Appendix C

Air Quality and Greenhouse Gas Technical Report

RE Slate Solar Project

Air Quality and Greenhouse Gas Emissions Technical Report

June 2019 | REC 06.03

Prepared for:

RE Slate LLC
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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AB	Assembly Bill
AC	alternating current
APCD	Air Pollution Control District
BACT	best available control technology
BPS	best performance standards
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emission Estimator Model
CAFE	Corporate Average Fuel Economy
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CFC	chlorofluorocarbon
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2-equivalent
CUP	Conditional Use Permit
DPM	diesel particulate matter
DC	diret current
EO	Executive Order
ESS	Energy Storage System
F	Farenheit
Gen-tie line	generation intertie line
GHG	greenhouse gas
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HFC	hydrofluorocarbon
HI	hazard index
HRA	health risk assessment
IPCC	Intergovernmental Panel on Climate Change
km	kilometer

ACRONYMS AND ABBREVIATIONS (cont.)

LCFS	Low Carbon Fuel Standard
LOS	Level of Service
MEI	maximally exposed individual
MMT	million metric tons
mpg	miles per gallon
mph	miles per hour
MT	metric ton
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NHTSA	National Highway Traffic Safety Administration
NIOSH	National Institute for Occupational Safety and Health
NOAA	National Oceanic and Atmospheric Administration
NO	nitrogen oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
O_3	ozone
OEHHA	Office of Environmental Health Hazard
Pb	lead
PFC	perfluorocarbon
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
ppm	parts per million
PV	photovoltaic
ROG	reactive organic gas
RPS	Renewable Portfolios Standard
SB	Senate Bill
SCADA	supervisory control and data acquisition
SCAQMD	South Coast Air Quality Management District
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
SO_X	sulfur oxides

ACRONYMS AND ABBREVIATIONS (cont.)

TACs	toxic air contaminants
URF	Unit Risk Factor
USEPA	United States Environmental Protection Agency
VERA	Voluntary Emissions Reduction Agreement
VOC	volatile organic compound

EXECUTIVE SUMMARY

This report presents an assessment of potential air quality and greenhouse gas (GHG) emission impacts associated with the proposed RE Slate Solar Project (project). The evaluation addresses the potential for criteria air pollutant and GHG emission impacts during the construction, operation, and decommissioning of the project. All analyses comply with the San Joaquin Valley Air Pollution Control District (SJVAPCD) *Guide for Assessing and Mitigating Air Quality Impacts* (March 2015) to satisfy California Environmental Quality Act (CEQA) requirements.

The project would result in emissions of criteria air pollutants and GHGs during construction, operation, and decommissioning. Construction emissions include fugitive dust, heavy construction equipment exhaust, and vehicle trips associated with workers commuting to and from the site and trucks delivering materials. Construction activities are assumed to begin October 2020 and be completed November 2021. In accordance with SJVAPCD Rules 8021 and 8071, fugitive dust control measures including the use of an on-site water truck to water down active grading areas and unpaved and paved roads at least twice daily are incorporated into the project design. Project operational emissions would include pollutants generated by vehicular traffic associated with staff activities and the occasional use of off-road equipment for maintenance and panel washing. Project emissions of criteria pollutants during construction would remain below the SJVAPCD emissions thresholds for all pollutants with the exception of nitrogen oxides (NO_X). Construction period NO_X emissions would be reduced to a less than significant level with the incorporation of Mitigation Measures AQ-1 and AQ-2. Project emissions of criteria pollutants during operations and decommissioning would be below the SJVAPCD emissions thresholds for all pollutants. Because the project would generate renewable energy, it would result in a net decrease of emissions of GHGs over the lifetime of the project because it would replace the use of fossil fuels that would have otherwise been used to generate similar amounts of energy.

A health risk assessment conducted for diesel particulate exposure during construction determined that the project would not result in risks that exceed standards established by the SJVAPCD. The project would not result in the formation of carbon monoxide (CO) hotspots. Exposure of workers to Valley Fever spores would be reduced to a less than significant level through Mitigation Measure AQ-3. An evaluation of potential odors from the project indicated that associated impacts would be less than significant.

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1.0 PROJECT DESCRIPTION

1.1 PROJECT OVERVIEW

The project is being proposed by RE Slate, LLC (project applicant). The project applicant seeks a Conditional Use Permit (CUP) from Kings County to construct, operate, maintain, and eventually decommission a photovoltaic (PV) electricity generating and energy storage system (ESS) and associated infrastructure. The project would generate a total of 300 megawatts (MW) of alternating current (AC) electricity on approximately 2,490 acres of privately owned land in unincorporated western Kings County (see Figure 1, *Regional Location,* and Figure 2, *Aerial Map*). The project would provide solar power to utility customers by interconnecting to the nearby regional electricity grid at Pacific Gas and Electric Company's (PG&E) existing Mustang Switching Station located northwest of the project site (on the site for the operational RE Mustang Solar Generation Facility), utilizing a future shared generation intertie electric transmission line (gen-tie line) that will be built as part of the approved RE Mustang Two Solar Generation Facility, directly southwest of the project site (the project has been approved, but not yet constructed).

Components of the project would include:

- Solar arrays including PV modules and steel support structures, electrical inverters, transformers, cabling, fencing, and other infrastructure;
- Electrical substations and appurtenant equipment;
- Other necessary infrastructure, including one permanent operation and maintenance building, septic system and leach field, supervisory control and data acquisition (SCADA) system, meteorological data system, buried conduit for electrical wires, overhead collector lines, on-site roads, a shared busbar, other shared facilities, and security fencing;
- A 300-MW energy storage system with a 4-hour capacity or approximately 1,200 MW hours, consisting of battery or flywheel enclosures and electrical cabling and appurtenant equipment; and,
- A short gen-tie connection line consisting of power poles, conductors, insulators, optical fiber cables and safety equipment which would connect ("tie-in") to the future RE Mustang Two substation which will be located south of Kent Avenue near the western project site boundary. The tie-in would connect the project to a gen-tie interconnection line to the PG&E Mustang Switching Station which would be shared with the RE Mustang Two Solar Project.

Construction of the solar facility is expected to begin in the fourth quarter (October) of 2020. Construction could occur in phases and is expected to take 14 months. The project would operate year-round to generate solar electricity during daylight hours and would store and dispatch power at the ESS during both daylight and non-daylight hours. The anticipated operating life of the facility is up to 40 years. Following the operating period, the facility would be either repowered or decommissioned. With the exception of the short gen-tie line, all construction work for the solar generation facility would occur entirely within the fence line of the solar facility.

1.2 PROJECT LOCATION

The 2,490-acre project site is located in unincorporated Kings County, 0.2 mile southeast of Naval Air Station Lemoore (NAS Lemoore), 3.2 miles southwest of the City of Lemoore, and 10.5 miles west-southwest of the City of Hanford (Figure 1). The site is generally bound by Avenal Cutoff Road to the northwest, Jackson Avenue to the north, the Kings River and 23rd Avenue to the east, and Laurel Avenue to the south (Figure 2). The western site boundary generally follows unnamed agricultural roads. The project site occupies parts of Sections 25, 26, 34, 35, and 36 of Township 19 South, Range 19 East and Sections 1, 2, 11, 12, and 13 of Township 20 South, Range 19 East, Mount Diablo Base and Meridian. The majority of the project site is located within the "Westhaven, CA" and "Stratford, CA" USGS 7.5-minute quadrangles, with a portion of the northernmost parcels located within the "Lemoore, CA" 7.5-minute quadrangle.

The project site is used for various agricultural uses – for the past eight years, the project site has been alternately cropped and irrigated, grazed, and left fallow. Following 2014, the majority of the project site was left uncultivated and used as pastureland or fallowed. Surrounding land uses are a combination of agriculture and solar PV operations. The proposed project is located adjacent to and in the immediate vicinity of other existing and approved solar projects.

1.3 PROPOSED CONSTRUCTION PHASING

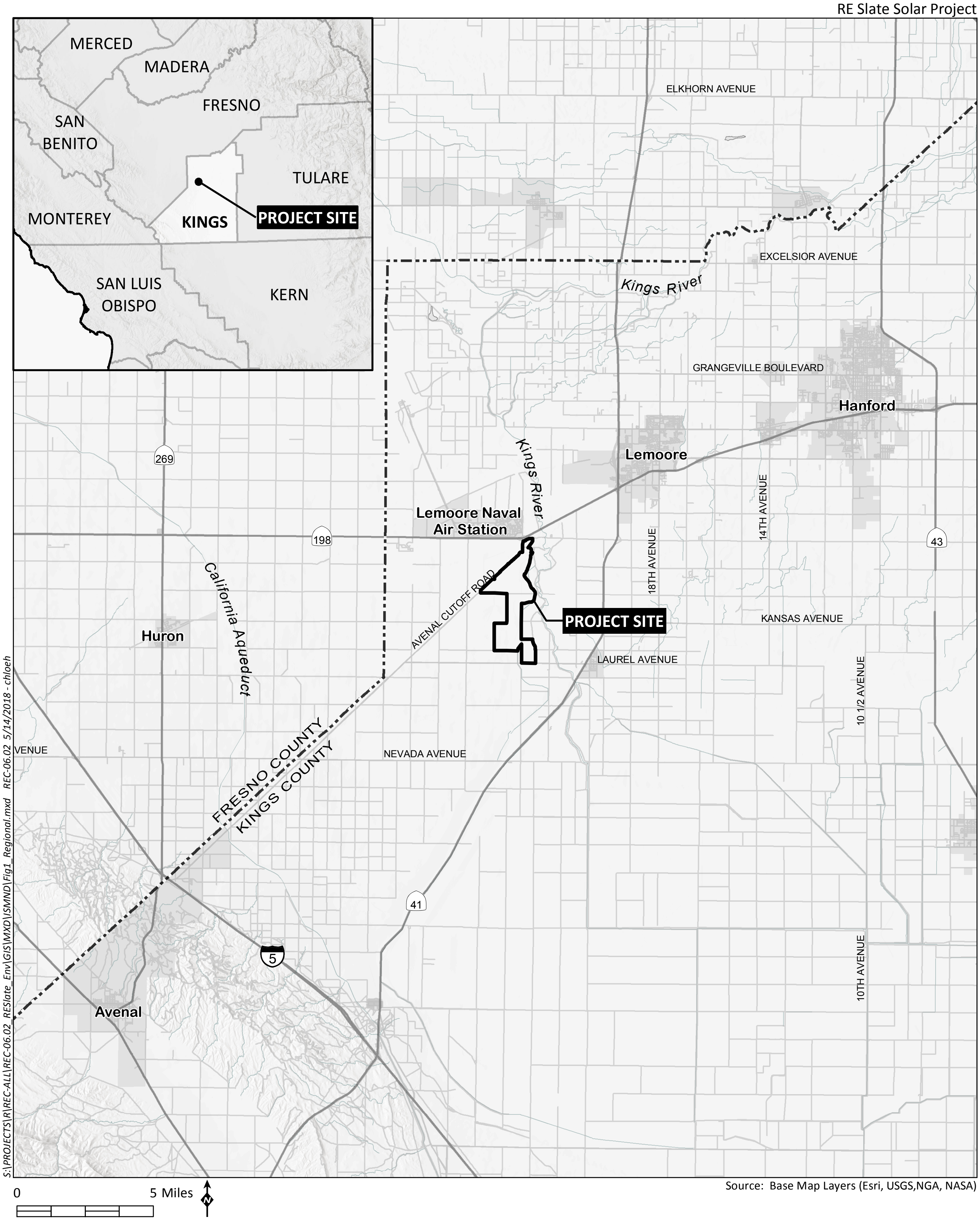
Construction equipment would operate between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday, for up to a maximum of 8 hours per piece of equipment, daily. Weekend construction work is not expected to be required, but may occur on occasion, depending on schedule considerations.

1.3.1 Solar Facility

For the purpose of the analysis, project construction would commence as early as October 2020 and be completed by December 2021. Solar facility construction phasing is assumed as follows:

- Phase 1, *Site Preparation*, extends for a duration of up to 10 weeks, or 49 working days.
- Phase 2, *PV Module System Installation*, would extend for a duration of up to 49 weeks, or 246 working days, and would overlap Phase 1 by approximately 2 weeks.
- Phase 3, *Installation of Inverters, Transformers, Substation and Electrical Collector System*, would extend for a duration of up to 35 weeks, or 173 working days, and overlap Phase 2 by about 21 weeks.

Table 1, *Solar Facility Construction Phasing and Workforce*, shows the average and maximum number of workers required for construction, the average number of daily trips, and the length of the phase. Because of overlaps in the construction phases, the total number of construction workers at any given time would range between 17 and 1,003, with the peak number of workers on the site during the two weeks that the Site Preparation and PV Module System Installation phases overlap. The majority of the labor force is expected to come from the surrounding communities with a maximum round-trip commute of up to 80 miles.



Source: Base Map Layers (Esri, USGS,NGA, NASA)

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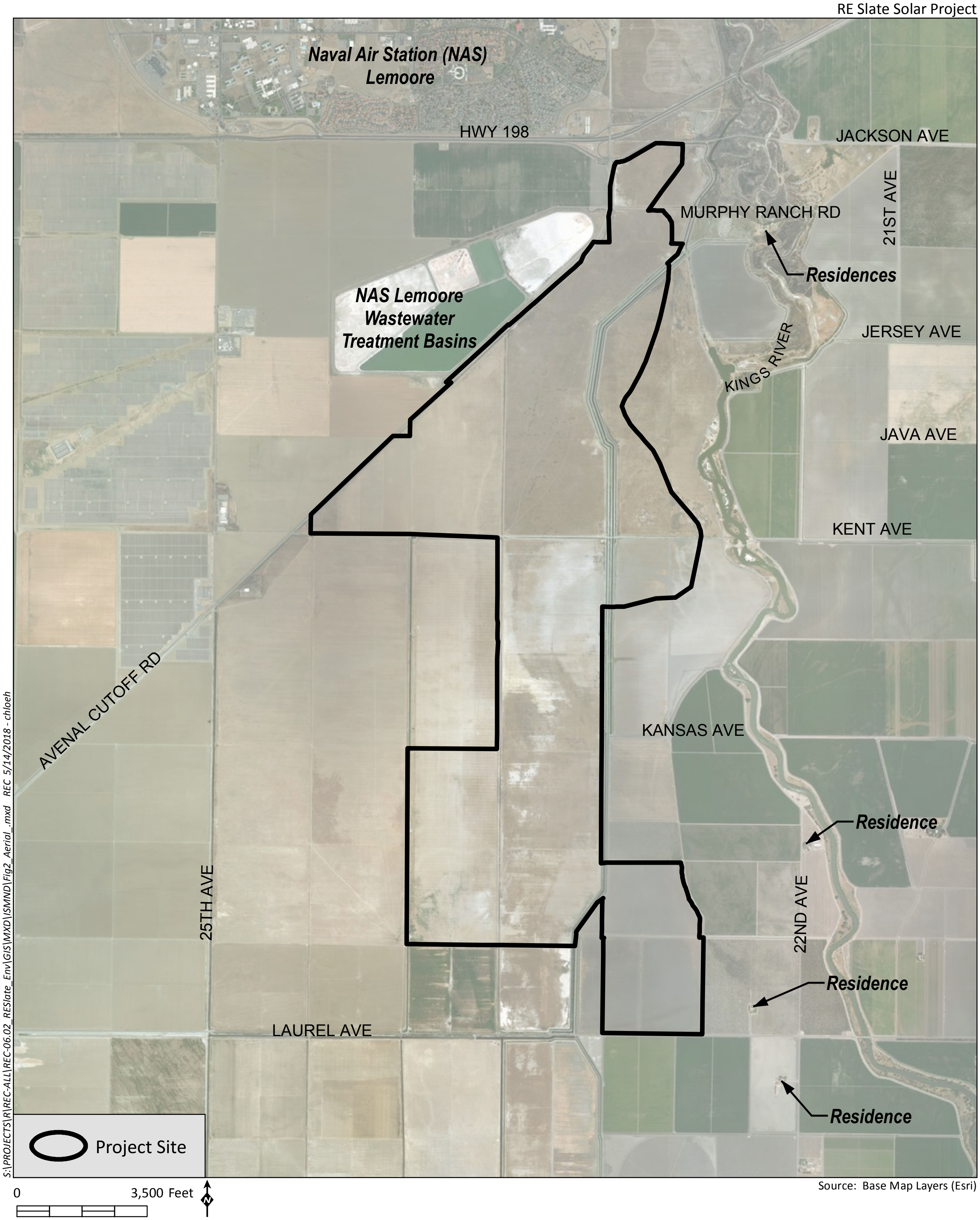
Regional Location

Figure 1



Source: Base Map Layers (Esri)

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Aerial Map

Figure 2

Table 1
SOLAR FACILITY CONSTRUCTION PHASING AND WORKFORCE

Construction Element	Construction Phase		
	Site Preparation	PV Installation	Inverters, Substation, & Connection
Phase Duration (work days)	49	246	173
Workforce			
Average Number of Workers	421	332	17
Maximum Number of Workers	561	442	23
Average Daily Trip Generation			
Workers[1]	842	664	34
Water Truck[2]	66	8	8
Construction Truck[3]	20	18	4
Freight Truck[3]	40	4	0

[1] Passenger vehicle; [2] Medium truck; [3] Large truck

All materials for the project's construction would be delivered by truck. The majority of truck traffic would occur on designated truck routes and major streets. Flatbed trailers and trucks would be used to transport construction equipment and construction materials to the site. Project components would be assembled on the site. Traffic resulting from construction activities would be temporary and could occur along area roadways as workers and materials are transported to and from the project site. It was assumed that materials deliveries during construction would travel up to 40 miles one way from source to the project site.

Equipment to be used for the construction of the project is identified in Table 2, *Solar Facility On-Site Equipment and Vehicle Use by Construction Phase.*

Table 2
SOLAR FACILITY ON-SITE EQUIPMENT
AND VEHICLE USE BY CONSTRUCTION PHASE

Equipment	Estimated Usage		
	Units	Hours/Day	Total Days Per Unit
Phase 1: Site Preparation			
Pickup Truck	18	4	36
Bulldozers	104	7	37
Water Trucks (10,000 gallon)	63	4	38
Graders	4	7	33
Flatbeds	32	4	37
Skid Steers	18	7	36
Front End Loaders	3	7	44
Roller Compactor	9	7	49
Backhoe	1	7	5
Instrument	18	7	36
Gravel Trucks (20 cubic-yard)	168	4	44

Table 2 (cont.)
SOLAR FACILITY ON-SITE EQUIPMENT AND VEHICLE USE BY CONSTRUCTION PHASE

Equipment	Estimated Usage		
	Units	Hours/Day	Total Days Per Unit
Phase 2: Photovoltaic Array Installation			
Water Trucks (10,000 gallon)	4	4	246
Flatbeds	64	4	183
Skid Steers	6	7	164
Pile Drivers	6	7	164
Forklifts	22	4	173
Welders	44	4	173
Trenchers	6	4	147
Phase 3: Inverters Substations and Connection			
Bulldozers	1	7	9
Water Trucks (10,000 gallon)	1	4	9
Graders	1	7	8
Flatbeds	1	4	8
Skid Steer	2	7	38
Front End Loaders	1	7	8
Roller Compactor	1	7	8
Water Buffalo	1	4	8
Pile Drivers	2	7	38
Trenchers	3	4	173
Backhoes	2	7	81
Cranes	2	4	165
Aerial Lifts	3	4	50
Directional Drill Rig	1	7	20
Concrete Trucks (10 cubic-yard)	31	4	1

1.3.2 Energy Storage System

The project could include, at the applicant's option, a battery or flywheel ESS capable of storing up to 300 MW of electricity and conducting energy to the regional electricity grid. The ESS would either be dispersed throughout the project site, connected to the PV array via direct current (DC; "DC-coupled"); or concentrated in one location on the site, connected to the PV array via alternating current ("AC-coupled").

The ESS would be largely assembled offsite and delivered to the project site for final installation. The ESS would be located on approximately 29 acres of the 2,490-acre project site. Heavy trucks and other equipment will be used to deliver and install the infrastructure and battery or flywheel enclosures. After a system is installed, it will be tested and commissioned. The ESS may be installed during installation of the PV arrays, or it could be installed later while the facility is in operation. ESS construction phasing is assumed as follows:

- Phase 1, *Site Preparation,* would extend for a duration of approximately 8 weeks or 40 working days.
- Phase 2*, Foundations, Structures, and Systems*, would extend for a duration of up to 35 weeks or 174 working days, and may overlap Phase 1 by up to one month.

- Phase 3, *Inverters, Substation, and Connection,* would extend for a duration of approximately 26 weeks or 131 working days and may overlap Phase 2 by up to one month.

As displayed in Table 3, *Energy Storage System Construction Phasing and Workforce*, the average number of workers ranges from 45 to 57 and the maximum numbers of workers could be 147 during the month that Phase 2 overlaps with Phase 3.

Table 3
ENERGY STORAGE SYSTEM CONSTRUCTION PHASING AND WORKFORCE

Construction Element	Site Preparation	Foundations, Structures and DC[1] System Installation	Inverters, Substation, & Connection
Phase Duration (work days)	40	174	131
Workforce			
Average Number of Workers	45	57	54
Maximum Number of Workers	59	76	71
Average Daily Trip Generation			
Workers[2]	90	114	108
Water Truck[3]	0	0	0
Construction Truck[4]	6	6	4
Freight Truck[4]	68	70	0

[1] Direct Current; [2] Passenger vehicle; [3] Medium truck; [4] Large truck

Equipment to be used for the construction of the project is identified in Table 4, *Energy Storage System On-Site Equipment and Vehicle Use by Construction Phase*.

Table 4
ENERGY STORAGE SYSTEM ON-SITE EQUIPMENT AND VEHICLE USE BY CONSTRUCTION PHASE

Equipment	Number of Units	Work Days per Unit	Hours per Day
Phase 1: Site Preparation			
Pickup	6	4	19
Bulldozers	9	7	30
Water Trucks (10,000 gallon)	6	4	40
Graders	6	7	15
Flatbeds	3	4	12
Skid Steers	1	7	5
Front End Loaders	3	7	25
Roller Compactor	3	7	25
Instrument	4	7	28
Gravel Trucks (20 cubic-yard)	78	4	33
Phase 2: Foundations, Structures and DC[1] System			
Pickup	4	4	66
Water Trucks (10,000 gallon)	3	4	87
Skid Steers	3	7	87
Trenchers	2	4	65
Crane	4	4	109

Table 4 (cont.)
ENERGY STORAGE SYSTEM ON-SITE EQUIPMENT AND VEHICLE USE BY CONSTRUCTION PHASE

Equipment	Number of Units	Work Days per Unit	Hours per Day
Phase 3: Inverters Substation and AC[2] System			
Skid Steer	2	7	37
Pile Drivers	2	7	37
Trenchers	7	4	131
Backhoes	3	7	29
Cranes	3	4	77
Aerial Lifts	2	4	56
Concrete Trucks (10 cubic-yard)	3	4	1

[1] Direct Current; [2] Alternating current

1.3.3 Overlapping Construction

Construction phases of the solar facility and ESS may overlap for the duration of ESS construction activity.

Peak overlapping construction of the solar PV facility and energy storage facility is as follows:

- *PV Phase 2 may overlap ESS Phase 1 and Phase 2 up to one month*
- *PV Phase 2 and Phase 3 may overlap ESS Phase 2 and Phase 3 for up to one month*
- *PV Phase 2 and Phase 3 may overlap ESS Phase 2 for up to 5 months*

Table 5, *Overlapping Construction Trip Generation*, presents average daily trips during the overlapping phases.

Table 5
OVERLAPPING CONSTRUCTION TRIP GENERATION

Overlapping Phase	Overlapping Duration	Vehicle	Average Daily Trips
PV Phase 2 (100%) + ESS Phases 1 (100%) and 2 (100%)	Up to 1 Month	Workers[1]	868
		Water Truck[2]	8
		Construction Truck[3]	60
		Freight Truck[3]	142
PV Phases 2 (100%) and 3 (100%) + ESS Phases 2 (100%) and 3 (100%)	Up to 1 Month	Workers[1]	920
		Water Truck[2]	16
		Construction Truck[3]	32
		Freight Truck[3]	74
PV Phases 2 (100%) and 3 (100%) + ESS Phase 2 (100%)	Up to 5 Months	Workers[1]	812
		Water Truck[2]	16
		Construction Truck[3]	28
		Freight Truck[3]	74

[1] Passenger vehicle; [2] Medium truck; [3] Large truck

1.4 OPERATION AND MAINTENANCE

Upon commissioning, the project would enter the operation phase. The solar modules at the site would operate during daylight hours seven days per week, 365 days per year.

Operational activities at the project site would include:

- Solar module washing;
- Vegetation, weed, and pest management;
- Security;
- Responding to automated electronic alerts based on monitored data, including actual versus expected tolerances for system output and other key performance metrics;
- Occasional equipment repair and replacement; and
- Communicating with customers, transmission system operators, and other entities involved in facility operations.

Up to six permanent staff could be on the site at any one time for ongoing facility maintenance and repairs. The duration of scheduled maintenance activities would vary in accordance with the required task but could involve up to 20 workers full-time for up to two weeks up to four times a year for module washing, and a similar number and duration for workers regularly visiting the site for routine maintenance activities. On intermittent occasions, up to 25 workers could be remotely dispatched to the site if repairs or replacement of equipment were needed in addition to module washing. A record of inspections would be kept on the site. The maximum number of on-site staff at any time would be 31 (six permanent staff and 25 temporary staff). The personnel and time required for emergency maintenance would vary in accordance with the necessary response. The majority of the operational labor force is expected to be from the City of Fresno and the surrounding communities with a maximum anticipated commute of 40 miles one way.

During operation, a maximum of 31 worker vehicles (passenger vehicles) would result in 62 average daily trips. Water trucks would be on-site every three or four months for approximately two weeks at a time. A maximum of 20 water trucks (medium trucks) would be used for concurrent panel washing and routine maintenance which would generate a maximum of 40 average daily trips. This represents a conservative analysis as simultaneous tasks would not be an everyday occurrence. The most distant water source for water trucks would be 40 miles away during operation and maintenance activities.

Equipment to be used during operation and maintenance of the project is identified in Table 6, *Operations and Maintenance Equipment*.

Table 6
OPERATIONS AND MAINTENANCE EQUIPMENT

Equipment[1]	Units	Estimated Usage		
		Hours per Day	Days per Week	Total Days
All-Terrain Vehicles	2	12	5	10
Kubota Tractors	1	3	5	10
Honda Portable Generators	2	6	5	10
Portable Water Trailers with Pump	1	2	5	10
Ford F150 (Routine O&M)	6	30	4	10
Ford F150 (Water Wash Trucks)	2	30	2	10

[1] for one quarterly maintenance period; O&M = operations and maintenance

1.5 DECOMISSIONING AND SITE RECLAMATION

The PV facility is anticipated to have an operating life of up to 40 years. After this period, the solar facility would be either repowered or decommissioned. Repowering after the operating life is not anticipated at this time; however, if repowering were to be pursued, it would require the facility owner to obtain all required permit approvals. Project decommissioning would occur in accordance with the expiration of the CUP and would involve the removal of above-grade facilities, buried electrical conduit, and all concrete foundations in accordance with a reclamation plan. Equipment would be repurposed off-site, recycled, or disposed of in a landfill as appropriate.

After the operating life of the solar facility is complete, the ESS would be decommissioned along with the rest of the solar facility. Batteries may be disposed of as hazardous waste, or recycled, depending on available technology. Lithium-ion batteries and their constituent parts will likely be recycled. Lithium-ion batteries contain a variety of valuable metals in addition to lithium, and recycling of these batteries is expected to become increasingly commonplace with the increased use of batteries in consumer goods and electric vehicles. Some batteries may have the capacity to be reused at the end of the operating life of the project. The chemical components of flow batteries may either be disposed of as hazardous waste (i.e., neutralization of the liquid within the battery), or they may comprise valuable elements which would also be recycled or reused.

Decommissioning would take approximately six months to be completed and would occur in three phases: Phase 1 would involve shutting down the systems and removing hazardous materials and wiring; Phase 2 would include removing the PV modules, inverters, and substations; and Phase 3 would include removing site fencing and driveways and the final soil reclamation process.

Approximately 81 to 87 workers may be on the site at a time for decommissioning activities. Decommissioning would involve the use of heavy equipment similar to what was used for construction. Appropriate hazardous materials control and erosion control measures would be used throughout the decommissioning process. It is anticipated that such controls would be substantially similar to those implemented during construction, although the intensity of activities would be much lower. Trips generated by decommissioning include worker vehicle trips, water truck trips and construction truck trips. Decommissioning would generate approximately 318 average daily worker trips, 4 water truck trips, and 40 construction truck trips.

Decommissioning phasing is assumed as follows:

- Phase 1, *Safe-off, Hazardous Materials and Wiring Removal*, extends for a duration of up to 6 weeks, or 28 working days, and may overlap with Phase 2 by approximately 3 weeks.
- Phase 2, *Removal of Inverter Blocks and Substation*, would extend for a duration of up to 13 weeks, or 63 working days, and may overlap Phase 3 by approximately 5 weeks.
- *Phase 3, Removal of Site Fencing and Roads and Final Soil Reclamation Process*, would extend for a duration of approximately 17 weeks or 85 working days, and may overlap Phase 4 by one week.
- *Phase 4, End of Decommission*, would extend for a duration of approximately 1 week or 5 working days.

Decommissioning would involve the use of heavy equipment and personnel similar to what was used for construction. Equipment to be used during decommissioning tasks are identified in Table 7, *Decommission Equipment*.

Table 7
DECOMMISSION EQUIPMENT

Reclamation Task	Equipment	Total Units	Total Days
Site Preparation / Removal of On-site Oils, Lubricants	Flat Bed Truck	2	8
Removal and Recycle of Underground Distribution Cables	Backhoe	4	77
	Flat Bed Truck	4	77
Removal and Recycle of Interconnection and Overhead Distribution Cables	Aerial Lift	2	57
	Flat Bed Truck	2	57
Removal and Disposal of PV Panels	Flat Bed Truck	4	251
Removal and Recycle of PV Modules Support Beams and Aluminum Racking	Flat Bed Truck	6	336
Removal and Recycle of Foundation Posts	Backhoe	5	165
Removal and Recycle of Electrical and Electronic Devices (including inverters and substation equipment)	Backhoe	2	24
	Crane	1	2
	Flat Bed Truck	2	24
Removal and Recycle of Fencing	Backhoe	3	111
	Flat Bed Truck	3	111
Removal of Compacted Area (roads, pathways)	Grader	2	7
Disc and Revegetate Project Site	Tractor	5	241
	Water Truck	2	48

2.0 AIR QUALITY SETTING

2.1 CRITERIA POLLUTANTS

Criteria pollutants are defined by state and federal law as a risk to the health and welfare of the general public. In general, air pollutants include the following compounds:

- Ozone (O_3)
- Reactive organic gases (ROGs) or volatile organic compounds (VOCs)
- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Respirable particulate matter and fine particulate matter (PM_{10} and $PM_{2.5}$)
- Sulfur dioxide (SO_2)
- Lead (Pb)

The following specific descriptions of health effects for each of the air pollutants potentially associated with project construction and operation are based on information provided by the California Air Resources Board (CARB; 2009) and the U.S. Environmental Protection Agency (USEPA; 2017a).

Ozone. Ozone is considered a photochemical oxidant, which is a chemical that is formed when VOCs and nitrogen oxides (NO_X), both by-products of fuel combustion, react in the presence of ultraviolet light. Ozone is considered a respiratory irritant and prolonged exposure can reduce lung function, aggravate asthma, and increase susceptibility to respiratory infections. Children and those with existing respiratory diseases are at greatest risk from exposure to ozone.

Reactive Organic Gases. ROGs (also known as VOCs) are compounds composed primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of ROGs. Other sources of ROGs include evaporative emissions from paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. While ROGs can be a health concern indoors, CARB regulates ROGs outdoors mainly because of their ability to create photochemical smog under certain conditions.

Carbon Monoxide. CO is a by-product of fuel combustion. CO is an odorless, colorless gas. CO affects red blood cells in the body by binding to hemoglobin and reducing the amount of oxygen that can be carried to the body's organs and tissues. CO can cause health effects to those with cardiovascular disease and can also affect mental alertness and vision.

Nitrogen Dioxide. NO_2, a species of the aforementioned NO_X, is also a by-product of fuel combustion and is formed both directly as a product of combustion and in the atmosphere through the reaction of nitrogen oxide (NO) with oxygen. NO_2 is a respiratory irritant and may affect those with existing respiratory illness, including asthma. NO_2 can also increase the risk of respiratory illness.

Respirable Particulate Matter and Fine Particulate Matter. Respirable particulate matter, or PM_{10}, refers to particulate matter with an aerodynamic diameter of 10 microns or less. Fine particulate matter, or $PM_{2.5}$, refers to particulate matter with an aerodynamic diameter of 2.5 microns or less. Particulate matter in these size ranges have been determined to have the potential to lodge in the lungs and contribute to respiratory problems. PM_{10} and $PM_{2.5}$ arise from a variety of sources, including road dust, diesel exhaust, fuel combustion, tire and brake wear, construction operations, and windblown dust. PM_{10} and $PM_{2.5}$ can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases such as asthma and chronic bronchitis. $PM_{2.5}$ is considered to have the potential to lodge deeper in the lungs. Particulate matter originating from diesel exhaust, diesel particulate matter, discussed in further detail below, is classified a carcinogen by CARB.

Sulfur dioxide. SO_2 is a colorless, reactive gas that is produced from the burning of sulfur-containing fuels such as coal and oil and by other industrial processes. Generally, the highest concentrations of SO_2 are found near large industrial sources. SO_2 is a respiratory irritant that can cause narrowing of the airways leading to wheezing and shortness of breath. Long-term exposure to SO_2 can cause respiratory illness and aggravate existing cardiovascular disease.

Lead. Lead in the atmosphere occurs as particulate matter. With the phase-out of leaded gasoline, large manufacturing facilities are the sources of the largest amounts of lead emissions. Lead is also present in some aircraft and racing fuels. Lead has the potential to cause gastrointestinal, central nervous system, kidney and blood diseases upon prolonged exposure. Lead is also classified as a probable human carcinogen. Because emissions of lead are found only in specialty fuels and projects that are permitted by the local air district, lead is not an air quality of concern for the proposed project.

2.2 TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs) are a diverse group of air pollutants that may cause or contribute to an increase in deaths or in serious illness or that may pose a present or potential hazard to human health. TACs include both organic and inorganic chemical substances that may be emitted from a variety of common sources, including gasoline stations, motor vehicles, dry cleaners, industrial operations, painting operations, and research and teaching facilities. TAC impacts are described by carcinogenic risk and by chronic (i.e., of long duration) and acute (i.e., severe but of short duration) adverse effects on human health. TACs are different than the criteria pollutants previously discussed because ambient air quality standards have not been established for TACs. TACs occurring at extremely low levels may still cause health effects, and it is typically difficult to identify levels of exposure that do not produce adverse health effects.

Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The solid emissions in diesel exhaust are known as diesel particulate matter (DPM). In 1998, California identified DPM as a TAC based on its potential to cause cancer, premature death, and other health problems (e.g., asthma attacks and other respiratory symptoms). Those most vulnerable are children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's known cancer risk from outdoor air pollutants. Diesel engines also contribute to California's $PM_{2.5}$ air quality problems. In addition, diesel soot causes visibility reduction (CARB 2011).

2.3 REGULATORY FRAMEWORK

2.3.1 Federal Clean Air Act

Air quality is defined by ambient air concentrations of specific pollutants identified by the USEPA to be of concern with respect to health and welfare of the general public. The USEPA is responsible for enforcing the Federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 Amendments. The CAA required the USEPA to establish National Ambient Air Quality Standards (NAAQS), which identify concentrations of pollutants in the ambient air below which no adverse effects on the public health and welfare are anticipated. In response, the USEPA established both primary and secondary standards for several criteria pollutants. Table 8, *Ambient Air Quality Standards*, shows the federal and state ambient air quality standards for these pollutants.

The CAA allows states to adopt ambient air quality standards and other regulations provided they are at least as stringent as federal standards. CARB has established the more stringent California Ambient Air Quality Standards (CAAQS) for the six criteria pollutants through the California Clean Air Act of 1988, and also has established CAAQS for additional pollutants, including sulfates, hydrogen sulfide (H_2S), vinyl chloride, and visibility-reducing particles. Areas that do not meet the NAAQS or the CAAQS for a particular pollutant are considered to be "nonattainment areas" for that pollutant.

Table 8
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary[1]	Secondary[2]
O_3	1 Hour	0.09 ppm (180 µg/m^3)	–	–
	8 Hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)	Same as Primary
PM_{10}	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	AAM	20 µg/m^3	–	Same as Primary
$PM_{2.5}$	24 Hour	–	35 µg/m^3	Same as Primary
	AAM	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
CO	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	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)	–	–
NO_2	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)	–
	AAM	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
SO_2	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	–
	3 Hour	–	–	0.5 ppm (1,300 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	–	–
Lead	30-day Avg.	1.5 µg/m^3	–	–
	Calendar Quarter	–	1.5 µg/m^3	Same as Primary
	Rolling 3-month Avg.	–	0.15 µg/m^3	
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per km – visibility ≥ 10 miles (0.07 per km – ≥30 miles for Lake Tahoe)	**No Federal Standards**	
Sulfates	24 Hour	25 µg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)		
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)		

Source: CARB 2016

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

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

O_3: ozone; ppm: parts per million; µg/m^3: micrograms per cubic meter; PM_{10}: particulate matter with an aerodynamic diameter of 10 microns or less;

AAM: Annual Arithmetic Mean; $PM_{2.5}$: fine particulate matter; CO: carbon monoxide; mg/m^3: milligrams per cubic meter; NO_2 nitrogen dioxide; SO_2: sulfur dioxide; km: kilometer; –: No Standard.

The USEPA has classified air basins (or portions thereof) as being in "attainment," "nonattainment," or "unclassified" for each criteria air pollutant, based on whether or not the NAAQS have been achieved. If an area is designated unclassified, it is because inadequate air quality data were available as a basis for a nonattainment or attainment designation. The project site is located within the San Joaquin Valley Air Basin (SJVAB) and, as such, is in an area designated a nonattainment area for certain pollutants that are regulated under the CAA. Table 9, *San Joaquin Valley Air Basin Attainment Status*, lists the federal and state attainment status of the SJVAB for the criteria pollutants. The USEPA classifies the SJVAB as in attainment for PM_{10}; attainment/unclassified for CO, NO_2, SO_2; no designation/classification for lead; and in nonattainment for 8-hour ozone and $PM_{2.5}$ with respect to federal air quality standards.

Table 9
SAN JOAQUIN VALLEY AIR BASIN ATTAINMENT STATUS

Criteria Pollutant	Federal Designation	State Designation
O_3 (1-hour)	(No federal standard)	Nonattainment/Severe
O_3 (8-hour)	Extreme Nonattainment	Nonattainment
CO	Attainment-Unclassified	Attainment-Unclassified
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
NO_2	Attainment-Unclassified	Attainment
SO_2	Attainment-Unclassified	Attainment
Lead	(No designation/classification)	Attainment

Source: CARB 2017a and SJVAPCD 2018

The CAA (and its subsequent amendments) requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The CAA Amendments dictate that states containing areas violating the NAAQS revise their SIPs to include extra control measures to reduce air pollution. The SIP includes strategies and control measures to attain the NAAQS by deadlines established by the CAA. The SIP is periodically modified to reflect the latest emissions inventories, plans, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA has the responsibility to review all SIPs to determine whether they conform to the requirements of the CAA.

2.3.2 State

California Clean Air Act

CARB, a part of the California EPA (CalEPA), is responsible for the coordination and administration of both federal and state air pollution control programs within California, including setting the California Ambient Air Quality Standards (CAAQS). CARB also conducts research, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. CARB also has primary responsibility for the development of California's SIP, for which it works closely with the federal government and the local air districts.

In addition to primary and secondary AAQS, the state has established a set of episode criteria for ozone, CO, NO_2, SO_2, and PM. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Table 9, above, lists the state attainment status of the SJVAB for the criteria pollutants. Under state designation, the SJVAB is currently in attainment for NO_2, SO_2, and lead; attainment/unclassified for CO; in nonattainment for 8-hour ozone, PM_{10}, and $PM_{2.5}$; and in severe nonattainment for 1-hour ozone.

Toxic Air Contaminants

California's air toxics control program began in 1983 with the passage of the Toxic Air Contaminant Identification and Control Act, better known as AB 1807 or the Tanner Bill. When a compound becomes listed as a TAC under the Tanner process, the CARB normally establishes minimum statewide emission control measures to be adopted by local air pollution control districts (APCDs). Later legislative amendments (AB 2728) required the CARB to incorporate all 189 federal hazardous air pollutants (HAPs) into the state list of TACs.

Supplementing the Tanner process, AB 2588 – the Air Toxics "Hot Spots" Information and Assessment Act of 1987 – currently regulates over 600 air compounds, including all of the Tanner-designated TACs. Under AB 2588, specified facilities must quantify emissions of regulated air toxics and report them to the local APCD. If the APCD determines that a potentially significant public health risk is posed by a given facility, the facility is required to perform a health risk assessment (HRA) and notify the public in the affected area if the calculated risks exceed specified criteria.

On August 27, 1998, CARB formally identified PM emitted in both gaseous and particulate forms by diesel-fueled engines as a TAC. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by the USEPA as HAPs and by CARB as TACs. CARB's Scientific Advisory Committee has recommended a unit risk factor (URF) of 300 in 1 million over a 70-year exposure period for diesel particulate. In September 2000, the CARB approved the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (Diesel Risk Reduction Plan; CARB 2000). The Diesel Risk Reduction Plan outlined a comprehensive and ambitious program that included the development of numerous new control measures over the next several years aimed at substantially reducing emissions from new and existing on-road vehicles (e.g., heavy-duty trucks and buses), off-road equipment (e.g., graders, tractors, forklifts, sweepers, and boats), portable equipment (e.g., pumps), and stationary engines (e.g., stand-by power generators). These requirements are now in force on a statewide basis.

2.4 LOCAL

2.4.1 San Joaquin Valley Air Pollution Control District

The California CAA designates local air districts as lead air quality planning agencies, requires air district to prepare air quality plans, and grants air districts authority to implement transportation control measures. The San Joaquin Valley Air Pollution Control District (SJVAPCD) is the administrator of air pollution rules and regulations within the SJVAB, including Kings County. The SJVAPCD is responsible for implementing measures and local air pollution rules that ensure NAAQS and CAAQS are achieved and maintained. The SJVAPCD issues stationary source air permits, develops emissions inventories, maintains air quality monitoring stations, and reviews air quality environmental documents required by the California Environmental Quality Act (CEQA). Because no stationary source equipment is planned for the project, no local registration or SJVAPCD permits are required for the facility. Rules that apply to the proposed solar facility project include:

- Rule 4101 – Visible Emissions – limits the visible plume from any source to 20 percent opacity.
- Rule 4102 – Nuisance – limits the amount of contaminants that may be a nuisance to the general public (odors).
- Rules 8011-8071 are designed to reduce PM_{10} emissions (predominantly dust/dirt) generated by human activity, including construction and demolition, road construction, bulk materials storage, use of paved and unpaved roads, carryout and trackout, etc. Among the Regulation VIII rules applicable to the proposed project are the following:
    - Rule 8011 – General Requirements;
    - Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities;
    - Rule 8031 – Bulk Materials;
    - Rule 8041 – Carryout and Trackout;
    - Rule 8051 – Open Areas;
    - Rule 8061 – Paved and Unpaved Roads; and
    - Rule 8071 – Unpaved Vehicle/Equipment Traffic Areas.
- Rule 9510 – Indirect Source Review — in order to reduce emissions of ozone precursors (i.e., ROG and NO_X) and PM_{10} from new land use development projects, and achieve the attainment plans for each pollutant, the SJVAPCD adopted the Indirect Source Review Rule in 2005 and amended the rule in 2017. The 2017 revisions became effective in March of 2018. The rule requires projects to reduce both construction and operational period emissions by specified amounts by applying the SJVAPCD-approved mitigation measures and/or paying fees to support off-site mitigation programs that reduce emissions. Fees apply to the unmitigated portion of the emissions and are based on estimated costs to reduce the emissions from other sources plus expected costs to cover administration of the program. Off-site emission reduction projects to be funded through the Indirect Source Review Rule include retrofitting heavy-duty engines, replacing agricultural machinery and pumps, paving unpaved roads and road shoulders, trading out combustion powered lawn and agricultural equipment with electrical and other equipment, as well as a number of other projects that result in quantifiable emissions reductions of PM_{10} and NO_X.

The SJVAPCD continuously monitors its progress in implementing air quality plans and periodically reports to CARB and USEPA. It also periodically revises its plans to reflect new conditions and requirements in accordance with mandated schedules.

The SJVAPCD has adopted several attainment plans to achieve compliance with the NAAQS and CAAQS. To address nonattainment status under the NAAQS and CAAQS for ozone, the SJVAPCD adopted the district's 2004 Extreme Ozone Attainment Demonstration Plan, however the EPA withdrew its plan approval in November 2012 and it is no longer a federally-approved plan. The most recent plan adopted by the SJVAPCD is the 2016 Plan for the 2008 8-Hour Ozone Standard which provides a comprehensive strategy to reduce NO_X emissions by over 60 percent between 2012 and 2031. The plan will bring the SJVAB into attainment of USEPA's 2008 8-hour ozone standard as expeditiously as practicable, no later than December 31, 2031.

On April 30, 2008, the SJVAPCD adopted the 2008 $PM_{2.5}$ Plan satisfying all federal implementation requirements for the 1997 federal $PM_{2.5}$ standard. Per guidance from USEPA, this plan addressed the 1997 $PM_{2.5}$ standard under Subpart 1 of CAA Title 1, Part D. Subsequently, in 2013, the D.C. Circuit Court ruled that USEPA erred by solely using CAA Subpart 1 in establishing its $PM_{2.5}$ implementation rule, without consideration of the PM-specific provisions in Subpart 4. In June 2014, EPA classified the Valley as a "Moderate" nonattainment area under Subpart 4 with an attainment date of April 5, 2015.

Until the exceptional weather conditions experienced due to the recent drought, the SJVAB was on the verge of attaining the 1997 federal $PM_{2.5}$ standard (15 micrograms per cubic meter [$\mu g/m^3$] for annual, 35 $\mu g/m^3$ for 24-hour[1]) with an average annual concentration of 14.7 $\mu g/m^3$ and average 24-hour concentration of 56.4 $\mu g/m^3$ at the SJVAB's historic peak $PM_{2.5}$ sites in Bakersfield in 2012. Due to the extreme drought, stagnation, strong inversions, and historically dry conditions experienced over the winter of 2013-2014, attainment was impossible even if the SJVAB experienced zero $PM_{2.5}$ pollution for the last three quarters of 2014. The CAA includes provisions for excluding uncontrollable "exceptional events" from a region's attainment determination, but the current USEPA framework specifically excludes stagnation and drought conditions. Given that attaining the standard in 2015 was physically impossible, the SJVAPCD was compelled to submit a formal request for reclassification to "Serious" non-attainment with a new attainment date of December 31, 2015. Unfortunately, the exceptional weather conditions experienced in 2013-2014 also made it impossible to meet the new attainment deadline of December 31, 2015. Therefore, the District submitted a request for a one-time extension of the attainment deadline for the 24-hour standard to 2018 and the annual standard to 2020 (SJVAPCD 2015).

The 2015 Plan for the 1997 $PM_{2.5}$ Standard, approved by the District Governing Board on April 16, 2015, will bring the SJVAB into attainment of USEPA's 1997 $PM_{2.5}$ standard as expeditiously as practicable, but no later than December 31, 2020 (SJVAPCD 2015). Currently, attainment strategies are being developed for the 1997, 2006, and 2012 $PM_{2.5}$ standards under the pending 2018 PM Plans. Inputs and comments received through the public engagement process have resulted in identification of a comprehensive list of potential new measures to achieve additional emissions reductions from both stationary and mobile sources. The pending 2018 PM Plans are anticipated to be finalized in 2018 and will undergo a public process for review and adoption into the district SIP and subsequently through the CARB and USEPA.

3.0 GREENHOUSE GASES SETTING

3.1 CLIMATE CHANGE OVERVIEW

Global climate change refers to changes in average climatic conditions on Earth including temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by atmospheric gases. These gases are commonly referred to as GHGs because they function like a greenhouse by letting sunlight in but preventing heat from escaping, thus warming the Earth's atmosphere.

GHGs are emitted by natural processes and human (anthropogenic) activities. Anthropogenic GHG emissions are primarily associated with: (1) the burning of fossil fuels during motorized transport, electricity generation, natural gas consumption, industrial activity, manufacturing, and other activities; (2) deforestation; (3) agricultural activity; and (4) solid waste decomposition.

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[1] In December 2012, the EPA revised the primary annual $PM_{2.5}$ standard from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ for the protection of public health.

The temperature record shows a decades-long trend of warming, with 2016 global surface temperatures ranking as the warmest year on record since 1880. (National Aeronautics and Space Administration [NASA] 2018). The newest release in long-term warming trends announced 2017 ranked as the second warmest year with an increase of 1.62 degrees Fahrenheit compared to the 1951-1980 average (NASA 2018). GHG emissions from human activities are the most significant driver of observed climate change since the mid-20th century (Intergovernmental Panel on Climate Change [IPCC] 2013). The IPCC constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. The statistical models show a "high confidence" that temperature increase caused by anthropogenic GHG emissions could be kept to less than two degrees Celsius relative to pre-industrial levels if atmospheric concentrations are stabilized at about 450 parts per million (ppm) carbon dioxide equivalent (CO_2e) by the year 2100 (IPCC 2014).

3.2 TYPES OF GREENHOUSE GASES

The GHGs defined under California's Assembly Bill (AB) 32 include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Carbon Dioxide. CO_2 is the most important and common anthropogenic GHG. CO_2 is an odorless, colorless GHG. Natural sources include the decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungi; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of CO_2 include burning fuels, such as coal, oil, natural gas, and wood. Data from ice cores indicate that CO_2 concentrations remained steady prior to the current period for approximately 10,000 years. The atmospheric CO_2 concentration in 2010 was 390 ppm, 39 percent above the concentration at the start of the Industrial Revolution (approximately 280 ppm in 1750). As of February 2018, the CO_2 concentration exceeded 408 ppm, a 46 percent increase since 1750 (National Oceanic and Atmospheric Administration [NOAA] 2018).

Methane. CH_4 is the main component of natural gas used in homes. A natural source of methane is from the decay of organic matter. Geological deposits known as natural gas fields contain methane, which is extracted for fuel. Other sources are from decay of organic material in landfills, fermentation of manure, and cattle digestion.

Nitrous Oxide. N_2O is produced by both natural and human-related sources. N_2O is emitted during agricultural and industrial activities, as well as during the combustion of fossil fuels and solid waste. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic (fatty) acid production, and nitric acid production.

Fluorocarbons. Fluorocarbons are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. Chlorofluorocarbons are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at Earth's surface). Chlorofluorocarbons were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped as required by the 1989 Montreal Protocol.

Sulfur Hexafluoride. SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semi-conductor manufacturing, and as a tracer gas for leak detection.

GHGs have long atmospheric lifetimes that range from one year to several thousand years. Long atmospheric lifetimes allow for GHG emissions to disperse around the globe. Because GHG emissions vary widely in the power of their climatic effects, climate scientists have established a unit called global warming potential (GWP). The GWP of a gas is a measure of both potency and lifespan in the atmosphere as compared to CO_2. For example, because methane and N_2O are approximately 25 and 298 times more powerful than CO_2, respectively, in their ability to trap heat in the atmosphere, they have GWPs of 25 and 298, respectively (CO_2 has a GWP of 1). CO_2e is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the prevalence of that gas to produce CO_2e. The atmospheric lifetime and GWP of selected GHGs are summarized in Table 10, *Global Warming Potentials and Atmospheric Lifetimes*.

Table 10
GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES

Greenhouse Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide (CO_2)	50-200	1
Methane (CH_4)	12	25
Nitrous Oxide (N_2O)	114	298
HFC-134a	14	1,430
PFC: Tetraflouromethane (CF_4)	50,000	7,390
PFC: Hexafluoroethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: IPCC 2007
HFC: hydrofluorocarbon; PFC: perfluorocarbon

3.3 REGULATORY FRAMEWORK

3.3.1 Federal

Federal Clean Air Act

The U.S. Supreme Court ruled on April 2, 2007, in *Massachusetts v. U.S. Environmental Protection Agency* (USEPA*)* that CO_2 is an air pollutant, as defined under the CAA, and that the USEPA has the authority to regulate emissions of GHGs. The USEPA announced that GHGs (including CO_2, CH_4, N_2O, HFC, PFC, and SF_6) threaten the public health and welfare of the American people. This action was a prerequisite to finalizing the USEPA's GHG emissions standards for light-duty vehicles, which were jointly proposed by the USEPA and the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA). The standards were established on April 1, 2010 for 2012 through 2016 model year vehicles and on October 15, 2012 for 2017 through 2025 model year vehicles (USEPA 2017b; USEPA and NHTSA 2012).

Light-Duty Vehicle GHG Emissions Standards and Corporate Average Fuel Economy Standards

The USEPA and the NHTSA have been working together on developing a national program of regulations to reduce GHG emissions and to improve fuel economy of light-duty vehicles. The USEPA is finalizing the first-ever national GHG emissions standards under the CAA, and the NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. On April 1, 2010, the USEPA and NHTSA announced a joint Final Rulemaking that established standards for 2012 through

2016 model year vehicles. This was followed up on October 15, 2012, when the agencies issued a Final Rulemaking with standards for model years 2017 through 2025. The rules require these vehicles to meet an estimated combined average emissions level of 250 grams per mile by 2016, decreasing to an average industry fleet-wide level of 163 grams per mile in model year 2025. The 2016 standard is equivalent to 35.5 miles per gallon (mpg), and the 2025 standard is equivalent to 54.5 mpg if the levels were achieved solely through improvements in fuel efficiency. The agencies expect, however, that a portion of these improvements will be made through improvements in air conditioning leakage and the use of alternative refrigerants that would not contribute to fuel economy. These standards would cut GHG emissions by an estimated 2 billion metric tons (MT) and 4 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2017–2025). The combined USEPA GHG emission standards and NHTSA CAFE standards resolve previously conflicting requirements under both federal programs and the standards of the State of California and other states that have adopted the California standards (USEPA 2017b; USEPA and NHTSA 2012).

3.3.2 State

There are numerous State plans, policies, regulations, and laws related to GHG emissions and global climate change. Following is a discussion of some of these plans, policies, and regulations that (1) establish overall State policies and GHG emission reduction targets; (2) require State or local actions that result in direct or indirect GHG emission reductions for the proposed project; and (3) require CEQA analysis of GHG emissions.

Executive Order S-3-05

On June 1, 2005, Executive Order (EO) S-3-05 proclaimed that California is vulnerable to climate change impacts. It declared that increased temperatures could reduce snowpack in the Sierra Nevada, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To avoid or reduce climate change impacts, EO S-3-05 calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

Assembly Bill 32 – Global Warming Solution Act of 2006

The California Global Warming Solutions Act of 2006, widely known as AB 32, requires that the CARB develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. The bill requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

Executive Order S-01-07

This EO, signed by Governor Schwarzenegger on January 18, 2007, directs that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by the year 2020. It orders that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California and directs CARB to determine whether a LCFS can be adopted as a discrete early action measure pursuant to AB 32. CARB approved the LCFS as a discrete early action item with a regulation adopted and implemented in April 2010. Although challenged in 2011, the Ninth Circuit reversed the District Court's opinion and rejected arguments that implementing LCFS violates the interstate commerce clause in September 2013. CARB is therefore continuing to implement the LCFS statewide.

Executive Order B-30-15

On April 29, 2015, EO B-30-15 established a California GHG emission reduction target of 40 percent below 1990 levels by 2030. The EO aligns California's GHG emission reduction targets with those of leading international governments, including the 28 nation European Union. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32. California's new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the goal established by EO S-3-05 of reducing emissions 80 percent under 1990 levels by 2050.

Senate Bill 32

As a follow-up to AB 32 and in response to EO-B-30-15, Senate Bill (SB) 32 was passed by the California legislature in August 2016 to codify the EO's California GHG emission reduction target of 40 percent below 1990 levels by 2030.

California Air Resources Board: Scoping Plan

On December 11, 2008, CARB adopted the Scoping Plan (CARB 2008) as directed by AB 32. The Scoping Plan proposes a set of actions designed to reduce overall GHG emissions in California to the levels required by AB 32. Measures applicable to development projects include those related to energy-efficiency building and appliance standards, the use of renewable sources for electricity generation, regional transportation targets, and green building strategy. Relative to transportation, the Scoping Plan includes nine measures or recommended actions related to reducing vehicle miles traveled (VMT) and vehicle GHG emissions through fuel and efficiency measures. These measures would be implemented statewide rather than on a project by project basis.

In response to EO B-30-15 and SB 32, all state agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. CARB was directed to update the Scoping Plan to reflect the 2030 target and, therefore, is moving forward with the update process. The mid-term target is critical to help frame the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure needed to continue driving down emissions. The 2017 Climate Change Scoping Plan Update, Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target, was adopted in December 2017. The Scoping Plan Update establishes a proposed framework for California to meet a 40 percent reduction in GHGs by 2030 compared to 1990 levels.

Assembly Bill 1493 – Vehicular Emissions of Greenhouse Gases

AB 1493 (Pavley) requires that CARB develop and adopt regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State." On September 24, 2009, CARB adopted amendments to the Pavley regulations that intend to reduce GHG emissions in new passenger vehicles from 2009 through 2016. In January 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single packet of standards called Advanced Clean Cars (CARB 2013).

California Code of Regulations, Title 24, Part 6

California Code of Regulations (CCR) Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. Energy-efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for water heating) results in GHG emissions.

The Title 24 standards are updated approximately every three years to allow consideration and possible incorporation of new energy efficiency technologies and methods. The latest update to the Title 24 standards occurred in 2016 and went into effect on January 1, 2017. The 2016 update to the Building Energy Efficiency Standards focuses on several key areas to improve the energy efficiency of newly constructed buildings and alterations to existing buildings. The most significant efficiency improvements to the residential Standards include improvements for attics, walls, water heating, and lighting. The Standards are divided into three basic sets. First, there is a basic set of mandatory requirements that apply to all buildings. Second, there is a set of performance standards – the energy budgets – that vary by climate zone (of which there are 16 in California) and building type; thus, the Standards are tailored to local conditions. Finally, the third set constitutes an alternative to the performance standards, which is a set of prescriptive packages that are basically a recipe or a checklist compliance approach.

Renewable Energy Programs and Mandates (SB 1078, 107, 2 X1 and EO S-14-08)

A series of substantive and far-reaching legislative initiatives have been advanced at the State level in the last decade, focused on increasing the generation of electricity via renewable energy sources and promoting a shift from fossil- or carbon-based fuels as a key strategy to reduce GHG emissions, air pollution, and water use associated with the energy sector.

The proposed project would be an important asset in meeting energy demand in the State, as it would contribute toward meeting California legislative initiatives by providing a long-term source of renewable electricity. In 2002, California established the Renewable Portfolios Standard (RPS), SB 1078, requiring electric utilities in the State to increase procurement of eligible renewable energy resources to achieve a target of 20 percent of their annual retail sales by the year 2010. Then-Governor Arnold Schwarzenegger signed Executive Order S-14-08 in 2008, increasing that target to 33 percent by the year 2020. In 2011, in an effort to codify the 33 percent reduction in GHG emissions by 2020, Governor Jerry Brown signed the California Renewable Energy Resources Act, SB 2 X1, into law. SB 2 X1 legislatively broadens the scope of the State RPS to include retail electricity sellers; investor- and publicly owned utilities; municipal utilities; and community choice aggregators under the mandate to obtain 33 percent of their retail electrical energy sales from renewable sources by 2020.

Senate Bill 350

Approved by Governor Brown on October 7, 2015, SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This will increase the use of RPS eligible resources, including solar, wind, biomass, and geothermal. In addition, large utilities are required to develop and submit Integrated Resource Plans to detail how each entity will meet their customers resource needs, reduce GHG emissions, and increase the use of clean energy.

3.3.3 Local

San Joaquin Valley Air Pollution Control District

In December 2009, the SJVAPCD adopted the following guidance documents applicable to the project:

- Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA (SJVAPCD 2009a), and
- District Policy: Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency (SJVAPCD 2009b).

This guidance and policy are the documents referenced in the SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts* adopted in March 2015 (SJVAPCD 2015). Consistent with the District Guidance and District Policy above, SJVAPCD (2015) acknowledges the current absence of numerical thresholds, and recommends a tiered approach to establish the significance of the GHG impacts on the environment:

1. If a project complies with an approved GHG emission reduction plan or GHG mitigation program which avoids or substantially reduces GHG emissions within the geographic area in which the project is located, then the project would be determined to have a less than significant individual and cumulative impact for GHG emissions;
2. If a project does not comply with an approved GHG emission reduction plan or mitigation program, then it would be required to implement best performance standards (BPS); and
3. If a project is not implementing BPS, then it should demonstrate that its GHG emissions would be reduced or mitigated by at least 29 percent, compared to business-as-usual.

4.0 EXISTING CONDITIONS

4.1 CLIMATE AND METEOROLOGY

The SJVAB is comprised of an inland Mediterranean climate, averaging more than 260 sunny days per year. The valley floor is characterized by warm, dry summers and cooler winters. Average daily temperatures in the basin range from 44.6 degrees Fahrenheit (°F) in January to 76.7°F in July. Summer highs often exceed 100°F, averaging in the low 90s in the northern valley and high 90s to the south. Maximum temperatures of 90°F or greater occur about 88 days per year. Temperatures of 32°F and below occur about 22 days per year. Nearly 90 percent of the annual precipitation falls in the 6 months between November and April (SJVAPCD 2015).

The Basin is approximately 250 miles long and 35 miles wide; it is the second largest air basin in the state of California. The SJVAB is defined by the Sierra Nevada Mountains to the east (8,000 to 14,000 feet in elevation), the Coast Range to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 8,000 feet in elevation). The valley opens to the sea at the Carquinez Strait where the San Joaquin-Sacramento Delta discharges into San Francisco Bay. Within the majority of the San Joaquin Valley, air movement through and out of the basin is restricted by the hills and mountains surrounding it. Although marine air generally flows into the basin from the San Joaquin

River Delta, the Coast Range hinders wind access into the SJVAB from the west, the Tehachapi Mountains prevent the southerly passage of airflow, and the Sierra Nevada Mountains prevent airflow to the east. These topographic features result in weak airflow in the valley, which becomes blocked vertically by high barometric pressure over the Basin. As a result, the majority of the SJVAB is highly susceptible to pollutant accumulation (SJVAPCD 2015).

Wind speed and direction play an important role in the dispersion and transport of air pollutants. Ozone and inhalable particulates (PM_{10} and $PM_{2.5}$) are classified as regional pollutants because they can be transported away from the emission source before concentrations peak. In contrast, local pollutants, such as carbon monoxide (CO), tend to have their highest concentrations near the source of emissions. These local pollutants dissipate easily and therefore have the highest concentrations during low wind speeds. Wind speed and direction data indicate that during the summer, winds usually originate at the north end of the Basin and flow in a south/southeasterly direction through the Tehachapi Pass into the Mojave Desert Air Basin (SJVAPCD 2015).

Inversions occur when warm air sits over cooler air, trapping the cooler air at elevations near or above ground level. When these inversions occur in the SJVAB they trap pollutants from dispersing vertically while the mountains surrounding the San Joaquin Valley trap the pollutants from dispersing horizontally. Ground-level inversions occur frequently during early fall and winter (i.e., October through January) while elevated inversions which, contribute to the occurrence of high levels of ozone, generally occur in the summer months. Severe air stagnation occurs as a result of these inversions and high concentrations of primary pollutants can then be found (SJVAPCD 2015).

4.2 EXISTING AIR QUALITY

4.2.1 Criteria Pollutants

Attainment Designations

Attainment designations are discussed in Sections 2.3. Table 9, *San Joaquin Valley Air Basin Attainment Status*. The SJVAB is a federal and state nonattainment area for 8-hour ozone and $PM_{2.5}$, a state nonattainment PM_{10}, and a severe state nonattainment area for 1-hour ozone.

Monitored Air Quality

Criteria air pollutant concentrations are measured at several monitoring stations in the SJVAB. The closest station to the project site is identified as the Hanford Monitoring Station, located at 807 South Irwin Street, approximately 15 miles northeast of the project site. Equipment at the station measures ozone, PM_{10}, $PM_{2.5}$, and NO_2 levels. Table 11, *Air Quality Monitoring Data*, summarizes the air quality data from this station for the most recent three-year period (2014-2016).

The data show violations of the federal and state 8-hour ozone standards and the 1-hour ozone state standard in each of the three years sampled. The levels of NO_2 did not exceed state or federal standards in the last three years. PM_{10} levels exceeded the state 24-hour standard once in 2016. $PM_{2.5}$ levels exceeded the federal 24-hour standard in each of the three years sampled.

Table 11
AIR QUALITY MONITORING DATA

Pollutant	2014	2015	2016
Ozone (O_3)			
Maximum 1-hour concentration (ppm)	0.108	0.119	0.097
Days above 1-hour state standard (>0.09 ppm)	5	4	2
Maximum 8-hour concentration (ppm)	0.094	0.094	0.088
Days above 8-hour state standard (>0.070 ppm)	39	42	49
Days above 8-hour federal standard (>0.075 ppm)	14	22	20
Respirable Particulate Matter (PM_{10})			
Maximum federal 24-hour concentration ($\mu g/m^3$)	131.3	136.9	152.2
Days above state standard (>50 $\mu g/m^3$)	138.8	*	121.2
Days above federal standard (>150 $\mu g/m^3$)	0	*	0
Fine Particulate Matter ($PM_{2.5}$)			
Maximum 24-hour concentration ($\mu g/m^3$)	96.7	98.2	59.7
Days above federal 24-hour standard (>35 $\mu g/m^3$)	34	28	25
Nitrogen Dioxide (NO_2)			
Maximum 1-hour concentration (ppm)	0.050	0.051	0.052
Days above state 1-hour standard (0.18 ppm)	0	0	0

Source: CARB (2017b)
ppm = parts per million, $\mu g/m^3$ = micrograms per cubic meter, *italic underline* = exceed standard
*Insufficient data available

4.2.2 Valley Fever

Valley Fever is an illness caused by a fungus (*Coccidioides immitis* and *C. posadasii*) that grows in soils under certain conditions. Favorable conditions for the Valley Fever fungus include low rainfall, high summer temperatures, and moderate winter temperatures. In California, the counties with the highest incident of Valley Fever are Fresno, Kern and Kings Counties. When soils are disturbed by wind or activities like construction and farming, Valley Fever fungal spores can become airborne. The spores present a potential health hazard when inhaled. Individuals in occupations such as construction, agriculture, and archaeology have a higher risk of exposure due to working in areas of disturbed soils which may have the Valley Fever fungus. Most people who inhale the spores do not get sick. Usually, susceptible individuals experience flu-like symptoms and will feel better on their own within weeks, although some people require antifungal medication (CDC 2014). In extreme cases, the disease can be fatal. The average annual exposure rate in the San Joaquin Valley is more than 10 in 100,000 people (CDPH 2013).

4.2.3 Greenhouse Gases

CARB performs statewide GHG inventories. The inventory is divided into six broad sectors; agriculture and forestry, commercial, electricity generation, industrial, residential, and transportation. Emissions are quantified in MMT of CO_2e. Table 12, *California Greenhouse Gas Emissions by Sector*, shows the estimated statewide GHG emissions for the years 1990, 2000, 2010, and 2015.

Table 12
CALIFORNIA GREENHOUSE GAS EMISSIONS BY SECTOR (MMT CO_2e)

Sector	1990	2000	2010	2015
Agriculture and Forestry	23.6 (5%)	32.1 (7%)	34.5 (8%)	34.6 (8%)
Commercial	14.4 (3%)	15.0 (3%)	21.6 (5%)	22.2 (5%)
Electricity Generation	110.6 (26%)	105.2 (22%)	90.5 (20%)	84.1 (19%)
Industrial	103.0 (24%)	105.4 (22%)	102.7 (23%)	103.0 (23%)
Residential	29.7 (7%)	31.8 (7%)	32.2 (7%)	26.9 (6%)
Transportation	150.7 (35%)	178.1 (38%)	173.7 (38%)	169.4 (39%)
Unspecified Remaining	1.3 (<1%)	1.2 (<1%)	0.8 (<1%)	0.82(<1%)
TOTAL	**433.3**	**468.8**	**456.0**	**440.4**

Source: CARB 2007 and CARB 2017d

As shown in Table 12, statewide GHG emissions totaled 433 MMT CO_2e in 1990, 469 MMT CO_2e in 2000, 456 MMT CO_2e in 2010, and 440 MMT CO_2e in 2015. Transportation-related emissions consistently contribute the most GHG emissions, followed by industrial emissions and electricity generation.

5.0 METHODOLOGY AND SIGNIFICANCE CRITERIA

5.1 METHODOLOGY

The construction and operational emissions were estimated from several emissions models and associated spreadsheet calculations, depending on the source type and data availability. The primary emissions models used included CARB's EMFAC for on-road vehicle emissions factor model (CARB 2017e), CARB's OFFROAD for off-road equipment (CARB 2014b), and emission factors obtained from the USEPA AP-42 *Compilation of Air Pollutant Emission Factors* (USEPA 2011). Short-term and annual project emissions were estimated using appropriate emission factors and the associated schedules. Refer to Section 1.0, *Project Description*, and Appendix A for details on equipment fleet, hours of operation, VMT, and other assumptions used. The following construction and operational sources and activities were analyzed for emissions:

- On-site construction equipment exhaust emissions (all criteria pollutants and GHGs) – based on EMFAC2017 emission factors for the SJVAPCD, and OFFROAD2011 emission factors and projected equipment schedules for Kings County.

- On-site construction equipment fugitive dust emissions (PM_{10} and $PM_{2.5}$) – based on USEPA AP-42 emission factors and project equipment schedules.

- On-site and off-site heavy-duty trucks (includes delivery, freight, dump, and water trucks) exhaust emissions (all criteria pollutants and GHGs) – based on EMFAC2017 and estimated VMT.

- On-site and off-site entrained fugitive dust emissions for paved and unpaved road travel (PM_{10} and $PM_{2.5}$) – based on AP-42 methodology and estimated VMT.

- Worker vehicle emissions for trips to and from the site (all criteria pollutants and GHGs) – based on EMFAC2017 and estimated VMT.
- Worker vehicle entrained fugitive dust emissions for paved roads (PM_{10} and $PM_{2.5}$) – based on AP-42 methodology and estimated VMT.

Please note that the SJVAPCD requires the use of the California Emissions Estimator Model (CalEEMod) to determine compliance with the Indirect Source Rule (Rule 9510); however, that model is designed to provide emissions quantifications for typical residential and commercial land uses and is inadequate for the purposes of evaluating large scale solar power development. The analysis contained herein uses the same methodology and emission factors as those contained within the latest version of CalEEMod (version 2016.3.2).

5.1.1 Off-Road Construction Equipment

Off-road construction equipment exhaust emissions were estimated using primarily the OFFROAD2011 diesel emission factors. OFFROAD2011 was run for statewide with averaging days of Monday through Sunday for the years 2020 and 2021. All scenarios were run for three seasons – Annual, Summer, and Winter. The exhaust emission factors for each equipment at each horsepower range were back calculated from total daily emissions reported in the model output files. Construction equipment for each phase of the project incorporated into the calculations is presented in Appendix A. The exhaust emissions were calculated from the appropriate emission factors, the number of pieces of equipment, the engine duty, and the operating schedule. Refer to Section 1.0, *Project Description*, and Appendix A for equipment and scheduling.

5.1.2 On-Site Vehicle Emissions from On-Road Vehicles

On-site truck exhaust emissions were estimated using the EMFAC2017 emission factors for years 2020 and 2021 fleet mix for the SJVAPCD region. On-site construction vehicles include a mix of Class 2 and Class 7 vehicle weights. Vehicles include gasoline-powered light trucks and diesel-powered water trucks, flatbed trucks, gravel trucks, and concrete trucks. Vehicles were assumed to travel at an average speed of five miles per hour (mph) within the site. Vehicles used during the operational phase of the project include light duty trucks.

5.1.3 On-Road Vehicle Emissions

Off-site truck exhaust emissions were estimated using the EMFAC2017 emission factors for years 2020 and 2021 fleet mix for the SJVAPCD region. Off-site emission includes emissions from construction related vehicles, such as delivery trucks and equipment transportation and other construction related equipment that would be driven on-road, as well as construction phase emissions from worker commutes. Assumptions regarding vehicle trips, trips per day, and VMT are described in Section 1.0, *Project Description*.

5.1.4 Fugitive Dust

Paved and unpaved road entrained fugitive dust emissions were estimated using the AP-42 emission factors and VMT. The emission factors are calculated based on the silt content of the road and the average vehicle weight. The silt content was obtained from AP-42 (Table 4.2.2-1; USEPA 2011), based on the mean silt value for construction sites. The average worker commute vehicle weight was assumed to be 2.2 tons while the average truck weight was assumed to be 20 tons.

For the site preparation phase grading and bulldozing activities, fugitive dust emissions were estimated using USEPA AP-42 Chapter 11.9 emission equations and factors. The emission factor was calculated based on the grading equipment mean speed and miles traveled.

5.1.5 Methodology for Determining Health Risks

Because of the potential for health risks associated with large-scale off-road diesel equipment use, an HRA was conducted with regard to diesel exhaust particulate matter. The significance threshold for health risks differs from that used for criteria pollutants in that no specific air quality standards have been established for diesel particulate emissions or many other TACs. Instead, significance thresholds are determined based on an analysis of the number of excess cancers relative to a chosen risk level. Excess cancer risks are defined as those occurring in excess of or above and beyond those risks that would normally be associated with a location or activity if toxic pollutants were not present.

The USEPA considers for risk management those pollutants that could cause carcinogenic risk between one in 10,000 (1.0×10^4 or 1.0E-04) and one in one million (1.0×10^6 or 1.0E-06), with the latter criteria generally used for development of Preliminary Remediation Goals. Passage of Proposition 65 (encoded in California Health and Safety Code Section 25249.6) in 1986 prohibits a person in the course of doing business from knowingly and intentionally exposing any individual to a chemical that has been listed as known to the state to cause cancer or reproductive toxicity without first giving clear and reasonable warning. For a chemical that is listed as a carcinogen, the "no significant risk" level under Proposition 65 is defined as the level which is calculated to result in not more than one excess case of cancer in 100,000 individuals (1×10^5) exposed over a 70-year lifetime. Since 2007, no San Joaquin Valley facilities have been determined to pose risks in excess of action levels, which are an increased cancer risk of more than 10 in 1 million after 70 years of exposure (SJVAPCD 2016). The 10 in 1 million threshold is based on the latest scientific data, and is designed to protect the most sensitive individuals in the population as each chemical's exposure level includes large margins of safety. In addition to this carcinogen threshold, the California Office of Environmental Health Hazard (OEHHA) recommends that the non-carcinogenic hazards for TACs at ground level should not exceed a chronic hazard index (HI) greater than one.

The first step of the HRA is to characterize the project-related emissions. Exhaust emissions of DPM from the construction equipment are below the 10 and 2.5 micron range (PM_{10} and $PM_{2.5}$, respectively); therefore, all PM_{10} exhaust emissions expected to occur onsite were included in the HRA. DPM is the only pollutant needed for the cancer risk analysis (which uses 70-year-average emission rates for residential sensitive receptor risks) since the cancer slope factor established by OEHHA for the assessment of DPM cancer risk includes consideration of the individual toxic species that could be adsorbed onto DPM particles.

The air dispersion modeling for the HRA was performed using the USEPA AERMOD dispersion model, version 18081. AERMOD is a steady-state, multiple-source, Gaussian dispersion model designed for use with emission sources situated in terrain where ground elevations can exceed the stack heights of the emission sources (not a factor in this case). The AERMOD model requires hourly meteorological data consisting of wind vector, wind speed, temperature, stability class, and mixing height. For this analysis, meteorological data from the Lemoore Naval Air Station (Station ID: 23110) was selected as being the nearest, most representative meteorology. The model was run to obtain the peak 24-hour and annual average concentration. Receptors used included the discrete receptors for nearby sensitive receptors shown in Figure 2 and a 10-kilometer by 10-kilometer grid (6.2 miles x 6.2 miles) with a receptor spacing of 500 meters.

Various activities will occur at different locations throughout the approximately 2,490-acre project site. Because of the variability in equipment location and timing of specific construction actions, the entire 2,490-acre site was input to AERMOD as an area source. Emissions from construction trucks and equipment were assigned a release height of 10 feet, which is the approximate average height of the exhaust port plus a nominal amount of plume rise. The AERMOD results were then incorporated into CARB's Hotspot Analysis and Reporting Program Version 2 (HARP2) Air Dispersion Modeling and Risk Tool with the PM_{10} exhaust emission rates estimated for all onsite activity to determine individual health risk levels.

5.2 SIGNIFICANCE CRITERIA

5.2.1 Air Quality

According to Appendix G of the State CEQA Guidelines and the SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts*, a project would have a significant air quality environmental impact if it would:

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 nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
4. Expose sensitive receptors (i.e., day care centers, schools, retirement homes, and hospitals or medical patients in residential homes which could be impacted by air pollutants) to substantial pollutant concentrations; or
5. Create objectionable odors affecting a substantial number of people.

Appendix G of the State CEQA Guidelines states that the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. The SJVAPCD has established significance thresholds to assess the impacts of project-related air pollutant emissions. The significance thresholds are updated, as needed, to appropriately represent the most current technical information and attainment status in the SJVAB. Table 13, *SJVAPCD Air Quality Significance Thresholds*, presents the most current significance thresholds, including thresholds for construction and operational emissions and maximum incremental cancer risk and hazard indices for TACs. Thresholds for decommissioning are the same as those presented for construction. A project with emission rates and risk values below these thresholds is generally considered to have a less than significant effect on air quality.

Table 13
SJVAPCD AIR QUALITY SIGNIFICANCE THRESHOLDS

Mass Daily Thresholds (tons per year)		
Pollutant	**Construction**	**Operation**
ROG	10	10
NO_X	10	10
CO	100	100
PM_{10}	15	15
$PM_{2.5}$	15	15
SO_X	27	27
Toxic Air Contaminants		
TACs[1]	Maximum Incremental Cancer Risk ≥ 10 in 1 million Chronic & Acute Hazard Index ≥ 1.0 (project increment)	

Source: SJVAPCD 2015
[1] TACs (carcinogenic and noncarcinogenic)

As set forth in the *Guidance for Assessing and Mitigating Air Quality Impacts*, any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. Impacts of local pollutants (CO, TACs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects will exceed air quality standards.

5.2.2 Greenhouse Gas Emissions

Given the relatively small levels of emissions generated by a project in relationship to the total amount of GHG emissions generated on a national or global basis, individual projects are not expected to result in significant, direct impacts with respect to climate change. However, given the magnitude of the impact of GHG emissions on the global climate, GHG emissions from new development could result in significant, cumulative impacts with respect to climate change. Thus, the potential for a significant GHG impact is limited to cumulative impacts.

According to Appendix G of the State CEQA Guidelines, the following criteria may be considered in establishing the significance of GHG emissions:

Would the project:

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

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

As discussed in Section 3.3, Regulatory Framework, the SJVAPCD has adopted the guidance in *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* and the policy, *Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*. The guidance and policy rely on the use of BPS to assess significance of project specific GHG emissions on global climate change during the environmental review process. However, SJVAPCD's adopted BPS are specifically directed at reducing GHG emissions from stationary sources; therefore, the adopted BPS would not generally be applicable to RE Slate Solar Project as the project would not be a stationary source of emissions. The SJVAPCD guidance does not limit a lead agency's authority in establishing its own process and guidance for determining significance of project related impacts on global climate change.

In the event that a local air district's guidance for addressing GHG impacts does not use numerical GHG emissions thresholds, at the lead agency's discretion, a neighboring air district's GHG thresholds may be used to determine impacts. Although the project is not located within the South Coast Air Quality Management District (SCAQMD), SCAQMD currently has a GHG threshold of 10,000 MT of CO2e per year for construction emissions (amortized over a 30-year project lifetime) plus annual operation emissions. This threshold is often used by agencies, such as the California Public Utilities Commission, to evaluate GHG impacts in areas that do not have specific thresholds (CPUC 2015). Therefore, because this threshold has been established by the SCAQMD in an effort to control GHG emissions in the largest metropolitan area in the State of California, this threshold is considered a conservative approach for evaluating the significance of GHG emissions in a more rural area, such as Kings County.

6.0 AIR QUALITY IMPACT ANALYSIS

This section evaluates potential direct impacts of the proposed project related to the air pollutant emissions.

6.1 CONSISTENCY WITH AIR QUALITY PLANS

The SJVAPCD has adopted several attainment plans that outline the long-term strategies designed to achieve compliance with the NAAQS and CAAQS. According to SJVAPCD (page 65; SJVACPD 2015), "projects with emissions below the thresholds of significance for criteria pollutants would be determined to not conflict or obstruct implementation of the District's air quality plan". The thresholds of significance for criteria pollutants established by the SJVAPCD are presented in Table 13. The project emissions reported in Appendix A, which are summarized in Tables 15 and 16, below, show that with the incorporation of the prescribed Mitigation Measure AQ-1 and Mitigation Measure AQ-2, emissions of all criteria pollutants are below the thresholds of significance. Therefore, the project would not conflict with or obstruct implementation of the applicable air quality plan, and impacts would be less than significant with mitigation.

6.2 CONFORMANCE TO FEDERAL AND STATE AIR QUALITY STANDARDS

The project would generate criteria pollutants in the short term during construction and the long term during operation. To determine whether a project would result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation, a project's emissions are evaluated based on the quantitative emission thresholds established by the SJVAPCD (as shown in Table 13).

6.2.1 Construction

Project Emissions

This project's construction emissions were estimated using the emission factors and methods described in Section 5.1, *Methodology*. Project-specific input was based on general information provided in Section 1.0, *Project Description*, and assumptions to estimate reasonable worst-case conditions. Additional details of phasing, selection of construction equipment, and other input parameters are included in Appendix A.

The results of the calculations for project construction are shown in Table 14, *Annual Construction Emissions*. Emissions are summed annually and presented for comparison with the SJVAPCD thresholds.

Table 14
ANNUAL CONSTRUCTION EMISSIONS

Activity	Criteria Air Pollutant Emissions (tons per year)					
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2020						
Truck Trips	0.10	0.31	1.38	<0.01	1.36	0.35
Worker Commute	0.18	4.08	0.45	0.01	2.72	0.69
PV Phase 1: Site Preparation	0.53	1.98	4.67	0.01	0.21	0.12
PV Phase 2: PV System Installation	0.32	1.54	2.31	<0.01	0.09	0.09
2020 TOTAL	***1.12***	***7.91***	***8.82***	***0.03***	***4.38***	***1.25***
2021						
Truck Trips	0.15	0.54	2.29	0.01	2.59	0.67
Worker Commute	0.21	0.29	0.04	<0.01	<0.01	<0.01
PV Phase 2: PV System Installation	1.09	5.98	8.43	0.02	0.31	0.30
PV Phase 3: Collection, Substation(s), Switching Station, Gen-Ties; Site Restoration and Revegetation	0.12	0.85	1.22	<0.01	0.07	0.06
ESS Phase 1: Site Preparation	0.13	0.42	1.32	<0.01	0.05	0.03
ESS Phase 2: Foundations, Structures, and System	0.07	0.50	0.76	<0.01	0.03	0.03
ESS Phase 3: Inverters, Substation, and Connection	0.13	0.94	1.31	<0.01	0.08	0.07
2021 TOTAL	***1.91***	***9.53***	***15.37***	***0.03***	***3.13***	***1.16***
MAX YEAR TOTAL	**1.91**	**9.53**	**15.37**	**0.03**	**4.38**	**1.58**
SJVAPCD Thresholds	10	100	10	27	15	15
Significant Impact?	*No*	*No*	***Yes***	*No*	*No*	*No*

Modeling data is provided in Appendix A

As shown in Table 14, annual NO_X emissions would exceed the SJVACPD threshold. Emissions of all other criteria pollutants related to project construction would be below the significance thresholds. Thus, direct impacts from criteria pollutants generated during construction would be potentially significant.

The effects of using only construction equipment meeting USEPA-Certified Tier 4 emission standards for all off-road diesel powered equipment 50 hp or greater was evaluated to determine the effectiveness in reducing NOx emissions to below a level of significance. The evaluation is presented below.

Project Emissions with Mitigation

The results of the calculations for project construction with the use of Tier 4 off-road construction equipment are shown in Table 15, *Annual Construction Emissions with Use of Tier 4 Off-Road Construction Equipment*.

Table 15
ANNUAL CONSTRUCTION EMISSIONS WITH USE OF TIER 4 OFF-ROAD CONSTRUCTION EQUIPMENT

Activity	Pollutant Emissions (tons per year)					
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2020						
Truck Trips	0.10	0.31	1.38	<0.01	1.36	0.35
Worker Commute	0.18	4.08	0.45	0.01	2.72	0.69
PV Phase 1: Site Preparation	0.44	2.18	3.74	0.01	0.16	0.07
PV Phase 2: PV System Installation	0.15	1.64	1.46	<0.01	0.02	0.02
2020 TOTAL	***0.86***	***8.21***	***7.03***	***0.03***	***4.25***	***1.13***
2021						
Truck Trips	0.15	0.54	2.29	0.01	2.59	0.67
Worker Commute	0.21	0.29	0.04	<0.01	<0.01	<0.01
PV Phase 2: PV System Installation	0.50	6.46	5.43	0.02	0.06	0.06
PV Phase 3: Collection, Substation(s), Switching Station, Gen-Ties; Site Restoration and Revegetation	0.02	1.02	0.17	<0.01	0.01	<0.01
ESS Phase 1: Site Preparation	0.11	0.52	0.93	<0.01	0.03	0.01
ESS Phase 2: Foundations, Structures, and System	0.02	0.58	0.17	<0.01	<0.01	<0.01
ESS Phase 3: Inverters, Substation, and Connection	0.02	1.05	0.15	<0.01	<0.01	<0.01
2021 TOTAL	***1.03***	***10.45***	***9.18***	***0.03***	***2.70***	***0.75***
MAX YEAR TOTAL	**1.03**	**10.45**	**9.18**	**0.03**	**4.25**	**1.13**
SJVAPCD Thresholds	10	100	10	27	15	15
Significant Impact?	*No*	*No*	*No*	*No*	*No*	*No*

Modeling data is provided in Appendix A

As shown in Table 15, should all off-road, diesel powered 50 hp or greater construction equipment be Tier 4 standard, impacts associated with NO_X emissions would be less than significant; however, because there is the possibility that not all equipment will be able to be Tier 4, unless it can be guaranteed that all equipment would meet the Tier 4 standard, additional mitigation would be required.

Mitigation Measures

The following measures are prescribed to reduce NO_X emissions during construction.

MM AQ-1 **Tier 4 Off-road Equipment.** The applicant shall ensure that, whenever feasible, off-road diesel-powered construction equipment greater than 50 hp shall meet USEPA-Certified Tier 4 emission standards and shall be outfitted with best available control technology devices certified by the California Air Resources Board (CARB). A copy of each unit's certified tier specification, best available control technology documentation, and CARB or SJVAPCD operating permit shall be provided to the Kings County Community Development Agency at the time of mobilization of each applicable unit of equipment.

If all off-road diesel-powered construction equipment greater than 50 hp used for the project meet USEPA-Certified Tier 4 emission standards, emissions of all criteria pollutants would be below the thresholds of significance. The applicant, however, has indicated that, while it is likely that most or all of the off-road diesel-powered project construction equipment will meet this standard, it cannot guarantee that all off-road diesel-powered project construction equipment greater than 50 hp will meet Tier 4 emission standards. Therefore, implementation of MM AQ-2 is required to further address this impact.

MM AQ-2 **Voluntary Emissions Reduction Agreement.** If the applicant is unable to guarantee that all off-road diesel-powered construction equipment greater than 50 hp will meet Tier 4 emissions standards, then the project applicant will enter into a VERA with SJVAPCD to mitigate or reduce project emissions beyond the requirements of Rule 9510 through the payment of fees (on a per-ton basis) to SJVAPCD. The payment of fees will be made to SJVAPCD based on the fee schedule in the development mitigation contract and the amount of reduction necessary to offset project NO_x emissions below SJVAPCD thresholds.

6.2.2 Operation

Evaluation of operational emissions is analyzed based on the increase of emissions from the proposed project, as discussed in Section 5.1, *Methodology*. Project specific input was based on general information provided in Section 1.0, *Project Description*. As a worst-case scenario, it was assumed that 100 percent of the daily worker trips would also generate on-site trips, and one trip for every two quarterly maintenance employees would occur on-site. The average daily on-site trip would be 15 miles long, and 70 percent of the driveways on the project site would be dirt, and 30 percent would be paved/gravel.

As illustrated in Table 16, *Annual Operation Emissions*, the increase of daily maximum operational emissions related to the project would be low and well below the SJVAPCD significance criteria for all criteria pollutants and would not result in a significant direct impact related to operational emissions. No mitigation would be required.

Table 16
ANNUAL OPERATION EMISSIONS

Emission Source	Pollutant Emissions (tons per year)					
	ROG	**CO**	**NO_X**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Worker Commute	<0.01	0.05	0.01	<0.01	2.34	0.24
Water Trucks	<0.01	0.05	0.01	<0.01	4.78	0.52
Onsite Equipment	0.01	0.15	0.13	<0.01	0.01	0.01
TOTAL	**0.02**	**0.25**	**0.15**	**<0.01**	**7.13**	**0.77**
SJVAPCD Thresholds	10	100	10	27	15	15
Significant Impact?	*No*	*No*	*No*	*No*	*No*	*No*

Modeling data is provided in Appendix A

6.2.3 Decommissioning

This project's decommissioning emissions were estimated using the emission factors and methods described in Section 5.1, *Methodology*. Project-specific input was based on general information provided in Section 1.0, *Project Description*, and assumptions to estimate reasonable worst-case conditions. Additional details of phasing, selection of construction equipment, and other input parameters are included in Appendix A.

The results of the calculations for project decommissioning are shown in Table 17, *Annual Decommissioning Emissions*. Emissions are summed annually and presented for comparison with the SJVAPCD thresholds for construction activities (Table 13).

Table 17
ANNUAL DECOMMISSIONING EMISSIONS

Activity	Pollutant Emissions (tons per year)					
	VOC	**CO**	**NO_X**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Truck Trips	0.01	0.17	0.81	<0.01	1.78	0.44
Worker Commute	0.02	0.84	0.04	<0.01	1.55	0.39
Onsite Equipment	0.03	0.44	0.38	<0.01	0.01	<0.01
TOTAL	**0.06**	**1.45**	**1.23**	**0.01**	**3.33**	**0.84**
SJVAPCD Thresholds	10	100	10	27	15	15
Significant Impact?	*No*	*No*	*No*	*No*	*No*	*No*

Modeling data is provided in Appendix A

As shown in Table 17, annual emissions during decommissioning would be less than the SJVAPCD significance criteria for all criteria pollutants and would not result in a significant direct impact. No mitigation would be required.

6.3 CUMULATIVELY CONSIDERABLE NET INCREASE OF NONATTAINMENT CRITERIA POLLUTANTS

The region where the project would be built is designated as nonattainment for the ozone precursors PM_{10} and $PM_{2.5}$. The SJVAPCD (2015) states that if project emissions exceed the significance thresholds for the criteria pollutants, a project would have a cumulative, as well as an individual, significant impact. This does not imply that if the project is below all significant thresholds, it cannot be cumulatively significant.

The SJVAPCD significance thresholds for PM_{10} and $PM_{2.5}$, presented in Table 13, are each 15 tons per year, for construction and operational emissions. Tables 14 and 15 show that PM_{10} from project construction activities is the pollutant emitted in the greatest quantity, totaling 3.94 tons per year before the applicant's mitigation, and 3.81 tons per year after mitigation. Emission levels below the significance thresholds are not expected to cause exceedance of the air quality standards in the vicinity of the source, which is the area of highest concentrations. In the case of the project, because the construction emissions of PM_{10} before the applicant's mitigation are less than the significance thresholds, the ambient air concentrations would also be expected to be below the air quality standards in the vicinity of the source, decreasing even further with distance from the source.

However, in order to assess cumulative impacts, the significance of the incremental effects of the project was estimated in connection with the effects of past, current, and probable future projects within the same geographic area. A list of projects considered for the cumulative analysis was compiled using data provided by the Kings County Community Development Agency. The projects with a potential to generate emissions that would cumulate with those of the proposed project are all solar plants, either under construction or operational.

Of the projects closest to the project site, the following may be under construction during the same timeframe as the project; American Kings, Westlands Aquamarine, Daylight Solar, and Westlands Solar. Assuming construction activities from these projects would occur during the exact timeframe as the proposed RE Slate Solar Project, the total construction emissions of PM_{10} could be estimated to be about 14.5 tons per year, which is below the significance threshold of 15 tons per year for a project's construction emissions. In addition, the significance thresholds have been designed to provide reference emission levels for the most conservative scenario, which is a single source. Emissions originating from multiple sources distributed over an area have substantially lower air quality impacts compared to a single source. Therefore, it can be reasonably inferred that the cumulative air quality impacts of PM_{10} emissions are expected to be well below the air quality standards and, therefore, would not result in a considerable net increase of PM_{10} levels in the region.

Operational emissions from the project are lower than construction emissions and would cumulate with similar levels of operational emissions from a smaller number of projects compared to the projects under construction in the same area. Therefore, the cumulative impacts from operational emissions of PM_{10} would also be expected to be below the air quality thresholds and, therefore, would not result in a considerable net increase of PM_{10} levels in the region.

Therefore, the project would not result in a cumulatively considerable net increase of any criteria pollutants for which the region is nonattainment and impacts under this criterion would be less than significant.

6.4 IMPACTS TO SENSITIVE RECEPTORS

Sensitive receptors are described as residences, schools, day-care centers, playgrounds, medical facilities, or other facilities that may house individuals with health conditions (medical patients or elderly persons/athletes/students/children) that may be adversely affected by changes in air quality. Impacts to sensitive receptors are typically analyzed for operational period CO hot spots and exposure to TACs. An analysis of the project's potential to expose sensitive receptors to these pollutants is provided below.

6.4.1 Carbon Monoxide Hot Spots

A CO hot spot is an area of localized CO pollution caused by severe vehicle congestion on major roadways, typically near intersections. A quantitative screening is required in two instances: (1) if a project increases the average delay at signalized intersections operating at Level of Service (LOS) E or F; or (2) if a project causes an intersection that would operate at LOS D or better without the project to operate at LOS E or F with the project. Based on the results of Traffic Impact Analysis (TIA) prepared for the project, with implementation of the recommended measure of alternative worker schedules/shifts to eliminate peak-hour trips, the construction of the project is not anticipated to create or exacerbate any significant impacts to the existing study area during any phase of construction, operation, or maintenance (LSA 2018). Thus, the project would neither cause new severe congestion nor significantly worsen existing congestion. There would be no potential for a CO hot spot or exposure of sensitive receptors to substantial, project-generated, local CO emissions. The impact would be less than significant and no mitigation is required.

6.4.2 Exposure to TACs

Construction activities would result in short-term, project-generated emissions of DPM from the exhaust of off-road, heavy-duty diesel equipment. CARB identified DPM as a TAC in 1998. Additionally, the OEHHA has determined that chronic exposure to DPM can cause carcinogenic and non-carcinogenic health effects. The dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Thus, the risks estimated for a maximally exposed individual (MEI) are higher if a fixed exposure occurs over a longer time period. According to the OEHHA, HRAs, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 30-year exposure; however, such assessments should be limited to the period/duration of activities associated with the project. As such, the exposure duration for the project was set to the duration of the construction activity, 14 months.

The USEPA AERMOD dispersion model was used to estimate concentrations of DPM from the construction of the project. The DPM construction equipment emissions were estimated using the methods described above in Section 5.1, *Methodology*. The emissions were represented in the model as an area source equal to the size of the project's construction area. An emission release height of 10 feet was also assumed. Receptor locations where construction impacts were calculated focused on residences located east-southeast of the project site. CARB's HARP2 model was then used to process the AERMOD results using OEHHA's recommended methodology to provide estimates of cancer risk and chronic non-cancer health risk. The AERMOD and HARP2 model outputs are provided in Appendix B.

Table 18, *Health Risk Levels from Project Construction*, provides the results of the HRA along with the SJVAPCD's significance thresholds for cancer and non-cancer health risks.

Table 18
HEALTH RISK LEVELS FROM PROJECT CONSTRUCTION

Metric	Dispersion Model Estimate[1]	Significance Threshold	Exceeds Threshold?
Cancer Risk	1.60 in 1 million	10 in 1 million	No
Chronic Non-Cancer HI	0.00037	1.0	No

HRA Modeling data is provided in Appendix B
[1] Computed at the MEI

The sensitive receptor with the highest cancer risk and HI is located approximately 0.25 miles east of the project site (depicted in Figure 2). As shown in Table 18, the cancer risk is estimated to be 1.60 in 1 million and the HI is 0.00037. As such, the project would not exceed the significance thresholds for cancer risk and chronic non-cancer hazard. The impact would be less than significant.

In terms of long-term operations, the proposed project does not include any new sources of TACs and therefore, would not generate substantial emissions of TACs.

6.4.3 Valley Fever

Workers may be exposed to Valley Fever spores during construction, which would be a significant impact. Although the applicant includes standard practices to reduce fugitive dust in all of their projects, implementation of MM AQ-3 would be required to reduce impacts to less than significant.

Mitigation Measures

The following measure is prescribed to reduce exposure to Valley Fever.

MM AQ-3 **Reducing Valley Fever Exposure.** In order to reduce exposure of the public and workers from Valley Fever spores during ground disturbing activities, the following measures shall be implemented during project construction and decommissioning:

- Implement the Dust Control Plan required to be approved for the project by the SJVAPCD under District Rule 8021 prior to ground disturbing activity.
- When exposure to dust is unavoidable for workers who will be disturbing the top 2 to 12 inches of soil, provide workers with National Institute for Occupational Safety and Health- (NIOSH) approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or HEPA, as recommended in the California Department of Public Health publication "Preventing Work-Related Coccidioidomycosis (Valley Fever)."

6.5 ODORS

Project construction equipment and activities would generate odors. Primary construction odor sources include diesel exhaust emissions from equipment operating on site. There may be situations where construction activity odors would be noticeable by passersby, but these odors would not be unfamiliar or necessarily objectionable. The odors would be temporary and would dissipate rapidly from the source with an increase in distance. Therefore, the impacts would be short-term, would be detectable or noticeable to few people, and would be less than significant.

Land uses associated with odor complaints include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting activities, refineries, landfills, dairies, and fiberglass molding operations. The project does not include land uses typically associated with odor sources. Impacts associated with odor sources are considered less than significant.

7.0 GREENHOUSE GAS IMPACT ANALYSIS

This section evaluates potential impacts of the proposed project related to the generation of GHG emissions.

7.1 GREENHOUSE GAS EMISSIONS

7.1.1 Construction Emissions

The project's construction GHG emissions were estimated using the emission factors and methods described in Section 5.1, *Methodology*. Project-specific input was based on general information provided in Section 1.0, *Project Description*, and assumptions to estimate reasonable worst-case conditions. Additional details of phasing, selection of construction equipment, and other input parameters are included in Appendix A.

Emissions of GHGs related to the construction of the project would be temporary. As shown in Table 19, *Estimated Construction GHG Emissions*, total GHG emissions associated with construction are estimated at 5,507 MT of CO_2e.

Table 19
ESTIMATED CONSTRUCTION GHG EMISSIONS

Source	Emissions (MT CO_2e)
Truck Trips	1,064
Worker Commute	1,094
PV Site Preparation	849
PV Installation	1,860
PV Inverters, Substation & Connection	154
ESS Site Prep	244
ESS Foundations, Structures, and DC	96
ESS Inverters, Substation, and AC	146
TOTAL[1]	**5,507**
Amortized Construction Emissions[2]	184

Modeling data is provided in Appendix A
[1] The total presented is the sum of the unrounded values.
[2] Construction emissions are amortized over 30 years in accordance with SCAQMD guidance.

Because GHG emission reduction measures for construction equipment are relatively limited, SCAQMD, in its *Draft Guidance Document – Interim CEQA GHG Significance Thresholds,* recommends that construction emissions be amortized over a 30-year project lifetime and considered to be an element of operational emissions (SCAQMD 2008). The proposed construction activities, therefore, would contribute 184 MT CO_2e emissions per year over a 30-year project lifetime.

7.1.2 Operational Emissions

As described in Section 1.0, up to six permanent staff could be on the site at any one time for ongoing facility maintenance and repairs. On intermittent occasions, up to 25 workers could be remotely dispatched to the site if repairs or replacement of equipment were needed in addition to module washing. A total of up to 28 light duty truck trips per day could also occur during these quarterly maintenance activities. It was assumed that the project would result in a total of 3,184 annual trips at a roundtrip distance of 80 miles. Quarterly maintenance activities would also require the use of the off-road equipment as described in Section 1.0. Emissions from on- and off-road sources were estimated using the methods described in Section 5.1.

Operations and Maintenance activities were estimated to result in 73 MT CO_2e per year. The impact evaluation of construction emissions is typically performed as annual operating emissions by amortizing the construction emissions over the life of the project, nominally 30 years. Therefore, direct project GHG emissions would be approximately 184 MT CO_2e per year from construction activities and 73 MT CO_2e per year from long-term maintenance activities. A total of 257 MT CO_2e per year would be generated by the proposed project.

Conversely, the proposed solar facility would be capable of generating up to 300 MW of electricity under peak solar conditions. The energy generated by the proposed project is estimated at 684 gigawatt-hours per year. This electric power would be dispatched to the California Independent System Operator (CAISO) in accordance with a complex and dynamic formula that takes into account numerous variables in ongoing dispatching decisions to meet demand for electricity at any given time. One of those variables is compliance with the mandate to integrate electricity generated from renewable sources into the system at a predetermined rate, i.e., 33 percent by 2020 as mandated by the RPS (CAISO 2018). Since fossil fuel sources are typically less expensive and more reliable than renewable sources at the utility scale, it is expected that in the absence of an RPS mandate, these fossil sources would continue to be the dominant fuel source for electrical generation in California. Thus, renewable sources of electricity, such as solar generation, are considered to offset an equivalent amount of generation from other fuel sources, such as natural gas or coal, that would otherwise be dispatched by the CAISO in the absence of an RPS mandate. In other words, the installation and operation of solar facilities, such as the project, would result in a net reduction of fossil-based generation, and hence a net reduction in CO_2e emissions, relative to overall CO_2e emissions that would occur without the project. Using PG&E's emission factors, as detailed in Appendix A, it has been calculated that the project would result in the offset of up to 199,698 MT CO_2e per year.

As stated, a total of 257 MT CO_2e per year would be generated by the proposed project from construction and operational activities. With the offset of approximately 199,698 MT CO_2e per year from operation of the proposed facility, the project would have a net benefit of reducing global GHG emissions by approximately 199,442 MT CO_2e per year. Therefore, the implementation of the project would result in a net regional and global reduction of GHG emissions compared with the existing conditions.

GHG emissions from the project would not be cumulatively considerable; the project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

7.2 CONSISTENCY WITH LOCAL PLANS ADOPTED FOR THE PURPOSE OF REDUCING GREENHOUSE GAS EMISSIONS

As a solar power project, the RE Slate Project would fulfill a portion of the renewable portfolio that is mandated for California and reflected in the CARB AB 32 Scoping Plan and SB 2 X1, partially satisfying the goals of the California Renewable Energy Programs (as described above under Section 3.3, *Regulatory Framework*. Additionally, the emission reductions enabled by the project would help reach the AB 32 emission reduction goals for the electricity generation sector. Therefore, the project would conform to applicable plans, policies, and regulations related to GHG emission reductions and would have a less than significant impact.

8.0 MITIGATION MEASURES

8.1 AIR QUALITY

The following measures are prescribed to reduce NO_X emissions during construction.

MM AQ-1: Tier 4 Off-road Equipment. The applicant shall ensure that, whenever feasible, off-road diesel-powered construction equipment greater than 50 hp shall meet USEPA-Certified Tier 4 emission standards and shall be outfitted with best available control technology devices certified by the California Air Resources Board (CARB). A copy of each unit's certified tier specification, best available control technology documentation, and CARB or SJVAPCD operating permit shall be provided to the Kings County Community Development Agency at the time of mobilization of each applicable unit of equipment.

MM AQ-2: Voluntary Emissions Reduction Agreement. If the applicant is unable to guarantee that all off-road diesel-powered construction equipment greater than 50 hp will meet Tier 4 emissions standards, then the project applicant will enter into a VERA with SJVAPCD to mitigate or reduce project emissions beyond the requirements of Rule 9510 through the payment of fees (on a per-ton basis) to SJVAPCD. The payment of fees will be made to SJVAPCD based on the fee schedule in the development mitigation contract and the amount of reduction necessary to offset project NO_x emissions below SJVAPCD thresholds.

The following measure is prescribed to reduce exposure to Valley Fever.

MM AQ-3: Reducing Valley Fever Exposure. In order to reduce exposure of the public and workers from Valley Fever spores during ground disturbing activities, the following measures shall be implemented during project construction and decommissioning:

- Implement the Dust Control Plan required to be approved for the project by the San Joaquin Valley Air Pollution District under District Rule 8021 prior to ground disturbing activity.

- When exposure to dust is unavoidable for workers who will be disturbing the top 2 to 12 inches of soil, provide workers with NIOSH-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or HEPA, as recommended in the California Department of Public Health publication "Preventing Work-Related Coccidioidomycosis (Valley Fever)."

8.2 GREENHOUSE GASES

The proposed project would not result in a significant impact with respect to GHG emissions. Therefore, no mitigation is required.

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Appendix A

Emission Calculations

Construction Emissions Summary

2020	ROG	CO	NOx	SOx	PM10 Total	PM2.5 Total	MT CO2e
	Uncontrolled Annual Emissions (Tons per Year)						
Truck Trips	0.10	0.31	1.38	0.00	1.36	0.35	369.02
Worker Commute	0.18	4.08	0.45	0.01	2.72	0.69	1,087.60
PV Site Prep	0.53	1.98	4.67	0.01	0.21	0.12	848.80
PV Installation	0.32	1.54	2.31	0.00	0.09	0.09	373.36
Total	**1.12**	**7.91**	**8.82**	**0.03**	**4.38**	**1.25**	**2,678.77**

2021	ROG	CO	NOx	SOx	PM10 Total	PM2.5 Total	MT CO2e
Truck Trips	0.15	0.54	2.29	0.01	2.59	0.67	694.90
Worker Commute	0.21	0.29	0.04	0.00	0.00	0.00	6.58
PV Installation	1.09	5.98	8.43	0.02	0.31	0.30	1,486.79
PV Inverters Substation & Connection	0.12	0.85	1.22	0.00	0.07	0.06	154.15
BESS Site Prep	0.13	0.42	1.32	0.00	0.05	0.03	243.91
BESS Foundations, Structures & DC	0.07	0.50	0.76	0.00	0.03	0.03	95.78
BESS Inverters, Substation & AC	0.13	0.94	1.31	0.00	0.08	0.07	146.05
Total	**1.91**	**9.53**	**15.37**	**0.03**	**3.13**	**1.16**	**2,828.15**

Year	ROG	CO	NOx	SOx	PM10 Total	PM2.5 Total	MT CO2e
	Uncontrolled Annual Emissions (Tons per Year)						
2020	1.12	7.91	8.82	0.03	4.38	1.25	2,678.77
2021	1.91	9.53	15.37	0.03	3.13	1.16	2,828.15
Max	**1.91**	**9.53**	**15.37**	**0.03**	**4.38**	**1.25**	**2,828.15**
SJVAPCD Threshold	*10*	*100*	*10*	*27*	*15*	*15*	
Exceed Threshold?	***No***	***No***	***Yes***	***No***	***No***	***No***	

2050	ROG	CO	NOx	SOx	PM10 Total	PM2.5 Total	MT CO2e
	Decommissioning Annual Emissions (Tons per Year)						
Truck Trips	0.01	0.17	0.81	0.00	1.78	0.44	283.74
Worker Commute	0.02	0.84	0.04	0.00	1.55	0.39	375.61
Onsite Equipment	0.03	0.44	0.38	0.00	0.01	0.00	104.76
Total	**0.06**	**1.45**	**1.23**	**0.01**	**3.33**	**0.84**	**764.12**
SJVAPCD Threshold	*10*	*100*	*10*	*27*	*15*	*15*	
Exceed Threshold?	***No***	***No***	***No***	***No***	***No***	***No***	

Construction Emissions Summary

Tier 4 Final Annual Emissions (Tons per Year)

2020	ROG	CO	NOx	SOx	PM10 Total	PM2.5 Total	MT CO2e
Truck Trips	0.10	0.31	1.38	0.00	1.36	0.35	369.02
Worker Commute	0.18	4.08	0.45	0.01	2.72	0.69	1,087.60
PV Site Prep	0.44	2.18	3.74	0.01	0.16	0.07	848.80
PV Installation	0.15	1.64	1.46	0.00	0.02	0.02	373.36
Total	**0.86**	**8.21**	**7.03**	**0.03**	**4.25**	**1.13**	**2,678.77**

2021	ROG	CO	NOx	SOx	PM10 Total	PM2.5 Total	MT CO2e
Truck Trips	0.15	0.54	2.29	0.01	2.59	0.67	694.90
Worker Commute	0.21	0.29	0.04	0.00	0.00	0.00	6.58
PV Installation	0.50	6.46	5.43	0.02	0.06	0.06	1,486.79
PV Inverters Substation & Connection	0.02	1.02	0.17	0.00	0.01	0.00	154.15
BESS Site Prep	0.11	0.52	0.93	0.00	0.03	0.01	243.91
BESS Foundations, Structures & DC	0.02	0.58	0.17	0.00	0.00	0.00	95.78
BESS Inverters, Substation & AC	0.02	1.05	0.15	0.00	0.00	0.00	146.05
Total	**1.03**	**10.45**	**9.18**	**0.03**	**2.70**	**0.75**	**2,828.15**

Tier 4 Final Annual Emissions (Tons per Year)

Year	ROG	CO	NOx	SOx	PM10 Total	PM2.5 Total	MT CO2e
2020	0.86	8.21	7.03	0.03	4.25	1.13	2,678.77
2021	1.03	10.45	9.18	0.03	2.70	0.75	2,828.15
Max	**1.03**	**10.45**	**9.18**	**0.03**	**4.25**	**1.13**	**2,828.15**
SJVAPCD Threshold	*10*	*100*	*10*	*27*	*15*	*15*	
Exceed Threshold?	***No***	***No***	***No***	***No***	***No***	***No***	

Uncontrolled Equipment Emissions

2020 - PV Site Prep						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Tracked dozer, large	104	37	212	0.43	7	0.3600	1.5549	4.6323	0.0050	0.1750	0.1610	0.0258	0.0028	472.94	0.1530	0.9734	4.2043	12.5250	0.0135	0.4732	0.4353	0.1236	0.0133	0.5968	0.4487	1,160.08	0.3753	1,169.46
Grader	4	33	187	0.41	7	0.3520	1.3418	4.6779	0.0050	0.1500	0.1380	0.0258	0.0028	475.30	0.1540	0.0275	0.1048	0.3653	0.0004	0.0117	0.0108	0.0985	0.0106	0.1102	0.0214	33.67	0.0109	33.94
Skid steer w auger/hoe	18	36	65	0.37	7	0.1880	3.2771	2.5046	0.0050	0.1080	0.1000			471.91	0.1530	0.0227	0.3965	0.3030	0.0006	0.0131	0.0121	-	-	0.0131	0.0121	51.80	0.0168	52.22
FE Loader	3	44	203	0.36	7	0.2900	1.2689	3.4212	0.0050	0.1140	0.1040			469.51	0.1520	0.0216	0.0944	0.2547	0.0004	0.0085	0.0077	-	-	0.0085	0.0077	31.70	0.0103	31.96
Roller, vibratory	9	49	80	0.38	7	0.3880	3.5314	3.8815	0.0050	0.2470	0.2280			473.86	0.1530	0.0399	0.3628	0.3988	0.0005	0.0254	0.0234	-	-	0.0254	0.0234	44.17	0.0143	44.52
Backhoe	1	5	97	0.37	7	0.3310	3.6015	3.3257	0.0050	0.2100	0.1930			475.15	0.1540	0.0004	0.0045	0.0041	0.0000	0.0003	0.0002	-	-	0.0003	0.0002	0.54	0.0002	0.54
Pickup	18	36			4	0.8123	12.5191	1.2377	0.0436	0.0565	0.0520			4,405.67		0.0023	0.0358	0.0035	0.0001	0.0002	0.0001	-	-	0.0002	0.0001	11.44	-	11.44
Water Truck	63	38			4	1.0879	18.9087	0.9038	0.0442	0.1068	0.1022			4,675.61		0.0114	0.1978	0.0095	0.0005	0.0011	0.0011	-	-	0.0011	0.0011	44.36	-	44.36
Flatbed Truck	32	37			4	10.5652	20.6874	88.0635	0.1733	1.4358	1.3737			18,344.42		0.0547	0.1072	0.4562	0.0009	0.0074	0.0071	-	-	0.0074	0.0071	86.22	-	86.22
Gravel Truck - 20 CY	168	44			4	10.5652	20.6874	88.0635	0.1733	1.4358	1.3737			18,344.42		0.3451	0.6757	2.8765	0.0057	0.0469	0.0449	-	-	0.0469	0.0449	543.59	-	543.59
															TOTAL	0.5256	1.9796	4.6717	0.0090	0.1145	0.1075	0.0985	0.0106	0.2130	0.1181	847.49	0.0524	848.80

2020 - PV System Installation						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Skid steer w auger/hoe	6	33	65	0.37	7	0.1880	3.2771	2.5046	0.0050	0.1080	0.1000			471.91	0.1530	0.0069	0.1197	0.0915	0.0002	0.0039	0.0037	-	-	0.0039	0.0037	15.63	0.0051	15.76
Pile Driver	6	33	221	0.50	7	0.1420	1.0677	1.8073	0.0050	0.0520	0.0480			466.83	0.1510	0.0238	0.1792	0.3033	0.0008	0.0087	0.0081	-	-	0.0087	0.0081	71.06	0.0230	71.64
Forklift	22	35	89	0.20	4	0.4590	3.7595	4.1330	0.0050	0.3080	0.2830			471.53	0.1530	0.0274	0.2241	0.2463	0.0003	0.0184	0.0169	-	-	0.0184	0.0169	25.50	0.0083	25.70
Welder	44	35	46	0.45	4	0.9370	4.8400	4.3040	0.0070	0.2380	0.2380			568.30	0.0840	0.1299	0.6709	0.5966	0.0010	0.0330	0.0330	-	-	0.0330	0.0330	71.47	0.0106	71.73
Trencher	6	29	78	0.50	4	0.6100	3.8327	5.5195	0.0050	0.4130	0.3800			475.13	0.1540	0.0185	0.1165	0.1678	0.0002	0.0126	0.0116	-	-	0.0126	0.0116	13.10	0.0042	13.21
Water Truck	4	49			4	1.0879	18.9087	0.9038	0.0442	0.1068	0.1022			4,675.61		0.0009	0.0164	0.0008	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	3.68	-	3.68
Flatbed Truck	64	37			4	10.5652	20.6874	88.0635	0.1733	1.4358	1.3737			18,344.42		0.1090	0.2134	0.9082	0.0018	0.0148	0.0142	-	-	0.0148	0.0142	171.63	-	171.63
																0.3164	1.5401	2.3145	0.0043	0.0915	0.0874	-	-	0.0915	0.0874	372.08	0.0511	373.36

2021 - PV System Installation						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Skid steer w auger/hoe	6	131	65	0.37	7	0.1780	3.2769	2.3659	0.0050	0.0960	0.0890			471.98	0.1530	0.0260	0.4787	0.3456	0.0007	0.0140	0.0130	-	-	0.0140	0.0130	62.55	0.0203	63.06
Pile Driver	6	131	221	0.50	7	0.1320	1.0642	1.5510	0.0050	0.0470	0.0430			467.99	0.1510	0.0886	0.7143	1.0410	0.0034	0.0315	0.0289	-	-	0.0315	0.0289	284.96	0.0919	287.26
Forklift	22	138	89	0.20	4	0.4120	3.7200	3.7559	0.0050	0.2670	0.2450			471.53	0.1530	0.0982	0.8869	0.8954	0.0012	0.0637	0.0584	-	-	0.0637	0.0584	101.98	0.0331	102.81
Welder	44	138	46	0.45	4	0.8290	4.7080	4.1330	0.0070	0.2030	0.2030			568.30	0.0740	0.4597	2.6105	2.2917	0.0039	0.1126	0.1126	-	-	0.1126	0.1126	285.87	0.0372	286.80
Trencher	6	118	78	0.50	4	0.5560	3.7891	5.1059	0.0050	0.3710	0.3410			475.29	0.1540	0.0676	0.4608	0.6209	0.0006	0.0451	0.0415	-	-	0.0451	0.0415	52.44	0.0170	52.86
Water Truck	4	197			4	1.0550	19.0176	0.8448	0.0432	0.0966	0.0924			4,570.79		0.0037	0.0660	0.0029	0.0001	0.0003	0.0003	-	-	0.0003	0.0003	14.39	-	14.39
Flatbed Truck	64	146			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.3500	0.7673	3.2338	0.0071	0.0435	0.0417	-	-	0.0435	0.0417	679.62	-	679.62
															TOTAL	1.0938	5.9845	8.4315	0.0170	0.3108	0.2963	-	-	0.3108	0.2963	1,481.80	0.1995	#######

2021 - PV Inverters Substation & Connection						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Tracked dozer, large	1	9	212	0.43	7	0.3430	1.5146	4.3339	0.0050	0.1630	0.1500	0.0258	0.0028	472.92	0.1530	0.0022	0.0096	0.0274	0.0000	0.0010	0.0009	0.0073	0.0008	0.0084	0.0017	2.72	0.0009	2.74
Grader	1	8	187	0.41	7	0.3350	1.3069	4.3813	0.0050	0.1390	0.1280	0.0258	0.0028	474.54	0.1530	0.0016	0.0062	0.0207	0.0000	0.0007	0.0006	0.0058	0.0006	0.0064	0.0012	2.04	0.0007	2.05
Skid steer w auger/hoe	2	38	65	0.37	7	0.1780	3.2769	2.3659	0.0050	0.0960	0.0890			471.98	0.1530	0.0025	0.0456	0.0329	0.0001	0.0013	0.0012	-	-	0.0013	0.0012	5.96	0.0019	6.01
FE Loader	1	8	203	0.36	7	0.2660	1.2403	2.9977	0.0050	0.1000	0.0920			469.56	0.1520	0.0012	0.0056	0.0135	0.0000	0.0005	0.0004	-	-	0.0005	0.0004	1.92	0.0006	1.94
Roller, vibratory	1	8	80	0.38	7	0.3530	3.5072	3.5889	0.0050	0.2190	0.2020			473.90	0.1530	0.0007	0.0066	0.0067	0.0000	0.0004	0.0004	-	-	0.0004	0.0004	0.81	0.0003	0.81
Pile Driver	2	38	221	0.50	7	0.1320	1.0642	1.5510	0.0050	0.0470	0.0430			467.99	0.1510	0.0084	0.0681	0.0992	0.0003	0.0030	0.0027	-	-	0.0030	0.0027	27.15	0.0088	27.37
Trencher	3	173	78	0.50	4	0.5560	3.7891	5.1059	0.0050	0.3710	0.3410			475.29	0.1540	0.0495	0.3375	0.4548	0.0004	0.0330	0.0304	-	-	0.0330	0.0304	38.41	0.0124	38.72
Backhoe	2	81	97	0.37	7	0.2960	3.5707	2.9950	0.0050	0.1770	0.1620			475.36	0.1540	0.0132	0.1592	0.1335	0.0002	0.0079	0.0072	-	-	0.0079	0.0072	19.23	0.0062	19.38
Crane	2	165	231	0.29	4	0.3490	1.6782	4.1044	0.0050	0.1670	0.1530			472.91	0.1530	0.0339	0.1631	0.3989	0.0005	0.0162	0.0149	-	-	0.0162	0.0149	41.69	0.0135	42.03
Aerial Lift	3	50	63	0.31	4	0.1090	3.1762	1.7437	0.0050	0.0330	0.0310			472.11	0.1530	0.0014	0.0408	0.0224	0.0001	0.0004	0.0004	-	-	0.0004	0.0004	5.50	0.0018	5.54
Direction Drill Rig	1	20	221	0.50	7	0.1320	1.0642	1.5510	0.0050	0.0470	0.0430			467.99	0.1510	0.0023	0.0181	0.0264	0.0001	0.0008	0.0007	-	-	0.0008	0.0007	7.24	0.0023	7.30
Water Truck	1	9			4	1.0550	19.0176	0.8448	0.0432	0.0966	0.0924			4,570.79		0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.16	-	0.16
Flatbed Truck	1	8			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0003	0.0007	0.0028	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.58	-	0.58
Concrete Truck - 10 CY	31	1			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0012	0.0025	0.0107	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	2.25	-	2.25
															TOTAL	0.1162	0.8547	1.2227	0.0018	0.0644	0.0592	0.0058	0.0006	0.0702	0.0598	152.93	0.0485	154.15

Uncontrolled Equipment Emissions

2021 - BESS Site Prep						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Tracked dozer, large	9	30	212	0.43	7	0.3430	1.5146	4.3339	0.0050	0.1630	0.1500	0.0258	0.0028	472.92	0.1530	0.0648	0.2862	0.8190	0.0009	0.0308	0.0283	0.0806	0.0087	0.1114	0.0371	81.08	0.0262	81.73
Grader	6	15	187	0.41	7	0.3350	1.3069	4.3813	0.0050	0.1390	0.1280	0.0258	0.0028	474.54	0.1530	0.0180	0.0704	0.2359	0.0003	0.0075	0.0069	0.0208	0.0022	0.0283	0.0091	23.18	0.0075	23.36
Skid steer w auger/hoe	1	5	65	0.37	7	0.1780	3.2769	2.3659	0.0050	0.0960	0.0890			471.98	0.1530	0.0002	0.0030	0.0022	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	0.40	0.0001	0.40
FE Loader	3	25	203	0.36	7	0.2660	1.2403	2.9977	0.0050	0.1000	0.0920			469.56	0.1520	0.0111	0.0518	0.1251	0.0002	0.0042	0.0038	-	-	0.0042	0.0038	17.78	0.0058	17.92
Roller, vibratory	3	25	80	0.38	7	0.3530	3.5072	3.5889	0.0050	0.2190	0.2020			473.90	0.1530	0.0061	0.0609	0.0623	0.0001	0.0038	0.0035	-	-	0.0038	0.0035	7.46	0.0024	7.52
Pickup	6	19			4	0.7135	11.2365	1.0754	0.0422	0.0543	0.0499			4,259.40		0.0003	0.0055	0.0005	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	1.89	-	1.89
Water Truck	6	40			4	1.0550	19.0176	0.8448	0.0432	0.0966	0.0924			4,570.79		0.0011	0.0199	0.0009	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	4.34	-	4.34
Flatbed Truck	3	12			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0013	0.0029	0.0121	0.0000	0.0002	0.0002	-	-	0.0002	0.0002	2.54	-	2.54
Gravel Truck - 20 CY	78	33			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0957	0.2099	0.8847	0.0019	0.0119	0.0114	-	-	0.0119	0.0114	185.93	-	185.93
															TOTAL	**0.1339**	**0.4242**	**1.3237**	**0.0026**	**0.0278**	**0.0260**	**0.0208**	**0.0022**	**0.0486**	**0.0282**	**243.51**	**0.0158**	**243.91**

2021 - BESS Foundations, Structures & DC						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Skid steer w auger/hoe	3	87	65	0.37	7	0.1780	3.2769	2.3659	0.0050	0.0960	0.0890			471.98	0.1530	0.0087	0.1593	0.1150	0.0002	0.0047	0.0043	-	-	0.0047	0.0043	20.82	0.0067	20.99
Trencher	2	65	78	0.50	4	0.5560	3.7891	5.1059	0.0050	0.3710	0.3410			475.29	0.1540	0.0124	0.0847	0.1141	0.0001	0.0083	0.0076	-	-	0.0083	0.0076	9.64	0.0031	9.72
Crane	4	109	231	0.29	4	0.3490	1.6782	4.1044	0.0050	0.1670	0.1530			472.91	0.1530	0.0450	0.2166	0.5298	0.0006	0.0216	0.0197	-	-	0.0216	0.0197	55.38	0.0179	55.82
Pickup	4	66			4	0.7135	11.2365	1.0754	0.0422	0.0543	0.0499			4,259.40		0.0008	0.0130	0.0012	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	4.46	-	4.46
Water Truck	3	87			4	1.0550	19.0176	0.8448	0.0432	0.0966	0.0924			4,570.79		0.0012	0.0220	0.0010	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	4.79	-	4.79
															TOTAL	**0.0682**	**0.4956**	**0.7612**	**0.0011**	**0.0347**	**0.0319**	**-**	**-**	**0.0347**	**0.0319**	**95.09**	**0.0278**	**95.78**

2021 - BESS Inverters, Substation & AC						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Skid steer w auger/hoe	2	37	65	0.37	7	0.1780	3.2769	2.3659	0.0050	0.0960	0.0890			471.98	0.1530	0.0024	0.0450	0.0325	0.0001	0.0013	0.0012	-	-	0.0013	0.0012	5.88	0.0019	5.93
Pile Driver	2	37	221	0.50	7	0.1320	1.0642	1.5510	0.0050	0.0470	0.0430			467.99	0.1510	0.0083	0.0671	0.0979	0.0003	0.0030	0.0027	-	-	0.0030	0.0027	26.79	0.0086	27.00
Trencher	7	131	78	0.50	4	0.5560	3.7891	5.1059	0.0050	0.3710	0.3410			475.29	0.1540	0.0880	0.5995	0.8078	0.0008	0.0587	0.0539	-	-	0.0587	0.0539	68.21	0.0221	68.77
Backhoe	3	29	97	0.37	7	0.2960	3.5707	2.9950	0.0050	0.1770	0.1620			475.36	0.1540	0.0072	0.0870	0.0730	0.0001	0.0043	0.0039	-	-	0.0043	0.0039	10.51	0.0034	10.59
Crane	3	77	231	0.29	4	0.3490	1.6782	4.1044	0.0050	0.1670	0.1530			472.91	0.1530	0.0237	0.1140	0.2788	0.0003	0.0113	0.0104	-	-	0.0113	0.0104	29.15	0.0094	29.38
Aerial Lift	2	56	63	0.31	4	0.1090	3.1762	1.7437	0.0050	0.0330	0.0310			472.11	0.1530	0.0011	0.0306	0.0168	0.0000	0.0003	0.0003	-	-	0.0003	0.0003	4.13	0.0013	4.16
Concrete Truck - 10 CY	3	1			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0001	0.0002	0.0010	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.22	-	0.22
															TOTAL	**0.1308**	**0.9435**	**1.3078**	**0.0017**	**0.0790**	**0.0725**	**-**	**-**	**0.0790**	**0.0725**	**144.88**	**0.0468**	**146.05**

Uncontrolled Equipment Emissions

2050 - Decommissioning						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Equipment Work Days	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Tractor	1	241	97	0.37	7	0.2540	3.7030	1.4850	0.0060	0.0160	0.0160			568.30	0.0220	0.0170	0.2471	0.0991	0.0004	0.0011	0.0011	-	-	0.0011	0.0011	34.41	0.0013	34.44
Grader	1	7	187	0.41	7	0.1880	1.1330	0.3600	0.0060	0.0130	0.0130	0.0258	0.0028	568.30	0.0170	0.0008	0.0047	0.0015	0.0000	0.0001	0.0001	0.0044	0.0005	0.0045	0.0005	2.14	0.0001	2.14
Backhoe	1	377	97	0.37	7	0.2540	3.7030	1.4850	0.0060	0.0160	0.0160			568.30	0.0220	0.0265	0.3866	0.1550	0.0006	0.0017	0.0017	-	-	0.0017	0.0017	53.83	0.0021	53.88
Crane	1	2	231	0.29	4	0.1950	1.1440	0.3440	0.0060	0.0130	0.0130			568.30	0.0170	0.0001	0.0007	0.0002	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.30	0.0000	0.30
Aerial Lift	1	57	63	0.31	4	0.1610	3.3440	1.4070	0.0060	0.0120	0.0120			568.30	0.0140	0.0008	0.0164	0.0069	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	2.53	0.0001	2.53
Flatbed Truck	1	864			4	0.5419	9.2386	56.4617	0.1255	0.0419	0.0401			13,285.02		0.0021	0.0352	0.2151	0.0005	0.0002	0.0002	-	-	0.0002	0.0002	45.91	-	45.91
															TOTAL	**0.0303**	**0.4436**	**0.3787**	**0.0012**	**0.0020**	**0.0019**	**0.0044**	**0.0005**	**0.0064**	**0.0024**	**104.71**	**0.0022**	**104.76**

Tier 4 Equipment Emissions

2020 - PV Site Prep						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Tracked dozer, large	104	37	212	0.43	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080	0.0258	0.0028	472.94	0.1530	0.1622	5.9485	0.7030	0.0135	0.0216	0.0216	0.1236	0.0133	0.1452	0.0350	1,160.08	0.3753	1,169.46
Grader	4	33	187	0.41	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080	0.0258	0.0028	475.30	0.1540	0.0047	0.1718	0.0203	0.0004	0.0006	0.0006	0.0985	0.0106	0.0992	0.0113	33.67	0.0109	33.94
Skid steer w auger/hoe	18	36	65	0.37	7	0.1200	3.7000	2.7400	0.0050	0.0080	0.0080			471.91	0.1530	0.0145	0.4477	0.3315	0.0006	0.0010	0.0010	-	-	0.0010	0.0010	51.80	0.0168	52.22
FE Loader	3	44	203	0.36	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			469.51	0.1520	0.0045	0.1638	0.0194	0.0004	0.0006	0.0006	-	-	0.0006	0.0006	31.70	0.0103	31.96
Roller, vibratory	9	49	80	0.38	7	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			473.86	0.1530	0.0062	0.3801	0.0267	0.0005	0.0008	0.0008	-	-	0.0008	0.0008	44.17	0.0143	44.52
Backhoe	1	5	97	0.37	7	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			475.15	0.1540	0.0001	0.0046	0.0003	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.54	0.0002	0.54
Pickup	18	36			4	0.8123	12.5191	1.2377	0.0436	0.0565	0.0520			4,405.67		0.0023	0.0358	0.0035	0.0001	0.0002	0.0001	-	-	0.0002	0.0001	11.44	-	11.44
Water Truck	63	38			4	1.0879	18.9087	0.9038	0.0442	0.1068	0.1022			4,675.61		0.0114	0.1978	0.0095	0.0005	0.0011	0.0011	-	-	0.0011	0.0011	44.36	-	44.36
Flatbed Truck	32	37			4	10.5652	20.6874	88.0635	0.1733	1.4358	1.3737			18,344.42		0.0547	0.1072	0.4562	0.0009	0.0074	0.0071	-	-	0.0074	0.0071	86.22	-	86.22
Gravel Truck - 20 CY	168	44			4	10.5652	20.6874	88.0635	0.1733	1.4358	1.3737			18,344.42		0.3451	0.6757	2.8765	0.0057	0.0469	0.0449	-	-	0.0469	0.0449	543.59	-	543.59
															TOTAL	**0.4435**	**2.1845**	**3.7440**	**0.0090**	**0.0586**	**0.0562**	**0.0985**	**0.0106**	**0.1572**	**0.0669**	**847.49**	**0.0524**	**848.80**

2020 - PV System Installation						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Skid steer w auger/hoe	6	33	65	0.37	7	0.1200	3.7000	2.7400	0.0050	0.0080	0.0080			471.91	0.1530	0.0044	0.1351	0.1001	0.0002	0.0003	0.0003	-	-	0.0003	0.0003	15.63	0.0051	15.76
Pile Driver	6	33	221	0.50	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			466.83	0.1510	0.0101	0.3692	0.0436	0.0008	0.0013	0.0013	-	-	0.0013	0.0013	71.06	0.0230	71.64
Forklift	22	35	89	0.20	4	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			471.53	0.1530	0.0036	0.2205	0.0155	0.0003	0.0005	0.0005	-	-	0.0005	0.0005	25.50	0.0083	25.70
Welder	44	35	46	0.45	4	0.1200	4.1000	2.7500	0.0070	0.0080	0.0080			568.30	0.0840	0.0166	0.5684	0.3812	0.0010	0.0011	0.0011	-	-	0.0011	0.0011	71.47	0.0106	71.73
Trencher	6	29	78	0.50	4	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			475.13	0.1540	0.0018	0.1125	0.0079	0.0002	0.0002	0.0002	-	-	0.0002	0.0002	13.10	0.0042	13.21
Water Truck	4	49			4	1.0879	18.9087	0.9038	0.0442	0.1068	0.1022			4,675.61		0.0009	0.0164	0.0008	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	3.68	-	3.68
Flatbed Truck	64	37			4	10.5652	20.6874	88.0635	0.1733	1.4358	1.3737			18,344.42		0.1090	0.2134	0.9082	0.0018	0.0148	0.0142	-	-	0.0148	0.0142	171.63	-	171.63
															TOTAL	**0.1464**	**1.6354**	**1.4573**	**0.0043**	**0.0184**	**0.0177**	**-**	**-**	**0.0184**	**0.0177**	**372.08**	**0.0511**	**373.36**

2021 - PV System Installation						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Skid steer w auger/hoe	6	131	65	0.37	7	0.1200	3.7000	2.7400	0.0050	0.0080	0.0080			471.98	0.1530	0.0175	0.5405	0.4003	0.0007	0.0012	0.0012	-	-	0.0012	0.0012	62.55	0.0203	63.06
Pile Driver	6	131	221	0.50	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			467.99	0.1510	0.0403	1.4766	0.1745	0.0034	0.0054	0.0054	-	-	0.0054	0.0054	284.96	0.0919	287.26
Forklift	22	138	89	0.20	4	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			471.53	0.1530	0.0143	0.8821	0.0620	0.0012	0.0019	0.0019	-	-	0.0019	0.0019	101.98	0.0331	102.81
Welder	44	138	46	0.45	4	0.1200	4.1000	2.7500	0.0070	0.0080	0.0080			568.30	0.0740	0.0665	2.2734	1.5249	0.0039	0.0044	0.0044	-	-	0.0044	0.0044	285.87	0.0372	286.80
Trencher	6	118	78	0.50	4	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			475.29	0.1540	0.0073	0.4500	0.0316	0.0006	0.0010	0.0010	-	-	0.0010	0.0010	52.44	0.0170	52.86
Water Truck	4	197			4	1.0550	19.0176	0.8448	0.0432	0.0966	0.0924			4,570.79		0.0037	0.0660	0.0029	0.0001	0.0003	0.0003	-	-	0.0003	0.0003	14.39	-	14.39
Flatbed Truck	64	146			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.3500	0.7673	3.2338	0.0071	0.0435	0.0417	-	-	0.0435	0.0417	679.62	-	679.62
															TOTAL	**0.4996**	**6.4559**	**5.4300**	**0.0170**	**0.0577**	**0.0558**	**-**	**-**	**0.0577**	**0.0558**	**1,481.80**	**0.1995**	**#######**

2021 - PV Inverters Substation & Connection						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Tracked dozer, large	1	9	212	0.43	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080	0.0258	0.0028	472.92	0.1530	0.0004	0.0139	0.0016	0.0000	0.0001	0.0001	0.0073	0.0008	0.0074	0.0008	2.72	0.0009	2.74
Grader	1	8	187	0.41	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080	0.0258	0.0028	474.54	0.1530	0.0003	0.0104	0.0012	0.0000	0.0000	0.0000	0.0058	0.0006	0.0058	0.0007	2.04	0.0007	2.05
Skid steer w auger/hoe	2	38	65	0.37	7	0.1200	3.7000	2.7400	0.0050	0.0080	0.0080			471.98	0.1530	0.0017	0.0515	0.0381	0.0001	0.0001	0.0001	-	-	0.0001	0.0001	5.96	0.0019	6.01
FE Loader	1	8	203	0.36	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			469.56	0.1520	0.0003	0.0099	0.0012	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	1.92	0.0006	1.94
Roller, vibratory	1	8	80	0.38	7	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			473.90	0.1530	0.0001	0.0069	0.0005	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.81	0.0003	0.81
Pile Driver	2	38	221	0.50	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			467.99	0.1510	0.0038	0.1407	0.0166	0.0003	0.0005	0.0005	-	-	0.0005	0.0005	27.15	0.0088	27.37
Trencher	3	173	78	0.50	4	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			475.29	0.1540	0.0053	0.3296	0.0232	0.0004	0.0007	0.0007	-	-	0.0007	0.0007	38.41	0.0124	38.72
Backhoe	2	81	97	0.37	7	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			475.36	0.1540	0.0027	0.1650	0.0116	0.0002	0.0004	0.0004	-	-	0.0004	0.0004	19.23	0.0062	19.38
Crane	2	165	231	0.29	4	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			472.91	0.1530	0.0058	0.2138	0.0253	0.0005	0.0008	0.0008	-	-	0.0008	0.0008	41.69	0.0135	42.03
Aerial Lift	3	50	63	0.31	4	0.1200	3.7000	2.7400	0.0050	0.0080	0.0080			472.11	0.1530	0.0015	0.0475	0.0352	0.0001	0.0001	0.0001	-	-	0.0001	0.0001	5.50	0.0018	5.54
Direction Drill Rig	1	20	221	0.50	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			467.99	0.1510	0.0010	0.0375	0.0044	0.0001	0.0001	0.0001	-	-	0.0001	0.0001	7.24	0.0023	7.30
Water Truck	1	9			4	1.0550	19.0176	0.8448	0.0432	0.0966	0.0924			4,570.79		0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.16	-	0.16
Flatbed Truck	1	8			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0003	0.0007	0.0028	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.58	-	0.58
Concrete Truck - 10 CY	31	1			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0012	0.0025	0.0107	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	2.25	-	2.25
															TOTAL	**0.0241**	**1.0167**	**0.1708**	**0.0018**	**0.0030**	**0.0030**	**0.0058**	**0.0006**	**0.0088**	**0.0036**	**152.93**	**0.0485**	**154.15**

Tier 4 Equipment Emissions

2021 - BESS Site Prep						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operatio n Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Tracked dozer, large	9	30	212	0.43	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080	0.0258	0.0028	472.92	0.1530	0.0113	0.4157	0.0491	0.0009	0.0015	0.0015	0.0806	0.0087	0.0821	0.0102	81.08	0.0262	81.73
Grader	6	15	187	0.41	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080	0.0258	0.0028	474.54	0.1530	0.0032	0.1184	0.0140	0.0003	0.0004	0.0004	0.0208	0.0022	0.0212	0.0027	23.18	0.0075	23.36
Skid steer w auger/hoe	1	5	65	0.37	7	0.1200	3.7000	2.7400	0.0050	0.0080	0.0080			471.98	0.1530	0.0001	0.0034	0.0025	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.40	0.0001	0.40
FE Loader	3	25	203	0.36	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			469.56	0.1520	0.0025	0.0918	0.0108	0.0002	0.0003	0.0003	-	-	0.0003	0.0003	17.78	0.0058	17.92
Roller, vibratory	3	25	80	0.38	7	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			473.90	0.1530	0.0010	0.0642	0.0045	0.0001	0.0001	0.0001	-	-	0.0001	0.0001	7.46	0.0024	7.52
Pickup	6	19			4	0.7135	11.2365	1.0754	0.0422	0.0543	0.0499			4,259.40		0.0003	0.0055	0.0005	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	1.89	-	1.89
Water Truck	6	40			4	1.0550	19.0176	0.8448	0.0432	0.0966	0.0924			4,570.79		0.0011	0.0199	0.0009	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	4.34	-	4.34
Flatbed Truck	3	12			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0013	0.0029	0.0121	0.0000	0.0002	0.0002	-	-	0.0002	0.0002	2.54	-	2.54
Gravel Truck - 20 CY	78	33			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0957	0.2099	0.8847	0.0019	0.0119	0.0114	-	-	0.0119	0.0114	185.93	-	185.93
															TOTAL	**0.1054**	**0.5161**	**0.9301**	**0.0026**	**0.0131**	**0.0126**	**0.0208**	**0.0022**	**0.0339**	**0.0148**	**243.51**	**0.0158**	**243.91**

2021 - BESS Foundations, Structures & DC						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operatio n Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Skid steer w auger/hoe	3	87	65	0.37	7	0.1200	3.7000	2.7400	0.0050	0.0080	0.0080			471.98	0.1530	0.0058	0.1799	0.1332	0.0002	0.0004	0.0004	-	-	0.0004	0.0004	20.82	0.0067	20.99
Trencher	2	65	78	0.50	4	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			475.29	0.1540	0.0013	0.0827	0.0058	0.0001	0.0002	0.0002	-	-	0.0002	0.0002	9.64	0.0031	9.72
Crane	4	109	231	0.29	4	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			472.91	0.1530	0.0077	0.2840	0.0336	0.0006	0.0010	0.0010	-	-	0.0010	0.0010	55.38	0.0179	55.82
Pickup	4	66			4	0.7135	11.2365	1.0754	0.0422	0.0543	0.0499			4,259.40		0.0008	0.0130	0.0012	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	4.46	-	4.46
Water Truck	3	87			4	1.0550	19.0176	0.8448	0.0432	0.0966	0.0924			4,570.79		0.0012	0.0220	0.0010	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	4.79	-	4.79
															TOTAL	**0.0170**	**0.5815**	**0.1748**	**0.0011**	**0.0018**	**0.0018**	**-**	**-**	**0.0018**	**0.0018**	**95.09**	**0.0278**	**95.78**

2021 - BESS Inverters, Substation & AC						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)										Emissions (Tons/Year)												
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operatio n Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust (lb/hr)	PM2.5 dust (lb/hr)	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	PM10 dust	PM2.5 dust	PM10 TOT	PM2.5 TOT	CO2 (MT)	CH4 (MT)	CO2e (MT)
Skid steer w auger/hoe	2	37	65	0.37	7	0.1200	3.7000	2.7400	0.0050	0.0080	0.0080			471.98	0.1530	0.0016	0.0508	0.0376	0.0001	0.0001	0.0001	-	-	0.0001	0.0001	5.88	0.0019	5.93
Pile Driver	2	37	221	0.50	7	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			467.99	0.1510	0.0038	0.1388	0.0164	0.0003	0.0005	0.0005	-	-	0.0005	0.0005	26.79	0.0086	27.00
Trencher	7	131	78	0.50	4	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			475.29	0.1540	0.0095	0.5854	0.0411	0.0008	0.0013	0.0013	-	-	0.0013	0.0013	68.21	0.0221	68.77
Backhoe	3	29	97	0.37	7	0.0600	3.7000	0.2600	0.0050	0.0080	0.0080			475.36	0.1540	0.0015	0.0902	0.0063	0.0001	0.0002	0.0002	-	-	0.0002	0.0002	10.51	0.0034	10.59
Crane	3	77	231	0.29	4	0.0600	2.2000	0.2600	0.0050	0.0080	0.0080			472.91	0.1530	0.0041	0.1495	0.0177	0.0003	0.0005	0.0005	-	-	0.0005	0.0005	29.15	0.0094	29.38
Aerial Lift	2	56	63	0.31	4	0.1200	3.7000	2.7400	0.0050	0.0080	0.0080			472.11	0.1530	0.0012	0.0357	0.0264	0.0000	0.0001	0.0001	-	-	0.0001	0.0001	4.13	0.0013	4.16
Concrete Truck - 10 CY	3	1			4	8.4840	18.5989	78.3905	0.1716	1.0556	1.0100			18,159.94		0.0001	0.0002	0.0010	0.0000	0.0000	0.0000	-	-	0.0000	0.0000	0.22	-	0.22
															TOTAL	**0.0217**	**1.0505**	**0.1466**	**0.0017**	**0.0027**	**0.0027**	**-**	**-**	**0.0027**	**0.0027**	**144.88**	**0.0468**	**146.05**

RE Slate Solar Project
Construction and Freight Truck Emissions

Year	2020
Trips	1,971
Roundtrip Distance	80
Total VMT	157,680

Grams per Trip Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
1.57	19.31	23.26	0.04	0.04	0.04	3,866.10

Grams per Mile Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.53	1.30	7.58	0.02	7.75	2.02	1,892.05

Total Trip Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.04	0.05	0.00	0.00	0.00	7.62

Total VMT Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.09	0.23	1.32	0.00	1.35	0.35	298.34

Total Truck-Related Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.10	0.27	1.37	0.00	1.35	0.35	305.96

Year	2021
Trips	3,777
Roundtrip Distance	80
Total VMT	302,197

Grams per Trip Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
1.58	20.04	22.67	0.04	0.03	0.03	3,917.79

Grams per Mile Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.43	1.14	6.52	0.02	7.73	1.99	1,859.78

Total Trip Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.01	0.08	0.09	0.00	0.00	0.00	14.80

Total VMT Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.14	0.38	2.17	0.01	2.57	0.66	562.02

Total Truck-Related Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.15	0.46	2.27	0.01	2.57	0.66	576.82

RE Slate Solar Project
Water Truck Emissions

Year	2020
Trips	664
Roundtrip Distance	120
Total VMT	79,728

Grams per Trip Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
-	-	-	-	-	-	-

Grams per Mile Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.01	0.23	0.08	0.00	0.05	0.02	399.92

Total Trip Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
-	-	-	-	-	-	-

Total VMT Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.04	0.01	0.00	0.01	0.00	63.06

Total Truck-Related Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.04	0.01	0.00	0.01	0.00	63.06

Year	2021
Trips	1,273
Roundtrip Distance	120
Total VMT	152,712

Grams per Trip Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
-	-	-	-	-	-	-

Grams per Mile Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.01	0.22	0.07	0.00	0.05	0.02	390.73

Total Trip Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
-	-	-	-	-	-	-

Total VMT Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.07	0.02	0.00	0.02	0.01	118.08

Total Truck-Related Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.07	0.02	0.00	0.02	0.01	118.08

RE Slate Solar Project
Worker Commute Emissions

Year	2020
Total Trips	36,786
Roundtrip Distance	80
Total VMT	2,942,904

Grams per Trip Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
2.30	3.15	0.41	0.00	0.00	0.00	77.72

Grams per Mile Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.03	1.22	0.13	0.00	0.84	0.21	368.59
				0.00	0.00	
				0.01	0.00	
				0.04	0.02	
				0.79	0.19	

Trip Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.09	0.13	0.02	0.00	0.00	0.00	2.86

VMT Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.08	3.96	0.43	0.01	2.72	0.69	1,084.74

Total Worker Commute Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.18	4.08	0.45	0.01	2.72	0.69	1,087.60

Year	2021
Total Trips	87,013
Roundtrip Distance	80
Total VMT	6,961,024

Grams per Trip Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
2.18	3.03	0.37	0.00	0.00	0.00	75.25

Grams per Mile Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.02	1.09	0.11	0.00	0.84	0.21	356.41

Trip Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.21	0.29	0.04	0.00	0.00	0.00	6.55

VMT Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.00	0.00	0.00	0.00	0.00	0.03

Total Worker Commute Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.21	0.29	0.04	0.00	0.00	0.00	6.58

RE Slate Solar Project
Decommissioning Truck Emissions

Year		2050				
Trips		2,640				
Roundtrip Distance		80				
Total VMT		211,200				
Grams per Trip Emission Factors						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
1.59	23.56	18.84	0.03	0.01	0.01	3,025.21
Grams per Mile Emission Factors						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.03	0.43	3.26	0.01	7.63	1.89	1,305.67
Total Trip Emissions (tons)						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.07	0.05	0.00	0.00	0.00	7.99
Total VMT Emissions (tons)						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.01	0.10	0.76	0.00	1.78	0.44	275.76
Total Truck-Related Emissions (tpy)						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.01	0.17	0.81	0.00	1.78	0.44	283.74

RE Slate Solar Project
Decommissioning Worker Commute Emissions

Year		2050				
Trips		20,988				
Roundtrip Distance		80				
Total VMT		1,679,040				
Grams per Trip Emission Factors						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.65	1.84	0.12	0.00	0.00	0.00	45.31
Grams per Mile Emission Factors						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.43	0.02	0.00	0.84	0.21	223.14
Total Trip Emissions (tons)						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.02	0.04	0.00	0.00	0.00	0.00	0.95
Total VMT Emissions (tons)						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.79	0.03	0.00	1.55	0.39	374.66
Total Worker Commute-Related Emissions (tpy)						
ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.02	0.84	0.04	0.00	1.55	0.39	375.61

Fugitive Dust from Equipment Passes

$EF_{PM10} = 0.051 \times (S)^{2.0} \times F_{PM10}$

$EF_{PM2.5} = 0.04 \times (S)^{2.5} \times F_{PM2.5}$

S =	7.1
F_{PM10} =	0.6
$F_{PM2.5}$ =	0.031
EF_{PM10} =	1.5425
$EF_{PM2.5}$ =	0.1666

VMT = As/Wb x 43,560(sqft/acre)/5,280(ft/mile)

Wb =	12

Equipment Type	Acres/Hour
Crawler Tractor	0.0625
Grader	0.0625
Rubber Tired Dozer	0.0625
Scraper	0.1250

VMT per Hour by Equipment Type	
Crawler Tractor	0.04297
Grader	0.04297
Rubber Tired Dozer	0.04297
Scraper	0.08594

Control Efficiency	61%

E/hr = EF x VMT

	PM10	PM2.5	
Crawler Tractor	0.0258	0.0028	lbs/hr
Grader	0.0258	0.0028	lbs/hr
Rubber Tired Dozer	0.0258	0.0028	lbs/hr
Scraper	0.0517	0.0056	lbs/hr

Source: USEPA AP-42 Section 11.9

Paved Roads Dust

$E = k(sL)^{0.91} \times (W)^{1.02}$

k_{PM10} =	0.0022	
$k_{PM2.5}$ =	0.00054	
sL =	0.32	
W_{TRUCKS}	20	
W_{CAR}	2.2	
<u>Trucks</u>		
E_{PM10}	0.0166	lbs/vmt
$E_{PM2.5}$	0.0041	lbs/vmt
<u>Cars</u>		
E_{PM10}	0.0017	lbs/vmt
$E_{PM2.5}$	0.0004	lbs/vmt

Source: USEPA AP-42 Section 13.2.1

Unpaved Roads Dust

$E = k\,(s/12)^{a}(W/3)^{b}$

k_{PM10} =	1.5	
$k_{PM2.5}$ =	0.15	
a =	0.9	
b =	0.45	
s =	21.8	
W_{TRUCKS}	20	
W_{CAR}	2.2	
Control Efficiency	61%	
<u>Trucks</u>		
E_{PM10}	2.3511	lbs/vmt
$E_{PM2.5}$	0.2351	lbs/vmt
<u>Cars</u>		
E_{PM10}	0.8707	lbs/vmt
$E_{PM2.5}$	0.0871	lbs/vmt

Source: USEPA AP-42 Section 13.2.2

Operational Equipment Emissions

2022 - O&M Equipment						Emission Factors (Onroad - g/hr; Offroad - g/hp-hr)								Emissions (Tons/Year)								
Equipment Description	No. of Units	Total Work Days Per Unit	HP	LF	Daily Operation Per Unit (Hours)	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	CO2	CH4	ROG	CO	NOX	SO2	PM10 Exh	PM2.5 Exh	CO2 (MT)	CH4 (MT)	CO2e (MT)
All-Terrain Vehicles	2	40	97	0.37	12	0.2960	3.5707	2.9950	0.0050	0.1770	0.1620	475.36	0.1540	0.0112	0.1356	0.1137	0.0002	0.0067	0.0062	16.38	0.0053	16.51
Kubota Tractors	1	40	97	0.37	3	0.2960	3.5707	2.9950	0.0050	0.1770	0.1620	475.36	0.1540	0.0014	0.0170	0.0142	0.0000	0.0008	0.0008	2.05	0.0007	2.06
Honda Portable Generatc	2	40	84	0.74	6	0.3260	3.3610	2.8880	0.0060	0.1530	0.1530	568.30	0.0290	0.0107	0.1105	0.0950	0.0002	0.0050	0.0050	16.96	0.0009	16.98
Portable Water Trailers v	1	40	84	0.74	2	0.3470	3.4120	2.9280	0.0060	0.1620	0.1620	568.30	0.0310	0.0019	0.0187	0.0161	0.0000	0.0009	0.0009	2.83	0.0002	2.83
													TOTAL	**0.0140**	**0.1462**	**0.1253**	**0.0003**	**0.0068**	**0.0067**	**21.83**	**0.0017**	**21.87**

RE Slate Solar Project
O&M Water Truck Emissions

Year	2021
Trips	800
Roundtrip Distance	89
Total VMT	71,477

Grams per Trip Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
2.48	3.74	0.46	0.00	0.00	0.00	94.35

Grams per Mile Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.03	0.63	0.14	0.00	60.65	6.58	443.08

Total Trip Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.00	0.00	0.00	0.00	0.00	0.08

Total VMT Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.05	0.01	0.00	4.78	0.52	31.67

Total Water Truck-Related Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.05	0.01	0.00	4.78	0.52	31.75

RE Slate Solar Project
O&M Worker Commute Emissions

Year	2021
Trips	2,384
Roundtrip Distance	89
Total VMT	213,003

Grams per Trip Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
2.18	3.03	0.37	0.00	0.00	0.00	75.25

Grams per Mile Emission Factors

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.02	0.58	0.11	0.00	29.70	3.09	356.41

Total Trip Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.00	0.00	0.00	0.00	0.00	0.06

Total VMT Emissions (tons)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.05	0.01	0.00	2.34	0.24	25.48

Total Worker Commute-Related Emissions (tpy)

ROC	CO	NOX	SOX	PM10	PM2.5	CO2
0.00	0.05	0.01	0.00	2.34	0.24	25.54

RE Slate Solar Project

Emission Displacement Calculations

Assumptions

Capacity Factor	26%	
Conversion	8,766	Hours/Year
Conversion	2,205	pounds/metric ton

	Project Scenario
Project Capacity (MW)	300
Project Energy (MWh)	683,729

Power Supply Emissions

	Emission Factor[1] (lbs/MWh)	Metric Ton
Carbon Dioxide (CO_2)	6.41E+02	198,903
Methane (CH_4)	2.90E-02	9
Nitrous Oxide (N_2O)	6.17E-03	2

Total Emissions: Carbon Dioxide Equivalents

	Global Warming Potential[2]	Metric Ton
CO_2	1	198,903.37
CH_4	25	224.85
N_2O	298	570.23
CO_2e Displacement		**199,698.45**

References

[1] CalEEMod 2016.3.2

[2] IPCC2007

Appendix B

HRA Modeling Files

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**
** AERMOD Input Produced by:
** AERMOD View Ver. 9.6.1
** Lakes Environmental Software Inc.
** Date: 7/9/2018
** File: H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Slate Solar.ADI
**
****************************************
**
**
****************************************
** AERMOD Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl
   MODELOPT CONC FLAT ELEV
   AVERTIME 1 PERIOD
   POLLUTID DPM
   RUNORNOT RUN
   ERRORFIL "RE Slate Solar.err"
CO FINISHED
**
****************************************
** AERMOD Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION PAREA1       AREAPOLY   239665.290  4012937.958       66.890
** DESCRSRC Site
** Source Parameters **
   SRCPARAM PAREA1       9.9184E-08     3.048       128
   AREAVERT PAREA1       239665.290 4012937.958 239669.016 4013092.725
   AREAVERT PAREA1       240355.625 4013720.494 240494.903 4013716.853
   AREAVERT PAREA1       240498.769 4013851.371 240842.108 4014149.489
   AREAVERT PAREA1       240799.170 4014152.536 241319.025 4014613.669
   AREAVERT PAREA1       241324.039 4014607.760 241925.239 4015116.551
   AREAVERT PAREA1       241949.760 4015171.119 242031.073 4015276.227
   AREAVERT PAREA1       242161.933 4015270.880 242159.278 4015485.254
   AREAVERT PAREA1       242172.284 4015538.394 242177.317 4015729.460
   AREAVERT PAREA1       242215.277 4015897.236 242217.217 4015901.355
   AREAVERT PAREA1       242218.813 4015904.584 242220.625 4015907.776
   AREAVERT PAREA1       242223.329 4015912.228 242225.695 4015915.704
   AREAVERT PAREA1       242230.076 4015921.458 242233.493 4015925.460
```

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AREAVERT PAREA1       242240.357 4015925.810 242250.726 4015926.687
AREAVERT PAREA1       242260.453 4015927.972 242273.709 4015930.305
AREAVERT PAREA1       242289.928 4015934.223 242308.061 4015939.964
AREAVERT PAREA1       242321.182 4015945.248 242332.481 4015950.624
AREAVERT PAREA1       242344.964 4015957.276 242357.903 4015965.112
AREAVERT PAREA1       242557.636 4016074.709 242779.166 4016063.401
AREAVERT PAREA1       242778.082 4016018.076 242775.463 4015972.503
AREAVERT PAREA1       242773.891 4015941.773 242770.389 4015900.655
AREAVERT PAREA1       242486.122 4015525.029 242520.779 4015525.019
AREAVERT PAREA1       242581.862 4015522.193 242607.625 4015520.625
AREAVERT PAREA1       242614.897 4015507.388 242642.029 4015477.858
AREAVERT PAREA1       242654.307 4015463.744 242655.966 4015460.436
AREAVERT PAREA1       242665.272 4015442.431 242675.254 4015425.862
AREAVERT PAREA1       242675.846 4015276.451 242670.962 4015254.845
AREAVERT PAREA1       242668.592 4015250.180 242761.927 4015246.370
AREAVERT PAREA1       242757.395 4015241.459 242717.474 4015161.740
AREAVERT PAREA1       242632.855 4015088.138 242632.918 4015087.591
AREAVERT PAREA1       242645.729 4015072.974 242637.359 4014953.879
AREAVERT PAREA1       242563.961 4014640.837 242534.450 4014546.157
AREAVERT PAREA1       242455.754 4014338.351 242415.177 4014237.522
AREAVERT PAREA1       242389.355 4014187.108 242351.237 4014121.938
AREAVERT PAREA1       242330.333 4014085.050 242303.339 4014039.407
AREAVERT PAREA1       242268.965 4013998.485 242235.681 4013924.279
AREAVERT PAREA1       242260.780 4013853.348 242302.248 4013776.414
AREAVERT PAREA1       242437.018 4013616.545 242483.648 4013558.635
AREAVERT PAREA1       242541.488 4013446.230 242586.232 4013320.729
AREAVERT PAREA1       242625.007 4013218.643 242842.079 4012950.549
AREAVERT PAREA1       242861.536 4012892.842 242863.882 4012846.929
AREAVERT PAREA1       242775.383 4012434.835 242643.868 4012350.416
AREAVERT PAREA1       242482.640 4012344.531 242220.042 4012282.252
AREAVERT PAREA1       242040.910 4012289.314 241988.603 4010186.972
AREAVERT PAREA1       242018.893 4010186.906 242018.959 4010191.855
AREAVERT PAREA1       242640.405 4010177.039 242652.687 4010133.537
AREAVERT PAREA1       242648.598 4010113.756 242649.248 4010094.885
AREAVERT PAREA1       242651.592 4010071.175 242653.850 4010055.803
AREAVERT PAREA1       242658.257 4010037.313 242659.225 4010019.899
AREAVERT PAREA1       242663.821 4010006.967 242669.089 4009989.015
AREAVERT PAREA1       242677.259 4009970.202 242687.585 4009936.330
AREAVERT PAREA1       242695.679 4009913.185 242703.647 4009878.152
AREAVERT PAREA1       242719.003 4009855.702 242732.752 4009827.533
AREAVERT PAREA1       242762.934 4009784.943 242786.408 4009733.970
AREAVERT PAREA1       242790.563 4009714.866 242790.958 4009701.452
AREAVERT PAREA1       242786.223 4009671.861 242785.434 4009602.026
AREAVERT PAREA1       242781.883 4009560.993 242816.998 4009559.809
AREAVERT PAREA1       242788.809 4008768.478 241970.693 4008794.567
AREAVERT PAREA1       241995.733 4009574.198 241998.115 4009575.686
AREAVERT PAREA1       241981.889 4009576.282 241991.456 4009890.728
AREAVERT PAREA1       242001.808 4009901.236 241949.633 4009864.040
AREAVERT PAREA1       241774.418 4009630.104 241774.053 4009603.858
AREAVERT PAREA1       241760.373 4009511.780 240380.422 4009556.555
```

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   AREAVERT PAREA1       240422.345 4011160.612 241152.522 4011139.733
   AREAVERT PAREA1       241194.024 4012870.560 240480.000 4012920.000
   SRCGROUP ALL
SO FINISHED
**
****************************************
** AERMOD Receptor Pathway
****************************************
**
**
RE STARTING
   INCLUDED "RE Slate Solar.rou"
RE FINISHED
**
****************************************
** AERMOD Meteorology Pathway
****************************************
**
**
ME STARTING
   SURFFILE "..\AERMET\2015 KNLC Lemoore.SFC"
   PROFFILE "..\AERMET\2015 KNLC Lemoore.PFL"
   SURFDATA 23110 2015
   UAIRDATA 93214 2015
   PROFBASE 71.3 METERS
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST
   RECTABLE 1 1ST
** Auto-Generated Plotfiles
   PLOTFILE 1 ALL 1ST "RE Slate Solar.AD\01H1GALL.PLT" 31
   PLOTFILE PERIOD ALL "RE Slate Solar.AD\PE00GALL.PLT" 32
   SUMMFILE "RE Slate Solar.sum"
OU FINISHED

  *** Message Summary For AERMOD Model Setup ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            2 Warning Message(s)
 A Total of            0 Informational Message(s)
```

```
   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
RE W213     182       RECART: ELEV Input Inconsistent With Option: Input Ignored       UCART1
ME W186     126       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used          0.50

***********************************
*** SETUP Finishes Successfully ***
***********************************


*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                       ***        14:43:39
                                                                                                                       PAGE   1
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                           ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Allows User-Specified Options:
        1. Stack-tip Downwash.
        2. Allow FLAT/ELEV Terrain Option by Source,
           with      0 FLAT and      1 ELEV Source(s).
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Full Conversion Assumed for NO2.

**Other Options Specified:
        CCVR_Sub - Meteorological data includes CCVR substitutions
        TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of:  DPM

**Model Calculates  1 Short Term Average(s) of:   1-HR
```

```
    and Calculates PERIOD Averages

 **This Run Includes:      1 Source(s);       1 Source Group(s); and     445 Receptor(s)

               with:      0 POINT(s), including
                          0 POINTCAP(s) and      0 POINTHOR(s)
                and:      0 VOLUME source(s)
                and:      1 AREA type source(s)
                and:      0 LINE source(s)
                and:      0 OPENPIT source(s)
                and:      0 BUOYANT LINE source(s) with      0 line(s)


 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  15181

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    71.30 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                              ;  Emission Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.6 MB of RAM.

 **Input Runstream File:          aermod.inp
 **Output Print File:             aermod.out

 **Detailed Error/Message File:   RE Slate Solar.err
 **File for Summary of Results:   RE Slate Solar.sum

 *** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
 *** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                       PAGE   2
 *** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL


                                                  *** AREAPOLY SOURCE DATA ***

               NUMBER EMISSION RATE   LOCATION OF AREA  BASE     RELEASE  NUMBER      INIT.   URBAN  EMISSION RATE
   SOURCE       PART.  (GRAMS/SEC       X         Y      ELEV.    HEIGHT  OF VERTS.     SZ     SOURCE  SCALAR VARY
     ID         CATS.   /METER**2)   (METERS) (METERS) (METERS) (METERS)            (METERS)              BY
```

```
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

PAREA1           0   0.99184E-07  239665.3 4012938.0    66.9     3.05     128         0.00     NO

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE   3
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL


                                          *** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID                                             SOURCE IDs
-----------                                             ----------


 ALL        PAREA1      ,

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE   4
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                       *** GRIDDED RECEPTOR NETWORK SUMMARY ***

                                 *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                         *** X-COORDINATES OF GRID ***
                                                   (METERS)

      236200.0,  236700.0,  237200.0,  237700.0,  238200.0,  238700.0,  239200.0,  239700.0,  240200.0,  240700.0,
      241200.0,  241700.0,  242200.0,  242700.0,  243200.0,  243700.0,  244200.0,  244700.0,  245200.0,  245700.0,
      246200.0,

                                         *** Y-COORDINATES OF GRID ***
                                                   (METERS)

     4007400.0, 4007900.0, 4008400.0, 4008900.0, 4009400.0, 4009900.0, 4010400.0, 4010900.0, 4011400.0, 4011900.0,
     4012400.0, 4012900.0, 4013400.0, 4013900.0, 4014400.0, 4014900.0, 4015400.0, 4015900.0, 4016400.0, 4016900.0,
     4017400.0,

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE   5
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                 *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                             * ELEVATION HEIGHTS IN METERS *
```

Y-COORD (METERS)	X-COORD (METERS) 236200.00	236700.00	237200.00	237700.00	238200.00	238700.00	239200.00	239700.00	240200.00
4017400.00	72.20	71.50	71.00	70.40	70.10	69.20	68.30	67.40	66.80
4016900.00	72.50	71.90	71.30	70.70	70.10	69.20	68.30	67.40	66.80
4016400.00	73.00	72.20	71.60	70.70	70.10	69.40	68.60	67.70	66.80
4015900.00	73.20	72.50	71.60	70.70	69.80	69.20	68.30	67.40	66.80
4015400.00	73.20	72.50	71.60	70.70	69.60	68.80	68.30	67.70	66.40
4014900.00	73.60	72.80	71.30	70.40	69.50	68.90	68.30	67.40	64.60
4014400.00	73.50	72.50	71.30	70.40	69.60	68.60	68.00	67.40	64.60
4013900.00	73.50	72.50	71.30	70.10	69.50	68.60	68.00	67.10	66.00
4013400.00	73.80	72.50	71.30	70.10	69.50	68.30	67.70	67.10	65.80
4012900.00	73.50	72.50	71.30	70.40	69.50	68.60	67.70	66.80	65.80
4012400.00	73.50	72.30	71.60	70.40	69.50	68.60	67.70	66.80	65.80
4011900.00	73.20	72.20	71.60	70.40	69.50	68.30	67.70	66.80	65.80
4011400.00	73.20	72.00	71.60	70.40	69.50	68.60	67.70	66.80	65.80
4010900.00	73.20	72.20	71.60	70.70	69.60	68.60	67.70	66.80	65.80
4010400.00	72.80	72.10	71.60	70.40	69.80	68.90	68.00	67.10	66.00
4009900.00	73.20	71.90	71.00	70.10	69.80	68.90	68.00	67.10	65.80
4009400.00	72.90	71.60	70.70	70.10	69.80	69.20	68.00	66.80	65.80
4008900.00	73.20	71.70	70.70	70.10	69.30	68.60	67.50	67.10	65.80
4008400.00	72.80	71.90	70.70	69.80	68.90	68.30	67.40	66.40	65.70
4007900.00	72.80	71.60	70.40	69.50	68.60	67.70	67.00	66.10	65.20
4007400.00	72.50	71.60	70.10	69.50	68.60	67.10	66.40	65.80	64.90

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*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE   6
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                               * ELEVATION HEIGHTS IN METERS *
```

Y-COORD (METERS)	X-COORD (METERS) 240700.00	241200.00	241700.00	242200.00	242700.00	243200.00	243700.00	244200.00	244700.00
4017400.00	65.80	65.20	65.70	64.90	63.50	62.60	62.50	62.50	63.10
4016900.00	65.80	65.50	65.60	64.60	63.40	62.60	62.80	63.40	63.10
4016400.00	65.80	65.50	65.50	64.60	63.40	62.00	62.50	62.50	63.20
4015900.00	65.80	65.50	65.50	64.60	63.10	62.50	62.50	62.80	63.10
4015400.00	65.80	64.60	64.60	64.00	62.80	63.00	61.00	63.00	63.10
4014900.00	64.60	64.60	64.60	64.00	63.50	63.10	62.50	62.50	63.10
4014400.00	64.60	64.30	64.20	63.40	62.80	63.30	61.50	62.10	62.80
4013900.00	65.20	64.30	64.00	62.50	62.20	61.10	62.20	62.50	62.50
4013400.00	64.90	64.10	64.30	63.10	62.80	62.50	62.20	62.50	62.50
4012900.00	64.90	64.00	63.50	63.40	63.10	61.20	61.80	62.20	62.20
4012400.00	64.90	63.70	63.10	62.80	62.80	61.70	61.00	61.90	61.90

4011900.00	65.20	63.70	62.80	62.50	62.50	59.60	61.00	61.60	61.90
4011400.00	64.90	64.10	62.50	62.50	61.90	61.00	60.60	61.00	61.60
4010900.00	64.90	63.80	62.80	62.50	62.20	61.60	59.70	61.00	61.30
4010400.00	64.90	63.60	62.80	62.30	61.90	61.60	61.30	60.40	61.00
4009900.00	64.00	62.80	62.50	62.20	61.90	61.30	61.30	60.70	61.00
4009400.00	64.00	62.20	62.20	62.20	61.90	61.30	60.40	60.40	61.00
4008900.00	65.20	63.10	62.50	62.20	61.90	61.30	60.70	61.00	61.00
4008400.00	64.60	62.80	62.50	62.20	61.90	61.60	60.70	59.50	60.90
4007900.00	64.00	62.50	62.50	62.50	61.90	61.60	61.00	60.60	59.70
4007400.00	64.00	62.50	62.50	62.50	62.20	62.20	61.40	61.00	60.80

*** AERMOD - VERSION 18081 *** *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl *** 07/09/18
*** AERMET - VERSION 15181 *** *** *** 14:43:39
PAGE 7

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV RURAL

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 245200.00	245700.00	246200.00
4017400.00	63.70	64.00	64.00
4016900.00	64.00	64.00	64.00
4016400.00	64.00	64.00	64.00
4015900.00	64.00	64.00	64.10
4015400.00	63.70	63.70	64.00
4014900.00	63.40	63.40	64.00
4014400.00	64.00	63.40	64.00
4013900.00	63.40	63.40	64.00
4013400.00	62.50	62.90	63.70
4012900.00	62.50	62.60	63.40
4012400.00	62.50	62.50	63.10
4011900.00	62.50	62.50	62.80
4011400.00	62.50	62.50	62.50
4010900.00	62.20	62.50	62.20
4010400.00	61.60	62.40	61.60
4009900.00	61.00	61.30	61.00
4009400.00	61.00	61.00	61.00
4008900.00	61.00	61.00	61.00
4008400.00	60.70	61.00	61.00
4007900.00	59.80	61.00	61.00
4007400.00	59.70	60.40	60.40

*** AERMOD - VERSION 18081 *** *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl *** 07/09/18
*** AERMET - VERSION 15181 *** *** *** 14:43:39
PAGE 8

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV RURAL

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 236200.00	236700.00	237200.00	237700.00	238200.00	238700.00	239200.00	239700.00	240200.00
4017400.00	72.20	71.50	71.00	70.40	70.10	69.20	68.30	67.40	66.80
4016900.00	72.50	71.90	71.30	70.70	70.10	69.20	68.30	67.40	66.80
4016400.00	73.00	72.20	71.60	70.70	70.10	69.40	68.60	67.70	66.80
4015900.00	73.20	72.50	71.60	70.70	69.80	69.20	68.30	67.40	66.80
4015400.00	73.20	72.50	71.60	70.70	69.60	68.80	68.30	67.70	66.40
4014900.00	73.60	72.80	71.30	70.40	69.50	68.90	68.30	67.40	64.60
4014400.00	73.50	72.50	71.30	70.40	69.60	68.60	68.00	67.40	64.60
4013900.00	73.50	72.50	71.30	70.10	69.50	68.60	68.00	67.10	66.00
4013400.00	73.80	72.50	71.30	70.10	69.50	68.30	67.70	67.10	65.80
4012900.00	73.50	72.50	71.30	70.40	69.50	68.60	67.70	66.80	65.80
4012400.00	73.50	72.30	71.60	70.40	69.50	68.60	67.70	66.80	65.80
4011900.00	73.20	72.20	71.60	70.40	69.50	68.30	67.70	66.80	65.80
4011400.00	73.20	72.00	71.60	70.40	69.50	68.60	67.70	66.80	65.80
4010900.00	73.20	72.20	71.60	70.70	69.60	68.60	67.70	66.80	65.80
4010400.00	72.80	72.10	71.60	70.40	69.80	68.90	68.00	67.10	66.00
4009900.00	73.20	71.90	71.00	70.10	69.80	68.90	68.00	67.10	65.80
4009400.00	72.90	71.60	70.70	70.10	69.80	69.20	68.00	66.80	65.80
4008900.00	73.20	71.70	70.70	70.10	69.30	68.60	67.50	67.10	65.80
4008400.00	72.80	71.90	70.70	69.80	68.90	68.30	67.40	66.40	65.70
4007900.00	72.80	71.60	70.40	69.50	68.60	67.70	67.00	66.10	65.20
4007400.00	72.50	71.60	70.10	69.50	68.60	67.10	66.40	65.80	64.90

*** AERMOD - VERSION 18081 *** *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl *** 07/09/18
*** AERMET - VERSION 15181 *** *** *** 14:43:39
PAGE 9
*** MODELOPTs: NonDFAULT CONC FLAT and ELEV RURAL

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 240700.00	241200.00	241700.00	242200.00	242700.00	243200.00	243700.00	244200.00	244700.00
4017400.00	65.80	65.20	65.70	64.90	63.50	62.60	62.50	62.50	63.10
4016900.00	65.80	65.50	65.60	64.60	63.40	62.60	62.80	63.40	63.10
4016400.00	65.80	65.50	65.50	64.60	63.40	62.00	62.50	62.50	63.20
4015900.00	65.80	65.50	65.50	64.60	63.10	62.50	62.50	62.80	63.10
4015400.00	65.80	64.60	64.60	64.00	62.80	63.00	61.00	63.00	63.10
4014900.00	64.60	64.60	64.60	64.00	63.50	63.10	62.50	62.50	63.10

4014400.00 |	64.60	64.30	64.20	63.40	62.80	63.30	61.50	62.10	62.80
4013900.00 |	65.20	64.30	64.00	62.50	62.20	61.10	62.20	62.50	62.50
4013400.00 |	64.90	64.10	64.30	63.10	62.80	62.50	62.20	62.50	62.50
4012900.00 |	64.90	64.00	63.50	63.40	63.10	61.20	61.80	62.20	62.20
4012400.00 |	64.90	63.70	63.10	62.80	62.80	61.70	61.00	61.90	61.90
4011900.00 |	65.20	63.70	62.80	62.50	62.50	59.60	61.00	61.60	61.90
4011400.00 |	64.90	64.10	62.50	62.50	61.90	61.00	60.60	61.00	61.60
4010900.00 |	64.90	63.80	62.80	62.50	62.20	61.60	59.70	61.00	61.30
4010400.00 |	64.90	63.60	62.80	62.30	61.90	61.60	61.30	60.40	61.00
4009900.00 |	64.00	62.80	62.50	62.20	61.90	61.30	61.30	60.70	61.00
4009400.00 |	64.00	62.20	62.20	62.20	61.90	61.30	60.40	60.40	61.00
4008900.00 |	65.20	63.10	62.50	62.20	61.90	61.30	60.70	61.00	61.00
4008400.00 |	64.60	62.80	62.50	62.20	61.90	61.60	60.70	59.50	60.90
4007900.00 |	64.00	62.50	62.50	62.50	61.90	61.60	61.00	60.60	59.70
4007400.00 |	64.00	62.50	62.50	62.50	62.20	62.20	61.40	61.00	60.80

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*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE  10
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                              * HILL HEIGHT SCALES IN METERS *
```

Y-COORD (METERS) |	X-COORD (METERS) 245200.00	245700.00	246200.00
4017400.00 |	63.70	64.00	64.00
4016900.00 |	64.00	64.00	64.00
4016400.00 |	64.00	64.00	64.00
4015900.00 |	64.00	64.00	64.10
4015400.00 |	63.70	63.70	64.00
4014900.00 |	63.40	63.40	64.00
4014400.00 |	64.00	63.40	64.00
4013900.00 |	63.40	63.40	64.00
4013400.00 |	62.50	62.90	63.70
4012900.00 |	62.50	62.60	63.40
4012400.00 |	62.50	62.50	63.10
4011900.00 |	62.50	62.50	62.80
4011400.00 |	62.50	62.50	62.50
4010900.00 |	62.20	62.50	62.20
4010400.00 |	61.60	62.40	61.60
4009900.00 |	61.00	61.30	61.00
4009400.00 |	61.00	61.00	61.00
4008900.00 |	61.00	61.00	61.00
4008400.00 |	60.70	61.00	61.00
4007900.00 |	59.80	61.00	61.00
4007400.00 |	59.70	60.40	60.40

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*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE  11
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                          *** DISCRETE CARTESIAN RECEPTORS ***
                                        (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                                       (METERS)

    ( 243439.0, 4015355.0,      61.4,      61.4,       0.0);         ( 243679.0, 4010290.0,      61.3,      61.3,       0.0);
    ( 243210.0, 4008962.0,      61.3,      61.3,       0.0);         ( 243437.0, 4008380.0,      61.3,      61.3,       0.0);

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE  12
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                         *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                           (1=YES; 0=NO)

           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1

               NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.


                                *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                          (METERS/SEC)

                                               1.54,   3.09,   5.14,   8.23,  10.80,

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE  13
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                  *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

  Surface file:   ..\AERMET\2015 KNLC Lemoore.SFC                                                  Met Version:  15181
  Profile file:   ..\AERMET\2015 KNLC Lemoore.PFL
  Surface format: FREE
  Profile format: FREE
```

```
  Surface station no.:     23110                  Upper air station no.:     93214
                 Name: UNKNOWN                                     Name: UNKNOWN
                 Year:    2015                                     Year:    2015
```

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
15	01	01	1	01	-25.9	0.221	-9.000	-9.000	-999.	249.	37.6	0.04	0.74	1.00	3.76	128.	10.0	272.0	2.0
15	01	01	1	02	-9.5	0.096	-9.000	-9.000	-999.	82.	8.3	0.06	0.74	1.00	2.44	162.	10.0	271.4	2.0
15	01	01	1	03	-13.8	0.117	-9.000	-9.000	-999.	96.	10.4	0.05	0.74	1.00	2.95	218.	10.0	269.9	2.0
15	01	01	1	04	-5.6	0.073	-9.000	-9.000	-999.	47.	6.2	0.05	0.74	1.00	1.93	237.	10.0	269.9	2.0
15	01	01	1	05	-4.1	0.062	-9.000	-9.000	-999.	37.	5.1	0.04	0.74	1.00	1.72	243.	10.0	269.9	2.0
15	01	01	1	06	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.74	1.00	0.00	0.	10.0	269.2	2.0
15	01	01	1	07	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.74	1.00	0.00	0.	10.0	269.9	2.0
15	01	01	1	08	-2.9	0.052	-9.000	-9.000	-999.	29.	4.4	0.04	0.74	0.65	1.48	111.	10.0	269.9	2.0
15	01	01	1	09	6.2	0.130	0.171	0.005	29.	112.	-31.9	0.04	0.74	0.36	1.64	107.	10.0	274.2	2.0
15	01	01	1	10	47.0	0.159	0.440	0.005	65.	152.	-7.7	0.04	0.74	0.26	1.69	124.	10.0	277.0	2.0
15	01	01	1	11	76.9	-9.000	-9.000	-9.000	260.	-999.	-99999.0	0.04	0.74	0.22	0.00	0.	10.0	279.9	2.0
15	01	01	1	12	92.7	0.167	1.309	0.010	875.	163.	-4.5	0.04	0.74	0.21	1.72	98.	10.0	280.9	2.0
15	01	01	1	13	93.8	0.250	1.325	0.009	896.	300.	-15.0	0.03	0.74	0.21	3.00	87.	10.0	282.5	2.0
15	01	01	1	14	79.9	0.292	1.265	0.008	914.	378.	-28.0	0.04	0.74	0.22	3.52	120.	10.0	283.1	2.0
15	01	01	1	15	52.0	0.245	1.101	0.008	925.	291.	-25.4	0.04	0.74	0.25	2.93	127.	10.0	284.2	2.0
15	01	01	1	16	12.3	0.169	0.681	0.008	928.	169.	-35.7	0.04	0.74	0.34	2.08	148.	10.0	283.8	2.0
15	01	01	1	17	-8.2	0.091	-9.000	-9.000	-999.	68.	8.4	0.05	0.74	0.60	2.42	185.	10.0	282.0	2.0
15	01	01	1	18	-28.4	0.247	-9.000	-9.000	-999.	295.	47.9	0.05	0.74	1.00	3.92	229.	10.0	277.0	2.0
15	01	01	1	19	-10.8	0.100	-9.000	-9.000	-999.	95.	8.4	0.04	0.74	1.00	2.79	257.	10.0	277.0	2.0
15	01	01	1	20	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.74	1.00	0.00	0.	10.0	275.9	2.0
15	01	01	1	21	-7.7	0.085	-9.000	-9.000	-999.	59.	7.1	0.04	0.74	1.00	2.36	260.	10.0	274.2	2.0
15	01	01	1	22	-11.6	0.103	-9.000	-9.000	-999.	80.	8.7	0.04	0.74	1.00	2.86	272.	10.0	273.8	2.0
15	01	01	1	23	-7.9	0.085	-9.000	-9.000	-999.	60.	7.1	0.04	0.74	1.00	2.36	280.	10.0	272.0	2.0
15	01	01	1	24	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.74	1.00	0.00	0.	10.0	271.4	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
15	01	01	01	10.0	1	128.	3.76	272.1	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

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*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                        ***        14:43:39
                                                                                                                        PAGE  14
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                             *** THE PERIOD (  8760 HRS) AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL      ***
                                 INCLUDING SOURCE(S):     PAREA1      ,

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                       ** CONC OF DPM      IN MICROGRAMS/M**3                          **
```

Y-COORD (METERS)	X-COORD (METERS) 236200.00	236700.00	237200.00	237700.00	238200.00	238700.00	239200.00	239700.00	240200.00
4017400.00	0.09137	0.10303	0.11388	0.12344	0.13283	0.14171	0.15001	0.16325	0.17049
4016900.00	0.09454	0.10690	0.12150	0.13527	0.14854	0.16254	0.17466	0.19032	0.20696
4016400.00	0.09880	0.11157	0.12842	0.14623	0.16491	0.18520	0.20489	0.22505	0.25169
4015900.00	0.10438	0.11735	0.13572	0.15667	0.18089	0.20885	0.24050	0.27135	0.31019
4015400.00	0.10986	0.12386	0.14284	0.16672	0.19556	0.23126	0.27582	0.32561	0.38448
4014900.00	0.11368	0.12991	0.15078	0.17637	0.21074	0.25511	0.31549	0.39128	0.48156
4014400.00	0.11379	0.13310	0.15686	0.18487	0.22325	0.27663	0.35556	0.47031	0.61970
4013900.00	0.11125	0.13246	0.15919	0.19044	0.23214	0.29301	0.39246	0.57047	0.87708
4013400.00	0.10828	0.12882	0.15717	0.19158	0.23592	0.30069	0.41282	0.72108	1.84200
4012900.00	0.10268	0.11977	0.14501	0.17778	0.22205	0.28249	0.37586	0.75863	1.48962
4012400.00	0.10113	0.11736	0.13983	0.16904	0.20876	0.26524	0.35982	0.49982	0.72329
4011900.00	0.10112	0.11654	0.13515	0.15839	0.19584	0.25857	0.34394	0.47376	0.64804
4011400.00	0.09579	0.10943	0.12857	0.15566	0.19609	0.24995	0.33340	0.47186	0.71136
4010900.00	0.08832	0.10275	0.12494	0.15474	0.19000	0.23638	0.31528	0.46639	0.81788
4010400.00	0.08396	0.09925	0.11987	0.14202	0.17071	0.21494	0.29067	0.43165	0.80779
4009900.00	0.07977	0.09433	0.10969	0.12846	0.15335	0.19217	0.25381	0.36834	0.68509
4009400.00	0.07340	0.08385	0.09582	0.11014	0.12978	0.16077	0.20803	0.28259	0.44443
4008900.00	0.06696	0.07671	0.08651	0.09885	0.11726	0.14364	0.17748	0.22969	0.31886
4008400.00	0.06310	0.06981	0.07854	0.08939	0.10515	0.12510	0.15156	0.19143	0.24714
4007900.00	0.05864	0.06495	0.07208	0.08218	0.09634	0.11312	0.13355	0.16554	0.19833
4007400.00	0.05412	0.05990	0.06688	0.07664	0.08829	0.10009	0.11763	0.14244	0.16606

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*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE  15
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                             *** THE PERIOD (  8760 HRS) AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL      ***
                                 INCLUDING SOURCE(S):     PAREA1      ,

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                       ** CONC OF DPM      IN MICROGRAMS/M**3                          **
```

Y-COORD (METERS)	X-COORD (METERS) 240700.00	241200.00	241700.00	242200.00	242700.00	243200.00	243700.00	244200.00	244700.00
4017400.00	0.17240	0.17493	0.16937	0.16115	0.15095	0.14373	0.15187	0.14784	0.13921
4016900.00	0.21314	0.22323	0.22700	0.21785	0.20103	0.20108	0.19722	0.18177	0.16593
4016400.00	0.27065	0.29033	0.32227	0.34674	0.32282	0.29981	0.25865	0.22558	0.20297
4015900.00	0.35037	0.39063	0.46850	0.77727	1.17764	0.46447	0.34014	0.28005	0.24223
4015400.00	0.45731	0.53990	0.69036	1.36675	1.32707	0.62409	0.42227	0.34082	0.28177
4014900.00	0.61609	0.82161	1.40825	2.17955	1.51977	0.74131	0.50913	0.39481	0.31992
4014400.00	0.89972	1.79387	2.46719	2.46267	1.34728	0.81465	0.57369	0.44192	0.35336

4013900.00 |	1.88821	2.60467	2.83840	2.53605	1.29010	0.85497	0.63323	0.48101	0.38001
4013400.00 |	2.50589	2.83145	3.02287	2.86480	1.61978	0.97614	0.68547	0.51697	0.40855
4012900.00 |	1.96013	2.55158	2.92672	2.94106	2.50615	1.07998	0.72461	0.54268	0.42765
4012400.00 |	1.00886	1.77892	2.71220	2.62052	2.15443	1.05909	0.71651	0.55134	0.44180
4011900.00 |	0.89382	1.71085	2.58978	1.72420	1.22375	0.88391	0.67555	0.53666	0.43594
4011400.00 |	1.01583	1.86391	2.58631	1.61706	1.06226	0.80403	0.63867	0.51421	0.41985
4010900.00 |	2.13551	2.54118	2.69958	1.60139	1.03214	0.77992	0.61849	0.50333	0.41186
4010400.00 |	2.28846	2.71467	2.78859	1.71260	1.11218	0.80931	0.62253	0.49095	0.40083
4009900.00 |	2.06529	2.49036	2.63543	2.52666	1.88354	0.89030	0.62600	0.48488	0.39477
4009400.00 |	0.89899	1.20547	1.45700	2.25882	2.18717	0.92365	0.60486	0.46513	0.37831
4008900.00 |	0.45995	0.60163	0.76414	1.73176	1.83956	0.80586	0.54139	0.42345	0.35257
4008400.00 |	0.31784	0.38709	0.47735	0.61543	0.69084	0.57541	0.44424	0.36017	0.30888
4007900.00 |	0.24081	0.28101	0.33793	0.39611	0.42220	0.40795	0.35958	0.30509	0.26520
4007400.00 |	0.19317	0.22011	0.25569	0.28774	0.30435	0.30301	0.29137	0.26323	0.23397

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*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                        ***        14:43:39
                                                                                                                        PAGE  16
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                             *** THE PERIOD (  8760 HRS) AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL      ***
                                 INCLUDING SOURCE(S):     PAREA1      ,

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                       ** CONC OF DPM      IN MICROGRAMS/M**3                          **
```

Y-COORD (METERS) |	X-COORD (METERS) 245200.00	245700.00	246200.00
4017400.00 |	0.13174	0.12605	0.12025
4016900.00 |	0.15769	0.14745	0.13377
4016400.00 |	0.18337	0.16370	0.14526
4015900.00 |	0.21071	0.18269	0.16149
4015400.00 |	0.23713	0.20383	0.17870
4014900.00 |	0.26602	0.22624	0.19606
4014400.00 |	0.29180	0.24498	0.21099
4013900.00 |	0.31234	0.26425	0.22732
4013400.00 |	0.33563	0.28102	0.23802
4012900.00 |	0.35006	0.29173	0.24776
4012400.00 |	0.36210	0.30048	0.25530
4011900.00 |	0.36031	0.30273	0.25849
4011400.00 |	0.35012	0.29728	0.25566
4010900.00 |	0.34338	0.28907	0.24668
4010400.00 |	0.33241	0.28111	0.24089
4009900.00 |	0.32886	0.27748	0.23659
4009400.00 |	0.31559	0.26822	0.23054
4008900.00 |	0.29977	0.25803	0.22393
4008400.00 |	0.26904	0.23771	0.21063

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 4007900.00 |       0.23610      0.21185      0.19157
 4007400.00 |       0.20897      0.18953      0.17186

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE  17
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                             *** THE PERIOD (  8760 HRS) AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL      ***
                                 INCLUDING SOURCE(S):     PAREA1      ,

                                            *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                       ** CONC OF DPM      IN MICROGRAMS/M**3                          **

      X-COORD (M)   Y-COORD (M)        CONC                        X-COORD (M)   Y-COORD (M)        CONC
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
        243439.00    4015355.00        0.50855                       243679.00    4010290.00        0.62758
        243210.00    4008962.00        0.82015                       243437.00    4008380.00        0.50163

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE  18
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                             *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL      ***
                                 INCLUDING SOURCE(S):     PAREA1      ,

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                       ** CONC OF DPM      IN MICROGRAMS/M**3                          **

 Y-COORD  |                                              X-COORD (METERS)
 (METERS) |       236200.00               236700.00               237200.00               237700.00               238200.00
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

4017400.0 |      9.74676 (15120908)     10.81731 (15120908)     11.17150 (15120908)     10.73087 (15122619)     11.06740 (15121917)
4016900.0 |      8.81662 (15120908)     10.38537 (15120908)     11.64599 (15120908)     12.30671 (15120908)     11.82433 (15122619)
4016400.0 |      9.11357 (15121703)      9.27411 (15120908)     11.29053 (15120908)     12.65266 (15120908)     13.66469 (15120908)
4015900.0 |     11.06626 (15030704)     10.53292 (15030704)     10.37419 (15121703)     12.30285 (15120908)     13.92290 (15120908)
4015400.0 |     13.13231 (15120806)     13.14092 (15120806)     13.06081 (15030704)     12.70479 (15030704)     13.63665 (15120908)
4014900.0 |     11.56696 (15120806)     14.21646 (15120806)     15.69377 (15120806)     16.13433 (15120806)     16.16242 (15120806)
4014400.0 |     12.41428 (15022604)     12.80248 (15022604)     13.14226 (15022604)     16.84936 (15120806)     19.38091 (15120806)
4013900.0 |     14.25946 (15011905)     15.36185 (15010608)     16.67420 (15010608)     17.73103 (15010608)     18.66399 (15010608)
4013400.0 |     14.55801 (15122707)     15.78590 (15122707)     17.43699 (15122707)     19.08228 (15122707)     21.10463 (15122707)
4012900.0 |     11.76771 (15020218)     13.03710 (15020218)     14.47224 (15020218)     16.19231 (15020218)     18.42808 (15012405)
4012400.0 |     12.42815 (15012405)     14.51901 (15012405)     16.30861 (15012405)     17.31575 (15012004)     22.66718 (15120718)
4011900.0 |     12.70566 (15012004)     14.03376 (15012004)     17.87339 (15120718)     19.06270 (15120718)     19.36887 (15030101)
4011400.0 |     14.98972 (15120718)     15.42165 (15120718)     13.48650 (15120718)     16.19102 (15030101)     17.34689 (15011906)
4010900.0 |     11.18872 (15120718)     13.59624 (15030101)     13.36207 (15030420)     15.16088 (15011906)     16.79352 (15011802)
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4010400.0 |     12.50018 (15030101)     12.68564 (15030420)     13.52756 (15011906)     15.03483 (15011802)     16.32609 (15122618)
4009900.0 |     11.50528 (15122707)     12.57522 (15011906)     13.62556 (15011802)     15.05682 (15122707)     16.78709 (15122707)
4009400.0 |     11.56353 (15011906)     12.45462 (15011802)     13.49901 (15122618)     12.26562 (15122618)     13.15093 (15120718)
4008900.0 |     11.64798 (15011802)     12.16779 (15122618)     11.71628 (15122618)     11.95166 (15120718)     13.28197 (15120718)
4008400.0 |     11.33584 (15122618)     11.22763 (15122618)     10.94950 (15120718)     11.82885 (15120718)     13.27832 (15011802)
4007900.0 |     10.77960 (15122618)      9.86361 (15120718)     10.06086 (15022419)     11.93681 (15011802)     14.90892 (15122618)
4007400.0 |      8.32718 (15122618)      9.28751 (15022419)     10.87233 (15011802)     13.08755 (15122618)     14.80039 (15122618)

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                       ***        14:43:39
                                                                                                                       PAGE  19
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                             *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL      ***
                                 INCLUDING SOURCE(S):     PAREA1      ,

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                       ** CONC OF DPM      IN MICROGRAMS/M**3                          **

 Y-COORD  |                                           X-COORD (METERS)
 (METERS) |       238700.00               239200.00               239700.00               240200.00               240700.00
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

4017400.0 |     12.18863 (15112106)     12.76597 (15012901)     14.71136 (15111004)     16.90653 (15022107)     18.29717 (15012204)
4016900.0 |     12.27604 (15050206)     13.71903 (15012901)     14.07835 (15111004)     17.42728 (15022107)     18.98016 (15012204)
4016400.0 |     13.25426 (15120908)     14.25639 (15112106)     15.04062 (15121917)     18.79709 (15111004)     19.67208 (15022107)
4015900.0 |     15.36322 (15120908)     15.51883 (15120908)     16.60515 (15012901)     19.59434 (15111004)     22.46177 (15022107)
4015400.0 |     15.59965 (15120908)     17.61868 (15120908)     18.57738 (15120908)     19.23251 (15111004)     25.18326 (15022107)
4014900.0 |     15.91930 (15030704)     17.95486 (15120908)     20.93560 (15120908)     22.65975 (15120908)     27.56485 (15111004)
4014400.0 |     20.57186 (15120806)     21.43217 (15120806)     22.22402 (15120806)     25.82023 (15120908)     31.49199 (15111004)
4013900.0 |     21.05040 (15120806)     26.06995 (15120806)     29.82460 (15120806)     32.33069 (15120806)     32.91860 (15120908)
4013400.0 |     24.87817 (15011905)     29.14552 (15010608)     35.35026 (15010608)     36.56483 (15120718)     31.88475 (15122618)
4012900.0 |     23.53018 (15012405)     32.17221 (15120718)     41.03139 (15120718)     37.51342 (15122618)     35.05674 (15022306)
4012400.0 |     25.33783 (15120718)     25.51915 (15011906)     29.67776 (15122618)     27.20342 (15122618)     31.16088 (15022306)
4011900.0 |     20.47078 (15011906)     23.52814 (15122618)     24.44969 (15120908)     24.66165 (15022306)     26.63689 (15011717)
4011400.0 |     19.34941 (15120806)     20.72044 (15120806)     24.11313 (15120908)     33.04879 (15120908)     29.10843 (15121917)
4010900.0 |     18.03384 (15120806)     22.10281 (15120806)     26.97156 (15120806)     32.67000 (15120806)     35.28504 (15021904)
4010400.0 |     17.76997 (15011905)     20.55929 (15010608)     24.64392 (15010608)     32.99156 (15120806)     46.78223 (15021904)
4009900.0 |     19.01988 (15122707)     22.01584 (15122707)     26.47583 (15122707)     34.92947 (15021904)     50.94106 (15021904)
4009400.0 |     14.95610 (15120718)     18.28954 (15012405)     24.75767 (15122618)     43.77924 (15021904)     49.66611 (15021904)
4008900.0 |     15.02625 (15011802)     20.25685 (15122618)     25.53549 (15022306)     45.66997 (15021904)     39.86836 (15021904)
4008400.0 |     17.19394 (15122618)     18.75203 (15022419)     28.63347 (15022306)     39.30733 (15021904)     31.57674 (15083121)
4007900.0 |     16.42495 (15122618)     21.73043 (15022306)     32.97874 (15021904)     32.68495 (15021904)     28.17299 (15031320)
4007400.0 |     16.50127 (15022306)     22.97847 (15022306)     32.39932 (15021904)     26.57341 (15021904)     26.96496 (15031320)

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                       ***        14:43:39
                                                                                                                       PAGE  20
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL
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```
                    *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL      ***
                        INCLUDING SOURCE(S):     PAREA1      ,

                         *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                              ** CONC OF DPM      IN MICROGRAMS/M**3                          **

 Y-COORD  |                                            X-COORD (METERS)
 (METERS) |      241200.00              241700.00              242200.00              242700.00              243200.00
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

4017400.0 |     18.84689 (15011321)     20.53616 (15051424)     22.97504 (15123103)     29.70701 (15010507)     25.85499 (15012104)
4016900.0 |     20.63797 (15012204)     22.53921 (15051424)     25.46444 (15123103)     36.50867 (15010507)     25.72067 (15012104)
4016400.0 |     23.01617 (15012204)     25.07044 (15051424)     29.05298 (15123103)     43.00066 (15010507)     28.75453 (15010804)
4015900.0 |     25.88909 (15012204)     28.49030 (15051424)     36.59683 (15051424)     41.22920 (15010507)     26.71803 (15010804)
4015400.0 |     29.31836 (15012204)     33.43198 (15051424)     44.81220 (15010507)     39.60252 (15012104)     23.97645 (15013101)
4014900.0 |     34.36595 (15012204)     41.10552 (15051424)     44.01671 (15010507)     34.74936 (15013101)     29.36049 (15013101)
4014400.0 |     38.55129 (15012204)     39.14838 (15051424)     41.93101 (15010507)     33.03199 (15013101)     25.32076 (15011121)
4013900.0 |     36.38403 (15012204)     36.86907 (15051424)     38.98298 (15010507)     33.06660 (15011121)     25.97247 (15010804)
4013400.0 |     33.71328 (15012204)     35.92319 (15010507)     36.66812 (15010507)     35.04858 (15092402)     28.79278 (15010804)
4012900.0 |     38.08771 (15021904)     34.47445 (15021904)     35.76543 (15011121)     35.76523 (15010804)     25.96338 (15011306)
4012400.0 |     42.84653 (15021904)     34.42773 (15083121)     33.36442 (15122507)     33.69323 (15120117)     24.84269 (15030606)
4011900.0 |     44.99229 (15021904)     37.80502 (15031320)     30.10350 (15122507)     29.22060 (15122507)     20.99731 (15120117)
4011400.0 |     44.53704 (15021904)     40.55514 (15031320)     30.31403 (15120117)     25.32126 (15122507)     22.98029 (15120117)
4010900.0 |     42.24808 (15021904)     42.39800 (15031320)     31.41188 (15120117)     22.72661 (15122507)     20.31160 (15120117)
4010400.0 |     43.73928 (15031320)     43.19131 (15031320)     30.12974 (15122507)     21.80985 (15120117)     18.89034 (15011401)
4009900.0 |     45.96724 (15031320)     42.43334 (15031320)     36.40908 (15122507)     27.33490 (15120117)     21.16969 (15011306)
4009400.0 |     46.69689 (15031320)     39.87773 (15122507)     46.27436 (15122507)     36.26146 (15120117)     23.69340 (15012404)
4008900.0 |     40.60543 (15031320)     32.72217 (15012720)     49.53530 (15122507)     41.44700 (15120117)     23.13904 (15120117)
4008400.0 |     35.70367 (15031320)     28.56690 (15012720)     41.69817 (15122507)     38.61086 (15122507)     30.28466 (15120117)
4007900.0 |     31.72921 (15031320)     25.45682 (15012720)     32.04335 (15122507)     35.97585 (15122507)     31.59138 (15120117)
4007400.0 |     28.16793 (15031320)     23.05873 (15012720)     26.04078 (15122507)     34.15437 (15122507)     25.66616 (15120117)

*** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
*** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                      PAGE  21
*** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                    *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL      ***
                        INCLUDING SOURCE(S):     PAREA1      ,

                         *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                              ** CONC OF DPM      IN MICROGRAMS/M**3                          **

 Y-COORD  |                                            X-COORD (METERS)
 (METERS) |      243700.00              244200.00              244700.00              245200.00              245700.00
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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4017400.0	20.05282 (15092402)	19.73134 (15010804)	16.35079 (15121407)	13.15943 (15111802)	12.09857 (15092402)
4016900.0	23.38108 (15010804)	18.66823 (15121407)	14.66649 (15111802)	13.44624 (15092402)	13.79026 (15010804)
4016400.0	21.57056 (15121407)	17.31209 (15011121)	14.55144 (15010924)	14.80119 (15010804)	15.30104 (15013101)
4015900.0	19.74171 (15011121)	17.13966 (15013101)	18.24291 (15013101)	17.77328 (15013101)	15.23762 (15013101)
4015400.0	22.30556 (15013101)	21.79507 (15013101)	18.17271 (15013101)	14.48884 (15122623)	13.38941 (15122623)
4014900.0	22.86962 (15013101)	19.89269 (15010804)	15.72301 (15020305)	14.55749 (15020305)	13.31379 (15011401)
4014400.0	22.51021 (15010804)	17.24363 (15011401)	15.89585 (15011401)	14.19402 (15011401)	12.08856 (15011401)
4013900.0	21.70190 (15010804)	15.07957 (15011401)	14.34177 (15013101)	12.05038 (15013101)	10.49655 (15020305)
4013400.0	19.02734 (15013101)	15.56284 (15112203)	13.91889 (15112203)	12.61901 (15112203)	11.57871 (15112203)
4012900.0	21.89768 (15011306)	19.12239 (15011306)	16.96639 (15011306)	15.34555 (15011306)	14.00826 (15011306)
4012400.0	21.06336 (15011124)	19.39557 (15011124)	17.37599 (15011124)	15.44087 (15011124)	13.48248 (15011124)
4011900.0	19.33142 (15012404)	18.05629 (15012404)	15.73718 (15012404)	13.15679 (15012404)	12.77822 (15011124)
4011400.0	14.89839 (15040304)	13.70195 (15011201)	14.53198 (15012404)	14.62337 (15012404)	13.25490 (15012404)
4010900.0	16.08392 (15030507)	12.72700 (15012506)	11.89843 (15020305)	11.55887 (15011201)	11.64421 (15011201)
4010400.0	17.99165 (15120117)	11.55818 (15040304)	11.18818 (15012506)	9.94576 (15012506)	8.92962 (15110403)
4009900.0	17.78826 (15011306)	15.23397 (15011306)	13.44989 (15011306)	11.95524 (15011306)	10.78021 (15011306)
4009400.0	18.17985 (15011124)	16.11934 (15011124)	14.36466 (15011124)	12.42820 (15011124)	10.52739 (15011124)
4008900.0	18.66853 (15012404)	17.05642 (15012404)	14.50675 (15012404)	11.94027 (15011124)	11.60870 (15011124)
4008400.0	16.03278 (15012506)	14.28204 (15011201)	14.36239 (15012404)	13.66070 (15012404)	12.20817 (15012404)
4007900.0	19.54191 (15120117)	13.71903 (15012506)	12.18254 (15120117)	11.79924 (15011201)	11.67214 (15012404)
4007400.0	24.26116 (15120117)	13.96251 (15120117)	12.13321 (15012506)	11.00529 (15120117)	9.61726 (15011201)

*** AERMOD - VERSION 18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***   07/09/18
*** AERMET - VERSION 15181 ***   ***   ***   14:43:39
PAGE 22

*** MODELOPTs: NonDFAULT CONC FLAT and ELEV RURAL

*** THE   1ST HIGHEST 1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL   ***
INCLUDING SOURCE(S):   PAREA1   ,

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

** CONC OF DPM   IN MICROGRAMS/M**3   **

Y-COORD (METERS)	X-COORD (METERS) 246200.00
4017400.0	12.76774 (15010804)
4016900.0	11.82061 (15013101)
4016400.0	14.97521 (15013101)
4015900.0	12.20208 (15013101)
4015400.0	12.39027 (15020305)
4014900.0	12.55792 (15011401)
4014400.0	10.38752 (15011401)
4013900.0	9.74738 (15011401)
4013400.0	10.71609 (15112203)
4012900.0	12.95751 (15011306)
4012400.0	11.80212 (15011124)
4011900.0	12.74083 (15011124)

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 4011400.0 |     11.40832 (15012404)
 4010900.0 |     12.12824 (15012404)
 4010400.0 |      9.93844 (15011201)
 4009900.0 |      9.76680 (15011306)
 4009400.0 |      9.18575 (15011306)
 4008900.0 |     11.06383 (15011124)
 4008400.0 |      9.63473 (15012404)
 4007900.0 |     11.53365 (15012404)
 4007400.0 |     10.18798 (15011201)

 *** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
 *** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                       PAGE  23
 *** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                             *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL      ***
                                 INCLUDING SOURCE(S):     PAREA1      ,

                                              *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                         ** CONC OF DPM      IN MICROGRAMS/M**3                          **

      X-COORD (M)  Y-COORD (M)        CONC     (YYMMDDHH)             X-COORD (M)  Y-COORD (M)        CONC     (YYMMDDHH)
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
        243439.00   4015355.00       23.14893  (15013101)               243679.00   4010290.00       17.80799  (15120117)
        243210.00   4008962.00       21.56713  (15012404)               243437.00   4008380.00       21.91493  (15120117)

 *** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
 *** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                       PAGE  24
 *** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                         *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS) RESULTS ***


                                     ** CONC OF DPM      IN MICROGRAMS/M**3                          **

                                                                                                          NETWORK
GROUP ID                      AVERAGE CONC              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       3.02287 AT (  241700.00,  4013400.00,    64.30,    64.30,    0.00)  GC  UCART1
          2ND HIGHEST VALUE IS       2.94106 AT (  242200.00,  4012900.00,    63.40,    63.40,    0.00)  GC  UCART1
          3RD HIGHEST VALUE IS       2.92672 AT (  241700.00,  4012900.00,    63.50,    63.50,    0.00)  GC  UCART1
          4TH HIGHEST VALUE IS       2.86480 AT (  242200.00,  4013400.00,    63.10,    63.10,    0.00)  GC  UCART1
          5TH HIGHEST VALUE IS       2.83840 AT (  241700.00,  4013900.00,    64.00,    64.00,    0.00)  GC  UCART1
          6TH HIGHEST VALUE IS       2.83145 AT (  241200.00,  4013400.00,    64.10,    64.10,    0.00)  GC  UCART1
          7TH HIGHEST VALUE IS       2.78859 AT (  241700.00,  4010400.00,    62.80,    62.80,    0.00)  GC  UCART1
          8TH HIGHEST VALUE IS       2.71467 AT (  241200.00,  4010400.00,    63.60,    63.60,    0.00)  GC  UCART1
          9TH HIGHEST VALUE IS       2.71220 AT (  241700.00,  4012400.00,    63.10,    63.10,    0.00)  GC  UCART1
```

```
        10TH HIGHEST VALUE IS       2.69958 AT (  241700.00,  4010900.00,    62.80,    62.80,    0.00)  GC  UCART1


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR

 *** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
 *** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                        PAGE  25
 *** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

                                                        *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                                            ** CONC OF DPM      IN MICROGRAMS/M**3                             **

                                                                     DATE                                                                     NETWORK
GROUP ID                                  AVERAGE CONC      (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      50.94106  ON 15021904: AT (  240700.00,  4009900.00,    64.00,    64.00,    0.00)  GC  UCART1


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR

 *** AERMOD - VERSION  18081 ***   *** H:\Work\REC 06 - RE Slate Solar\Analysis\AERMOD\RE Slate Solar\RE Sl ***        07/09/18
 *** AERMET - VERSION  15181 ***   ***                                                                      ***        14:43:39
                                                                                                                        PAGE  26
 *** MODELOPTs:    NonDFAULT  CONC  FLAT and  ELEV  RURAL

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            2 Warning Message(s)
 A Total of          401 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          198 Calm Hours Identified

 A Total of          203 Missing Hours Identified (  2.32 Percent)
```

```
   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
RE W213     182       RECART: ELEV Input Inconsistent With Option: Input Ignored       UCART1
ME W186     126       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used           0.50

   ************************************
   *** AERMOD Finishes Successfully ***
   ************************************
```

HARP2 - HRACalc (dated 17023) 7/9/2018 3:28:01 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
Pathway receptors loaded successfully
****
RISK SCENARIO SETTINGS

Receptor Type: Resident
Scenario: All
Calculation Method: Derived

****
EXPOSURE DURATION PARAMETERS FOR CANCER

Start Age: -0.25
Total Exposure Duration: 30

Exposure Duration Bin Distribution
3rd Trimester Bin: 0.25
0<2 Years Bin: 2
2<9 Years Bin: 0
2<16 Years Bin: 14
16<30 Years Bin: 14
16 to 70 Years Bin: 0

****
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments. The remaining pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: True
Dermal: True
Mother's milk: True
Water: False
Fish: False
Homegrown crops: False
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

****
INHALATION

Daily breathing rate: LongTerm24HR

Worker Adjustment Factors
Worker adjustment factors enabled: NO

Fraction at time at home
3rd Trimester to 16 years: OFF
16 years to 70 years: ON

****
SOIL & DERMAL PATHWAY SETTINGS

Deposition rate (m/s): 0.05
Soil mixing depth (m): 0.01
Dermal climate: Mixed

****
TIER 2 SETTINGS
Tier2 not used.

****

Calculating cancer risk
Cancer risk breakdown by pollutant and receptor saved to: H:\Work\REC 06 - RE Slate Solar\Analysis\HARP\RE SLATE SOLAR\hra\REC06_CancerRisk.csv
Cancer risk total by receptor saved to: H:\Work\REC 06 - RE Slate Solar\Analysis\HARP\RE SLATE SOLAR\hra\REC06_CancerRiskSumByRec.csv
Calculating chronic risk
Chronic risk breakdown by pollutant and receptor saved to: H:\Work\REC 06 - RE Slate Solar\Analysis\HARP\RE SLATE SOLAR\hra\REC06_NCChronicRisk.csv
Chronic risk total by receptor saved to: H:\Work\REC 06 - RE Slate Solar\Analysis\HARP\RE SLATE SOLAR\hra\REC06_NCChronicRiskSumByRec.csv
Calculating acute risk
Acute risk breakdown by pollutant and receptor saved to: H:\Work\REC 06 - RE Slate Solar\Analysis\HARP\RE SLATE SOLAR\hra\REC06_NCAcuteRisk.csv
Acute risk total by receptor saved to: H:\Work\REC 06 - RE Slate Solar\Analysis\HARP\RE SLATE SOLAR\hra\REC06_NCAcuteRiskSumByRec.csv
HRA ran successfully