. A substantial modification of federal clean air standards for PM was promulgated in 2006. Standards for PM-2.5 were strengthened, a new class of PM in the 2.5 to 10 micron size was created, some PM-10 standards were revoked, and a distinction between rural and urban air quality was adopted. In December, 2012, the federal annual standard for PM-2.5 was reduced from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ which matches the California AAQS. The severity of the basin's non-attainment status for PM-2.5 may be increased by this action and thus require accelerated planning for future PM-2.5 attainment.

In response to continuing evidence that ozone exposure at levels just meeting federal clean air standards is demonstrably unhealthful, EPA had proposed a further strengthening of the 8-hour standard. Draft standards were published. The anticipated future 8-hour standard was 0.065 ppm. Environmental organizations generally praised this proposal. Most manufacturing, transportation or power generation groups opposed the new standard as economically unwise in an uncertain fiscal climate. In recognition of the fact that a stronger ozone standard could adversely impact employment, that proposal has been placed on indefinite hold.

Of the standards shown in Table 1, those for ozone (O_3), and particulate matter (PM-10) are exceeded at times in the MDAB. They are called "non-attainment pollutants." Because of the variations in both the regional meteorology and in area-wide differences in levels of air pollution emissions, patterns of non-attainment have strong spatial and temporal differences.

BASELINE AIR QUALITY

Monitoring of air quality in the MDAB is the responsibility of the Mojave Desert Air Quality Management District (MDAQMD) headquartered in Victorville, California. The closest monitoring station to the project site is in Phelan. That station, however, only monitors ozone. The nearest station that monitors the full spectrum of air pollutants is the Victorville Station at 14306 Park Avenue. Table 4 summarizes the last five years of monitoring data from the available data at the Phelan and Victorville monitoring stations. Findings are summarized below:

1. Photochemical smog (ozone) levels frequently exceed standards. The 1-hour state standard was violated an average of 25 times a year in the last five years at the monitoring station closest to the project site and the 8-hour state standard was violated an average of 63 times per year. The Mojave Desert Air Basin does not generate enough ozone precursors to substantially reduce ozone levels. Attainment of ozone standards is most strongly linked to air quality improvements in upwind communities.

2. PM-10 levels have exceeded the state 24-hour standard on approximately 2-3 percent of all measurement days near Victorville. The three times less stringent federal 24 hour-standard has been exceeded only four times in the years 2007 to 2011. No significant trend can be seen in regards to maximum 24-hour PM-10 concentrations over the most recent years.

3. PM-10, however, is affected by construction, by unpaved road travel, by open fires and/or by agricultural practices. These emissions can be controlled to some extent, and are, therefore, components in a respirable range (10-micron diameter) particulate matter (PM-10) attainment plan developed by the Mojave Desert AQMD. An attainment plan for PM-10 was adopted in July 1995, for designated federal PM-10 non-attainment areas in the MDAB. Any project-related PM-10 generation activities require an enhanced level of controls consistent with the control measures that are part of that plan.

4. A fraction of PM-10 is comprised of ultra-small diameter particulates capable of being inhaled into deep lung tissue (PM-2.5). Year 2011 showed the lowest maximum 24-hour concentration in the past five years. The 24-hour federal standard has not been exceeded in the recent past.

5. More localized pollutants such as carbon monoxide and nitrogen oxides, etc. are generally very low near the project site because background levels in the Mojave Desert area never exceed allowable levels except during rare wildfire events such as in 2010. There is substantial excess dispersive capacity to accommodate localized vehicular air pollutants such as NOx or CO without any threat of violating applicable AAQS.

Table 3

Phelan/Victorville Monitoring Stations
Project Area Air Quality Monitoring Summary 2007-2011
(Days Standards Were Exceeded and Maximum Observed Levels)

Pollutant/Standard	2007	2008	2009	2010	2011
Ozone (Phelan)					
1-Hour > 0.09 ppm (S)	18	32	19	28	29
8-Hour > 0.07 ppm (S)	60	73	55	57	69
8- Hour > 0.075 ppm (F)	39	47	35	48	48
Max. 1-Hour Conc. (ppm)	0.119	0.130	0.121	0.137	0.124
Max. 8-Hour Conc. (ppm)	0.096	0.106	0.102	0.114	0.101
Carbon Monoxide (Victorville)					
1-Hour > 20. ppm (S)	0	0	0	0	0
1-Hour > 9. ppm (S, F)	0	0	0	0	0
Max 1-Hour Conc. (ppm)	2.1	1.4	1.8	15.9*	1.9
Max 8-Hour Conc. (ppm)	1.6	1.0	1.1	5.2*	1.5
Nitrogen Dioxide (Victorville)					
1-Hour > 0.18 ppm (S)	0	0	0	0	0
Max 1-Hour Conc. (ppm)	0.071	0.074	0.064	0.137	0.075
Inhalable Particulates (PM-10) (Victorville)					
24-Hour > 50 $\mu g/m^3$ (S)	4/56**	2/58	1/61	0/60	0/60
24-Hour > 150 $\mu g/m^3$ (F)	1/56	2/58	1/61	0/60	0/60
Max. 24-Hr. Conc. ($\mu g/m^3$)	339.*	72.	51	40.	34.
Ultra-Fine Particulates (PM-2.5) (Victorville)					
24-Hour > 35 $\mu g/m^3$ (F)*	0/64	0/56	0/61	0/62	0/48
Max. 24-Hr. Conc. ($\mu g/m^3$)	28.	19.	20.	20.	16.

*high wind/wildfire event
** "4/56" indicates 4 threshold exceedences out of 56 measurements

Source: Phelan (ozone only) and Victorville Air Monitoring Station Data Summary, www.arb.ca.gov/adam/

AIR QUALITY IMPACTS

STANDARDS OF SIGNIFICANCE

The Pinon Hills Solar project proposes a 2.6-megawatt solar photovoltaic energy generation facility. The facility will be automated and not require personnel to be onsite. Occasional visits to the project by maintenance and security personnel would be required to do repairs, clean equipment, and generally monitor the site. Otherwise, the facility does not generate air quality emissions. The sole purpose of the use is to convert solar energy into electricity. Potential air quality impacts to the immediate project vicinity would therefore derive almost exclusively during construction of the proposed improvements.

The Mojave Desert AQMD has adopted numerical emissions thresholds as indicators of potential significant impact even if the actual air quality increment cannot be directly quantified. The MDAQMD thresholds are as follows:

Carbon Monoxide (CO)	548 pounds/day	100 tons/year
Nitrogen Oxides (NOx)	137 pounds/day	25 tons/year
Sulfur Oxides (SOx)	137 pounds/day	25 tons/year
Reactive Organic Gases (ROG)	137 pounds/day	25 tons/year
Particulate Matter (PM-10)	82 pounds/day	15 tons/year
Particulate Matter (PM-2.5)	82 pounds/day	15 tons/year

ADDITIONAL INDICATORS

In its CEQA Handbook (2007), the MDAQMD also states that additional indicators should be used as screening criteria to determine the need for further analysis with respect to air quality. The additional indicators relevant to this project are as follows:

- Generates total emissions (direct and indirect) in excess of the MDAQMD thresholds.
- Generate a violation of any ambient air quality standard when added to the local background
- Creates odors that could be considered a nuisance by any substantial number of people.
- Does not conform to applicable attainment or maintenance plans.
- Emits hazardous or toxic emissions that create an excess cancer risk of more than 10 in a million or a non-cancerous health index (HI) or more than 1.0.

Except in special circumstances, the CEQA Handbook notes that meeting the daily or annual emissions thresholds is normally sufficient to demonstrate a less-than-significant impact.

CONSTRUCTION ACTIVITY IMPACTS

The California Emissions Estimator Model (CalEEMod) was developed by the South Coast AQMD to provide a model by which to calculate both construction emissions and operational emissions from a variety of land use projects. It calculates both the daily maximum and annual average emissions for criteria pollutants as well as total or annual greenhouse gas (GHG) emissions.

On-site grading and construction equipment emissions for the Pinon Hills Solar project were calculated utilizing the CalEEMod computer model. Construction crew commuting emissions as well as truck trips (deliveries, equipment transport, servicing) to the site were calculated with CalEEMod using crew and truck traffic estimates provided by the project construction contractor.

Although exhaust emissions will result from on and off-site heavy equipment, the exact types and numbers of equipment will vary among contractors such that such emissions cannot be quantified with certainty. The project is expected to begin construction in 2014. Estimated construction emissions were modeled using CalEEMod2013.2.2 to identify maximum daily emissions for each pollutant during each project construction activity. Construction emissions include all emissions associated with the construction equipment, worker trips, and on-road diesel truck traffic including deliveries and equipment transport. The modeled prototype construction equipment fleet and schedule is indicated in Table 4. On-road truck mileage for solar panel delivery was assumed to begin upon entry to the air basin with a 50 mile one-way trip length. Other construction related items such as sand and gravel and equipment delivery were assumed to require a 10 mile one-way trip length. Construction time frames indicated below reflect information for both Phase 1 and Phase 2 and assume the phases occur sequentially.

Table 4
Construction Activity Equipment Fleet

Phase Name and Duration	Equipment
Site Prep and Grading (40 days)	1 Dozer
	2 Loader/Backhoes
	2 Graders
	10 workers
	37 truck deliveries per day at 20 miles round trip
PV Installation (80 days)	3 Trenchers
	3 Welders
	2 Rough Terrain Forklifts
	1 Generator Set
	2 Loader/Backhoes
	20 workers
	10 truck deliveries per day at 20 miles round trip
	8 truck deliveries per day at 100 miles round trip (solar

	panels)

Utilizing this indicated equipment fleets shown in Tables 4 the worst case daily construction emissions are calculated by CalEEMod and are listed in Table 5. As shown in Table 5, peak construction emissions would occur during site preparation and grading would not exceed MDAQMD significance thresholds. The only construction mitigation measure modeled was to water exposed site surfaces at least 3 times per day. However, because the MDAQMD emissions guidelines are also based on an annual tons per year basis, the emissions were also compared to these thresholds as shown in Table 6.

Table 5
2014 Construction Activity Maximum Daily Emissions (pounds/day)

Activity	ROG	NOx	CO	SO_2	PM-10	PM-2.5	CO_2
Grading and Installation							
Unmitigated	6.3	52.7	36.1	0.1	11.5	6.3	7,077.2
w/Fugitive Dust Mitigation*	6.3	52.7	36.1	0.1	6.6	4.1	7,077.2
Thresholds	137	137	548	137	82	82	-

*enhanced fugitive dust control measures provided in Mitigation section of this report
Source: CalEEMod output in report appendix

Table 6
2014 Construction Activity Annual Emissions (tons/year)

Activity	ROG	NOx	CO	SO_2	PM-10	PM-2.5	CO_2
Grading and Installation							
Unmitigated	0.4	3.1	2.2	0.0	0.4	0.3	350.3
w/Fugitive Dust Mitigation*	0.4	3.1	2.2	0.0	0.3	0.2	350.3
Thresholds	25	25	100	25	15	15	-

*enhanced fugitive dust control measures provided in Mitigation section of this report
Source: CalEEMod output in report appendix

As with daily emissions annual construction related emissions are well below their respective CEQA significance thresholds.

OPERATIONAL IMPACTS

Project generated traffic associated with operations and maintenance activities would be minimal. No permanent staff will be based at the project site. Cleaning of solar panels would occur occasionally and security personnel would visit the site periodically. As a conservative

estimate, it was assumed that one light truck could visit the site daily for either cleaning or security purposes.

EMFAC2011, the California Air Resources Board tool for estimating emissions from on-road vehicles, was used to calculate vehicular emissions associated with cleaning and security travel. EMFAC2011 emissions calculations were made for a 50 mile round trip distance for a light duty truck. Daily operational emissions and associated thresholds and are shown in Table 7 and annual emissions are provided in Table 8.

Table 7
Operational Activity Emissions (lbs/day)

Activity	ROG	NOx	CO	SO_2	PM-10	PM-2.5	CO_2
Light Truck 50 miles							
Cleaning and Security	0.02	0.05	0.46	0.00	0.00	0.00	43.63
MDAQMD Threshold	137	137	548	137	82	82	-

Table 8 provides the annual operational emissions assuming one truck visit every day (365 days per year).

Table 8
Operational Activity Emissions (tons/year)

Activity	ROG	NOx	CO	SO_2	PM-10	PM-2.5	CO_2
Light Truck 50 miles							
Cleaning and Security	0.003	0.009	0.084	0.000	0.000	0.000	7.962
MDAQMD Threshold	25	25	100	25	15	15	-

Operational emissions are less than their respective daily or annual thresholds.

HAZARDOUS EMISSIONS

There are sparsely scattered sensitive uses in the project vicinity. The Pinon Hills Elementary School is approximately 650 feet east of the closest site perimeter. An existing small solar energy plant is located 160 feet west of` the Pinon Hills School.

The proposed facility will not result in significant emissions of hazardous air pollutants; therefore, an assessment of the potential risk to the population attributable to emissions of hazardous air pollutants from the proposed project is not required. The project will not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste. within one-quarter mile of an existing or proposed school.

Small amounts of hazardous air pollutants are contained in the diesel exhaust of the construction equipment to be used to prepare the site and install the solar panels. Diesel exposure risk is calculated based upon a 70-year lifetime with the receptor located outdoors permanently. Student exposure to construction equipment exhaust emissions will only be for several months with very limited outdoor exposure. The existing solar plant is located much closer to the campus and was installed while the school was operational. The combination of limited exhaust particulate emissions, brief student exposure and generally good daytime desert dispersion conditions renders hazardous emissions impacts as less-than-significant.

Additionally, the project is not a facility that is expected to be a source of odors. There does not appear to be any significant source of objectionable odors in close proximity that may adversely impact the project site when it is in operation. As such, the proposed project is not expected to be a source of any odorous compounds nor will it likely be impacted by any odorous source.

GREENHOUSE GAS EMISSIONS

"Greenhouse gases" (so called because of their role in trapping heat near the surface of the earth) emitted by human activity are implicated in global climate change, commonly referred to as "global warming." These greenhouse gases contribute to an increase in the temperature of the earth's atmosphere by transparency to short wavelength visible sunlight, but near opacity to outgoing terrestrial long wavelength heat radiation in some parts of the infrared spectrum. The principal greenhouse gases (GHGs) are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. For purposes of planning and regulation, Section 15364.5 of the California Code of Regulations defines GHGs to include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. Fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of GHG emissions, accounting for approximately half of GHG emissions globally. Industrial and commercial sources are the second largest contributors of GHG emissions with about one-fourth of total emissions.

California has passed several bills and the Governor has signed at least three executive orders regarding greenhouse gases. GHG statues and executive orders (EO) include AB 32, SB 1368, EO S-03-05, EO S-20-06 and EO S-01-07.

AB 32 is one of the most significant pieces of environmental legislation that California has adopted. Among other things, it is designed to maintain California's reputation as a "national and international leader on energy conservation and environmental stewardship." It will have wide-ranging effects on California businesses and lifestyles as well as far reaching effects on other states and countries. A unique aspect of AB 32, beyond its broad and wide-ranging mandatory provisions and dramatic GHG reductions are the short time frames within which it must be implemented. Major components of the AB 32 include:

- Require the monitoring and reporting of GHG emissions beginning with sources or categories of sources that contribute the most to statewide emissions.
- Requires immediate "early action" control programs on the most readily controlled GHG sources.
- Mandates that by 2020, California's GHG emissions be reduced to 1990 levels.
- Forces an overall reduction of GHG gases in California by 25-40%, from business as usual, over the next 13 years (by 2020).
- Must complement efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminants.

Statewide, the framework for developing the implementing regulations for AB 32 is under way. Additionally, through the California Climate Action Registry (CCAR now called the Climate Action Reserve), general and industry-specific protocols for assessing and reporting GHG emissions have been developed. GHG sources are categorized into direct sources (i.e. company owned) and indirect sources (i.e. not company owned). Direct sources include combustion

emissions from on-and off-road mobile sources, and fugitive emissions. Indirect sources include off-site electricity generation and non-company owned mobile sources.

Greenhouse Gas Emissions Significance Thresholds

In response to the requirements of SB97, the state Resources Agency developed guidelines for the treatment of GHG emissions under CEQA. These new guidelines became state laws as part of Title 14 of the California Code of Regulations in March, 2010.

Section 15064.4 of the Code specifies how significance of GHG emissions is to be evaluated. The process is broken down into quantification of project-related GHG emissions, making a determination of significance, and specification of any appropriate mitigation if impacts are found to be potentially significant. At each of these steps, the new GHG guidelines afford the lead agency with substantial flexibility.

Emissions identification may be quantitative, qualitative or based on performance standards. CEQA guidelines allow the lead agency to "select the model or methodology it considers most appropriate". The most common practice for infrastructure/combustion GHG emissions quantification is to use a computer model such as CalEEMod or EMFAC2011 as was used in the ensuing analysis.

The significance of those emissions then must be evaluated; the selection of a threshold of significance must take into consideration what level of GHG emissions would be cumulatively considerable. The guidelines are clear that they do not support a zero net emissions threshold. If the lead agency does not have sufficient expertise in evaluating GHG impacts, it may rely on thresholds adopted by an agency with greater expertise.

The California Air Resources Board (ARB) has developed an interim significance guideline for industrial projects or 7,000 metric tons of CO_2-equivalent annual emissions. Solar power generation is not strictly an "industrial" process. However, in the absence of any adopted significance thresholds, this screening level will be used in the following analysis.

GHG Impact Analysis

GHG emissions would be potentially significant if the project would:

- Generate greenhouse gas emissions either directly or indirectly, that may have a significant impact on the environment.

- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Construction Activity GHG Emissions

During project construction, the CalEEMod2013.2.2 computer model predicts that the indicated activities could generate the following annual emissions shown in Table 9.

Table 9

2014 Annual CO_2(e)Construction Emissions (tons/year)

Short Tons CO_2 per Year*	Short Tons CO_2(e) per Year	Metric Tons CO_2(e) per Year
350.3	353.5	321.3

*Output provided in appendix

Equipment exhaust also contains small amounts of methane and nitric oxides which are also GHGs. Non-CO_2 GHG emissions represent approximately a one percent increase in CO_2-equivalent emissions from diesel equipment exhaust. For screening purposes, the temporary construction activity GHG emissions were compared to the chronic operational emissions in the ARB's interim thresholds. The screening level operational threshold is 7,000 metric tons (MT) of CO_2-equivalent (CO_2(e)) per year. Worst year construction activities generating a total of 321 MT are well below this threshold.

Operational Activity GHG Emissions

Operational travel for cleaning of the panels and security travel will create a very small amount of annual CO_2, shown to be approximately 8 metric tons of CO_2 per year. However, the project is GHG positive because it will provide 2.6 MW of energy generation from both phases combined. The development of renewable energy resources is an integral component of the California AB-32 implementation strategy. Project operational GHG impacts are therefore considered positive.

Net GHG Emissions Displacement (Off-set)

As designed, the Pinon Hills Solar project, a 2.6 MW rated plant with a 20% solar capacity factor, would annually produce 4,555 megawatt-hour (MW-HR) of electrical energy. The generation of 1 MW-HR of electricity in California produces an average of 0.331 MT of CO_2(e). The off-set created by 4,555 MW-HR per year of solar generation would be 1500 MT CO_2(e). The corresponding operational GHG emissions would be approximately 8 metric tons of CO_2(e). The net GHG benefit for this project would be 1,490 MT CO_2(e) per year.

The displacement/off-set effect of solar power is enhanced by the fact that the displaced generation reduction would likely occur at fossil-fueled power plants that have higher GHG emission rates than 0.331 MT per MW-HR. The most highly efficient combined cycle gas-fired plant in California generates 0.35 MT per MW-HR. Coal-fired plants in the western United States may produce almost 1.0 MT of CO_2(e) per MW-HR. Therefore gas turbine or coal-fired plants would produce from 1,600 to 4,555 MT without the proposed project.

MITIGATION

CONSTRUCTION EMISSIONS MITIGATION

Short-term emissions are primarily related to the grading and construction of the project and are recognized to be short in duration and without lasting impacts on air quality. With the enhanced dust control mitigation measures listed below, construction activity air pollution emissions are not expected to exceed MDAQMD CEQA thresholds for any pollutant even if the phases are under simultaneous construction. Regardless, the PM-10 non-attainment status of the Mojave Desert area requires that Best Available Control Measures (BACMs) be used as required by the Mojave AQMD Rule 403. Recommended construction activity mitigation includes:

Dust Control

- Apply soil stabilizers such as hay bales or aggregate cover to inactive areas.
- Prepare a high wind dust control plan and implement plan elements and terminate soil disturbance when winds exceed 25 mph.
- Stabilize previously disturbed areas if subsequent construction is delayed.
- Water exposed surfaces and haul roads 3 times/day.
- Cover all stock piles with tarps.
- Replace ground cover in disturbed areas quickly.
- Reduce speeds on unpaved roads to less than 15 mph.
- Trenches shall be left exposed for as short a time as possible.
- Identify proper compaction for backfilled soils in construction specifications.

APPENDIX

CalEEMod2013.2.2 Computer Model Output

CalEEMod Input Assumptions

Construction Duration
1/1/2014 - 2/25/2014 Site Prep and Grading (40 days)
3/1/2014 - 6/20/2014 PV Install (80 days)

Equipment:

Site Prep	10 worker crew		
	2 Graders	8 hours/day	162 hp
	1 Dozer	8 hours/day	358 hp
	2 Tractor/Loader/Backhoes	8 hours/day	75 hp each
	37 truck trips at 20 miles per round trip per day		
PV Install	20 worker crew		
	3 Trenchers	7 hours/day	69 hp
	3 Rough Terrain Forklifts	7 hours/day	149 hp each
	1 Generator Set	8 hours/day	84 hp
	2 Tractor/Loader/Backhoes	7 hours/day	75 hp each
	3 Welders	8 hours/day	46 hp
	10 truck trips at 20 miles per round trip per day		
	8 truck trips at 100 miles per round trip per day		

Mitigation
Water exposed surfaces 3 times per day

Pinion Hills Solar

San Bernardino-Mojave Desert County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	15.00	User Defined Unit	15.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2015
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 15 acres disturbed total (7.5 acres per site)

Construction Phase - Site Prep/Grading: 40 days, PV Install: 80 days

Off-road Equipment - Prep and Grade: 2 graders, 2 loader/backhoes, 1 dozer

Off-road Equipment - PV Install: 3 trenchers, 3 welders, 2 rough terrain forklifts, 1 gen set, 2 loader/backhoes

Trips and VMT - Prep: 10 workers, PV Install: 20 workers
8 daily transport round trips at 100 miles per trip for solar panel delivery

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	300.00	80.00
tblConstructionPhase	NumDays	30.00	40.00
tblConstructionPhase	PhaseEndDate	6/17/2014	6/20/2014
tblConstructionPhase	PhaseStartDate	2/26/2014	3/1/2014
tblGrading	AcresOfGrading	40.00	75.00
tblLandUse	LotAcreage	0.00	15.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblProjectCharacteristics	OperationalYear	2014	2015
tblTripsAndVMT	HaulingTripLength	20.00	100.00
tblTripsAndVMT	HaulingTripLength	20.00	100.00
tblTripsAndVMT	HaulingTripNumber	0.00	640.00
tblTripsAndVMT	VendorTripLength	7.30	20.00
tblTripsAndVMT	VendorTripLength	7.30	20.00
tblTripsAndVMT	VendorTripNumber	0.00	37.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	6.3107	52.7368	36.1218	0.0704	8.7569	3.1999	11.5127	3.7350	3.0191	6.2702	0.0000	7,057.5085	7,057.5085	0.9367	0.0000	7,077.1798
Total	**6.3107**	**52.7368**	**36.1218**	**0.0704**	**8.7569**	**3.1999**	**11.5127**	**3.7350**	**3.0191**	**6.2702**	**0.0000**	**7,057.5085**	**7,057.5085**	**0.9367**	**0.0000**	**7,077.1798**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	6.3107	52.7368	36.1218	0.0704	3.8705	3.1999	6.6262	1.5848	3.0191	4.1200	0.0000	7,057.5084	7,057.5084	0.9367	0.0000	7,077.1798
Total	**6.3107**	**52.7368**	**36.1218**	**0.0704**	**3.8705**	**3.1999**	**6.6262**	**1.5848**	**3.0191**	**4.1200**	**0.0000**	**7,057.5084**	**7,057.5084**	**0.9367**	**0.0000**	**7,077.1798**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**55.80**	**0.00**	**42.44**	**57.57**	**0.00**	**34.29**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.6000e-004	2.0000e-005	1.5800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.2800e-003	3.2800e-003	1.0000e-005		3.4800e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.6000e-004**	**2.0000e-005**	**1.5800e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**		**3.2800e-003**	**3.2800e-003**	**1.0000e-005**	**0.0000**	**3.4800e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.6000e-004	2.0000e-005	1.5800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.2800e-003	3.2800e-003	1.0000e-005		3.4800e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.6000e-004**	**2.0000e-005**	**1.5800e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**		**3.2800e-003**	**3.2800e-003**	**1.0000e-005**	**0.0000**	**3.4800e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Prep and Grading	Grading	1/1/2014	2/25/2014	5	40	
2	PV Install	Building Construction	3/1/2014	6/20/2014	5	80	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Prep and Grading	Excavators	0	8.00	162	0.38
Prep and Grading	Graders	2	8.00	174	0.41
Prep and Grading	Rubber Tired Dozers	1	8.00	255	0.40
Prep and Grading	Scrapers	0	8.00	361	0.48
Prep and Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
PV Install	Cranes	0	7.00	226	0.29
PV Install	Forklifts	0	8.00	89	0.20
PV Install	Generator Sets	1	8.00	84	0.74
PV Install	Rough Terrain Forklifts	2	7.00	100	0.40
PV Install	Tractors/Loaders/Backhoes	2	7.00	97	0.37
PV Install	Trenchers	3	7.00	80	0.50
PV Install	Welders	3	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Prep and Grading	5	10.00	37.00	0.00	10.80	20.00	100.00	LD_Mix	HDT_Mix	HHDT
PV Install	11	20.00	10.00	640.00	10.80	20.00	100.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Prep and Grading - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.0105	0.0000	8.0105	3.5249	0.0000	3.5249			0.0000			0.0000
Off-Road	4.1405	43.4599	25.8774	0.0276		2.4599	2.4599		2.2631	2.2631		2,934.2713	2,934.2713	0.8671		2,952.4805
Total	**4.1405**	**43.4599**	**25.8774**	**0.0276**	**8.0105**	**2.4599**	**10.4704**	**3.5249**	**2.2631**	**5.7880**		**2,934.2713**	**2,934.2713**	**0.8671**		**2,952.4805**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8091	9.1959	9.3028	0.0211	0.6642	0.2952	0.9594	0.1882	0.2715	0.4598		2,157.2071	2,157.2071	0.0143		2,157.5072
Worker	0.0594	0.0809	0.9416	1.0500e-003	0.0822	6.7000e-004	0.0828	0.0218	6.1000e-004	0.0224		92.8325	92.8325	6.4400e-003		92.9676
Total	**0.8684**	**9.2768**	**10.2444**	**0.0221**	**0.7464**	**0.2959**	**1.0422**	**0.2100**	**0.2722**	**0.4822**		**2,250.0396**	**2,250.0396**	**0.0207**		**2,250.4748**

3.2 Prep and Grading - 2014

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.1241	0.0000	3.1241	1.3747	0.0000	1.3747			0.0000			0.0000
Off-Road	4.1405	43.4599	25.8774	0.0276		2.4599	2.4599		2.2631	2.2631	0.0000	2,934.2713	2,934.2713	0.8671		2,952.4805
Total	**4.1405**	**43.4599**	**25.8774**	**0.0276**	**3.1241**	**2.4599**	**5.5840**	**1.3747**	**2.2631**	**3.6378**	**0.0000**	**2,934.2713**	**2,934.2713**	**0.8671**		**2,952.4805**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8091	9.1959	9.3028	0.0211	0.6642	0.2952	0.9594	0.1882	0.2715	0.4598		2,157.2071	2,157.2071	0.0143		2,157.5072
Worker	0.0594	0.0809	0.9416	1.0500e-003	0.0822	6.7000e-004	0.0828	0.0218	6.1000e-004	0.0224		92.8325	92.8325	6.4400e-003		92.9676
Total	**0.8684**	**9.2768**	**10.2444**	**0.0221**	**0.7464**	**0.2959**	**1.0422**	**0.2100**	**0.2722**	**0.4822**		**2,250.0396**	**2,250.0396**	**0.0207**		**2,250.4748**

3.3 PV Install - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.4644	36.5191	25.9705	0.0348		2.7904	2.7904		2.6424	2.6424		3,427.8336	3,427.8336	0.9035		3,446.8063
Total	**5.4644**	**36.5191**	**25.9705**	**0.0348**		**2.7904**	**2.7904**		**2.6424**	**2.6424**		**3,427.8336**	**3,427.8336**	**0.9035**		**3,446.8063**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.5089	10.2982	5.0448	0.0278	0.7005	0.3284	1.0289	0.1921	0.3021	0.4942		2,860.9809	2,860.9809	0.0165		2,861.3282
Vendor	0.2187	2.4854	2.5143	5.7000e-003	0.1795	0.0798	0.2593	0.0509	0.0734	0.1243		583.0290	583.0290	3.8600e-003		583.1101
Worker	0.1187	0.1619	1.8832	2.1000e-003	0.1643	1.3500e-003	0.1656	0.0436	1.2100e-003	0.0448		185.6650	185.6650	0.0129		185.9353
Total	**0.8463**	**12.9455**	**9.4423**	**0.0356**	**1.0443**	**0.4095**	**1.4538**	**0.2866**	**0.3767**	**0.6632**		**3,629.6748**	**3,629.6748**	**0.0333**		**3,630.3735**

3.3 PV Install - 2014

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.4644	36.5191	25.9705	0.0348		2.7904	2.7904		2.6424	2.6424	0.0000	3,427.8336	3,427.8336	0.9035		3,446.8063
Total	**5.4644**	**36.5191**	**25.9705**	**0.0348**		**2.7904**	**2.7904**		**2.6424**	**2.6424**	**0.0000**	**3,427.8336**	**3,427.8336**	**0.9035**		**3,446.8063**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.5089	10.2982	5.0448	0.0278	0.7005	0.3284	1.0289	0.1921	0.3021	0.4942		2,860.9809	2,860.9809	0.0165		2,861.3282
Vendor	0.2187	2.4854	2.5143	5.7000e-003	0.1795	0.0798	0.2593	0.0509	0.0734	0.1243		583.0290	583.0290	3.8600e-003		583.1101
Worker	0.1187	0.1619	1.8832	2.1000e-003	0.1643	1.3500e-003	0.1656	0.0436	1.2100e-003	0.0448		185.6650	185.6650	0.0129		185.9353
Total	**0.8463**	**12.9455**	**9.4423**	**0.0356**	**1.0443**	**0.4095**	**1.4538**	**0.2866**	**0.3767**	**0.6632**		**3,629.6748**	**3,629.6748**	**0.0333**		**3,630.3735**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.439326	0.070293	0.181647	0.159541	0.045271	0.007627	0.006435	0.073565	0.000871	0.001112	0.010186	0.000590	0.003534

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.6000e-004	2.0000e-005	1.5800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.2800e-003	3.2800e-003	1.0000e-005		3.4800e-003
Unmitigated	1.6000e-004	2.0000e-005	1.5800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.2800e-003	3.2800e-003	1.0000e-005		3.4800e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.6000e-004	2.0000e-005	1.5800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.2800e-003	3.2800e-003	1.0000e-005		3.4800e-003
Total	**1.6000e-004**	**2.0000e-005**	**1.5800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**3.2800e-003**	**3.2800e-003**	**1.0000e-005**		**3.4800e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.6000e-004	2.0000e-005	1.5800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.2800e-003	3.2800e-003	1.0000e-005		3.4800e-003
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6000e-004**	**2.0000e-005**	**1.5800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**3.2800e-003**	**3.2800e-003**	**1.0000e-005**		**3.4800e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Pinion Hills Solar

San Bernardino-Mojave Desert County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	15.00	User Defined Unit	15.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2015
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 15 acres disturbed total (7.5 acres per site)

Construction Phase - Site Prep/Grading: 40 days, PV Install: 80 days

Off-road Equipment - Prep and Grade: 2 graders, 2 loader/backhoes, 1 dozer

Off-road Equipment - PV Install: 3 trenchers, 3 welders, 2 rough terrain forklifts, 1 gen set, 2 loader/backhoes

Trips and VMT - Prep: 10 workers, PV Install: 20 workers
8 daily transport round trips at 100 miles per trip for solar panel delivery

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	300.00	80.00
tblConstructionPhase	NumDays	30.00	40.00
tblConstructionPhase	PhaseEndDate	6/17/2014	6/20/2014
tblConstructionPhase	PhaseStartDate	2/26/2014	3/1/2014
tblGrading	AcresOfGrading	40.00	75.00
tblLandUse	LotAcreage	0.00	15.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblProjectCharacteristics	OperationalYear	2014	2015
tblTripsAndVMT	HaulingTripLength	20.00	100.00
tblTripsAndVMT	HaulingTripLength	20.00	100.00
tblTripsAndVMT	HaulingTripNumber	0.00	640.00
tblTripsAndVMT	VendorTripLength	7.30	20.00
tblTripsAndVMT	VendorTripLength	7.30	20.00
tblTripsAndVMT	VendorTripNumber	0.00	37.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	0.3553	3.0796	2.2015	3.8000e-003	0.2160	0.1831	0.3991	0.0859	0.1715	0.2574	0.0000	349.2713	349.2713	0.0501	0.0000	350.3234
Total	**0.3553**	**3.0796**	**2.2015**	**3.8000e-003**	**0.2160**	**0.1831**	**0.3991**	**0.0859**	**0.1715**	**0.2574**	**0.0000**	**349.2713**	**349.2713**	**0.0501**	**0.0000**	**350.3234**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	0.3553	3.0796	2.2015	3.8000e-003	0.1182	0.1831	0.3014	0.0429	0.1715	0.2144	0.0000	349.2711	349.2711	0.0501	0.0000	350.3232
Total	**0.3553**	**3.0796**	**2.2015**	**3.8000e-003**	**0.1182**	**0.1831**	**0.3014**	**0.0429**	**0.1715**	**0.2144**	**0.0000**	**349.2711**	**349.2711**	**0.0501**	**0.0000**	**350.3232**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**45.25**	**0.00**	**24.49**	**50.05**	**0.00**	**16.70**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0000e-005	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-005**	**0.0000**	**1.4000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.0000**	**2.8000e-004**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0000e-005	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-005**	**0.0000**	**1.4000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.0000**	**2.8000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Prep and Grading	Grading	1/1/2014	2/25/2014	5	40	
2	PV Install	Building Construction	3/1/2014	6/20/2014	5	80	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Prep and Grading	Excavators	0	8.00	162	0.38
Prep and Grading	Graders	2	8.00	174	0.41
Prep and Grading	Rubber Tired Dozers	1	8.00	255	0.40
Prep and Grading	Scrapers	0	8.00	361	0.48
Prep and Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
PV Install	Cranes	0	7.00	226	0.29
PV Install	Forklifts	0	8.00	89	0.20
PV Install	Generator Sets	1	8.00	84	0.74
PV Install	Rough Terrain Forklifts	2	7.00	100	0.40
PV Install	Tractors/Loaders/Backhoes	2	7.00	97	0.37
PV Install	Trenchers	3	7.00	80	0.50
PV Install	Welders	3	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Prep and Grading	5	10.00	37.00	0.00	10.80	20.00	100.00	LD_Mix	HDT_Mix	HHDT
PV Install	11	20.00	10.00	640.00	10.80	20.00	100.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Prep and Grading - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1602	0.0000	0.1602	0.0705	0.0000	0.0705	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0828	0.8692	0.5176	5.5000e-004		0.0492	0.0492		0.0453	0.0453	0.0000	53.2385	53.2385	0.0157	0.0000	53.5689
Total	**0.0828**	**0.8692**	**0.5176**	**5.5000e-004**	**0.1602**	**0.0492**	**0.2094**	**0.0705**	**0.0453**	**0.1158**	**0.0000**	**53.2385**	**53.2385**	**0.0157**	**0.0000**	**53.5689**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0177	0.1960	0.2189	4.2000e-004	0.0131	5.9100e-003	0.0190	3.7100e-003	5.4400e-003	9.1500e-003	0.0000	39.0877	39.0877	2.6000e-004	0.0000	39.0932
Worker	1.0500e-003	1.8100e-003	0.0167	2.0000e-005	1.6100e-003	1.0000e-005	1.6300e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.5268	1.5268	1.2000e-004	0.0000	1.5292
Total	**0.0187**	**0.1978**	**0.2356**	**4.4000e-004**	**0.0147**	**5.9200e-003**	**0.0206**	**4.1400e-003**	**5.4500e-003**	**9.5900e-003**	**0.0000**	**40.6145**	**40.6145**	**3.8000e-004**	**0.0000**	**40.6224**

3.2 Prep and Grading - 2014

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0625	0.0000	0.0625	0.0275	0.0000	0.0275	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0828	0.8692	0.5176	5.5000e-004		0.0492	0.0492		0.0453	0.0453	0.0000	53.2385	53.2385	0.0157	0.0000	53.5688
Total	**0.0828**	**0.8692**	**0.5176**	**5.5000e-004**	**0.0625**	**0.0492**	**0.1117**	**0.0275**	**0.0453**	**0.0728**	**0.0000**	**53.2385**	**53.2385**	**0.0157**	**0.0000**	**53.5688**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0177	0.1960	0.2189	4.2000e-004	0.0131	5.9100e-003	0.0190	3.7100e-003	5.4400e-003	9.1500e-003	0.0000	39.0877	39.0877	2.6000e-004	0.0000	39.0932
Worker	1.0500e-003	1.8100e-003	0.0167	2.0000e-005	1.6100e-003	1.0000e-005	1.6300e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.5268	1.5268	1.2000e-004	0.0000	1.5292
Total	**0.0187**	**0.1978**	**0.2356**	**4.4000e-004**	**0.0147**	**5.9200e-003**	**0.0206**	**4.1400e-003**	**5.4500e-003**	**9.5900e-003**	**0.0000**	**40.6145**	**40.6145**	**3.8000e-004**	**0.0000**	**40.6224**

3.3 PV Install - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2186	1.4608	1.0388	1.3900e-003		0.1116	0.1116		0.1057	0.1057	0.0000	124.3871	124.3871	0.0328	0.0000	125.0756
Total	**0.2186**	**1.4608**	**1.0388**	**1.3900e-003**		**0.1116**	**0.1116**		**0.1057**	**0.1057**	**0.0000**	**124.3871**	**124.3871**	**0.0328**	**0.0000**	**125.0756**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0214	0.4387	0.2246	1.1100e-003	0.0276	0.0131	0.0407	7.5700e-003	0.0121	0.0197	0.0000	103.7955	103.7955	6.0000e-004	0.0000	103.8081
Vendor	9.5600e-003	0.1059	0.1183	2.3000e-004	7.0600e-003	3.2000e-003	0.0103	2.0100e-003	2.9400e-003	4.9500e-003	0.0000	21.1285	21.1285	1.4000e-004	0.0000	21.1315
Worker	4.2100e-003	7.2300e-003	0.0667	8.0000e-005	6.4500e-003	5.0000e-005	6.5000e-003	1.7100e-003	5.0000e-005	1.7600e-003	0.0000	6.1071	6.1071	4.7000e-004	0.0000	6.1169
Total	**0.0352**	**0.5519**	**0.4096**	**1.4200e-003**	**0.0411**	**0.0164**	**0.0575**	**0.0113**	**0.0151**	**0.0264**	**0.0000**	**131.0311**	**131.0311**	**1.2100e-003**	**0.0000**	**131.0565**

3.3 PV Install - 2014

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2186	1.4608	1.0388	1.3900e-003		0.1116	0.1116		0.1057	0.1057	0.0000	124.3870	124.3870	0.0328	0.0000	125.0755
Total	**0.2186**	**1.4608**	**1.0388**	**1.3900e-003**		**0.1116**	**0.1116**		**0.1057**	**0.1057**	**0.0000**	**124.3870**	**124.3870**	**0.0328**	**0.0000**	**125.0755**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0214	0.4387	0.2246	1.1100e-003	0.0276	0.0131	0.0407	7.5700e-003	0.0121	0.0197	0.0000	103.7955	103.7955	6.0000e-004	0.0000	103.8081
Vendor	9.5600e-003	0.1059	0.1183	2.3000e-004	7.0600e-003	3.2000e-003	0.0103	2.0100e-003	2.9400e-003	4.9500e-003	0.0000	21.1285	21.1285	1.4000e-004	0.0000	21.1315
Worker	4.2100e-003	7.2300e-003	0.0667	8.0000e-005	6.4500e-003	5.0000e-005	6.5000e-003	1.7100e-003	5.0000e-005	1.7600e-003	0.0000	6.1071	6.1071	4.7000e-004	0.0000	6.1169
Total	**0.0352**	**0.5519**	**0.4096**	**1.4200e-003**	**0.0411**	**0.0164**	**0.0575**	**0.0113**	**0.0151**	**0.0264**	**0.0000**	**131.0311**	**131.0311**	**1.2100e-003**	**0.0000**	**131.0565**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.439326	0.070293	0.181647	0.159541	0.045271	0.007627	0.006435	0.073565	0.000871	0.001112	0.010186	0.000590	0.003534

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0000e-005	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004
Unmitigated	1.0000e-005	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004
Total	**1.0000e-005**	**0.0000**	**1.4000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.0000**	**2.8000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004
Total	**1.0000e-005**	**0.0000**	**1.4000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.0000**	**2.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/ Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/ Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation