APPENDIX D
AIR QUALITY EMISSION CALCULATIONS AND WIND ROSE DATA

This Appendix presents information that supports the air quality impact assessment presented in Section 5.6 (Air Quality) of the EIR, and is organized as follows:

- D.1 – Methodology for Construction and Operational Phase Emission Calculations
- D.2 – Construction Phase Emission Calculations for Pile Foundation Scenario
- D.3 – Construction Phase Emission Calculations for Concrete Ballast Foundation Scenario
- D.4 – Operational Phase Emission Calculations
- D.5 – Wind Data for Project Area
- D.6 – Indirect Emissions and Emissions Avoidance from Grid-supplied Power

Section D.1 presents the methodology used to perform the construction- and operational-phase emission calculations.

Section D.2 presents construction emission calculations for the proposed 8-10 megawatt (MW) per month of installed solar power generation capacity with pile foundation, while Section D.3 presents construction emission calculations for the concrete ballast foundation construction scenario. Total construction emissions would be greater for the pile foundation construction scenario.

Section D.4 presents operational phase emissions calculations for motor vehicles, emergency fire water pump testing, and maintenance vehicles.

Section D.5 presents wind data in tabular and graphical form for the Project region.

Once the proposed AV Solar Ranch One Project was operational and producing solar energy, the Project would significantly reduce greenhouse gas and criteria pollutant emissions relative to traditional fossil fuel generation at an equivalent electrical output. Section D.6 (Indirect and Avoided Emission Calculations) presents emissions and emission factors data for electrical-based emissions either consumed during construction and/or potentially displaced by the Project.

EIR Section 4.0 (Project Description) and Appendix H (Construction Equipment and Truck Delivery Details) provide supporting information for the air quality emission calculations for the Project.

D.1 METHODOLOGY FOR CONSTRUCTION AND OPERATIONAL PHASE EMISSION CALCULATIONS

Construction of the proposed AV Solar Ranch One Project (Project) would result in emissions similar to those associated with other large industrial construction projects. On-site emissions would arise primarily from heavy-duty off road vehicles and equipment. On-site fugitive dust emissions would also be generated during site preparation and construction. Off-site emissions would occur from construction worker vehicles and material delivery trucks. The construction-related emissions would be temporary and transient in nature.

The Project would include construction of internal access roads, an Operation and Maintenance building, the solar arrays, the on-site substation, drainage improvements, temporary assembly buildings, and on-site and off-site transmission lines. In addition, the construction phase potentially would include air emissions from a concrete batch operation. On-site and off-site emissions during each month of construction were calculated separately for the pile foundation and concrete ballast foundation scenarios.

Summary emissions tables are presented for total project emissions in Tables D.2-12 to D.2-13 (pile foundation) and D.3-13 to D.3-15 (concrete ballast foundation). Fugitive dust emissions are summarized in Tables D.2-11 and D.3-12 for the pile foundation and concrete ballast foundation scenarios, respectively.

D.1.1 Construction Equipment Exhaust Emissions

The combustion of fuel to provide power for the operation of various construction activities and equipment results in the generation of criteria pollutants (carbon monoxide [CO], volatile organic compounds [VOC], nitrogen oxides [NO_X], sulfur oxides [SO_X], respirable particulate matter [PM_{10}], and fine particulate matter [$PM_{2.5}$]) emissions. The following predictive emission equation was used to calculate exhaust emissions from each type of construction equipment:

$$\text{Exhaust (combustion) Emissions}_{i,j}\ (\text{Ib}) = EF_{C,i,j} \times T_{H,j}$$

Where: $EF_{C,i,j}$ = Emission factor for specific air contaminant i from construction equipment type j (lb/hr)

$T_{H,j}$ = Operating time for equipment of type j (hr)

The exhaust emission factors used for the calculations of CO, VOC, NO_X, SO_X, and PM_{10} are composite horsepower-based off-road emission factors for 2011 derived from the California Air Resources Board's (CARB) OFFROAD2007 Model (version 2.0.1.2, December 15, 2007) (CARB 2007a). The OFFROAD2007 Model calculates total daily emissions by equipment category (crane, dozer, grader, etc.) and type of fuel (diesel, gasoline, etc.) within

engine horsepower ranges in a geographic area, such as the Antelope Valley Air Quality Management District (AVAQMD) jurisdiction. The model also calculates total daily operating hours within the geographic area by equipment category, fuel, and horsepower range. The total daily emissions were divided by the total daily operating hours to calculate emission factors (in pounds per hour) by equipment category, fuel, and horsepower range.

The model can calculate the emissions and operating hours for equipment within individual model years or for equipment of all model years combined. The emission factors were calculated for all model years combined for all of the equipment that would be used to grade the substation/inverter/building pads and to perform drainage channel improvements and associated earthwork.

The diesel off-road equipment emission factors for all model years combined during 2011 are in Tables D.2-6 and D.3-6 in Sections D.2 and D.3, respectively.

$PM_{2.5}$ emission factors were calculated from PM_{10} emission factors using the following equation:

$$EF_{C,PM2.5,j}\ (lb/hr) = EF_{C,PM2.5,j} \times F_{PM2.5,j}$$

Where: $EF_{C,PM2.5,j}$ = $PM_{2.5}$ emission factor for construction equipment type j (Ib/hr)

$EF_{C,PM10,j}$ = PM_{10} emission factor for construction equipment type] (lb/hr)

$F_{PM2.5,j}$ = Mass fraction of $PM_{2.5}$ emissions in PM_{10} emissions from equipment of type j (unitless)

The mass fractions of $PM_{2.5}$ in PM_{10} emissions from construction equipment exhaust depend on the type of fuel (diesel or gasoline). AVAQMD requested $PM_{2.5}$ fractions in PM_{10} emissions be used. Based on research of applicable documents, URS used $PM_{2.5}$ mass fractions from PM profiles in the California Emission Inventory Development and Reporting System (CEIDARS) developed by CARB (SCAQMD 2006).

The resultant construction equipment emission factors (lb/hr) for the construction equipment to be used for construction of the proposed Project are listed in Tables D.2-9 and D.3-9 in Sections D.2 and D.3, respectively. The emission calculations cited in Tables D.2-9 and D.3-9 provide a load factor for each piece of equipment to determine daily emissions. The load factor includes consideration of engine horsepower utilization and the percentage of operation over an 8-hour day.

D.1.2 Motor Vehicle Exhaust; Brake Wear and Tire Wear Emissions (Construction and Operation)

The combustion of fuel in motor vehicle engines results in the generation of CO, VOC, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ emissions. Motor vehicle brake and tire wear results in the generation of PM_{10} and $PM_{2.5}$ emissions. The following predictive emission equation was used to calculate emissions from both on-site and off-site motor vehicles:

$$\text{Exhaust Emissions}_{i,j}\ (\text{lb}) = EF_{i,j} \times VMT_j$$

Where: $EF_{i,j}$ = Emission factor for specific air contaminant i from motor vehicle type j (lb/mi)

VMT_j = Distance traveled each day by motor vehicle of type j (mi)

CO, VOC, NO_X, SO_X, and PM_{10} emission factors were compiled by running CARB's EMFAC2007 (version 2.3) Burden Model (CARB 2007b) for the AVAQMD jurisdiction during calendar year 2011. Emission factors were based on the California fleet average for calendar year 2011 as predicted by the EMFAC2007 model. The model assumes a population distribution of older vehicles to arrive at an aggregate average per each vehicle class. The exception would be in the pile scenario where construction phase water trucks were assumed to be a newer on road fleet of model years ranging from 2006 to 2011. Emission factors were based on an assumed ambient air temperature of 70°F and relative humidity of 20%. Emission factors for on-road activities assumed a vehicle speed of 50 miles per hour (mph) while emission factors for off-road activities (onsite) assumed a vehicle speed of 10 mph. The emission factors account for the emissions from start, running and idling exhaust. In addition, the VOC emission factors take into account diurnal, hot soak, running and resting emissions, and the PM_{10} emission factors account for exhaust, brake wear, and tire wear emissions separately.

$PM_{2.5}$ emission factors were calculated by multiplying the PM_{10} emission factors by the mass fraction of $PM_{2.5}$ emissions in motor vehicle exhaust, brake wear and tire wear PM_{10} emissions. The $PM_{2.5}$ mass fractions in PM_{10} emissions from gasoline and diesel-fueled engine exhaust were from PM profiles in the California Emission Inventory Data and Reporting System (CEIDARS) developed by CARB.

The motor vehicle emission factors from the Burden Model and the calculated PM_{10} and $PM_{2.5}$ emission factors are listed in Appendix sections D.2 and D.3. The motor vehicle emission factors for the vehicles to be used for construction of the Project are listed in Tables D.2-7 and D.3-7.

D.1.3 Fugitive Dust (Construction)

Fugitive Dust during the construction phase was calculated based on estimated disturbed acreage and excavation volumes (cut/fill) per activity per month provided by the Project. The emissions factor used the Urban Emission Model (URBEMIS) 2007 (version 9.2.4) value of 0.11 tons/acre-month of disturbed area plus 0.059 ton/1,000 cubic yards of on-site cut/fill and 0.22 ton/1,000 cubic yards of off-site cut/fill. These values represent the average emission factors for fugitive dust. The volume of excavation material included detention basins, undergrounding of utilities, sitework grading, and transmission line piers/poles. The volumes are consistent with those delineated on the Grading and Drainage Plan presented as Figure 4.4-12 in DEIR Section 4.0 of the EIR

The emission calculations assigned an 84 percent control efficiency to disturbed area emissions for PM_{10} dust mitigation by use of water, soil palliatives, and operational controls. A 61 percent control efficiency was assigned to excavation emissions for PM_{10} dust mitigation by use of watering. This efficiency was based on URBEMIS 2007 (Jones & Stokes 2008). The disturbed acreage, excavation volumes, and resultant emissions (controlled and uncontrolled) are presented in Tables D.2-11 and D.3-11 for the pile foundation and the concrete ballast foundation construction scenarios, respectively. The URBEMIS fugitive dust emission factors source data are presented on Figures D.2-1 and D.3-1.

D.1.4 Concrete Batch Emissions (Construction)

PM_{10} and $PM_{2.5}$ emissions were based on the USEPA emission factors for concrete batching found in Section 11.12 of AP-42 (Compilation of Air Pollutant Emission Factors) (USEPA 2006). The emission factors for individual process steps of concrete batching were utilized. These include the following: aggregate transfer, sand transfer, unloading to silo, weigh hopper loading, and central mix loading.

The emission factors are based on cubic yards of concrete mixed. The estimate of total cubic yards of concrete required (150,000 cubic yards) was based on the number of tracking ballast foundations, drive motor foundations, control building foundations, and the electrical equipment (inverter, step up transformers, on-site substation). The rated capacity of the plant was assumed to be 100 cubic yards per hour. Daily maximum PM_{10} and $PM_{2.5}$ emissions were based on an 8-hour work day (800 cubic yards per day). However, for the purposes of this EIR, the average concrete production rate over 34 months was used to calculate the total project emissions. The $PM_{2.5}$ to PM_{10} ratio was estimated at 0.17 based on CARB data. Parameters and emissions are presented in Table D.3-12 for the ballast foundation construction scenario. Dust emissions generated from the vehicles near the concrete plant

driveways are assumed to be controlled to a minimum of 84 percent due to the availability of water and the batch plant being subject to AVAQMD permit to operate conditions.

D.1.5 Motor Vehicle Unpaved Road Dust Emissions (Operations)

Vehicle travel on unpaved roads generates fugitive PM_{10} and $PM_{2.5}$ emissions by entrainment of dust on the roads. The following predictive emission equation was used to calculate entrained paved road dust emissions:

Entrained Dust PM_{10} $Emissions_j$ (lb) = EF_j x VMT_j

Where: EF_j = Emission factor for entrained road dust PM_{10} from motor vehicle type j (lb/mi)

VMT_j = Distance traveled each day by motor vehicles of type j (mi)

The PM_{10} emission factor was calculated from the USEPA methodology for industrial unpaved roads, which is based on vehicle weight and silt loading (USEPA 2006). The silt loading was assumed from the South Coast Air Quality Management District CEQA handbook (SCAQMD 1993).

EFD (lb/mi) = $1.5 \times (SL)^{0.65} \times (W/3)^{1,5} \times (1\text{-}CE)$

Where: 1.5 = A constant for PM_{10} emissions (g/mi)

SL = Silt loading (g/m^2)

W = Average weight of vehicles on roads traveled by vehicles of type j (tons) (20 tons)

CE = Control efficiency

The control factor was assumed to be 68 percent based on the aforementioned SCAQMD handbook. This factor is conservative given the expected presence of vegetation on many of the internal solar array access roads and the planned use of dust palliatives/tackifiers on permanent (compacted soil)roads on the site. $PM_{2.5}/PM_{10}$ fractions of the fugitive dust were assumed at 15 percent. Dust from motor vehicles on unpaved roads during construction was not calculated because the aggregated fugitive dust emission factor for disturbed acreage (URBEMIS) is assumed to include all roads.

D.1.6 Emergency Diesel-fired Engine Emissions (Construction)

The assumptions made regarding emergency engine (backup fire water pump) operation that were used as the basis for emission calculations include:

- One 135-kW diesel-fired, 2009 model year Tier 3 engine (fire water pump).
- The calculations assume the use of ultra-low sulfur (15 ppm) diesel fuel.
- The diesel engine would be operated for one one-hour test per week, not to exceed 50 hours per year.
- Load during the periodic testing would be at 80 percent load.
- Emissions do not reflect emergency use.
- 100 percent of the PM_{10} emissions are $PM_{2.5}$.

The emergency diesel fire water pump engine would operate a maximum of 50 hours per year for testing and maintenance and would have an output of 135 kW. Emission factors, were obtained from a similar sized Cummins engine (Model CFP7E-F30) and would comply with EPA Tier 3 engine emission requirements. SO_X emissions were calculated using a fuel sulfur content of 15 ppmw. The emissions and calculation basis (emissions, fuel use, operating parameters) for the emergency fire water pump emissions are detailed in Table D.4-5.

Under the New Source Performance Standard (NSPS) Subpart IIII, the emission limit for NO_X is combined with non-methane hydrocarbons (NMHC). For these emission estimates, the NO_X fraction is assumed to be 95 percent of the combined emissions, and the balance NMHC (Moyer 2003). NMHC is assumed to be equivalent to VOC.

The calculation procedure for NO_X, CO, PM_{10}, and VOC are similar to one another; only the emission factors differ between the calculations. Sulfur dioxide emissions are based on mass balance.

Exhaust (combustion) $Emissions_{i,j}$ (Ib) = $EF_{C,i,j}$ x $T_{H,j}$ x LF x KW

Where: $EF_{C,i,j}$ = Emission factor for specific air contaminant i from construction equipment type j (g/kwh)

$T_{H,j}$ = Operating time for equipment of (hr/year)

LF = 0.8

KW = 135 KW

Exhaust (combustion) SO_2 Emissions = FR (gal/hr) x D (lb/gal) x $15/10^6$ x CF

Where: FR = Fuel Rate (9.3 gal/hr)

D = Density = 7.9 lb/gal (diesel)

CF = 2 = stoichiometry conversion factor from sulfur to sulfur dioxide mass

D.1.7 Operational Vehicle Exhaust Emissions

The facility would require periodic vehicle travel over the unpaved portions of the solar field to perform routine maintenance including panel washing, maintenance inspections and repairs of the solar panel network, and dust suppressant application. A brush clearing hogger tractor is also included for vegetation removal and cutting. Criteria pollutant emissions are expected from the combustion of fuels in the vehicles and fugitive PM_{10} emissions are expected from vehicle traffic in the solar fields.

Vehicle criteria pollutant emissions are calculated as the anticipated miles traveled multiplied by an emission factor. The emission factors, except fugitive emissions from entrained road dust, were compiled by running the CARB's EMFAC2007 (Version 2.3) Emission Factor Model and calculating daily emissions based on daily vehicle-miles traveled. All the emission factors account for the emissions from start, running and idling exhaust. Fugitive PM_{10} and $PM_{2.5}$ emission factors take into account tire and brake wear and entrained unpaved road dust. Onsite Vehicle emissions are shown in Table D.4-1 to D.4-2 for the operational phase. Offsite emissions for motor vehicle travelling to the project site are cited in Table D.4-3. Summaries of maximum daily and annual operations emissions are provided in Tables D.4-6 and D.4-7, respectively.

D.1.8 Greenhouse Gas Emissions (Construction and Operations)

Greenhouse gas (GHG) emissions were estimated based on predicted fuel use for the construction and operation mobile source equipment and the standard emission factors of CO_2 and other GHG gases (N_2O and CH_4). The calculations were conducted in accordance with the emission inventory principles of the General Reporting Protocol of the California Climate Action Registry (CCAR 2008). For operations, eGRID emission factors for the prediction of displaced California electrical generation GHG emissions were used with the predicted electrical production. These factors (mobile source and eGRID) are presented in Tables D.2-8 and D.3-8. The GHG emissions of mobile sources during operations were based on the same emission factors as those used in the construction phase for water trucks and pickup trucks.

For the construction phase, electrical power will be consumed for water pumping and the operation of the concrete batch plant (ballast foundation only). These indirect emissions would be generated from power produced feeding the electrical grid. These construction indirect emissions are presented in Table D.6-1. The avoided emissions criteria and GHG emissions from operations of the Project were based on eGRID and factors from California Energy Commission. The emissions are based on the rated project annual output (628,000

MWh/yr) and 5 percent losses due to transmission. These emissions are presented in Table D.6-2.

GHG emissions from potential leakage of sulfur hexafluoride (SF_6) gas associated switchgear breakers, transformers, and capacitors are identified in Table D.4-6. A leakage rate of 1 percent per year was assumed.

D.1.9 Listing of Tables

There are 14 construction emissions tables and calculation sheets for the pile foundation scenario The listing of the applicable tables for this scenario is in Table D.1-1. There are 15 tables and calculation sheets for the ballast foundation scenario. These tables are delineated by name and the number of pages in Table D.1-2. The operational phase emissions tables are listed in Table D.1-3. Indirect emissions of GHG from construction and potentially avoided GHG emissions tables are listed D.1-5.

D.1.10 References

California Air Resources Board (CARB). 2007a. California Air Resources Board Offroad 2007 model version 2.0.1.2. http://www.arb.ca.gov/mse:/offroad/offroad.htm.

2007b. EMFAC 2007 version 2.3 – Calculating Emission Inventories for Vehicles in California. http://www.arb.ca.gov/mse:/onroad/latest_version.htm.

California Climate Action Registry (CCAR). 2008. General Reporting Protocol, Version 3.0. April.

Jones and Stokes Associates. 2008. URBEMIS 2007 for Windows Version 9.2 (with Users Manual documentation) March 8, 2008. http://www.urbemis.com/software/ urbemis2007v9_4.html.

Moyer, Carl. 2003. The Carl Moyer Memorial Air Quality Standards Attainment Program Guidelines, California Environmental Protection Agency, Air Resources Board, Chapter 3. September.

South Coast Air Quality Management District (SCAQMD). 2006. Final Methodology to Calculate PM2.5 and PM2.5 Significance Thresholds, Appendix A – Updated CEIDARS Table with PM2.5 Fractions. October. http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html.

South Coast Air Quality Management District (SCAQMD). 1993. CEQA Air Quality Handbook, Table A9-9-F-1.

U.S. Environmental Protection Agency (EPA). 2006. Compilation of Air Pollutant Emission Factors (AP-42) 5th Edition, Section 11.12, Concrete Batching.

2006. Compilation of Air Pollutant Emission Factors (AP-42) 5th Edition, Section 13.2.2. November.

TABLE D.1-1
LISTING OF APPENDIX D.2 TABLES
PILE FOUNDATION CONSTRUCTION SCENARIO EMISSIONS

Number	Title	No. of Pages
D.2-1	Monthly Construction Personnel Projection (Pile)	3
D.2-2	Equipment Mobilization by Activity (Pile)	4
D.2-3	Monthly Construction Equipment Projection (Pile)	2
D.2-4	Truck Trips (Pile)	1
D.2-5	Off-site Vehicles Distance Travelled (Pile)	1
D.2-6	Offroad 2007 Emission Factors (Pile)	4
D.2-7	EMFAC Emission Factors (Pile)	5
D.2-8	Greenhouse Gas Emission Factors (Pile)	4
D.2-9	Daily On-site Combustion Emissions by Month (Pile)	18
D.2-10	Daily Off-site Emissions by Month (Pile)	23
D.2-11	Disturbed Acreage, Excavation Volumes, and Fugitive Dust Emissions by Month (Pile)	4
D.2-12	Summary of All Sources Daily Emissions by Month (Total) (Pile)	2
D.2-13	Summary of All Sources and Threshold Emissions (Total) (Pile)	1
D.2-14	Summary of GHG Emissions (Total) (Pile)	2

TABLE D.1-2
LISTING OF APPENDIX D.3 TABLES
CONCRETE BALLAST FOUNDATION CONSTRUCTION SCENARIO EMISSIONS

Number	Title	No. of Pages
D.3-1	Monthly Construction Personnel Projection (Ballast)	3
D.3-2	Equipment Mobilization by Activity (Ballast)	5
D.3-3	Monthly Construction Equipment Projection (Ballast)	2
D.3-4	Truck Trips (Ballast)	1
D.3-5	Off-site Vehicles Distance Travelled (Ballast)	1
D.3-6	Offroad 2007 Emission Factors (Ballast)	4
D.3-7	EMFAC Emission Factors (Ballast)	5
D.3-8	Greenhouse Gas Emission Factors (Ballast)	4
D.3-9	Daily On-site Combustion Emissions by Month (Ballast)	23
D.3-10	Daily Off-site Emissions by Month (Ballast)	23
D.3-11	Disturbed Acreage, Excavation Volumes, and Fugitive Dust Emissions by Month (Ballast)	4
D.3-12	Batch Plant (Ballast)	1
D.3-13	Summary of All Sources Daily Emissions by Month (Total) (Ballast)	3
D.3-14	Summary of All Sources and Threshold Emissions (Total) (Ballast	1
D.3-15	Summary of GHG Emissions (Total) (Ballast)	2

TABLE D.1-3
LISTING OF APPENDIX D.4 TABLES
FOR OPERATIONAL SCENARIO EMISSIONS

Number	Title	No. of Pages
D.4-1	Daily Operational Emissions without Washing	1
D.4-2	Daily Operational Emissions with Washing	1
D.4-3	Daily Off-site Combustion Emissions	1
D.4-4	Annual Off-site Emissions	1
D.4-5	Emergency Firewater Pump Emissions	1
D.4-6	Estimated Potential GHG Emissions from SF6 Leakage from Circuit Breakers and other Transmissions Systems	1
D.4-7	Estimated Daily Maximum Operational Emissions of Criteria Pollutants	1
D.4-8	Estimated Maximum Annual Operational Emissions of Criteria Pollutants and Greenhouse Gases (Tons/Year)	1

TABLE D.1-4
LISTING OF APPENDIX D.6 TABLES
FOR DISPLACED GHG AND CRITERIA EMISSIONS

Number	Title	No. of Pages
D.6-1	Indirect Emissions from Grid-supplied Power During Construction	1
D.6-2	Indirect Emissions Avoided from Displacement of Grid-supplied Power	1

D.2 CONSTRUCTION PHASE EMISSION CALCULATIONS FOR PILE FOUNDATION SCENARIO

D.2.1 Summary

This section presents the following tables and figures:

- Table D.2-1 Monthly Construction Personnel Projection (Pile)
- Table D.2-2 Equipment Mobilization by Activity (Pile)
- Table D.2-3 Monthly Construction Equipment Projection (Pile)
- Table D.2-4 Truck Trips (Pile)
- Table D.2-5 Off-site Vehicles Distance Travelled (Pile)
- Table D.2-6 Offroad 2007 Emission Factors (Pile)
- Table D.2-7 EMFAC Emission Factors (Pile)
- Table D.2-8 Greenhouse Gas Emission Factors (Pile)
- Table D.2-9 Daily On-site Combustion Emissions by Month (Pile)
- Table D.2-10 Daily Off-site Emissions by Month (Pile)
- Table D.2-11 Disturbed Acreage, Excavation Volumes and Fugitive Dust Emissions by Month (Pile)
- Table D.2-12 Summary of All Sources Daily Emissions by Month (Total) (Pile)
- Table D.2-13 Summary of All Sources and Threshold Emissions (Total) (Pile)
- Table D.2-14 Summary of GHG Emissions (Total) (Pile)
- Figure D.2-1 Input from URBEMIS 2007 Documenting Fugitive Dust Estimation Approach

D.2.2 Key Assumptions

The key assumptions used for the quantification of construction emissions for the pile foundation scenario are listed below.

D.2.2.1 General Assumptions

Construction activities are assumed to take place:

- 8 hours per day, 21.65 days per month, 12 months per year, for 38 months.

- Worst-case daily emissions are based on monthly equipment mobilizations provided by Applicant.
- Use 84 percent control for PM_{10} dust from disturbed area by use of water, soil palliatives, and operational controls. Use 61 percent control for PM_{10} dust from excavation (cut and fill) by use of watering.
- One commuter per car for all craft and supervisor personnel.
- Diesel-fueled equipment used for all on-site and off-site delivery trucks.
- Load Factor includes consideration of engine horsepower utilization and fraction of 8-hour day used.
- Use of OFFROAD 2007 and EMFAC 2007 fleet makeup and emission factors for offroad and onroad engines emission quantification.

D.2.2.2 Specific Assumptions for Equipment

- EMFAC 2007 Model using Calendar Year (CY) 2011 fleet average for all deliveries and on-site equipment with on-road engines.
- Use of 15T Mobile Hydraulic Cranes in Drainage "A" Sheet Pile and Solar Fields 1 to 6 Installations.
- Use of model year 2006 through 2011 water trucks with on-road engines.
- Use 155-HP Crawler Trencher and 250-HP Truck Tractor in offroad equipment.
- OFFROAD 2007 using CY 2011 fleet average for calculation of ROG, $S0_2$, and CO for on-site offroad engines.
- Demolition of 10,000 square feet of residential structures and sheds to occur in Month 1 of construction.
- Electrical power from local grid used for groundwater pumping and temporary fabrication/assembly building operations during construction.

TABLE D.2-1
MONTHLY CONSTRUCTION PERSONNEL PROJECTION
(PILE)

Construction Equipment Description	Hrs/Month	Construction Trade and Field Non-Labor Resources per Month																																								Total Man Months	Total Man-hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
230 kV Transmission Line																																											
Journeyman Lineman	165							4	4	4	4																															16	2,640
Apprentice Lineman	165							5	5	5	5																															20	3,300
Groundman/Helper	165							2	2	2	2																															8	1,320
Operating Engineers	165							7	7	7	7																															28	4,620
Cement Masons	165							3	3	3	3																															12	1,980
Area Craft Labor (Man-Months)		0	0	0	0	0	0	21	21	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		84	13,860
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	3,465	3,465	3,465	3,465	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Field Non-Manual	165							1.5	1.5	1.5	1.5																															6	990
Area Manpower (Man-Months)		0	0	0	0	0	0	23	23	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		90	
Area Manpower (Man-Hours)		0	0	0	0	0	0	3,713	3,713	3,713	3,713	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			14,850
High Voltage Substation																																											
Cement Masons	165					6	6																																			12	1,980
Iron Workers/Sheetmetal	165				6	6	6	6																																		24	3,960
Welders	165				4	4	4	4	2	2	2	2	2	2																												28	4,620
Laborers	165				2	2	2	2	2	2	2	2	2	2																												20	3,300
Electricians	165								4	4	4	4	4	4																												24	3,960
Technicians	165									4	4	4	4	4																												20	3,300
Operating Engineers	165				1	1	1	1	1	1	1	1	1	1																												10	1,650
Area Craft Labor (Man-Months)		0	0	0	13	19	19	13	9	13	13	13	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		138	22,770
Area Craft Labor (Man-Hours)		0	0	0	2,145	3,135	3,135	2,145	1,485	2,145	2,145	2,145	2,145	2,145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Field Non-Manual	165				2	2	2	2	2	2	1.5	1.5	1.5	1.5																												18	2,970
Area Manpower (Man-Months)		0	0	0	15	21	21	15	11	15	15	15	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		156	
Area Manpower (Man-Hours)		0	0	0	2,475	3,465	3,465	2,475	1,815	2,475	2,393	2,393	2,393	2,393	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			25,740
Medium Voltage Substation/Infrastructure																																											
Carpenters	165					2	4																																			6	990
Cement Masons	165				2	2	12	2	2	2	2	2	2	2																												30	4,950
Electricians	165					4	4	4	4	4	8	14	14	14																												70	11,550
Iron Workers/Sheetmetal	165						4	4	4																																	12	1,980
Laborers	165				5	5	6	3	3	3	3	3	3	3																												37	6,105
Operating Engineers	165				7	7	3	3	3	3	3	3	3	3																												38	6,270
Teamsters	165				2	2	2	2	2	2	2	2	2	2																												20	3,300
Technicians	165				2	2	2	2	2	2	2	2	2	2																												20	3,300
Area Craft Labor (Man-Months)		0	0	0	18	24	37	20	20	16	20	26	26	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		233	38,445
Area Craft Labor (Man-Hours)		0	0	0	2,970	3,960	6,105	3,300	3,300	2,640	3,300	4,290	4,290	4,290	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Field Non-Manual	165				5	6	7	8	8	8	8	8	8	8	8	8	8																									98	16,170
Area Manpower (Man-Months)		0	0	0	23	30	44	28	28	24	28	34	34	34	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		331	
Area Manpower (Man-Hours)		0	0	0	3,795	4,950	7,260	4,620	4,620	3,960	4,620	5,610	5,610	5,610	1,320	1,320	1,320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			54,615
Operations and Maintenance Facility																																											
Carpenters	165				10																																					10	1,650
Cement Masons	165				10	10																																				20	3,300
Electricians	165			4	4	4	4	4	4	4																																28	4,620
Iron Workers/Sheetmetal	165					10	10	10																																		30	4,950
Laborers	165				4	4	4	4	4																																	20	3,300
Miscellaneous Crews	165					20	20	20	20	20																																100	16,500
Operating Engineers	165	8	8	2	2	2	2	2	2	2																																30	4,950
Painters	165						2	2	2	2																																8	1,320
Pipefitters/Plumbers	165				2	2	2	2	2	2																																12	1,980
Teamsters	165		10	10	10	10	10	10	10	10																																80	13,200
Technicians	165						4	4	4	4																																16	2,640
Area Craft Labor (Man-Months)		8	18	16	42	62	58	58	48	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		354	58,410
Area Craft Labor (Man-Hours)		1,320	2,970	2,640	6,930	10,230	9,570	9,570	7,920	7,260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Field Non-Manual	165		6	6	6	6	6	6	6	6	6																															54	8,910
Area Manpower (Man-Months)		8	24	22	48	68	64	64	54	50	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		408	
Area Manpower (Man-Hours)		1,320	3,960	3,630	7,920	11,220	10,560	10,560	8,910	8,250	990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			67,320

TABLE D.2-1
MONTHLY CONSTRUCTION PERSONNEL PROJECTION
(PILE)

Construction Equipment Description	Hrs/Month	Construction Trade and Field Non-Labor Resources per Month																																								Total Man Months	Total Man-hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Drainage "A" Sheet Pile Installation																																											
Laborers	165		10	10	10	10																																			40	6,600
Operating Engineers	165		7	7	7	7																																			28	4,620
Teamsters	165																																								0	0
Area Craft Labor (Man-Months)		0	17	17	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	11,220
Area Craft Labor (Man-Hours)		0	2,805	2,805	2,805	2,805	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165		1	1	1	1																																			4	660
Area Manpower (Man-Months)		0	18	18	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	
Area Manpower (Man-Hours)		0	2,970	2,970	2,970	2,970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		11,880
Raw Water Supply Pipelin																																											
Laborers	165		13	8	4																																				25	4,125
Operating Engineers	165		4	3	1																																				8	1,320
Teamsters	165		2	2	1																																				5	825
Area Craft Labor (Man-Months)		0	19	13	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	6,270
Area Craft Labor (Man-Hours)		0	3,135	2,145	990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165		1	1	1																																				3	495
Area Manpower (Man-Months)		0	20	14	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	
Area Manpower (Man-Hours)		0	3,300	2,310	1,155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6,765
Solar Field Area One																																											
Carpenters	165								2	2	2	2	2	2	2	2	2	2	2																							22	3,630
Foundationman	165								6	6	6	6	6	6	6	6	6	6	6																							66	10,890
Electricians	165								50	50	50	50	50	50	50	50	50	50	50																							550	90,750
Trackerman	165								20	20	20	20	20	20	20	20	20	20	20																							220	36,300
Laborers	165								46	46	46	46	46	46	46	46	6	6	6																							386	63,690
Miscellaneous Crews	165								10	10	10	10	10	10	10	10	10	10	10																							110	18,150
Operating Engineers	165								21	21	21	21	21	21	21	21	5	5	5																							183	30,195
Technicians	165								4	4	4	4	4	4	4	4	4	4	4																							44	7,260
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	159	159	159	159	159	159	159	159	103	103	103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1581	260,865
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	16,995	16,995	16,995	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165								16	16	16	16	16	16	16	16	8	8	8																							152	25,080
Area Manpower (Man-Months)		0	0	0	0	0	0	0	175	175	175	175	175	175	175	175	111	111	111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,733	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	28,875	28,875	28,875	28,875	28,875	28,875	28,875	28,875	18,315	18,315	18,315	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		285,945
Solar Field Area Two																																											
Carpenters	165												2	2	2	2	2	2	2	2	2																					20	3,300
Foundationman	165												6	6	6	6	6	6	6	6	6																					60	9,900
Electricians	165												50	50	50	50	50	50	50	50	50																					500	82,500
Trackerman	165												20	20	20	20	20	20	20	20	20																					200	33,000
Laborers	165												36	36	36	36	36	36	36	36	36																					360	59,400
Miscellaneous Crews	165												10	10	10	10	10	10	10	10	10																					100	16,500
Operating Engineers	165												17	17	17	17	17	17	17	17	17																					170	28,050
Technicians	165												4	4	4	4	4	4	4	4	4																					40	6,600
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	145	145	145	145	145	145	145	145	145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1450	239,250
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165												14	14	14	14	14	14	14	14	14																					140	23,100
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	159	159	159	159	159	159	159	159	159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,590	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		262,350
Solar Field Area Three																																											
Carpenters	165															2	2	2	2	2	2	2	2	2	2	2	2	2	2													28	4,620
Foundationman	165															6	6	6	6	6	6	6	6	6	6	6	6	6	6													84	13,860
Electricians	165															50	50	50	50	50	50	50	50	50	50	50	50	50	50													700	115,500
Trackerman	165															20	20	20	20	20	20	20	20	20	20	20	20	20	20													280	46,200
Laborers	165															6	6	46	46	46	46	46	46	46	46	46	6	6	6													444	73,260
Miscellaneous Crews	165															10	10	10	10	10	10	10	10	10	10	10	10	10	10													140	23,100
Operating Engineers	165															5	5	21	21	21	21	21	21	21	21	21	5	5	5													214	35,310
Technicians	165															4	4	4	4	4	4	4	4	4	4	4	4	4	4													56	9,240
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	103	103	159	159	159	159	159	159	159	159	159	103	103	103	0	0	0	0	0	0	0	0	0	0	0	1946	321,090
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,995	16,995	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	16,995	16,995	16,995	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165															8	8	16	16	16	16	16	16	16	16	16	8	8	8													184	30,360
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	111	175	175	175	175	175	175	175	175	175	111	111	111	0	0	0	0	0	0	0	0	0	0	0	2,130	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,315	18,315	28,875	28,875	28,875	28,875	28,875	28,875	28,875	28,875	28,875	18,315	18,315	18,315	0	0	0	0	0	0	0	0	0	0	0		351,450

TABLE D.2-1
MONTHLY CONSTRUCTION PERSONNEL PROJECTION
(PILE)

Construction Equipment Description	Hrs/Month	Construction Trade and Field Non-Labor Resources per Month																																								Total Man Months	Total Man-hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Solar Field Area Four																																											
Carpenters	165																						2	2	2	2	2	2	2	2	2	2										20	3,300
Foundationman	165																						6	6	6	6	6	6	6	6	6	6										60	9,900
Electricians	165																						50	50	50	50	50	50	50	50	50	50										500	82,500
Trackerman	165																						20	20	20	20	20	20	20	20	20	20										200	33,000
Laborers	165																						46	46	46	46	46	46	46	6	6	6										340	56,100
Miscellaneous Crews	165																						10	10	10	10	10	10	10	10	10	10										100	16,500
Operating Engineers	165																						21	21	21	21	21	21	21	5	5	5										162	26,730
Technicians	165																						4	4	4	4	4	4	4	4	4	4										40	6,600
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159	159	159	159	159	159	159	103	103	103	0	0	0	0	0	0	0	0		1422	234,630
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26,235	26,235	26,235	26,235	26,235	26,235	26,235	16,995	16,995	16,995	0	0	0	0	0	0	0	0			
Field Non-Manual	165																						16	16	16	16	16	16	16	8	8	8										136	22,440
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	175	175	175	175	175	175	175	111	111	111	0	0	0	0	0	0	0	0		1,558	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28,875	28,875	28,875	28,875	28,875	28,875	28,875	18,315	18,315	18,315	0	0	0	0	0	0	0	0			257,070
Solar Field Area Five																																											
Carpenters	165																										2	2	2	2	2	2	2	2	2	2						20	3,300
Foundationman	165																										6	6	6	6	6	6	6	6	6	6						60	9,900
Electricians	165																										50	50	50	50	50	50	50	50	50	50						500	82,500
Trackerman	165																										20	20	20	20	20	20	20	20	20	20						200	33,000
Laborers	165																										36	36	36	36	36	36	36	36	36	36						360	59,400
Miscellaneous Crews	165																										10	10	10	10	10	10	10	10	10	10						100	16,500
Operating Engineers	165																										17	17	17	17	17	17	17	17	17	5						158	26,070
Technicians	165																										4	4	4	4	4	4	4	4	4	4						40	6,600
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	145	145	145	145	145	145	145	145	133	0	0	0	0		1438	237,270
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	21,945	0	0	0	0			
Field Non-Manual	165																										14	14	14	14	14	14	14	14	14	14						140	23,100
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159	159	159	159	159	159	159	159	159	147	0	0	0	0		1,578	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	24,255	0	0	0	0			260,370
Solar Field Area Six																																											
Carpenters	165																													2	2	2	2	2	2	2	2	2	2			20	3,300
Foundationman	165																													6	6	6	6	6	6	6	6	6	6			60	9,900
Electricians	165																													50	50	50	50	50	50	50	50	50	50			500	82,500
Trackerman	165																													20	20	20	20	20	20	20	20	20	20			200	33,000
Laborers	165																													36	36	36	36	36	36	36	36	36	36			360	59,400
Miscellaneous Crews	165																													10	10	10	10	10	10	10	10	10	10			100	16,500
Operating Engineers	165																													17	17	17	17	17	17	17	17	17	17			170	28,050
Technicians	165																													4	4	4	4	4	4	4	4	4	4			40	6,600
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	145	145	145	145	145	145	145	145	145	0		1450	239,250
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	0			
Field Non-Manual	165																													14	14	14	14	14	14	14	14	14	14			140	23,100
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159	159	159	159	159	159	159	159	159	159	0		1,590	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	26,235	0			262,350
Project Totals																																											
Journeyman Lineman	165	0	0	0	0	0	0	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		16	2,640
Apprentice Lineman	165	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		20	3,300
Groundman/Helper	165	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		8	1,320
Operating Engineers	165	8	19	12	18	17	6	13	34	34	32	25	42	42	38	43	27	43	43	38	38	38	42	42	42	42	43	43	43	39	39	39	34	34	34	22	17	17	17	0		1199	197,835
Carpenters	165	0	0	0	10	2	4	0	2	2	2	2	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0		146	24,090
Cement Masons	165	0	0	0	12	18	18	5	5	5	5	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		74	12,210
Foundationman	165	0	0	0	0	0	0	0	6	6	6	6	12	12	12	18	18	18	18	12	12	12	12	12	12	12	18	18	18	18	18	18	12	12	12	12	6	6	6	0		390	64,350
Electricians	165	0	0	4	4	8	8	8	62	62	62	68	118	118	100	150	150	150	150	100	100	100	100	100	100	100	150	150	150	150	150	150	100	100	100	100	50	50	50	0		3372	556,380
Trackerman	165	0	0	0	0	0	0	0	20	20	20	20	40	40	40	60	60	60	60	40	40	40	40	40	40	40	60	60	60	60	60	60	40	40	40	40	20	20	20	0		1300	214,500
Iron Workers/Sheetmetal	165	0	0	0	6	16	20	20	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		66	10,890
Welders	165	0	0	0	4	4	4	4	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		28	4,620
Laborers	165	0	23	18	25	21	12	9	55	51	51	51	87	87	82	88	48	88	88	82	82	82	92	92	92	92	88	88	88	78	78	78	72	72	72	72	36	36	36	0		2392	394,680
Miscellaneous Crews	165	0	0	0	0	20	20	20	30	30	10	10	20	20	20	30	30	30	30	20	20	20	20	20	20	20	30	30	30	30	30	30	20	20	20	20	10	10	10	0		750	123,750
Painters	165	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		8	1,320
Pipefitters/Plumbers	165	0	0	0	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		12	1,980
Teamsters	165	0	12	12	13	12	12	12	12	12	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		105	17,325
Technicians	165	0	0	0	2	2	6	6	10	14	10	10	14	14	8	12	12	12	12	8	8	8	8	8	8	8	12	12	12	12	12	12	8	8	8	8	4	4	4	0		316	52,140
Area Craft Labor (Man-Months)		8	54	46	96	122	114	112	257	253	213	198	343	343	304	407	351	407	407	304	304	304	318	318	318	318	407	407	407	393	393	393	290	290	290	278	145	145	145	0		10202	1,683,330
Area Craft Labor (Man-Hours)		1,320	8,910	7,590	15,840	20,130	18,810	18,480	42,405	41,745	35,145	32,670	56,595	56,595	50,160	67,155	57,915	67,155	67,155	50,160	50,160	50,160	52,470	52,470	52,470	52,470	67,155	67,155	67,155	64,845	64,845	64,845	47,850	47,850	47,850	45,870	23,925	23,925	23,925	0			
Field Non-Manual	165	0	8	8	15	15	15	18	34	34	33	26	40	40	38	46	38	38	38	30	30	30	32	32	32	32	38	38	38	36	36	36	28	28	28	28	14	14	14	0		1075	177,375
Area Manpower (Man-Months)		8	62	54	111	137	129	130	291	287	246	224	383	383	342	453	389	445	445	334	334	334	350	350	350	350	445	445	445	429	429	429	318	318	318	306	159	159	159	0		11,277	
Area Manpower (Man-Hours)		1,320	10,230	8,910	18,315	22,605	21,285	21,368	47,933	47,273	40,590	36,878	63,113	63,113	56,430	74,745	64,185	73,425	73,425	55,110	55,110	55,110	57,750	57,750	57,750	57,750	73,425	73,425	73,425	70,785	70,785	70,785	52,470	52,470	52,470	50,490	26,235	26,235	26,235	0			1,860,705

NOTE:
Unless noted, construction manhours are based on 165 hours per month
Man-Months are equivalent to workforce for any given month

TABLE D.2-2
EQUIPMENT MOBILIZATION BY ACTIVITY
(PILE)

Construction Equipment Description	Util	HP	Construction Duration in Months/Equipment Pieces per Month																																									Total Pieces per Month	Total Hrs With Util
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
230 kV Transmission Line																																													
Truck Tractor	0.50	250							1	1	1	1																														4	330
Pick Up Truck	0.50	150							3	3	3	3																														12	990
Flatbed – Stake Body Truck	0.50	220							3	3	3	3																														12	990
Line Truck	0.50	220							3	3	2	2																														10	825
Pressure Digger (Truck Mounted)	0.50	220							1	1	1																															3	248
Truck (1 ton) Conductor Reel Trailer	0.50	220									1	1																														2	165
Truck (1 ton) Wire Puller/Tensioner	0.50	220									1	1																														2	165
Truck (1 ton) Trailer	0.50	220							1	1																																2	165
Crane (100T)[1]	0.25	290							2	2	2	2																														8	330
High Reach Bucket Truck (1 ton)	0.50	220							1	1	2	2																														6	495
Backhoe (CAT-225)	0.50	135							1	1	1	1																														4	330
Forklift (10T)[3]	0.10	100							1	1	1																															3	50
Concrete Truck	0.50	250							4	4																																8	660
Dump Truck (15cy)[3]	0.10	275								1	1																															2	33
Sub-totals			0	0	0	0	0	0	21	22	19	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78	5,775
High Voltage Substation																																													
Truck Tractor[1]	0.25	250						1	1	1	1	1	1	1																												7	289
Pick Up Truck	0.50	150				2	2	2	2	2	2	2	2	2	2																											20	1,650
Flatbed – Stake Body Truck	0.50	220				2	2	2	2	2	2	2	2	2	2																											20	1,650
Truck (1 ton) Trailer[2]	0.05	220				1	1	1	1	1	1	1	1	1	1																											10	83
Crane (100T)[1]	0.25	290								1	1	1	1	1																												5	206
High Reach Bucket Truck (1 ton)[3]	0.10	220										1	1	1																												3	50
Backhoe (CAT-225)	0.50	135				1	1	1																																		3	248
Forklift (10T)[3]	0.10	100				1	1	1	1	1	1	1	1	1	1																											10	165
Concrete Truck	0.50	250					1	1																																		2	165
Dump Truck (15cy)[3]	0.10	275					1	1	1					3	3																											9	149
Crawler Trencher[3]	0.10	155							1	1	1																															3	50
Portable Welding Machine	0.50	50					2	2	2	2	2	2	2	2	2																											18	1,485
Compactor (Bomag BW211)[3]	0.10	130				1	1	1																																		3	50
Plate Compactor[2]	0.05	5							1	1	1																															3	25
Sub-totals			0	0	0	8	12	13	12	12	12	11	11	14	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	116	6,262
Medium Voltage Substation/Infrastructure																																													
Wheel Loader (CAT 950)	0.50	130				1	1																																			2	165
Grader (CAT-12)	0.50	135				1	1																																			2	165
Excavator, Cat 235	0.50	195				1	1																																			2	165
Dump Truck (15cy)	0.50	275				1	1																																			2	165
Concrete Truck	0.50	250						1																																		1	83
Compactor (Bomag BW211)	0.50	130				1	1																																			2	165
Conveyor Truck for Rock/Sand	0.50	250						1																																		1	83
Concrete Pump Truck	0.50	250						1																																		1	83
Hydraulic Mobile Crane (15T)	0.50	130						1	1	1	1	1	1																													6	495
Manlift (Scissors)	0.50	30						1	1	1	1	1	1																													6	495
Sub-totals			0	0	0	5	5	5	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	2,063
Operations and Maintenance Facility																																													
Wheel Loader (CAT 950)	0.50	130	1	1																																						2	165
Grader (CAT-12)	0.50	135	1	1																																						2	165
Excavator, Cat 235	0.50	195	1	1																																						2	165
Dozer (D-8)	0.50	300	1	1																																						2	165
Dump Truck (15cy)	0.50	275	3	3	3																																					9	743
AC Paver	0.50	200							1																																	1	83
Concrete Truck	0.50	250			3																																					3	248
Compactor (Bomag BW211)	0.50	130		1																																						1	83
Carry Lift, Pettibone	0.50	100				1	1	1	1																																	4	330
Conveyor Truck for Rock/Sand	0.50	250			1																																					1	83
Concrete Pump Truck	0.50	250			1																																					1	83
Hydraulic Mobile Crane (35T)	0.50	175			1	1	1	1	1																																	5	413
Grade All	0.50	100				2	2	2	2																																	8	660
Manlift (Scissors)	0.50	30				5	5	5	5																																	20	1,650
Sub-totals			7	8	9	9	9	9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	5,033
Drainage "A" Sheet Pile Installation																																													
Hydraulic Mobile Crane (15T)	0.50	175		2	2	2	2																																			8	660
Vibrator Hammer & Generator	0.50	51		2	2	2	2																																			8	660
Truck (1 ton), Maintenance	0.50	220		1	1	1	1																																			4	330
Fuel Truck	0.50	220		1	1	1	1																																			4	330
Water Truck, 4000 gal	0.50	220		2	1	1	1																																			5	413
Sub-totals			0	8	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	2,393

TABLE D.2-2
EQUIPMENT MOBILIZATION BY ACTIVITY
(PILE)

Construction Equipment Description	Util	HP	Construction Duration in Months/Equipment Pieces per Month																																									Total Pieces per Month	Total Hrs With Util
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Raw Water Supply Pipeline																																													
Hydraulic Auger Drill	0.50	200		1																																						1	83
Hydraulic Mobile Crane (35T)	0.50	175		1	1	1																																				3	248
Grade All	0.50	100		1	2																																					3	248
Butt Fusion Machine & Generator	0.50	51		1	1	1																																				3	248
Plate Compactor[2)]	0.50	5		1	1	1																																				3	248
Wheel Loader (CAT 950)	0.50	130		1	1	1																																				3	248
Pick Up Truck	0.50	150		1	1	1																																				3	248
Truck (1 ton), Maintenance	0.50	220		1	1	1																																				3	248
Sub-totals			0	8	8	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	1,815
Solar Field Area One																																													
Grader (CAT-12)	0.50	135								1	1	1																														3	248
Excavator, Cat 235	0.50	195								1	1	1																														3	248
Dozer (D-8)	0.50	300								1	1	1																														3	248
Dump Truck (15cy)	0.50	275								1	1	1																														3	248
Compactor (Bomag BW211)	0.50	130								1	1	1																														3	248
Water Truck, 4000 gal	0.50	220							1	2	1	1	1	1	1	1	1	1	1	1																						13	1,073
Concrete Truck	0.50	250																																								0	0
Case Backhoe/Front End Loader (580)	0.50	90								2	2	2	2	2	2	2	2	2	2	2																						22	1,815
Hydraulic Mobile Crane (15T)	0.50	130								10	10	10	10	10	10	10	10	2	2	2																						86	7,095
Grade All	0.50	100								1	1	1	1	1	1	1	1	1	1	1																						11	908
Flatbed – Stake Body Truck	0.50	220								5	5	5	5	5	5	5	5	5	5	5																						55	4,538
Crawler Trencher	0.50	155								1	1	1	1	1	1	1	1	1	1	1																						11	908
Pick Up Truck	0.50	150											24	24	24	24	24	24	24	24																						192	15,840
Hydraulic Mobile Crane (35T)	0.50	175																																								0	0
Vibrator Hammer & Generator	0.50	51								8	8	8	8	8	8	8	8																									64	5,280
Fuel Truck	0.50	220								1	1	1	1	1	1	1	1	1	1	1																						11	908
Hogger[1)]	0.25	175								1																																1	41
Sub-totals			0	0	0	0	0	0	1	36	34	34	53	53	53	53	53	37	37	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	481	39,641
Solar Field Area Two																																													
Grader (CAT-12)	0.50	135												1	1	1																										3	248
Excavator, Cat 235	0.50	195												1	1	1																										3	248
Dozer (D-8)	0.50	300												1	1	1																										3	248
Dump Truck (15cy)	0.50	275												1	1	1																										3	248
Compactor (Bomag BW211)	0.50	130												1	1	1																										3	248
Water Truck, 4000 gal	0.50	220												2	2	1	1	1	2	1	1	1	1																			13	1,073
Concrete Truck	0.50	250																																								0	0
Case Backhoe/Front End Loader (580)	0.50	90												2	2	2	2	2	2	2	2	2	2																			20	1,650
Hydraulic Mobile Crane (15T)	0.50	130												8	8	8	8	8	8	8	8	8	8																			80	6,600
Grade All	0.50	100												1	1	1	1	1	1	1	1	1	1																			10	825
Flatbed – Stake Body Truck	0.50	220												5	5	5	5	5	5	5	5	5	5																			50	4,125
Crawler Trencher	0.50	155												1	1	1	1	1	1	1	1	1	1																			10	825
Pick Up Truck	0.50	150															24	24	24	24	24	24	24																			168	13,860
Hydraulic Mobile Crane (35T)	0.50	175																																								0	0
Vibrator Hammer & Generator	0.50	51												6	6	6	6	6	6	6	6	6	6																			60	4,950
Fuel Truck	0.50	220												1	1	1	1	1	1	1	1	1	1																			10	825
Hogger[1)]	0.25	175												1																												1	41
Sub-totals			0	0	0	0	0	0	0	0	0	0	0	32	31	30	49	49	50	49	49	49	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	437	36,011
Solar Field Area Three																																													
Grader (CAT-12)	0.50	135															1	1	1	1	1																						5	413
Excavator, Cat 235	0.50	195															1	1	1	1	1																						5	413
Dozer (D-8)	0.50	300															1	1	1	1	1																						5	413
Dump Truck (15cy)	0.50	275															1	1	1	1	1																						5	413
Compactor (Bomag BW211)	0.50	130															1	1	1	1	1																						5	413
Water Truck, 4000 gal	0.50	220															1	1	1	1	1	1	1	1	1	1	1	1	1														13	1,073
Concrete Truck	0.50	250																																								0	0
Case Backhoe/Front End Loader (580)	0.50	90															2	2	2	2	2	2	2	2	2	2	2	2	2	2													28	2,310
Hydraulic Mobile Crane (15T)	0.50	130															2	2	10	10	10	10	10	10	10	10	10	2	2	2													100	8,250
Grade All	0.50	100															1	1	1	1	1	1	1	1	1	1	1	1	1	1													14	1,155
Flatbed – Stake Body Truck	0.50	220															5	5	5	5	5	5	5	5	5	5	5	5	5	5													70	5,775
Crawler Trencher	0.50	155															1	1	1	1	1	1	1	1	1	1	1	1	1	1													14	1,155
Pick Up Truck	0.50	150																	24	24	24	24	24	24	24	24	24	24	24	24													288	23,760
Hydraulic Mobile Crane (35T)	0.50	175																																								0	0
Vibrator Hammer & Generator	0.50	51																	8	8	8	8	8	8	8	8	8																72	5,940
Fuel Truck	0.50	220															1	1	1	1	1	1	1																				7	578
Hogger[1)]	0.25	175															1																										1	41
Sub-totals			0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	18	58	58	58	53	53	52	52	52	52	36	36	35	0	0	0	0	0	0	0	0	0	0	0	632	52,099

TABLE D.2-2
EQUIPMENT MOBILIZATION BY ACTIVITY
(PILE)

Construction Equipment Description	Util	HP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	Total Pieces per Month	Total Hrs With Util
			Construction Duration in Months/Equipment Pieces per Month																																								
Solar Field Area Four																																											
Grader (CAT-12)	0.50	135																						1	1	1																3	248
Excavator, Cat 235	0.50	195																						1	1	1																3	248
Dozer (D-8)	0.50	300																						1	1	1																3	248
Dump Truck (15cy)	0.50	275																						1	1	1																3	248
Compactor (Bomag BW211)	0.50	130																						1	1	1																3	248
Water Truck, 4000 gal	0.50	220																						2	1	1	1	2	1	1	1	1	1									12	990
Concrete Truck	0.50	250																																								0	0
Case Backhoe/Front End Loader (580)	0.50	90																						2	2	2	2	2	2	2	2	2	2									20	1,650
Hydraulic Mobile Crane (15T)	0.50	130																						10	10	10	10	10	10	10	2	2	2									76	6,270
Grade All	0.50	100																						1	1	1	1	1	1	1	1	1	1									10	825
Flatbed – Stake Body Truck	0.50	220																						5	5	5	5	5	5	5	5	5	5									50	4,125
Crawler Trencher	0.50	155																						1	1	1	1	1	1	1	1	1	1									10	825
Pick Up Truck	0.50	150																									24	24	24	24	24	24	24									168	13,860
Hydraulic Mobile Crane (35T)	0.50	175																																								0	0
Vibrator Hammer & Generator	0.50	51																						8	8	8	8	8	8	8												56	4,620
Fuel Truck	0.50	220																						1	1	1	1	1	1	1	1	1	1									10	825
Hogger[1)]	0.25	175																						1																		1	41
Sub-totals			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	34	34	53	54	53	53	37	37	37	0	0	0	0	0	0	0	0	428	35,269
Solar Field Area Five																																											
Grader (CAT-12)	0.50	135																										1	1	1												3	248
Excavator, Cat 235	0.50	195																										1	1	1												3	248
Dozer (D-8)	0.50	300																										1	1	1												3	248
Dump Truck (15cy)	0.50	275																										1	1	1												3	248
Compactor (Bomag BW211)	0.50	130																										1	1	1												3	248
Water Truck, 4000 gal	0.50	220																										1	1	1	1	1	1	1	1	1	1					10	825
Concrete Truck	0.50	250																																								0	0
Case Backhoe/Front End Loader (580)	0.50	90																										2	2	2	2	2	2	2	2	2	2					20	1,650
Hydraulic Mobile Crane (15T)	0.50	130																										8	8	8	8	8	8	8	8	8	8					80	6,600
Grade All	0.50	100																										1	1	1	1	1	1	1	1	1	1					10	825
Flatbed – Stake Body Truck	0.50	220																										5	5	5	5	5	5	5	5	5	5					50	4,125
Crawler Trencher	0.50	155																										1	1	1	1	1	1	1	1	1	1					10	825
Pick Up Truck	0.50	150																													24	24	24	24	24	24	24					168	13,860
Hydraulic Mobile Crane (35T)	0.50	175																																								0	0
Vibrator Hammer & Generator	0.50	51																										6	6	6	6	6	6	6	6	6	6					60	4,950
Fuel Truck	0.50	220																										1	1	1	1	1	1	1	1	1	1					10	825
Hogger[1)]	0.25	175																										1														1	41
Sub-totals			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	30	30	49	49	49	49	49	49	49	0	0	0	0	434	35,764
Solar Field Area Six																																											
Grader (CAT-12)	0.50	135																													1	1	1									3	248
Excavator, Cat 235	0.50	195																													1	1	1									3	248
Dozer (D-8)	0.50	300																													1	1	1									3	248
Dump Truck (15cy)	0.50	275																													1	1	1									3	248
Compactor (Bomag BW211)	0.50	130																													1	1	1									3	248
Water Truck, 4000 gal	0.50	220																													1	1	1	1	1	2	1	1	1	1		11	908
Concrete Truck	0.50	250																																								0	0
Case Backhoe/Front End Loader (580)	0.50	90																													2	2	2	2	2	2	2	2	2	2		20	1,650
Hydraulic Mobile Crane (15T)	0.50	130																													8	8	8	8	8	8	8	8	8	8		80	6,600
Grade All	0.50	100																													1	1	1	1	1	1	1	1	1	1		10	825
Flatbed – Stake Body Truck	0.50	220																													5	5	5	5	5	5	5	5	5	5		50	4,125
Crawler Trencher	0.50	155																													1	1	1	1	1	1	1	1	1	1		10	825
Pick Up Truck	0.50	150																																24	24	24	24	24	24	24		168	13,860
Hydraulic Mobile Crane (35T)	0.50	175																																								0	0
Vibrator Hammer & Generator	0.50	51																													6	6	6	6	6	6	6	6	6	6		60	4,950
Fuel Truck	0.50	220																													1	1	1	1	1	1	1	1	1	1		10	825
Hogger[1)]	0.25	175																													1											1	41
Sub-totals			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	30	30	49	49	50	49	49	49	49	0	435	35,846

TABLE D.2-2
EQUIPMENT MOBILIZATION BY ACTIVITY
(PILE)

Construction Equipment Description	Util	HP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	Total Pieces per Month	Total Hrs With Util
			Construction Duration in Months/Equipment Pieces per Month																																								
			Project Totals																																								
Truck Tractor	0.34	250	0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	618.75
Line Truck	0.50	220	0	0	0	0	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	825
Pressure Digger (Truck Mounted)	0.50	220	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	247.5
Truck (1 ton) Conductor Reel Trailer	0.50	220	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Truck (1 ton) Wire Puller/Tensioner	0.50	220	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Truck (1 ton) Trailer	0.13	220	0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	247.5
Crane (100T)[1]	0.25	290	0	0	0	0	0	0	2	3	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	536.25
High Reach Bucket Truck (1 ton)	0.37	220	0	0	0	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	544.5
Hydraulic Auger Drill	0.50	200	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	82.5
Backhoe (CAT-225)	0.50	135	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	577.5
Forklift (10T)[3]	0.10	100	0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	214.5
Portable Welding Machine	0.50	50	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	1485
Plate Compactor[2]	0.28	5	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	272.25
Wheel Loader (CAT 950)	0.50	130	1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	577.5
Conveyor Truck for Rock/Sand	0.50	250	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Concrete Pump Truck	0.50	250	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Manlift (Scissors)	0.50	30	0	0	0	5	5	6	6	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	2145
AC Paver	0.50	200	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	82.5
Carry Lift, Pettibone	0.50	100	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	330
Hydraulic Mobile Crane (35T)	0.50	175	0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	660
Vibrator Hammer & Generator	0.50	51	0	2	2	2	2	0	0	8	8	8	8	14	14	14	14	6	14	14	14	14	14	16	16	16	16	14	14	14	12	12	12	12	12	12	12	6	6	6	0	380	31350
Truck (1 ton), Maintenance	0.50	220	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	577.5
Fuel Truck	0.50	220	0	1	1	1	1	0	0	1	1	1	1	2	2	2	3	3	3	3	2	2	2	1	1	1	1	2	2	2	3	3	3	2	2	2	2	1	1	1	0	62	5115
Grader (CAT-12)	0.50	135	1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	24	1980
Excavator, Cat 235	0.50	195	1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	24	1980
Dozer (D-8)	0.50	300	1	1	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	22	1815
Dump Truck (15cy)	0.40	275	3	3	3	1	2	1	1	2	2	1	0	4	4	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	42	2739
Compactor (Bomag BW211)	0.45	130	0	1	0	2	2	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	26	1947
Water Truck, 4000 gal [4]	0.50	220	0	2	1	1	1	0	1	2	1	1	1	3	3	2	3	3	4	3	2	2	2	3	2	2	2	4	3	2	3	3	3	2	2	3	2	1	1	1	0	77	6352.5
Concrete Truck	0.50	250	0	0	3	0	1	2	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	1155
Case Backhoe/Front End Loader (580)	0.50	90	0	0	0	0	0	0	0	2	2	2	2	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	130	10725
Hydraulic Mobile Crane (15T)	0.50	130	0	2	2	2	2	1	1	11	11	11	11	18	18	18	20	12	20	20	18	18	18	20	20	20	20	20	20	20	18	18	18	16	16	16	16	8	8	8	0	516	42570
Grade All	0.50	100	0	1	2	2	2	2	1	1	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	76	6270
Flatbed – Stake Body Truck	0.50	220	0	0	0	2	2	2	5	10	10	10	7	12	12	10	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	10	10	10	10	5	5	5	0	357	29452.5
Crawler Trencher	0.48	155	0	0	0	0	0	0	1	2	2	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	68	5412
Pick Up Truck	0.50	150	0	1	1	3	2	2	5	5	5	5	26	26	26	24	48	48	72	72	48	48	48	24	24	24	48	48	48	48	48	48	48	48	48	48	48	24	24	24	0	1187	97927.5
Butt Fusion Machine & Generator	0.50	51	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	247.5
Hogger[1]	0.25	175	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	6	247.5
Project Totals			7	24	24	35	33	27	46	72	67	63	66	99	95	83	121	104	145	144	107	102	102	88	86	86	105	121	119	118	117	116	116	98	98	99	98	49	49	49	0	3,178	257,969

NOTE:
Unless noted, construction equipment hours are based on 165 hours per month and 50% utilization.
1) Based on 25% utilization
2) Based on 5% utilization
3) Based on 10% utilization
4) Modern fleet of water trucks (2006 and newer)

TABLE D.2-3
MONTHLY CONSTRUCTION EQUIPMENT PROJECTION
(PILE)

					Month After Construction Start																			
Construction Equipment Description	**HP**	**D**	**G**	**P**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
AC Paver	200	X			0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Backhoe (CAT-225)	135	X			0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Carry Lift, Pettibone	100	X			0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Case Backhoe/Front End Loader (580)	90	X			0	0	0	0	0	0	0	2	2	2	2	4	4	4	6	6	6	6	4	4
Compactor (Bomag BW211)	130	X			0	1	0	2	2	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0
Conveyor Truck for Rock/Sand	250	X			0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crane (100T)	290	X			0	0	0	0	0	0	2	3	3	3	1	1	0	0	0	0	0	0	0	0
Crawler Trencher	155	X			0	0	0	0	0	0	1	2	2	1	1	2	2	2	3	3	3	3	2	2
Dozer (D-8)	300	X			1	1	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0
Excavator, Cat 235	195	X			1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0
Forklift (10T)	100	X			0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0
Grade All	100	X			0	1	2	2	2	2	2	1	1	1	1	2	2	2	3	3	3	3	2	2
Grader (CAT-12)	135	X			1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0
High Reach Bucket Truck	220	X			0	0	0	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	0	0
Hydraulic Auger Drill	200	X			0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydraulic Mobile Crane (15T)	130	X			0	2	2	2	2	1	1	11	11	11	11	18	18	18	20	12	20	20	18	18
Hydraulic Mobile Crane (35T)	175	X			0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Line Truck	220	X			0	0	0	0	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0
Manlift (Scissors)	30	X			0	0	0	5	5	6	6	1	1	1	1	0	0	0	0	0	0	0	0	0
Plate Compactor	5	X			0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Pressure Digger (Truck Mounted)	220	X			0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Scraper, Cat 621B	330	X			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1 ton) Conductor Reel Trailer	220	X			0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Truck (1 ton), Maintenance	220	X			0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck Tractor	250	X			0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0
Truck (1 ton) Trailer	220	X			0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0
Truck (1 ton) Wire Puller/Tensioner	220	X			0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Vibrating Hammer & Generator	51	X			0	2	2	2	2	0	0	8	8	8	8	14	14	14	14	6	14	14	14	14
Welding Machine	50	X			0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0
Wheel Loader (CAT 950)	130	X			1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hogger	175	x			0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0
Vehicles with Onroad Engines for Emissions Estimates																								
Concrete Truck	250	X			0	0	3	0	1	2	4	4	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Pump Truck	250	X			0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dump Truck (15cy)	275	X			3	3	3	1	2	1	1	2	2	1	0	4	4	1	1	1	1	1	1	0
Flatbed - Stake Body Truck	220	X			0	0	0	2	2	2	5	10	10	10	7	12	12	10	15	15	15	15	10	10
Fuel Truck	220	X			0	1	1	1	1	0	0	1	1	1	1	2	2	2	3	3	3	3	2	2
Pick Up Truck	150		X		0	1	1	3	2	2	5	5	5	5	26	26	26	24	48	48	72	72	48	48
Water Truck, 4000 gal	220	X			0	2	1	1	1	0	1	2	1	1	1	3	3	2	3	3	4	3	2	2
Total					7	23	23	34	33	27	46	72	67	63	66	99	95	83	121	104	145	144	107	102
Delivery Trucks per Month																								
Light Weight & Delivery Trucks	200				10	11	11	16	16	16	9	33	33	33	31	55	55	48	72	72	72	72	48	48
Truck Tractor Delivery Trucks	275				10	37	37	118	44	19	122	235	135	125	125	219	219	217	242	144	241	241	216	216

	Month After Construction Start (continued)																			
Construction Equipment Description	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
AC Paver	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Backhoe (CAT-225)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Carry Lift, Pettibone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Case Backhoe/Front End Loader (580)	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	
Compactor (Bomag BW211)	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Conveyor Truck for Rock/Sand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Crane (100T)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Crawler Trencher	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	
Dozer (D-8)	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Excavator, Cat 235	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Forklift (10T)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grade All	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	
Grader (CAT-12)	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
High Reach Bucket Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hydraulic Auger Drill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hydraulic Mobile Crane (15T)	18	20	20	20	20	20	20	20	18	18	18	16	16	16	16	8	8	8	0	
Hydraulic Mobile Crane (35T)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Line Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Manlift (Scissors)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Plate Compactor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pressure Digger (Truck Mounted)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Scraper, Cat 621B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck (1 ton) Conductor Reel Trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck (1 ton), Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck Tractor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck (1 ton) Trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck (1 ton) Wire Puller/Tensioner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Vibrating Hammer & Generator	14	16	16	16	16	14	14	14	12	12	12	12	12	12	12	6	6	6	0	
Welding Machine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Wheel Loader (CAT 950)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hogger	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	
Vehicles with Onroad Engines for Emissions Estimates																				
Concrete Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Concrete Pump Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Dump Truck (15cy)	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Flatbed - Stake Body Truck	10	10	10	10	10	15	15	15	15	15	15	10	10	10	10	5	5	5	0	
Fuel Truck	2	1	1	1	1	2	2	2	3	3	3	2	2	2	2	1	1	1	0	
Pick Up Truck	48	24	24	24	48	48	48	48	48	48	48	48	48	48	48	24	24	24	0	
Water Truck, 4000 gal	2	3	2	2	2	4	3	2	3	3	3	2	2	3	2	1	1	1	0	
Total	102	88	86	86	105	121	119	118	117	116	116	98	98	99	98	49	49	49	0	0
Delivery Trucks per Month																				
Light Weight & Delivery Trucks	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	0	
Truck Tractor Delivery Trucks	216	243	243	243	243	241	241	241	218	218	218	193	193	193	193	98	98	98	0	

HP=horsepower
G=gasoline
D=diesel
P=propane

TABLE D.2-3
MONTHLY CONSTRUCTION EQUIPMENT PROJECTION
(PILE)

Construction Equipment Description	HP	D	G	P	12-month Period for 12-month Rolling Total 1-12	2-13	3-14	4-15	5-16	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26	16-27	17-28	18-29	19-30	20-31	21-32	22-33	23-34	24-35	25-36	26-37	27-38	28-39	29-40	1-40 (entire construction)
AC Paver	200	X			1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Backhoe (CAT-225)	135	X			7	7	7	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Carry Lift, Pettibone	100	X			4	4	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Case Backhoe/Front End Loader (580)	90	X			12	16	20	26	32	38	44	48	50	52	54	56	56	56	58	58	58	58	58	60	60	60	60	60	58	56	52	46	40	130
Compactor (Bomag BW211)	130	X			10	11	11	12	11	10	10	11	10	9	9	10	10	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	26
Conveyor Truck for Rock/Sand	250	X			2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Crane (100T)	290	X			13	13	13	13	13	13	13	11	8	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Crawler Trencher	155	X			9	11	13	16	19	22	25	26	26	26	27	28	28	28	29	29	29	29	29	30	30	30	30	30	29	28	26	23	20	68
Dozer (D-8)	300	X			6	6	6	7	8	9	10	11	10	9	9	10	10	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	22
Excavator, Cat 235	195	X			8	8	8	9	9	9	10	11	10	9	9	10	10	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	24
Forklift (10T)	100	X			12	13	13	13	12	11	10	8	6	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Grade All	100	X			17	19	20	21	22	23	24	24	25	26	27	28	28	28	29	29	29	29	29	30	30	30	30	30	29	28	26	23	20	76
Grader (CAT-12)	135	X			8	8	8	9	9	9	10	11	10	9	9	10	10	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	24
High Reach Bucket Truck	220	X			9	9	9	9	9	9	9	8	7	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Hydraulic Auger Drill	200	X			1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hydraulic Mobile Crane (15T)	130	X			72	90	106	124	134	152	171	188	195	202	211	220	222	224	226	226	234	232	230	230	228	226	222	218	206	194	182	162	142	516
Hydraulic Mobile Crane (35T)	175	X			8	8	7	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Line Truck	220	X			10	10	10	10	10	10	10	7	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Manlift (Scissors)	30	X			26	26	26	26	21	16	10	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
Plate Compactor	5	X			6	6	5	4	3	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Pressure Digger (Truck Mounted)	220	X			3	3	3	3	3	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Scraper, Cat 621B	330	X			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1 ton) Conductor Reel Trailer	220	X			2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Truck (1 ton), Maintenance	220	X			7	7	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Truck Tractor	250	X			11	11	11	11	11	11	10	8	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Truck (1 ton) Trailer	220	X			11	12	12	12	11	10	9	7	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
Truck (1 ton) Wire Puller/Tensioner	220	X			2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Vibrating Hammer & Generator	51	X			0	0	0	0	0		122	136	142	148	156	164	166	168	168	168	176	174	172	170	168	166	162	158	148	138	130	116	102	380
Welding Machine	50	X			16	18	18	18	18	16	14	12	10	8	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
Wheel Loader (CAT 950)	130	X			7	6	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Hogger	175	x			2	2	2	3	3	3	3	3	2	2	3	3	2	2	3	2	2	3	3	3	3	3	2	2	2	2	1	1	1	6
Vehicles with Onroad Engines for Emissions Estimates																																		
Concrete Truck	250	X			14	14	14	11	11	10	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
Concrete Pump Truck	250	X			2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Dump Truck (15cy)	275	X			23	24	22	20	20	19	19	19	17	15	15	16	13	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	42
Flatbed - Stake Body Truck	220	X			60	72	82	97	110	123	136	141	141	141	141	144	142	140	145	145	145	145	145	150	150	150	150	150	145	140	130	115	100	357
Fuel Truck	220	X			10	12	13	15	17	19	22	24	25	26	26	26	25	24	24	23	22	22	22	23	23	23	24	25	25	25	24	22	20	62
Pick Up Truck	150		X		81	107	130	177	222	292	362	405	448	491	510	508	506	528	552	552	552	528	504	504	504	504	528	552	552	528	504	456	408	1187
Water Truck, 4000 gal	220	X			14	17	17	19	21	24	27	28	28	29	31	32	31	30	32	32	31	30	30	31	31	31	31	31	30	29	26	23	21	77
Total					506	580	628	714	780	880	1,105	1,166	1,196	1,231	1,256	1,276	1,263	1,273	1,311	1,309	1,323	1,295	1,267	1,276	1,272	1,268	1,279	1,291	1,254	1,198	1,126	1,007	889	3,175
Delivery Trucks per Month																																		
Light Weight & Delivery Trucks	200				274	319	356	417	473	529	585	624	639	654	669	686	679	672	696	696	696	696	696	720	720	720	720	720	696	672	624	552	480	1697
Truck Tractor Delivery Trucks	275				1226	1435	1615	1820	1846	2043	2265	2359	2340	2421	2539	2657	2681	2705	2729	2728	2825	2802	2779	2781	2758	2735	2685	2635	2490	2345	2202	1961	1720	6593

HP=horsepower
G=gasoline
D=diesel
P=propane

TABLE D.2-4
TRUCK TRIPS
(PILE)

Construction Equipment Description	HP	Construction Deliveries per Month																																								Total Pieces
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
230 kV Transmission Line																																										
Light Weight & Delivery Trucks	200							2	2	2	2																														8
Truck Tractor	275							20	20	10																															50
Concrete Truck	250							90	90																																180
Sub-totals		0	0	0	0	0	0	112	112	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	238
High Voltage Substation																																										
Light Weight & Delivery Trucks	200				1	1	1	2	2	2	2	2	2	2																											17
Truck Tractor	275				5	5	5	10																																	25
Concrete Truck	250					1	1																																		2
Sub-totals		0	0	0	6	7	7	12	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44
Medium Voltage Substation/Infrastructure																																										
Light Weight & Delivery Trucks	200				5	5	5	5	5	5	5	5	5	5																											50
Truck Tractor	275				2	2	2	2	2	2	2	2	2	2																											20
Concrete Truck	250						1																																		1
Sub-totals		0	0	0	7	7	8	7	7	7	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71
Operations and Maintenance Facility and Concrete Batch Plant																																										
Light Weight & Delivery Trucks	200	10	10	10	10	10	10																																		60
Truck Tractor	275	10	10	10	10	10	10																																		60
Concrete Truck	250				75																																				75
Sub-totals		20	20	20	95	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	195
Drainage "A" Sheet Pile Installation																																										
Light Weight & Delivery Trucks	200																																								0
Truck Tractor	275		26	26	26	26																																			104
Sub-totals		0	26	26	26	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104
Raw Water Supply Pipeline																																										
Light Weight & Delivery Trucks	200		1	1																																					2
Truck Tractor	275		1	1																																					2
Sub-totals		0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Solar Field Area One																																										
Light Weight & Delivery Trucks	200								24	24	24	24	24	24	24	24	24	24	24																						264
Truck Tractor	275								122	122	122	122	122	122	122	122	24	24	24																						1048
Concrete Truck	250								1	1	1	1	1	1	1	1	1	1	1																						11
Sub-totals		0	0	0	0	0	0	0	147	147	147	147	147	147	147	147	49	49	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1323
Solar Field Area Two																																										
Light Weight & Delivery Trucks	200												24	24	24	24	24	24	24	24	24	24																			240
Truck Tractor	275												93	93	93	93	93	93	93	93	93	93																			930
Concrete Truck	250												1	1	1	1	1	1	1	1	1	1																			10
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	118	118	118	118	118	118	118	118	118	118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1180
Solar Field Area Three																																										
Light Weight & Delivery Trucks	200															24	24	24	24	24	24	24	24	24	24	24	24	24	24												336
Truck Tractor	275															24	24	121	121	121	121	121	121	121	121	121	24	24	24												1209
Concrete Truck	250															1	1	1	1	1	1	1	1	1	1	1	1	1	1												14
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49	146	146	146	146	146	146	146	146	146	49	49	49	0	0	0	0	0	0	0	0	0	0	0	1559
Solar Field Area Four																																										
Light Weight & Delivery Trucks	200																						24	24	24	24	24	24	24	24	24	24									240
Truck Tractor	275																						120	120	120	120	120	120	120	24	24	24									912
Concrete Truck	250																						1	1	1	1	1	1	1	1	1	1									10
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	145	145	145	145	145	145	49	49	49	0	0	0	0	0	0	0	0	1162
Solar Field Area Five																																										
Light Weight & Delivery Trucks	200																										24	24	24	24	24	24	24	24	24						240
Truck Tractor	275																										94	94	94	94	94	94	94	94	94						940
Concrete Truck	250																										1	1	1	1	1	1	1	1	1						10
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119	119	119	119	119	119	119	119	119	0	0	0	0	0	1190
Solar Field Area Six																																										
Light Weight & Delivery Trucks	200																													24	24	24	24	24	24	24	24	24	24		240
Truck Tractor	275																													97	97	97	97	97	97	97	97	97	97		970
Concrete Truck	250																													1	1	1	1	1	1	1	1	1	1		10
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122	122	122	122	122	122	122	122	122	122	0	1220
Totals		20	48	48	134	60	35	131	268	168	158	156	274	274	265	314	216	313	313	264	264	264	291	291	291	291	313	313	313	290	290	290	241	241	241	241	122	122	122	0	8290
Total Light Weight & Delivery Trucks		10	11	11	16	16	16	9	33	33	33	31	55	55	48	72	72	72	72	48	48	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	0	1697
Trucks/day		0.5	0.5	0.5	0.7	0.7	0.7	0.4	1.5	1.5	1.5	1.4	2.5	2.5	2.2	3.3	3.3	3.3	3.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.3	3.3	3.3	3.3	3.3	3.3	2.2	2.2	2.2	2.2	1.1	1.1	1.1	0.0	
Total Truck Tractor		10	37	37	43	43	17	32	144	134	124	124	217	217	215	239	141	238	238	214	214	214	241	241	241	241	238	238	238	215	215	215	191	191	191	191	97	97	97	0	6270
Total Concrete Truck		0	0	0	75	1	2	90	91	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	323
Total HDD		10	37	37	118	44	19	122	235	135	125	125	219	219	217	242	144	241	241	216	216	216	243	243	243	243	241	241	241	218	218	218	193	193	193	193	98	98	98	0	
Total HDD Trips/day		0.5	1.7	1.7	5.4	2.0	0.9	5.6	10.8	6.2	5.8	5.8	10.1	10.1	10.0	11.2	6.6	11.1	11.1	10.0	10.0	10.0	11.2	11.2	11.2	11.2	11.1	11.1	11.1	10.1	10.1	10.1	8.9	8.9	8.9	8.9	4.5	4.5	4.5	0.0	
Total Truck Trips/day		0.9	2.2	2.2	6.2	2.8	1.6	6.0	12.4	7.8	7.3	7.2	12.6	12.6	12.2	14.5	10.0	14.4	14.4	12.2	12.2	12.2	13.4	13.4	13.4	13.4	14.4	14.4	14.4	13.4	13.4	13.4	11.1	11.1	11.1	11.1	5.6	5.6	5.6	0.0	

Note: Truck trips per day calculated as total deliveries per month divided by work days per month (assumed to be 21.65)

TABLE D.2-5
OFF-SITE VEHICLES DISTANCE TRAVELLED (PILE)

	Trip Distribution			One-way Distance			Weighted One-way Distance				Weighted Round-Trip Distance			
	Acton Percent	Gorman Percent	Mojave Percent	Acton Miles	Gorman Miles	Mojave Miles	Acton Miles	Gorman Miles	Mojave Miles	**Average Miles**	Acton Miles	Gorman Miles	Mojave Miles	**Average Miles**
Worker Vehicles	70%	5%	25%	39.6	25.5	34.0	27.72	1.275	8.5	**37.495**	55.44	2.55	17	**74.99**
Delivery Trucks	100%	0%	0%	39.6	25.5	34.0	39.6	0	0	**39.6**	79.2	0	0	**79.2**

TABLE 4-5
PROJECT CONSTRUCTION AND OPERATIONS
TRIP DISTRIBUTION ASSUMPTIONS

Land Use Trip Category	To SR-14 South (Percent)	To SR-14 North (Percent)	To SR-138 West (Percent)
Construction Worker	70	5	25
Construction Delivery	100	0	0
Operations and Maintenance Trips	90	0	10

TABLE D.2-6
OFFROAD 2007 EMISSION FACTORS
(PILE)

Equipment	Fuel	MaxHP	Class	C/R	Pre	Hand	Port	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	CO Exhaust
Aerial Lifts	D	500	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.36E+00	1.44E+00	1.38E+01	8.87E-05	3.55E-04
Aerial Lifts	D	750	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.10E-01	1.15E-01	2.01E+00	1.33E-05	5.16E-05
Air Compressors	G4	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	5.98E-01	7.92E-01	5.43E+00	7.68E-05	1.73E-03
Air Compressors	D	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.59E+00	3.54E+00	1.43E+01	1.93E-04	8.85E-04
Air Compressors	D	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.23E+00	4.98E+00	2.96E+01	2.57E-04	7.53E-04
Air Compressors	D	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.91E+00	6.49E+00	6.81E+01	5.35E-04	1.87E-03
Air Compressors	D	750	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.09E+00	2.43E+00	3.94E+01	3.15E-04	1.08E-03
Air Compressors	D	1000	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.69E-02	5.99E-02	1.32E+00	1.33E-05	4.62E-05
Bore/Drill Rigs	G4	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.14E-01	3.34E-02	3.02E-01	4.09E-06	8.76E-05
Bore/Drill Rigs	D	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	5.21E-01	1.20E+00	7.73E+00	4.98E-05	4.54E-04
Bore/Drill Rigs	D	250	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.48E-01	1.04E+00	8.81E+00	4.60E-05	1.78E-04
Bore/Drill Rigs	D	500	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	9.98E-01	2.31E+00	3.24E+01	1.63E-04	6.38E-04
Bore/Drill Rigs	D	750	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.11E+01	4.88E+01	1.36E+03	6.86E-03	2.67E-02
Bore/Drill Rigs	D	1000	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	3.54E+01	8.17E+01	3.43E+03	1.99E-02	6.90E-02
Concrete/Industrial Saws	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.12E-02	1.78E-02	1.30E-01	1.62E-06	7.80E-06
Cranes	G4	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	9.10E-03	1.04E-02	5.56E-02	8.71E-07	1.79E-05
Cranes	D	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	2.09E+00	7.34E+00	2.70E+01	4.24E-04	1.78E-03
Cranes	D	250	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.05E+00	1.42E+01	7.25E+01	8.32E-04	2.32E-03
Cranes	D	500	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.49E+00	5.22E+00	4.27E+01	4.49E-04	1.59E-03
Cranes	D	750	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.42E+01	1.55E+02	2.14E+03	2.27E-02	7.97E-02
Cranes	D	9999	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	5.56E+01	1.95E+02	8.61E+03	1.01E-01	3.73E-01
Crawler Tractors	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.51E+01	4.35E+01	2.41E+02	4.04E-03	1.64E-02
Crawler Tractors	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.29E+01	3.74E+01	2.82E+02	3.63E-03	1.02E-02
Crawler Tractors	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	8.87E+00	2.56E+01	3.02E+02	3.55E-03	1.40E-02
Crawler Tractors	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.82E+01	5.24E+01	1.11E+03	1.31E-02	5.13E-02
Crawler Tractors	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.82E+01	5.23E+01	1.57E+03	1.98E-02	8.12E-02
Crushing/Proc. Equipment	D	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.07E+00	2.80E+00	2.14E+01	3.15E-04	1.36E-03
Crushing/Proc. Equipment	D	250	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.07E-01	2.79E-01	3.09E+00	2.90E-05	8.12E-05
Crushing/Proc. Equipment	D	500	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	6.00E-01	1.57E+00	2.66E+01	2.27E-04	7.52E-04
Crushing/Proc. Equipment	D	750	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.13E+00	2.97E+00	7.93E+01	6.87E-04	2.20E-03
Crushing/Proc. Equipment	D	9999	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.13E+00	2.97E+00	1.76E+02	1.93E-03	6.54E-03
Excavators	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	4.09E+01	1.60E+02	8.18E+02	1.11E-02	5.34E-02
Excavators	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.66E+01	6.50E+01	4.67E+02	4.46E-03	1.22E-02
Excavators	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.20E+01	4.69E+01	4.96E+02	4.42E-03	1.35E-02
Excavators	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.07E+01	4.16E+01	7.31E+02	6.56E-03	1.99E-02
Forklifts	G4	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.81E+00	8.91E+00	3.59E+01	3.39E-04	1.35E-02
Forklifts	C4	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.63E+00	1.79E+01	8.75E+01	5.30E-05	2.00E-02
Forklifts	D	175	Industrial Equipment	U	P	NHH	NP	Los Angeles	MD	AV	5.73E+00	2.83E+01	7.24E+01	9.05E-04	4.64E-03
Forklifts	D	250	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	5.69E+00	2.81E+01	9.81E+01	8.35E-04	2.29E-03
Forklifts	D	500	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.44E+00	1.20E+01	6.04E+01	4.82E-04	1.34E-03
Gas Compressors	C4	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	6.72E-02	1.56E+00	2.41E+01	1.39E-05	5.26E-03
Gas Compressors	C4	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	5.38E-02	1.25E+00	2.50E+01	1.07E-05	6.05E-03
Gas Compressors	C4	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.70E-02	1.10E+00	3.52E+01	1.50E-05	8.52E-03
Generator Sets	G4	175	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.65E+00	5.18E-01	4.66E+00	4.88E-05	1.34E-03
Generator Sets	C4	175	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.08E+00	3.38E-01	3.70E+00	2.38E-06	6.42E-04
Generator Sets	D	175	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.74E+00	2.54E+00	1.64E+01	1.79E-04	9.33E-04
Generator Sets	D	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.53E+00	1.42E+00	1.36E+01	9.51E-05	3.18E-04
Generator Sets	D	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	3.41E+00	3.15E+00	4.80E+01	2.99E-04	1.20E-03
Generator Sets	D	750	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.12E+00	1.96E+00	4.82E+01	3.11E-04	1.21E-03
Generator Sets	D	9999	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	5.51E-01	5.10E-01	2.42E+01	2.17E-04	7.71E-04
Graders	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.79E+01	4.68E+01	2.65E+02	3.88E-03	1.73E-02
Graders	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.11E+01	2.90E+01	2.26E+02	2.41E-03	6.80E-03
Graders	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.14E-01	8.20E-01	8.54E+00	8.38E-05	2.87E-04
Graders	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.81E-01	1.78E+00	3.92E+01	3.87E-04	1.32E-03
Off-Highway Tractors	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	6.86E+00	2.11E+01	1.26E+02	2.35E-03	8.92E-03
Off-Highway Tractors	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.48E+00	1.99E+01	1.18E+02	1.78E-03	5.05E-03
Off-Highway Tractors	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.14E+02	3.50E+02	9.07E+03	1.24E-01	5.76E-01
Off-Highway Tractors	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.20E+01	3.69E+01	1.37E+03	1.97E-02	9.45E-02
Off-Highway Trucks	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	3.64E-01	1.99E+00	1.14E+01	1.63E-04	7.56E-04
Off-Highway Trucks	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.69E+00	1.47E+01	1.11E+02	1.14E-03	3.00E-03
Off-Highway Trucks	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.79E+00	2.07E+01	2.55E+02	2.45E-03	7.27E-03
Off-Highway Trucks	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.43E+02	7.79E+02	1.56E+04	1.51E-01	4.44E-01
Off-Highway Trucks	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.69E+01	3.65E+02	1.03E+04	1.11E-01	3.49E-01
Other Construction Equipment	G4	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	3.19E-01	3.24E-01	1.78E+00	8.48E-06	5.38E-04
Other Construction Equipment	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.10E+00	2.12E+00	1.03E+01	1.16E-04	6.23E-04
Other Construction Equipment	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.55E+00	4.92E+00	5.66E+01	3.93E-04	1.39E-03

TABLE D.2-6
OFFROAD 2007 EMISSION FACTORS
(PILE)

Equipment	NOX Exhaust	CO2 Exhaust	SO2 Exhaust	PM Exhaust	N2O Exhaust	CH4 Exhaust	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)
Aerial Lifts	1.18E-03	1.53E-01	1.50E-06	3.54E-05	0.00E+00	8.00E-06	2.47E-05	2.47E-04	6.18E-05	8.19E-04	1.04E-06	1.06E-01	5.58E-06	0.00E+00
Aerial Lifts	1.76E-04	2.22E-02	2.23E-07	5.23E-06	0.00E+00	1.20E-06	4.54E-05	4.47E-04	1.16E-04	1.53E-03	1.93E-06	1.92E-01	1.04E-05	0.00E+00
Air Compressors	5.26E-04	4.93E-02	4.90E-07	3.93E-06	1.01E-05	4.33E-06	4.96E-06	2.19E-03	9.69E-05	6.64E-04	6.19E-07	6.23E-02	5.47E-06	1.27E-05
Air Compressors	1.56E-03	1.56E-01	1.76E-06	8.88E-05	0.00E+00	1.74E-05	2.51E-05	2.50E-04	5.45E-05	4.42E-04	4.97E-07	4.42E-02	4.91E-06	0.00E+00
Air Compressors	3.01E-03	3.26E-01	3.67E-06	9.44E-05	0.00E+00	2.32E-05	1.90E-05	1.51E-04	5.17E-05	6.05E-04	7.38E-07	6.56E-02	4.67E-06	0.00E+00
Air Compressors	6.12E-03	7.51E-01	7.37E-06	2.02E-04	0.00E+00	4.83E-05	3.11E-05	2.88E-04	8.25E-05	9.44E-04	1.14E-06	1.16E-01	7.44E-06	0.00E+00
Air Compressors	3.65E-03	4.34E-01	4.37E-06	1.19E-04	0.00E+00	2.84E-05	4.90E-05	4.44E-04	1.30E-04	1.50E-03	1.80E-06	1.79E-01	1.17E-05	0.00E+00
Air Compressors	1.62E-04	1.46E-02	1.46E-07	4.69E-06	0.00E+00	1.20E-06	7.83E-05	7.71E-04	2.21E-04	2.70E-03	2.44E-06	2.43E-01	2.00E-05	0.00E+00
Bore/Drill Rigs	3.18E-05	2.76E-03	2.74E-08	2.20E-07	5.24E-07	2.31E-07	6.58E-06	2.62E-03	1.23E-04	9.54E-04	8.21E-07	8.26E-02	6.93E-06	1.57E-05
Bore/Drill Rigs	4.96E-04	8.49E-02	9.55E-07	2.68E-05	0.00E+00	4.49E-06	2.23E-05	3.76E-04	4.13E-05	4.11E-04	7.93E-07	7.05E-02	3.73E-06	0.00E+00
Bore/Drill Rigs	5.22E-04	9.74E-02	1.10E-06	1.66E-05	0.00E+00	4.15E-06	1.60E-05	1.72E-04	4.44E-05	5.04E-04	1.06E-06	9.40E-02	4.01E-06	0.00E+00
Bore/Drill Rigs	1.71E-03	3.59E-01	3.52E-06	5.96E-05	0.00E+00	1.47E-05	2.58E-05	2.77E-04	7.05E-05	7.42E-04	1.53E-06	1.56E-01	6.36E-06	0.00E+00
Bore/Drill Rigs	7.30E-02	1.50E+01	1.51E-04	2.51E-03	0.00E+00	6.19E-04	5.15E-05	5.47E-04	1.41E-04	1.50E-03	3.09E-06	3.07E-01	1.27E-05	0.00E+00
Bore/Drill Rigs	3.01E-01	3.79E+01	3.81E-04	7.64E-03	0.00E+00	1.79E-03	9.35E-05	8.44E-04	2.43E-04	3.68E-03	4.66E-06	4.64E-01	2.19E-05	0.00E+00
Concrete/Industrial Saws	1.38E-05	1.43E-03	1.61E-08	7.40E-07	0.00E+00	1.46E-07	4.15E-05	4.37E-04	9.07E-05	7.76E-04	9.00E-07	8.00E-02	8.19E-06	0.00E+00
Cranes	6.18E-06	5.05E-04	5.02E-09	4.03E-08	1.28E-07	4.92E-08	3.89E-06	1.73E-03	8.41E-05	5.96E-04	4.85E-07	4.88E-02	4.75E-06	1.23E-05
Cranes	3.23E-03	2.95E-01	3.32E-06	1.90E-04	0.00E+00	3.82E-05	2.58E-05	2.43E-04	5.77E-05	4.40E-04	4.52E-07	4.01E-02	5.21E-06	0.00E+00
Cranes	8.21E-03	7.98E-01	8.97E-06	3.04E-04	0.00E+00	7.51E-05	2.13E-05	1.63E-04	5.84E-05	5.77E-04	6.30E-07	5.60E-02	5.27E-06	0.00E+00
Cranes	4.30E-03	4.69E-01	4.61E-06	1.63E-04	0.00E+00	4.05E-05	3.12E-05	3.05E-04	8.61E-05	8.24E-04	8.83E-07	9.00E-02	7.77E-06	0.00E+00
Cranes	2.21E-01	2.35E+01	2.37E-04	8.28E-03	0.00E+00	2.04E-03	5.33E-05	5.13E-04	1.46E-04	1.42E-03	1.52E-06	1.51E-01	1.32E-05	0.00E+00
Cranes	1.13E+00	9.46E+01	9.51E-04	3.49E-02	0.00E+00	9.11E-03	1.79E-04	1.91E-03	5.18E-04	5.77E-03	4.88E-06	4.85E-01	4.67E-05	0.00E+00
Crawler Tractors	3.05E-02	2.63E+00	2.96E-05	1.79E-03	0.00E+00	3.65E-04	4.11E-05	3.77E-04	9.29E-05	7.02E-04	6.81E-07	6.05E-02	8.38E-06	0.00E+00
Crawler Tractors	3.41E-02	3.10E+00	3.49E-05	1.35E-03	0.00E+00	3.28E-04	3.61E-05	2.72E-04	9.72E-05	9.12E-04	9.34E-07	8.30E-02	8.77E-06	0.00E+00
Crawler Tractors	3.27E-02	3.32E+00	3.26E-05	1.30E-03	0.00E+00	3.20E-04	5.07E-05	5.46E-04	1.39E-04	1.27E-03	1.27E-06	1.29E-01	1.25E-05	0.00E+00
Crawler Tractors	1.23E-01	1.22E+01	1.22E-04	4.82E-03	0.00E+00	1.18E-03	9.20E-05	9.79E-04	2.50E-04	2.34E-03	2.33E-06	2.32E-01	2.25E-05	0.00E+00
Crawler Tractors	2.14E-01	1.72E+01	1.73E-04	6.93E-03	0.00E+00	1.79E-03	1.32E-04	1.55E-03	3.78E-04	4.08E-03	3.31E-06	3.29E-01	3.41E-05	0.00E+00
Crushing/Proc. Equipment	2.46E-03	2.34E-01	2.64E-06	1.44E-04	0.00E+00	2.84E-05	5.14E-05	4.85E-04	1.12E-04	8.78E-04	9.40E-07	8.36E-02	1.01E-05	0.00E+00
Crushing/Proc. Equipment	3.31E-04	3.41E-02	3.83E-07	1.05E-05	0.00E+00	2.62E-06	3.76E-05	2.91E-04	1.04E-04	1.19E-03	1.37E-06	1.22E-01	9.39E-06	0.00E+00
Crushing/Proc. Equipment	2.51E-03	2.93E-01	2.88E-06	8.39E-05	0.00E+00	2.04E-05	5.34E-05	4.79E-04	1.44E-04	1.60E-03	1.83E-06	1.87E-01	1.30E-05	0.00E+00
Crushing/Proc. Equipment	7.80E-03	8.74E-01	8.79E-06	2.55E-04	0.00E+00	6.20E-05	8.58E-05	7.41E-04	2.31E-04	2.62E-03	2.96E-06	2.94E-01	2.09E-05	0.00E+00
Crushing/Proc. Equipment	2.26E-02	1.94E+00	1.95E-05	6.71E-04	0.00E+00	1.74E-04	2.26E-04	2.20E-03	6.48E-04	7.60E-03	6.57E-06	6.53E-01	5.85E-05	0.00E+00
Excavators	8.31E-02	8.95E+00	1.01E-04	5.04E-03	0.00E+00	9.97E-04	3.15E-05	3.34E-04	6.92E-05	5.20E-04	6.31E-07	5.61E-02	6.24E-06	0.00E+00
Excavators	4.44E-02	5.15E+00	5.79E-05	1.51E-03	0.00E+00	4.02E-04	2.32E-05	1.88E-04	6.86E-05	6.84E-04	8.92E-07	7.93E-02	6.19E-06	0.00E+00
Excavators	4.13E-02	5.47E+00	5.37E-05	1.50E-03	0.00E+00	3.99E-04	3.19E-05	2.89E-04	9.44E-05	8.82E-04	1.15E-06	1.17E-01	8.52E-06	0.00E+00
Excavators	6.30E-02	8.06E+00	8.10E-05	2.24E-03	0.00E+00	5.92E-04	5.39E-05	4.78E-04	1.58E-04	1.51E-03	1.95E-06	1.94E-01	1.42E-05	0.00E+00
Forklifts	1.69E-03	3.24E-01	3.22E-06	2.58E-05	6.26E-05	1.88E-05	2.90E-06	1.52E-03	3.81E-05	1.90E-04	3.61E-07	3.64E-02	2.11E-06	7.02E-06
Forklifts	2.59E-03	5.83E-01	0.00E+00	5.19E-05	0.00E+00	4.44E-04	2.90E-06	1.12E-03	2.96E-06	1.45E-04	0.00E+00	3.26E-02	2.48E-05	0.00E+00
Forklifts	6.88E-03	7.92E-01	8.92E-06	4.19E-04	0.00E+00	8.17E-05	1.48E-05	1.64E-04	3.20E-05	2.43E-04	3.15E-07	2.80E-02	2.89E-06	0.00E+00
Forklifts	8.69E-03	1.08E+00	1.22E-05	2.75E-04	0.00E+00	7.53E-05	9.80E-06	8.16E-05	2.97E-05	3.09E-04	4.33E-07	3.85E-02	2.68E-06	0.00E+00
Forklifts	4.59E-03	6.66E-01	6.54E-06	1.59E-04	0.00E+00	4.35E-05	1.32E-05	1.12E-04	4.01E-05	3.81E-04	5.44E-07	5.54E-02	3.62E-06	0.00E+00
Gas Compressors	5.24E-04	1.61E-01	0.00E+00	1.28E-05	0.00E+00	1.16E-04	8.21E-06	3.36E-03	8.86E-06	3.35E-04	0.00E+00	1.03E-01	7.43E-05	0.00E+00
Gas Compressors	5.08E-04	1.66E-01	0.00E+00	1.48E-05	0.00E+00	8.94E-05	1.18E-05	4.84E-03	8.52E-06	4.06E-04	0.00E+00	1.33E-01	7.14E-05	0.00E+00
Gas Compressors	7.15E-04	2.34E-01	0.00E+00	2.08E-05	0.00E+00	1.26E-04	1.90E-05	7.78E-03	1.37E-05	6.53E-04	0.00E+00	2.14E-01	1.15E-04	0.00E+00
Generator Sets	3.92E-04	4.27E-02	4.24E-07	3.40E-06	7.35E-06	2.76E-06	6.57E-06	2.58E-03	9.42E-05	7.56E-04	8.19E-07	8.24E-02	5.33E-06	1.42E-05
Generator Sets	1.98E-04	2.50E-02	0.00E+00	2.22E-06	0.00E+00	2.00E-05	6.57E-06	1.90E-03	7.04E-06	5.84E-04	0.00E+00	7.38E-02	5.90E-05	0.00E+00
Generator Sets	1.65E-03	1.80E-01	2.02E-06	8.13E-05	0.00E+00	1.62E-05	3.20E-05	3.68E-04	7.06E-05	6.51E-04	7.98E-07	7.09E-02	6.37E-06	0.00E+00
Generator Sets	1.28E-03	1.50E-01	1.69E-06	3.63E-05	0.00E+00	8.58E-06	2.56E-05	2.24E-04	6.71E-05	9.00E-04	1.19E-06	1.06E-01	6.06E-06	0.00E+00
Generator Sets	4.05E-03	5.30E-01	5.20E-06	1.20E-04	0.00E+00	2.70E-05	3.81E-05	3.82E-04	9.50E-05	1.29E-03	1.65E-06	1.68E-01	8.57E-06	0.00E+00
Generator Sets	4.19E-03	5.32E-01	5.35E-06	1.23E-04	0.00E+00	2.81E-05	6.26E-05	6.17E-04	1.59E-04	2.14E-03	2.73E-06	2.72E-01	1.43E-05	0.00E+00
Generator Sets	2.78E-03	2.67E-01	2.68E-06	7.84E-05	0.00E+00	1.95E-05	1.54E-04	1.51E-03	4.25E-04	5.46E-03	5.27E-06	5.24E-01	3.83E-05	0.00E+00
Graders	2.99E-02	2.89E+00	3.26E-05	1.75E-03	0.00E+00	3.50E-04	3.75E-05	3.69E-04	8.29E-05	6.39E-04	6.97E-07	6.19E-02	7.48E-06	0.00E+00
Graders	2.41E-02	2.49E+00	2.81E-05	8.73E-04	0.00E+00	2.18E-04	3.01E-05	2.34E-04	8.32E-05	8.32E-04	9.67E-07	8.60E-02	7.50E-06	0.00E+00
Graders	8.06E-04	9.41E-02	9.23E-07	3.01E-05	0.00E+00	7.56E-06	3.67E-05	3.50E-04	1.02E-04	9.82E-04	1.13E-06	1.15E-01	9.21E-06	0.00E+00
Graders	3.81E-03	4.32E-01	4.34E-06	1.40E-04	0.00E+00	3.49E-05	7.90E-05	7.41E-04	2.18E-04	2.14E-03	2.44E-06	2.43E-01	1.96E-05	0.00E+00
Off-Highway Tractors	1.78E-02	1.37E+00	1.54E-05	1.03E-03	0.00E+00	2.12E-04	4.89E-05	4.23E-04	1.12E-04	8.44E-04	7.33E-07	6.52E-02	1.01E-05	0.00E+00
Off-Highway Tractors	1.61E-02	1.30E+00	1.46E-05	6.82E-04	0.00E+00	1.61E-04	3.42E-05	2.54E-04	8.94E-05	8.07E-04	7.33E-07	6.52E-02	8.07E-06	0.00E+00
Off-Highway Tractors	1.13E+00	9.93E+01	9.99E-04	4.68E-02	0.00E+00	1.12E-02	1.34E-04	1.65E-03	3.54E-04	3.24E-03	2.85E-06	2.84E-01	3.19E-05	0.00E+00
Off-Highway Tractors	2.02E-01	1.50E+01	1.51E-04	7.01E-03	0.00E+00	1.78E-03	1.90E-04	2.56E-03	5.34E-04	5.48E-03	4.09E-06	4.07E-01	4.81E-05	0.00E+00
Off-Highway Trucks	1.19E-03	1.24E-01	1.40E-06	7.30E-05	0.00E+00	1.47E-05	3.67E-05	3.80E-04	8.20E-05	5.98E-04	7.03E-07	6.25E-02	7.40E-06	0.00E+00
Off-Highway Trucks	1.09E-02	1.22E+00	1.37E-05	3.78E-04	0.00E+00	1.03E-04	2.57E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00
Off-Highway Trucks	2.20E-02	2.81E+00	2.76E-05	8.11E-04	0.00E+00	2.21E-04	3.92E-05	3.52E-04	1.18E-04	1.06E-03	1.34E-06	1.36E-01	1.07E-05	0.00E+00
Off-Highway Trucks	1.39E+00	1.72E+02	1.73E-03	5.04E-02	0.00E+00	1.36E-02	6.47E-05	5.70E-04	1.94E-04	1.78E-03	2.22E-06	2.21E-01	1.75E-05	0.00E+00
Off-Highway Trucks	1.25E+00	1.14E+02	1.15E-03	3.78E-02	0.00E+00	1.00E-02	1.04E-04	9.55E-04	3.05E-04	3.42E-03	3.14E-06	3.12E-01	2.75E-05	0.00E+00
Other Construction Equipment	4.16E-05	1.63E-02	1.62E-07	1.30E-06	1.71E-06	4.79E-07	4.00E-06	1.66E-03	2.62E-05	1.28E-04	4.99E-07	5.02E-02	1.48E-06	5.28E-06
Other Construction Equipment	9.84E-04	1.13E-01	1.27E-06	5.49E-05	0.00E+00	1.05E-05	2.59E-05	2.94E-04	5.47E-05	4.65E-04	5.99E-07	5.32E-02	4.94E-06	0.00E+00
Other Construction Equipment	4.46E-03	6.24E-01	6.13E-06	1.49E-04	0.00E+00	3.54E-05	3.02E-05	2.83E-04	7.98E-05	9.06E-04	1.25E-06	1.27E-01	7.20E-06	0.00E+00

TABLE D.2-6
OFFROAD 2007 EMISSION FACTORS
(PILE)

Equipment	Fuel	MaxHP	Class	C/R	Pre	Hand	Port	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	CO Exhaust
Other General Industrial Equipmen	G4	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.29E-02	8.39E-02	7.17E-01	4.01E-06	2.30E-04
Other General Industrial Equipmen	D	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.67E+00	1.82E+01	7.99E+01	1.19E-03	5.20E-03
Other General Industrial Equipmen	D	250	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.65E+00	1.82E+01	1.12E+02	1.09E-03	2.96E-03
Other General Industrial Equipmen	D	500	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.64E+00	1.81E+01	2.18E+02	1.97E-03	6.16E-03
Other General Industrial Equipmen	D	750	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.16E+00	4.53E+00	8.97E+01	8.18E-04	2.54E-03
Other General Industrial Equipmen	D	1000	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	7.05E-01	2.75E+00	6.99E+01	7.56E-04	2.51E-03
Other Material Handling Equipment	D	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.14E-01	7.75E-01	4.32E+00	6.38E-05	2.80E-04
Other Material Handling Equipment	D	250	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	5.10E-01	1.84E+00	1.21E+01	1.17E-04	3.20E-04
Other Material Handling Equipment	D	500	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	9.53E-02	3.44E-01	2.99E+00	2.66E-05	8.43E-05
Other Material Handling Equipment	D	9999	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.86E-02	1.03E-01	3.48E+00	3.75E-05	1.24E-04
Pavers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	3.58E+00	8.21E+00	4.81E+01	8.06E-04	3.24E-03
Pavers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.32E-01	9.89E-01	8.74E+00	1.13E-04	3.28E-04
Pavers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.43E-01	1.02E+00	1.08E+01	1.26E-04	5.41E-04
Paving Equipment	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	8.35E-01	1.92E+00	8.85E+00	1.47E-04	5.90E-04
Paving Equipment	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.35E-01	5.41E-01	3.00E+00	3.84E-05	1.11E-04
Pumps	G4	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	2.76E-01	1.67E-01	1.50E+00	1.63E-05	4.49E-04
Pumps	D	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	2.84E+00	3.13E+00	2.00E+01	2.26E-04	1.15E-03
Pumps	D	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.04E+00	2.25E+00	2.05E+01	1.49E-04	4.87E-04
Pumps	D	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.03E-02	4.45E-02	6.95E-01	4.51E-06	1.79E-05
Pumps	D	750	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	6.72E-03	7.41E-03	1.91E-01	1.28E-06	4.94E-06
Pumps	D	9999	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.48E-01	1.63E-01	1.00E+01	9.13E-05	3.27E-04
Rollers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	9.52E+00	1.83E+01	9.05E+01	1.29E-03	5.72E-03
Rollers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.35E+00	2.60E+00	1.81E+01	1.87E-04	5.56E-04
Rollers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	9.47E-01	1.82E+00	1.81E+01	1.70E-04	6.56E-04
Rough Terrain Forklifts	G4	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	2.28E-02	2.58E-02	2.11E-01	3.30E-06	6.77E-05
Rough Terrain Forklifts	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	3.82E+00	1.19E+01	6.76E+01	9.20E-04	4.32E-03
Rough Terrain Forklifts	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.13E-01	6.62E-01	5.12E+00	4.72E-05	1.33E-04
Rough Terrain Forklifts	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.40E-01	4.36E-01	5.06E+00	4.31E-05	1.38E-04
Rubber Tired Dozers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	5.61E-02	2.51E-01	1.49E+00	2.90E-05	1.08E-04
Rubber Tired Dozers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.37E+00	6.16E+00	5.14E+01	8.14E-04	2.27E-03
Rubber Tired Dozers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.11E+00	9.47E+00	1.15E+02	1.64E-03	7.63E-03
Rubber Tired Dozers	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.02E+01	1.35E+02	2.46E+03	3.54E-02	1.64E-01
Rubber Tired Dozers	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.04E+00	9.14E+00	2.47E+02	3.70E-03	1.78E-02
Rubber Tired Loaders	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	2.34E+01	6.25E+01	3.03E+02	4.38E-03	1.97E-02
Rubber Tired Loaders	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.32E+01	6.22E+01	4.20E+02	4.37E-03	1.24E-02
Rubber Tired Loaders	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	9.67E+00	2.59E+01	2.78E+02	2.66E-03	9.22E-03
Rubber Tired Loaders	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.75E+01	7.35E+01	1.62E+03	1.56E-02	5.36E-02
Rubber Tired Loaders	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.95E+00	7.88E+00	2.13E+02	2.28E-03	8.18E-03
Scrapers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	2.00E+00	6.12E+00	4.15E+01	7.01E-04	2.82E-03
Scrapers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.95E+00	5.97E+00	5.68E+01	7.41E-04	2.08E-03
Scrapers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	5.37E+00	1.64E+01	2.40E+02	2.86E-03	1.14E-02
Scrapers	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.56E+01	1.09E+02	2.75E+03	3.29E-02	1.31E-01
Signal Boards	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	7.96E-01	1.17E+00	8.23E+00	1.05E-04	4.90E-04
Signal Boards	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.68E-01	2.47E-01	2.85E+00	2.32E-05	7.08E-05
Surfacing Equipment	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.68E-02	2.09E-02	8.17E-02	1.06E-06	4.97E-06
Surfacing Equipment	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.36E-02	4.18E-02	2.56E-01	2.44E-06	7.68E-06
Surfacing Equipment	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.80E-01	3.48E-01	3.49E+00	3.01E-05	1.26E-04
Surfacing Equipment	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.81E+00	8.46E+00	1.33E+02	1.17E-03	4.78E-03
Sweepers/Scrubbers	G4	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.91E-02	2.70E-02	2.43E-01	1.00E-06	7.50E-05
Sweepers/Scrubbers	D	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.96E+00	1.32E+01	8.40E+01	1.05E-03	5.26E-03
Sweepers/Scrubbers	D	250	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.34E-01	2.12E+00	1.56E+01	1.27E-04	3.64E-04
Tractors/Loaders/Backhoes	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	9.43E+00	2.50E+01	1.16E+02	1.43E-03	7.34E-03
Tractors/Loaders/Backhoes	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.05E+00	8.09E+00	6.29E+01	5.42E-04	1.57E-03
Tractors/Loaders/Backhoes	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.92E+00	1.31E+01	2.04E+02	1.63E-03	5.25E-03
Tractors/Loaders/Backhoes	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.37E+02	3.64E+02	8.53E+03	6.90E-02	2.20E-01
Trenchers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	2.50E+00	4.34E+00	2.85E+01	4.68E-04	1.90E-03
Trenchers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.24E-01	3.89E-01	3.94E+00	5.08E-05	1.50E-04
Trenchers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.86E-01	4.96E-01	7.04E+00	8.14E-05	3.72E-04
Trenchers	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.36E+00	2.36E+00	6.32E+01	7.38E-04	3.34E-03
Welders	G4	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.01E+00	5.74E-01	3.46E+00	4.30E-05	1.02E-03
Welders	D	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.21E-01	2.13E-01	9.53E-01	1.21E-05	5.75E-05
Welders	D	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.69E-02	4.73E-02	2.55E-01	2.09E-06	6.34E-06
Welders	D	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	6.72E-02	1.18E-01	8.97E-01	6.59E-06	2.42E-05
Generator Sets	D	50	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV					

Notes: Consumption is gal/day for total population. Activity is hours per day for total population

TABLE D.2-6
OFFROAD 2007 EMISSION FACTORS
(PILE)

Equipment	NOX Exhaust	CO2 Exhaust	SO2 Exhaust	PM Exhaust	N2O Exhaust	CH4 Exhaust	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)	Exhaust/Activity (tons/hr)
Other General Industrial Equipmen	2.73E-05	6.54E-03	6.50E-08	5.21E-07	7.95E-07	2.26E-07	6.21E-06	2.74E-03	4.78E-05	3.26E-04	7.75E-07	7.80E-02	2.70E-06	9.48E-06
Other General Industrial Equipmen	9.03E-03	8.74E-01	9.83E-06	5.42E-04	0.00E+00	1.08E-04	2.97E-05	2.85E-04	6.54E-05	4.95E-04	5.39E-07	4.79E-02	5.90E-06	0.00E+00
Other General Industrial Equipmen	1.17E-02	1.23E+00	1.38E-05	3.81E-04	0.00E+00	9.88E-05	2.10E-05	1.63E-04	6.03E-05	6.47E-04	7.62E-07	6.77E-02	5.44E-06	0.00E+00
Other General Industrial Equipmen	2.01E-02	2.40E+00	2.36E-05	6.90E-04	0.00E+00	1.78E-04	3.81E-05	3.40E-04	1.09E-04	1.11E-03	1.30E-06	1.33E-01	9.81E-06	0.00E+00
Other General Industrial Equipmen	8.54E-03	9.89E-01	9.94E-06	2.90E-04	0.00E+00	7.38E-05	6.40E-05	5.61E-04	1.81E-04	1.89E-03	2.20E-06	2.19E-01	1.63E-05	0.00E+00
Other General Industrial Equipmen	8.82E-03	7.70E-01	7.74E-06	2.65E-04	0.00E+00	6.82E-05	9.62E-05	9.11E-04	2.75E-04	3.20E-03	2.81E-06	2.80E-01	2.48E-05	0.00E+00
Other Material Handling Equipment	4.88E-04	4.73E-02	5.32E-07	2.91E-05	0.00E+00	5.76E-06	3.76E-05	3.61E-04	8.23E-05	6.29E-04	6.86E-07	6.10E-02	7.43E-06	0.00E+00
Other Material Handling Equipment	1.27E-03	1.34E-01	1.50E-06	4.11E-05	0.00E+00	1.06E-05	2.23E-05	1.74E-04	6.36E-05	6.90E-04	8.15E-07	7.24E-02	5.74E-06	0.00E+00
Other Material Handling Equipment	2.75E-04	3.30E-02	3.24E-07	9.41E-06	0.00E+00	2.40E-06	2.73E-05	2.45E-04	7.73E-05	7.98E-04	9.40E-07	9.57E-02	6.97E-06	0.00E+00
Other Material Handling Equipment	4.37E-04	3.83E-02	3.76E-07	1.31E-05	0.00E+00	3.38E-06	1.27E-04	1.20E-03	3.63E-04	4.23E-03	3.64E-06	3.70E-01	3.27E-05	0.00E+00
Pavers	6.27E-03	5.26E-01	5.92E-06	3.58E-04	0.00E+00	7.27E-05	4.36E-05	3.94E-04	9.81E-05	7.64E-04	7.21E-07	6.41E-02	8.85E-06	0.00E+00
Pavers	1.09E-03	9.61E-02	1.08E-06	4.35E-05	0.00E+00	1.02E-05	4.40E-05	3.32E-04	1.15E-04	1.10E-03	1.09E-06	9.71E-02	1.03E-05	0.00E+00
Pavers	1.21E-03	1.18E-01	1.16E-06	4.80E-05	0.00E+00	1.14E-05	4.73E-05	5.33E-04	1.24E-04	1.19E-03	1.14E-06	1.17E-01	1.12E-05	0.00E+00
Paving Equipment	1.15E-03	9.68E-02	1.09E-06	6.52E-05	0.00E+00	1.32E-05	3.40E-05	3.07E-04	7.66E-05	5.99E-04	5.68E-07	5.05E-02	6.91E-06	0.00E+00
Paving Equipment	3.73E-04	3.30E-02	3.72E-07	1.47E-05	0.00E+00	3.46E-06	2.73E-05	2.06E-04	7.10E-05	6.89E-04	6.87E-07	6.11E-02	6.41E-06	0.00E+00
Pumps	1.18E-04	1.37E-02	1.37E-07	1.09E-06	2.11E-06	9.20E-07	6.57E-06	2.69E-03	9.76E-05	7.05E-04	8.20E-07	8.25E-02	5.52E-06	1.27E-05
Pumps	2.04E-03	2.19E-01	2.46E-06	1.03E-04	0.00E+00	2.04E-05	3.29E-05	3.68E-04	7.23E-05	6.52E-04	7.88E-07	7.00E-02	6.52E-06	0.00E+00
Pumps	1.95E-03	2.27E-01	2.55E-06	5.67E-05	0.00E+00	1.35E-05	2.52E-05	2.16E-04	6.62E-05	8.65E-04	1.13E-06	1.01E-01	5.98E-06	0.00E+00
Pumps	5.92E-05	7.67E-03	7.53E-08	1.80E-06	0.00E+00	4.07E-07	4.04E-05	4.03E-04	1.01E-04	1.33E-03	1.69E-06	1.72E-01	9.15E-06	0.00E+00
Pumps	1.68E-05	2.11E-03	2.12E-08	5.03E-07	0.00E+00	1.16E-07	6.79E-05	6.66E-04	1.73E-04	2.27E-03	2.87E-06	2.85E-01	1.56E-05	0.00E+00
Pumps	1.16E-03	1.10E-01	1.11E-06	3.29E-05	0.00E+00	8.24E-06	2.02E-04	2.01E-03	5.60E-04	7.13E-03	6.81E-06	6.77E-01	5.06E-05	0.00E+00
Rollers	1.04E-02	9.90E-01	1.11E-05	5.82E-04	0.00E+00	1.16E-04	3.18E-05	3.12E-04	7.02E-05	5.70E-04	6.08E-07	5.40E-02	6.33E-06	0.00E+00
Rollers	1.97E-03	1.99E-01	2.24E-06	7.11E-05	0.00E+00	1.69E-05	2.74E-05	2.14E-04	7.19E-05	7.58E-04	8.60E-07	7.65E-02	6.49E-06	0.00E+00
Rollers	1.77E-03	2.00E-01	1.96E-06	6.50E-05	0.00E+00	1.53E-05	3.56E-05	3.60E-04	9.30E-05	9.71E-04	1.07E-06	1.09E-01	8.39E-06	0.00E+00
Rough Terrain Forklifts	2.34E-05	1.91E-03	1.90E-08	1.53E-07	3.98E-07	1.86E-07	5.92E-06	2.63E-03	1.28E-04	9.07E-04	7.38E-07	7.43E-02	7.22E-06	1.54E-05
Rough Terrain Forklifts	7.17E-03	7.40E-01	8.33E-06	4.24E-04	0.00E+00	8.30E-05	3.58E-05	3.64E-04	7.76E-05	6.04E-04	7.02E-07	6.24E-02	7.00E-06	0.00E+00
Rough Terrain Forklifts	5.08E-04	5.65E-02	6.36E-07	1.68E-05	0.00E+00	4.26E-06	2.53E-05	2.01E-04	7.13E-05	7.67E-04	9.60E-07	8.53E-02	6.43E-06	0.00E+00
Rough Terrain Forklifts	4.40E-04	5.58E-02	5.48E-07	1.54E-05	0.00E+00	3.89E-06	3.53E-05	3.16E-04	9.89E-05	1.01E-03	1.26E-06	1.28E-01	8.92E-06	0.00E+00
Rubber Tired Dozers	2.15E-04	1.63E-02	1.83E-07	1.26E-05	0.00E+00	2.62E-06	5.00E-05	4.29E-04	1.15E-04	8.54E-04	7.28E-07	6.47E-02	1.04E-05	0.00E+00
Rubber Tired Dozers	7.14E-03	5.64E-01	6.35E-06	3.08E-04	0.00E+00	7.35E-05	5.00E-05	3.69E-04	1.32E-04	1.16E-03	1.03E-06	9.17E-02	1.19E-05	0.00E+00
Rubber Tired Dozers	1.44E-02	1.25E+00	1.23E-05	6.06E-04	0.00E+00	1.48E-04	6.40E-05	8.05E-04	1.73E-04	1.52E-03	1.30E-06	1.32E-01	1.56E-05	0.00E+00
Rubber Tired Dozers	3.14E-01	2.69E+01	2.71E-04	1.31E-02	0.00E+00	3.19E-03	9.72E-05	1.21E-03	2.62E-04	2.32E-03	2.00E-06	1.99E-01	2.36E-05	0.00E+00
Rubber Tired Dozers	3.71E-02	2.70E+00	2.72E-05	1.31E-03	0.00E+00	3.34E-04	1.43E-04	1.94E-03	4.05E-04	4.06E-03	2.97E-06	2.96E-01	3.65E-05	0.00E+00
Rubber Tired Loaders	3.39E-02	3.32E+00	3.74E-05	1.99E-03	0.00E+00	3.95E-04	3.18E-05	3.15E-04	7.01E-05	5.43E-04	5.98E-07	5.31E-02	6.32E-06	0.00E+00
Rubber Tired Loaders	4.43E-02	4.63E+00	5.21E-05	1.59E-03	0.00E+00	3.95E-04	2.55E-05	2.00E-04	7.04E-05	7.13E-04	8.37E-07	7.44E-02	6.35E-06	0.00E+00
Rubber Tired Loaders	2.60E-02	3.06E+00	3.01E-05	9.62E-04	0.00E+00	2.40E-04	3.72E-05	3.56E-04	1.03E-04	1.00E-03	1.16E-06	1.18E-01	9.29E-06	0.00E+00
Rubber Tired Loaders	1.55E-01	1.78E+01	1.79E-04	5.69E-03	0.00E+00	1.41E-03	7.74E-05	7.30E-04	2.13E-04	2.12E-03	2.44E-06	2.43E-01	1.92E-05	0.00E+00
Rubber Tired Loaders	2.65E-02	2.34E+00	2.35E-05	7.99E-04	0.00E+00	2.06E-04	1.01E-04	1.04E-03	2.90E-04	3.36E-03	2.98E-06	2.97E-01	2.61E-05	0.00E+00
Scrapers	5.32E-03	4.53E-01	5.10E-06	3.10E-04	0.00E+00	6.33E-05	5.07E-05	4.60E-04	1.14E-04	8.69E-04	8.32E-07	7.40E-02	1.03E-05	0.00E+00
Scrapers	6.96E-03	6.25E-01	7.03E-06	2.77E-04	0.00E+00	6.68E-05	4.63E-05	3.49E-04	1.24E-04	1.17E-03	1.18E-06	1.05E-01	1.12E-05	0.00E+00
Scrapers	2.64E-02	2.64E+00	2.59E-05	1.05E-03	0.00E+00	2.58E-04	6.39E-05	6.95E-04	1.74E-04	1.60E-03	1.58E-06	1.61E-01	1.57E-05	0.00E+00
Scrapers	3.09E-01	3.02E+01	3.04E-04	1.22E-02	0.00E+00	2.97E-03	1.12E-04	1.20E-03	3.02E-04	2.84E-03	2.79E-06	2.77E-01	2.72E-05	0.00E+00
Signal Boards	8.93E-04	9.02E-02	1.01E-06	4.75E-05	0.00E+00	9.47E-06	4.07E-05	4.20E-04	8.99E-05	7.65E-04	8.69E-07	7.72E-02	8.11E-06	0.00E+00
Signal Boards	2.88E-04	3.15E-02	3.54E-07	8.70E-06	0.00E+00	2.09E-06	3.53E-05	2.87E-04	9.41E-05	1.17E-03	1.43E-06	1.28E-01	8.49E-06	0.00E+00
Surfacing Equipment	9.08E-06	8.95E-04	1.01E-08	4.75E-07	0.00E+00	9.56E-08	2.28E-05	2.38E-04	5.07E-05	4.35E-04	4.82E-07	4.28E-02	4.58E-06	0.00E+00
Surfacing Equipment	2.69E-05	2.82E-03	3.17E-08	9.42E-07	0.00E+00	2.21E-07	2.25E-05	1.84E-04	5.85E-05	6.44E-04	7.58E-07	6.74E-02	5.28E-06	0.00E+00
Surfacing Equipment	3.33E-04	3.85E-02	3.78E-07	1.18E-05	0.00E+00	2.72E-06	3.38E-05	3.61E-04	8.66E-05	9.55E-04	1.08E-06	1.11E-01	7.81E-06	0.00E+00
Surfacing Equipment	1.30E-02	1.47E+00	1.47E-05	4.55E-04	0.00E+00	1.06E-04	5.37E-05	5.66E-04	1.39E-04	1.54E-03	1.74E-06	1.73E-01	1.25E-05	0.00E+00
Sweepers/Scrubbers	7.87E-06	2.23E-03	2.21E-08	1.77E-07	2.45E-07	5.66E-08	6.57E-06	2.78E-03	3.72E-05	2.92E-04	8.20E-07	8.25E-02	2.10E-06	9.09E-06
Sweepers/Scrubbers	8.28E-03	9.20E-01	1.04E-05	4.94E-04	0.00E+00	9.48E-05	3.73E-05	3.97E-04	7.93E-05	6.25E-04	7.81E-07	6.94E-02	7.15E-06	0.00E+00
Sweepers/Scrubbers	1.43E-03	1.72E-01	1.93E-06	4.42E-05	0.00E+00	1.14E-05	2.08E-05	1.72E-04	5.97E-05	6.74E-04	9.11E-07	8.09E-02	5.39E-06	0.00E+00
Tractors/Loaders/Backhoes	1.13E-02	1.27E+00	1.43E-05	6.68E-04	0.00E+00	1.29E-04	2.67E-05	2.94E-04	5.72E-05	4.50E-04	5.70E-07	5.06E-02	5.16E-06	0.00E+00
Tractors/Loaders/Backhoes	5.73E-03	6.94E-01	7.81E-06	1.89E-04	0.00E+00	4.89E-05	2.34E-05	1.94E-04	6.69E-05	7.08E-04	9.65E-07	8.58E-02	6.04E-06	0.00E+00
Tractors/Loaders/Backhoes	1.62E-02	2.25E+00	2.53E-05	5.73E-04	0.00E+00	1.47E-04	4.38E-05	4.02E-04	1.25E-04	1.24E-03	1.94E-06	1.72E-01	1.13E-05	0.00E+00
Tractors/Loaders/Backhoes	7.03E-01	9.41E+01	1.06E-03	2.44E-02	0.00E+00	6.22E-03	6.71E-05	6.03E-04	1.89E-04	1.93E-03	2.91E-06	2.58E-01	1.71E-05	0.00E+00
Trenchers	3.72E-03	3.12E-01	3.51E-06	2.08E-04	0.00E+00	4.23E-05	4.78E-05	4.38E-04	1.08E-04	8.57E-04	8.09E-07	7.19E-02	9.73E-06	0.00E+00
Trenchers	4.92E-04	4.34E-02	4.88E-07	1.98E-05	0.00E+00	4.59E-06	5.09E-05	3.86E-04	1.31E-04	1.26E-03	1.25E-06	1.11E-01	1.18E-05	0.00E+00
Trenchers	7.94E-04	7.72E-02	7.58E-07	3.15E-05	0.00E+00	7.34E-06	6.35E-05	7.49E-04	1.64E-04	1.60E-03	1.53E-06	1.56E-01	1.48E-05	0.00E+00
Trenchers	7.27E-03	6.93E-01	6.97E-06	2.86E-04	0.00E+00	6.66E-05	1.21E-04	1.41E-03	3.12E-04	3.08E-03	2.95E-06	2.93E-01	2.82E-05	0.00E+00
Welders	3.19E-04	3.16E-02	3.14E-07	2.52E-06	6.58E-06	2.43E-06	4.38E-06	1.78E-03	7.49E-05	5.57E-04	5.47E-07	5.50E-02	4.24E-06	1.15E-05
Welders	1.02E-04	1.04E-02	1.17E-07	5.55E-06	0.00E+00	1.09E-06	2.61E-05	2.70E-04	5.68E-05	4.78E-04	5.52E-07	4.91E-02	5.12E-06	0.00E+00
Welders	2.53E-05	2.81E-03	3.17E-08	7.79E-07	0.00E+00	1.88E-07	1.65E-05	1.34E-04	4.41E-05	5.36E-04	6.69E-07	5.95E-02	3.98E-06	0.00E+00
Welders	7.92E-05	9.90E-03	9.72E-08	2.55E-06	0.00E+00	5.95E-07	2.15E-05	2.05E-04	5.58E-05	6.70E-04	8.22E-07	8.37E-02	5.03E-06	0.00E+00
Generator Sets							1.32677E-05	0.00013761	5.02871E-05	0.000149893	1.97762E-07	0.015297744	4.53732E-06	0

TABLE D.2-7
EMFAC EMISSION FACTORS
(PILE)

Pollutant Name: Reactive Org Gases Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22.028	23.429	3.173	3.173	11.69	22.198
5	17.318	0.233	0.408	0.316	18.309	0.273	0.195	0.617	18.065	0.362	0.325	0.45	22.905	0.431	0.185	0.567	18.021	1.186	0.375	0.562	9.975	3.258
10	12.304	0.148	0.32	0.208	13.01	0.177	0.153	0.424	12.836	0.235	0.255	0.297	16.282	0.278	0.145	0.375	11.774	0.772	0.294	0.441	5.546	2.111
20	7.109	0.071	0.211	0.105	7.519	0.087	0.101	0.231	7.418	0.115	0.168	0.151	9.421	0.135	0.095	0.191	5.675	0.369	0.194	0.291	1.419	0.994
30	4.925	0.042	0.151	0.066	5.21	0.053	0.072	0.154	5.14	0.069	0.121	0.094	6.535	0.08	0.069	0.119	3.217	0.207	0.139	0.209	0.935	0.547
40	4.099	0.031	0.119	0.051	4.338	0.04	0.057	0.124	4.279	0.051	0.095	0.072	5.445	0.059	0.054	0.092	2.151	0.138	0.109	0.164	0.67	0.356
50	4.108	0.028	0.102	0.048	4.347	0.037	0.049	0.121	4.288	0.046	0.081	0.067	5.456	0.054	0.046	0.087	1.703	0.108	0.094	0.141	0.624	0.276
60	4.955	0.032	0.095	0.056	5.242	0.042	0.046	0.142	5.172	0.052	0.076	0.077	6.575	0.061	0.043	0.101	1.604	0.102	0.088	0.132	0.798	0.259
65	5.831	0.037	0.095	0.065	6.168	0.048	0.046	0.166	6.085	0.059	0.076	0.089	7.732	0.071	0.043	0.117	1.662	0.106	0.088	0.132	0.967	0.269

Pollutant Name: Carbon Monoxide Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136.515	141.648	26.3	26.3	47.206	137.138
5	147.349	3.199	2.677	3.9	150.522	4.577	2.128	7.265	147.759	5.029	2.639	5.729	271.514	5.068	2.078	6.678	323.587	11.401	2.847	7.309	16.231	40.104
10	107.398	2.839	1.846	3.347	109.711	3.953	1.467	5.864	107.697	4.417	1.819	4.922	197.898	4.409	1.433	5.575	215.286	7.585	1.963	5.04	11.702	26.682
20	66.637	2.301	1.006	2.612	68.072	3.1	0.8	4.233	66.823	3.528	0.992	3.836	122.789	3.494	0.781	4.21	112.389	3.96	1.07	2.747	6.254	13.929
30	50.855	1.922	0.658	2.159	51.95	2.559	0.523	3.405	50.997	2.927	0.648	3.16	93.709	2.898	0.511	3.442	73.11	2.576	0.7	1.796	4.55	9.061
40	47.737	1.65	0.516	1.873	48.765	2.209	0.41	3.013	47.87	2.512	0.508	2.732	87.962	2.501	0.4	3.013	59.262	2.088	0.549	1.408	3.438	7.345
50	55.115	1.458	0.485	1.718	56.302	2.005	0.386	2.967	55.268	2.235	0.478	2.493	101.558	2.256	0.377	2.853	59.858	2.109	0.516	1.325	2.918	7.419
60	78.268	1.338	0.548	1.711	79.954	1.952	0.435	3.378	78.486	2.084	0.54	2.458	144.222	2.17	0.425	3.028	75.337	2.654	0.583	1.495	2.991	9.337
65	100.799	1.309	0.623	1.792	102.969	2.005	0.495	3.874	101.079	2.063	0.614	2.549	185.738	2.209	0.484	3.319	91.787	3.234	0.663	1.701	3.249	11.376

Pollutant Name: Oxides of Nitrogen Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.436	1.533	75.051	75.051	112.434	1.448
5	3.508	0.308	2.219	0.327	3.521	0.402	2.238	0.559	3.467	0.708	2.146	0.724	5.796	0.789	2.249	0.824	1.801	0.52	5.758	11.196	35.694	2.858
10	3.688	0.266	1.841	0.286	3.702	0.345	1.857	0.49	3.645	0.605	1.781	0.622	6.095	0.676	1.866	0.712	1.893	0.547	4.777	9.289	24.721	3.003
20	4.062	0.212	1.41	0.232	4.077	0.273	1.421	0.407	4.014	0.473	1.364	0.492	6.711	0.531	1.429	0.572	2.075	0.6	3.658	7.112	15.246	3.293
30	4.448	0.182	1.244	0.204	4.465	0.235	1.254	0.371	4.396	0.403	1.203	0.424	7.351	0.455	1.261	0.499	2.258	0.652	3.228	6.276	13.921	3.583
40	4.846	0.168	1.266	0.193	4.864	0.22	1.276	0.365	4.789	0.373	1.224	0.396	8.007	0.423	1.282	0.472	2.44	0.705	3.283	6.384	13.184	3.873
50	5.25	0.168	1.484	0.194	5.27	0.222	1.496	0.387	5.189	0.375	1.435	0.4	8.676	0.426	1.503	0.48	2.623	0.758	3.849	7.484	13.034	4.163
60	5.658	0.18	2.005	0.21	5.679	0.244	2.021	0.443	5.591	0.411	1.939	0.439	9.349	0.467	2.031	0.526	2.806	0.811	5.201	10.113	13.471	4.452
65	5.862	0.192	2.458	0.224	5.884	0.264	2.478	0.489	5.793	0.445	2.377	0.474	9.686	0.505	2.491	0.567	2.897	0.837	6.376	12.398	13.91	4.597

Pollutant Name: Carbon Dioxide Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4776.9	4776.9	4098	4098	6617.135	4776.901
5	1313.986	949.64	358.513	950.427	1315.26	1184.957	346.459	1143.2	1316.204	1186.769	351.013	1185.937	1667.943	1624.53	346.459	1620.703	2513.51	2513.51	519.492	1505	3845.361	2513.51
10	992.919	717.6	358.513	718.341	993.882	895.418	346.459	868.334	994.595	896.788	351.013	896.31	1260.389	1227.583	346.459	1224.963	1672.267	1672.267	519.492	1505	3165.447	1672.267
20	633.91	458.138	358.513	458.828	634.525	571.663	346.459	560.985	634.98	572.537	351.013	572.455	804.671	783.727	346.459	782.455	873	873	519.492	1505	2183.16	873
30	469.639	339.417	358.513	340.083	470.095	423.523	346.459	420.353	470.432	424.17	351.013	424.27	596.15	580.633	346.459	579.978	567.895	567.895	519.492	1505	1924.234	567.895
40	403.761	291.805	358.513	292.462	404.152	364.113	346.459	363.954	404.443	364.67	351.013	364.842	512.525	499.185	346.459	498.777	460.326	460.326	519.492	1505	1753.407	460.326
50	402.817	291.123	358.513	291.779	403.207	363.262	346.459	363.146	403.497	363.817	351.013	363.99	511.326	498.017	346.459	497.613	464.953	464.953	519.492	1505	1670.679	464.953
60	466.351	337.04	358.513	337.706	466.803	420.557	346.459	417.538	467.139	421.201	351.013	421.304	591.976	576.568	346.459	575.925	585.19	585.19	519.492	1505	1676.049	585.19
65	530.579	383.458	358.513	384.133	531.093	478.478	346.459	472.523	531.474	479.21	351.013	479.242	673.505	655.975	346.459	655.09	712.968	712.968	519.492	1505	1711.772	712.968

TABLE D.2-7
EMFAC EMISSION FACTORS
(PILE)

Pollutant Nai Pollutant Name: Reactive Org Gases

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	3.173	12.357	0	0	0	0	0	0	0	0	22.028	22.864	3.173	5.622	0	0	0	0	0.201	0.638	7.569	1.048
5	0.658	2.01	0	6.399	0.818	1.757	5.483	4.058	0	4.867	27.082	7.578	0.909	1.821	27.082	1.621	0.258	2.053	11.748	0.362	5.84	0.838
10	0.517	1.35	0	4.187	0.593	1.198	4.31	2.981	0	3.735	17.711	4.951	0.714	1.294	17.711	1.051	0.203	1.338	8.537	0.236	3.292	0.526
20	0.34	0.687	0	2.029	0.347	0.63	3.054	1.883	0	2.548	8.562	2.387	0.47	0.734	8.562	0.496	0.134	0.64	5.199	0.116	0.905	0.229
30	0.244	0.408	0	1.16	0.233	0.389	2.604	1.474	0	2.115	4.874	1.354	0.338	0.479	4.874	0.275	0.096	0.36	3.84	0.071	0.602	0.152
40	0.192	0.283	0	0.783	0.18	0.282	2.679	1.436	0	2.141	3.272	0.906	0.265	0.355	3.272	0.181	0.075	0.239	3.452	0.054	0.436	0.121
50	0.165	0.228	0	0.624	0.16	0.238	3.324	1.74	0	2.639	2.6	0.718	0.227	0.296	2.6	0.141	0.065	0.188	3.783	0.05	0.402	0.12
60	0.154	0.214	0	0.589	0.164	0.236	4.958	2.608	0	3.941	2.451	0.676	0.213	0.278	2.451	0.133	0.06	0.177	5.05	0.06	0.498	0.15
65	0.154	0.219	0	0.609	0.175	0.248	6.481	3.45	0	5.17	2.538	0.701	0.213	0.281	2.538	0.138	0.06	0.183	6.277	0.071	0.593	0.182

Pollutant Na Pollutant Name: Carbon Monoxide

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	26.3	79.808	0	0	0	0	0	0	0	0	136.515	139.578	26.3	40.396	0	0	0	0	1.247	3.862	34.65	5.671
5	7.932	25.275	0	29.208	7.094	10.817	39.773	15.962	0	29.473	485.38	74.488	11.727	21.248	485.38	34.369	3.416	41.352	104.508	4.635	11.251	6.327
10	5.469	16.915	0	19.433	4.465	6.985	32.62	14.003	0	24.567	322.929	49.558	8.086	14.385	322.929	22.866	2.356	27.52	77.493	3.929	8.04	5.129
20	2.981	8.895	0	10.145	2.118	3.469	25.626	11.543	0	19.534	168.584	25.872	4.407	7.672	168.584	11.937	1.284	14.372	50.311	3.023	4.307	3.713
30	1.949	5.791	0	6.599	1.277	2.173	24.762	10.365	0	18.534	109.665	16.83	2.881	5.003	109.665	7.765	0.839	9.35	40.776	2.475	3.075	3.008
40	1.528	4.668	0	5.349	0.978	1.714	29.43	10.311	0	21.16	88.893	13.642	2.26	3.989	88.893	6.294	0.658	7.577	41.269	2.128	2.338	2.648
50	1.438	4.66	0	5.403	0.953	1.702	43.022	11.9	0	29.56	89.786	13.779	2.126	3.892	89.786	6.358	0.619	7.648	52.172	1.926	2.021	2.584
60	1.623	5.769	0	6.8	1.181	2.127	77.356	17.063	0	51.275	113.005	17.342	2.399	4.657	113.005	8.002	0.699	9.618	82.39	1.876	2.111	2.935
65	1.846	6.96	0	8.285	1.438	2.591	112.1	22.604	0	73.387	137.68	21.129	2.729	5.504	137.68	9.749	0.795	11.713	112.539	1.933	2.317	3.39

Pollutant Na Pollutant Name: Oxides of Nitrogen

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	75.051	39.517	0	0	0	0	0	0	0	0	1.436	1.494	75.051	65.889	0	0	0	0	0.013	0.042	86.287	5.203
5	14.062	8.652	0	1.793	14.545	12.398	1.089	1.305	0	1.183	2.702	2.132	20.836	18.509	2.702	1.091	12.467	2.239	2.342	0.497	23.732	1.911
10	11.666	7.483	0	1.884	11.125	9.57	1.142	1.223	0	1.177	2.839	2.24	17.287	15.415	2.839	1.146	10.343	2.083	2.461	0.433	16.909	1.445
20	8.933	6.209	0	2.066	7.563	6.637	1.249	1.122	0	1.194	3.113	2.456	13.236	11.896	3.113	1.256	7.92	1.949	2.705	0.351	10.851	1.01
30	7.883	5.806	0	2.248	6.279	5.6	1.36	1.086	0	1.242	3.387	2.672	11.681	10.562	3.387	1.367	6.989	1.962	2.958	0.309	9.834	0.914
40	8.018	6.016	0	2.429	6.368	5.705	1.472	1.102	0	1.312	3.661	2.888	11.881	10.764	3.661	1.478	7.109	2.077	3.217	0.293	9.451	0.879
50	9.4	6.871	0	2.611	7.887	6.999	1.586	1.166	0	1.404	3.935	3.104	13.929	12.584	3.935	1.588	8.334	2.3	3.48	0.297	9.716	0.902
60	12.701	8.718	0	2.793	11.932	10.393	1.698	1.286	0	1.52	4.208	3.32	18.821	16.894	4.208	1.699	11.261	2.689	3.744	0.323	10.808	0.995
65	15.572	10.272	0	2.884	15.819	13.642	1.754	1.372	0	1.589	4.345	3.428	23.074	20.631	4.345	1.754	13.806	2.99	3.875	0.346	11.795	1.077

Pollutant N Pollutant Name: Carbon Dioxide

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	4098	4425.763	0	0	0	0	0	0	0	0	4776.899	4776.899	4098	4182.559	0	0	0	0	43.648	130.385	4981.696	419.6
5	1505	1991.892	0	2513.51	2473.495	2480.231	227.849	273.047	0	247.4	2513.51	2513.51	1505	1630.612	2513.51	2513.51	1505	2414.894	786.453	1164.57	2568.864	1243.708
10	1505	1585.754	0	1672.267	2473.495	2338.615	194.934	226.334	0	208.516	1672.267	1672.267	1505	1525.833	1672.267	1672.267	1505	1655.911	601.589	872.282	2184.539	947.306
20	1505	1199.88	0	873	2473.495	2204.065	149.45	171.673	0	159.063	873	873	1505	1426.283	873	873	1505	934.8	393.23	550.323	1629.295	612.859
30	1505	1052.58	0	567.895	2473.495	2152.703	121.883	148.543	0	133.415	567.895	567.895	1505	1388.282	567.895	567.895	1505	659.528	295.584	405.109	1482.936	468.193
40	1505	1000.648	0	460.326	2473.495	2134.595	105.737	147.05	0	123.608	460.326	460.326	1505	1374.884	460.326	460.326	1505	562.479	254.045	347.427	1386.375	408.395
50	1505	1002.882	0	464.953	2473.495	2135.374	97.579	167.479	0	127.815	464.953	464.953	1505	1375.46	464.953	464.953	1505	566.653	249.394	346.928	1339.612	405.073
60	1505	1060.93	0	585.19	2473.495	2155.615	95.79	220.926	0	149.92	585.19	585.19	1505	1390.436	585.19	585.19	1505	675.132	280.637	403.42	1342.648	458.038
65	1505	1122.619	0	712.968	2473.495	2177.125	97.133	268.624	0	171.314	712.968	712.968	1505	1406.351	712.968	712.968	1505	790.416	314.012	460.707	1362.84	512.795

TABLE D.2-7
EMFAC EMISSION FACTORS
(PILE)

Pollutant Name: Sulfur Dioxide Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.049	0.049	0.039	0.039	0.063	0.049
5	0.015	0.009	0.003	0.009	0.015	0.011	0.003	0.011	0.015	0.011	0.003	0.011	0.021	0.016	0.003	0.016	0.03	0.024	0.005	0.014	0.037	0.025
10	0.012	0.007	0.003	0.007	0.012	0.009	0.003	0.008	0.012	0.009	0.003	0.009	0.016	0.012	0.003	0.012	0.02	0.016	0.005	0.014	0.03	0.017
20	0.007	0.004	0.003	0.004	0.007	0.006	0.003	0.005	0.007	0.006	0.003	0.006	0.01	0.008	0.003	0.008	0.01	0.008	0.005	0.014	0.021	0.009
30	0.005	0.003	0.003	0.003	0.005	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.007	0.006	0.003	0.006	0.007	0.005	0.005	0.014	0.018	0.006
40	0.005	0.003	0.003	0.003	0.005	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.006	0.005	0.003	0.005	0.005	0.004	0.005	0.014	0.017	0.005
50	0.005	0.003	0.003	0.003	0.005	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.007	0.005	0.003	0.005	0.005	0.004	0.005	0.014	0.016	0.005
60	0.006	0.003	0.003	0.003	0.006	0.004	0.003	0.004	0.006	0.004	0.003	0.004	0.008	0.006	0.003	0.006	0.007	0.006	0.005	0.014	0.016	0.006
65	0.007	0.004	0.003	0.004	0.007	0.005	0.003	0.005	0.007	0.005	0.003	0.005	0.01	0.006	0.003	0.006	0.008	0.007	0.005	0.014	0.016	0.007

Pollutant Name: PM10 Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.759	0.989	1.554	0
5	0.104	0.046	0.307	0.047	0.103	0.052	0.125	0.057	0.104	0.11	0.229	0.11	0.106	0.105	0.118	0.105	0.101	0.039	0.095	0.683	2.085	0.062
10	0.074	0.03	0.241	0.031	0.073	0.034	0.098	0.038	0.074	0.072	0.18	0.072	0.076	0.069	0.093	0.069	0.066	0.026	0.074	0.537	1.419	0.041
20	0.043	0.015	0.159	0.015	0.042	0.017	0.065	0.02	0.043	0.036	0.118	0.036	0.044	0.035	0.061	0.035	0.032	0.012	0.049	0.353	0.653	0.02
30	0.03	0.009	0.114	0.009	0.03	0.011	0.047	0.013	0.03	0.022	0.085	0.022	0.031	0.021	0.044	0.021	0.019	0.007	0.035	0.254	0.474	0.011
40	0.025	0.007	0.089	0.007	0.025	0.008	0.037	0.01	0.025	0.017	0.067	0.017	0.026	0.016	0.034	0.016	0.013	0.005	0.028	0.199	0.405	0.008
50	0.025	0.006	0.077	0.007	0.025	0.007	0.031	0.009	0.025	0.016	0.057	0.016	0.026	0.015	0.03	0.015	0.01	0.004	0.024	0.171	0.446	0.006
60	0.03	0.007	0.072	0.008	0.03	0.008	0.029	0.01	0.03	0.018	0.054	0.018	0.031	0.017	0.028	0.017	0.009	0.004	0.022	0.16	0.597	0.006
65	0.035	0.009	0.072	0.009	0.035	0.01	0.029	0.011	0.036	0.02	0.054	0.02	0.036	0.019	0.028	0.02	0.01	0.004	0.022	0.16	0.714	0.006

Pollutant Name: PM10 - Tire Wear Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
10	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
20	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
30	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
40	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
50	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
60	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
65	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012

Pollutant Name: PM10 - Brake Wear Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
10	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
20	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
30	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
40	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
50	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
60	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
65	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013

TABLE D.2-7
EMFAC EMISSION FACTORS
(PILE)

Pollutant Pollutant Name: Sulfur Dioxide

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0.039	0.044	0	0	0	0	0	0	0	0	0.049	0.049	0.039	0.04	0	0	0	0	0	0.001	0.048	0.004
5	0.014	0.019	0	0.025	0.024	0.024	0.003	0.003	0	0.003	0.032	0.025	0.014	0.016	0.032	0.025	0.014	0.024	0.009	0.011	0.025	0.012
10	0.014	0.015	0	0.016	0.024	0.022	0.002	0.002	0	0.002	0.021	0.017	0.014	0.015	0.021	0.016	0.014	0.016	0.007	0.008	0.021	0.009
20	0.014	0.012	0	0.009	0.024	0.021	0.002	0.002	0	0.002	0.011	0.009	0.014	0.014	0.011	0.009	0.014	0.009	0.005	0.005	0.016	0.006
30	0.014	0.01	0	0.006	0.024	0.021	0.002	0.002	0	0.002	0.007	0.006	0.014	0.013	0.007	0.006	0.014	0.006	0.004	0.004	0.014	0.005
40	0.014	0.01	0	0.005	0.024	0.02	0.002	0.002	0	0.002	0.006	0.005	0.014	0.013	0.006	0.005	0.014	0.006	0.003	0.003	0.013	0.004
50	0.014	0.01	0	0.005	0.024	0.02	0.002	0.002	0	0.002	0.006	0.005	0.014	0.013	0.006	0.005	0.014	0.006	0.003	0.003	0.013	0.004
60	0.014	0.01	0	0.006	0.024	0.021	0.002	0.002	0	0.002	0.007	0.006	0.014	0.013	0.007	0.006	0.014	0.007	0.004	0.004	0.013	0.004
65	0.014	0.011	0	0.007	0.024	0.021	0.003	0.003	0	0.003	0.009	0.007	0.014	0.013	0.009	0.007	0.014	0.008	0.005	0.004	0.013	0.005

Pollut Pollutant Name: PM10

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	1.234	0.638	0	0	0	0	0	0	0	0	0	0	1.384	1.211	0	0	0	0	0	0	1.163	0.07
5	0.766	0.426	0	0.062	0.409	0.351	0.08	0.005	0	0.048	0.101	0.055	1.328	1.17	0.101	0.016	0.448	0.06	0.091	0.069	1.345	0.145
10	0.601	0.331	0	0.041	0.297	0.254	0.063	0.004	0	0.038	0.066	0.036	1.043	0.917	0.066	0.01	0.352	0.045	0.068	0.045	0.932	0.098
20	0.396	0.214	0	0.02	0.173	0.148	0.045	0.003	0	0.027	0.032	0.017	0.686	0.603	0.032	0.005	0.232	0.028	0.044	0.022	0.454	0.049
30	0.284	0.153	0	0.011	0.117	0.099	0.039	0.002	0	0.023	0.019	0.01	0.493	0.433	0.019	0.003	0.167	0.019	0.034	0.014	0.329	0.033
40	0.223	0.119	0	0.008	0.09	0.076	0.04	0.002	0	0.024	0.013	0.007	0.387	0.34	0.013	0.002	0.131	0.015	0.033	0.01	0.277	0.027
50	0.191	0.102	0	0.006	0.08	0.068	0.049	0.002	0	0.029	0.01	0.005	0.332	0.291	0.01	0.002	0.112	0.013	0.037	0.01	0.294	0.027
60	0.179	0.096	0	0.006	0.082	0.069	0.073	0.004	0	0.043	0.009	0.005	0.311	0.273	0.009	0.001	0.105	0.012	0.052	0.011	0.376	0.033
65	0.179	0.096	0	0.006	0.088	0.074	0.095	0.005	0	0.056	0.01	0.005	0.311	0.273	0.01	0.002	0.105	0.012	0.066	0.013	0.442	0.039

Pollutant Na Pollutant Name: PM10 - Tire Wear

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
10	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
20	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
30	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
40	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
50	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
60	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
65	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009

Pollutant Nai Pollutant Name: PM10 - Brake Wear

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
10	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
20	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
30	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
40	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
50	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
60	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
65	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013

TABLE D.2-7
EMFAC EMISSION FACTORS
(PILE)

For on-site activity (mean vehicle speed = 10 mph, Temperature: 70F, Relative Humidity: 20%)

	Emission Factors (g/mile)									
	PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Assumptions for CH_4 and N_2O from Reference sources TAB
LDA-ALL	0.0520	0.0362	3.3470	0.2080	0.2860	0.0070	718.3410	0.0158	0.0110	Passenger Cars - Gasoline - Model Year 2001
LHD1-DSL	0.0990	0.0767	1.9630	0.2940	4.7770	0.0050	519.4920	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
MHD-DSL								0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
HHD-DSL	1.4830	1.3265	11.7020	5.5460	24.7210	0.0300	3165.4470	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
OBUS-CAT	0.0660	0.0463	26.6820	2.1110	3.0030	0.0170	1672.2670			

For off-site activity (mean vehicle speed = 50 mph, Temperature: 70F, Relative Humidity: 20%)

	Emission Factors (g/mile)									
	PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Assumptions for CH_4 and N_2O from Reference sources TAB
LDA-ALL	0.0280	0.0140	1.7180	0.0480	0.1940	0.0030	291.7790	0.0158	0.0110	Passenger Cars - Gasoline - Model Year 2001
LHD1-DSL	0.0490	0.0307	0.5160	0.0940	3.8490	0.0050	519.4920	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
MHD-DSL	0.1960	0.1558	1.3250	0.1410	7.4840	0.0140	1505.0000	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
HHD-DSL	0.5100	0.4313	2.9180	0.6240	13.0340	0.0160	1670.6790	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
OBUS-CAT	0.0310	0.0141	7.4190	0.2760	4.1630	0.0050	464.9530			

Note:
$PM_{2.5}$ emission factors determined using guidance from SCAQMD
Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds
10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions
On-road vehicles
- $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
- $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
- $PM_{2.5}$ Fraction of PM_{10}, Gasoline-catalyst: 0.928
- $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.250

TABLE D.2-8
GREENHOUSE GAS EMISSION FACTORS
(PILE)

Table C.4 Methane and Nitrous Oxide Emission Factors for Highway Vehicles by Model Year

Vehicle Types/Model Years	N_2O (g/mile)	CH_4 (g/mile)
Gasoline Passenger Cars		
Model Years 1984-1993	0.0647	0.0704
Model Year 1994	0.0560	0.0531
Model Year 1995	0.0473	0.0358
Model Year 1996	0.0426	0.0272
Model Year 1997	0.0422	0.0268
Model Year 1998	0.0393	0.0249
Model Year 1999	0.0337	0.0216
Model Year 2000	0.0273	0.0178
Model Year 2001	0.0158	0.0110
Model Year 2002	0.0153	0.0107
Model Year 2003	0.0135	0.0114
Model Year 2004	0.0083	0.0145
Model Year 2005 - Present	0.0079	0.0147
Gasoline Light Trucks (Vans, Pickup Trucks, SUVs)		
Model Years 1987-1993	0.1035	0.0813
Model Year 1994	0.0982	0.0646
Model Year 1995	0.0908	0.0517
Model Year 1996	0.0871	0.0452
Model Year 1997	0.0871	0.0452
Model Year 1998	0.0728	0.0391
Model Year 1999	0.0564	0.0321
Model Year 2000	0.0621	0.0346
Model Year 2001	0.0164	0.0151
Model Year 2002	0.0228	0.0178
Model Year 2003	0.0114	0.0155
Model Year 2004	0.0132	0.0152
Model Year 2005 - Present	0.0101	0.0157

TABLE D.2-8
GREENHOUSE GAS EMISSION FACTORS
(PILE)

Table C.4 Methane and Nitrous Oxide Emission Factors for Highway Vehicles by Model Year (continued)

Vehicle Types/Model Years	N_2O (g/mile)	CH_4 (g/mile)
Gasoline Heavy-Duty Vehicles		
Model Years 1985-1986	0.0515	0.4090
Model Year 1987	0.0849	0.3675
Model Years 1988-1989	0.0933	0.3492
Model Years 1990-1995	0.1142	0.3246
Model Year 1996	0.1680	0.1278
Model Year 1997	0.1726	0.0924
Model Year 1998	0.1693	0.0641
Model Year 1999	0.1435	0.0578
Model Year 2000	0.1092	0.0493
Model Year 2001	0.1235	0.0528
Model Year 2002	0.1307	0.0546
Model Year 2003	0.1240	0.0533
Model Year 2004	0.0285	0.0341
Model Year 2005 - Present	0.0177	0.0326
Diesel Passenger Cars		
Model Years 1960-1982	0.0012	0.0006
Model Years 1983 - Present	0.0010	0.0005
Diesel Light Trucks		
Model Years 1960-1982	0.0017	0.0011
Model Years 1983-1995	0.0014	0.0009
Model Years 1996 - Present	0.0015	0.0010
Diesel Heavy-Duty Vehicles		
All Model Years	0.0048	0.0051

Source: Gasoline vehicle factors from EPA Climate Leaders, Mobile Combustion Guidance, (2008) based on U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005 (2007). Diesel vehicle factors based on U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005 (2007), Annex 3.2, Table A-98.

TABLE D.2-8
GREENHOUSE GAS EMISSION FACTORS
(PILE)

Table C.6 Methane and Nitrous Oxide Emission Factors for Non-Highway Vehicles

Vehicle Type/Fuel Type	N_2O (g/gallon)	CH_4 (g/gallon)
Ships & Boats		
Residual Fuel Oil	0.30	0.86
Diesel Fuel	0.26	0.74
Gasoline	0.22	0.64
Locomotives		
Diesel Fuel	0.26	0.80
Agricultural Equipment		
Gasoline	0.22	1.26
Diesel Fuel	0.26	1.44
Construction		
Gasoline	0.22	0.50
Diesel Fuel	0.26	0.58
Other Non-Highway		
Snowmobiles (Gasoline)	0.22	0.50
Other Recreational (Gasoline)	0.22	0.50
Other Small Utility (Gasoline)	0.22	0.50
Other Large Utility (Gasoline)	0.22	0.50
Other Large Utility (Diesel)	0.26	0.58
Aircraft		
Jet Fuel	0.31	0.27
Aviation Gasoline	0.11	7.04
All Non-Highway/Construction Vehicles		
Butane*	0.41	0.09
Propane*	0.41	0.09

Source: U.S. EPA, Climate Leaders, Mobile Combustion Guidance (2008) based on U.S. EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005 (2007), Annex 3.2, Table A-101, except butane and propane.

* Butane and propane emission factors based on stationary combustion emission factors for these fuels from U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2000 (2002).

TABLE D.2-8
GREENHOUSE GAS EMISSION FACTORS
(PILE)

Table C.2 Carbon Dioxide, Methane and Nitrous Oxide Electricity Emission Factors by eGRID Subregion

eGRID Subregion Acronym	eGRID Subregion Name	CO_2 (lbs/MWh)	CH_4 (lbs/MWh)	N_2O (lbs/MWh)
AKGD	ASCC Alaska Grid	1,232.36	0.0256	0.0065
AKMS	ASCC Miscellaneous	498.86	0.0208	0.0041
AZNM	WECC Southwest	1,311.05	0.0175	0.0179
CAMX	WECC California	724.12	0.0302	0.0081
ERCT	ERCOT All	1,324.35	0.0187	0.0151
FRCC	FRCC All	1,318.57	0.0459	0.0169
HIMS	HICC Miscellaneous	1,514.92	0.3147	0.0469
HIOA	HICC Oahu	1,811.98	0.1095	0.0236
MROE	MRO East	1,834.72	0.0276	0.0304
MROW	MRO West	1,821.84	0.0280	0.0307
NEWE	NPCC New England	927.68	0.0865	0.0170
NWPP	WECC Northwest	902.24	0.0191	0.0149
NYCW	NPCC NYC/Westchester	815.45	0.0360	0.0055
NYLI	NPCC Long Island	1,536.80	0.1154	0.0181
NYUP	NPCC Upstate NY	720.80	0.0248	0.0112
RFCE	RFC East	1,139.07	0.0303	0.0187
RFCM	RFC Michigan	1,563.28	0.0339	0.0272
RFCW	RFC West	1,537.82	0.0182	0.0257
RMPA	WECC Rockies	1,883.08	0.0229	0.0288
SPNO	SPP North	1,960.94	0.0238	0.0321
SPSO	SPP South	1,658.14	0.0250	0.0226
SRMV	SERC Mississippi Valley	1,019.74	0.0243	0.0117
SRMW	SERC Midwest	1,830.51	0.0212	0.0305
SRSO	SERC South	1,489.54	0.0263	0.0255
SRTV	SERC Tennessee Valley	1,510.44	0.0201	0.0256
SRVC	SERC Virginia/Carolina	1,134.88	0.0238	0.0198

Source: eGRID2007 Version 1.1, December 2008 (Year 2005 data).
Note: Reporters calculating historical data for calendar years 1990-2007 should use the electricity emission factors in Appendix E.

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

Highest activity occurs in month 8.
construction schedule = 8 hours per day 7 am to 3:30 pm
delivery trucks can arrive at the site anytime during the day or night

				Emission Factors (Ton/Hr)											Emission Rate per Piece of Equipment (Lb/Hr)									
Equipment	**Load Factor**	**Hours/Day**	**Horsepower**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																							
AC Paver	0.5	4	200	4.40E-05	4.05E-05	3.32E-04	1.15E-04	1.10E-03	1.09E-06	9.71E-02	1.03E-05	0.00E+00	9.73E-02	0.088	0.081	0.663	0.229	2.200	0.002	194.197	0.021	0.000	194.632
Backhoe (CAT-225)	0.5	4	135	2.67E-05	2.46E-05	2.94E-04	2.94E-04	4.50E-04	5.70E-07	5.06E-02	5.16E-06	0.00E+00	5.08E-02	0.053	0.049	0.587	0.587	0.900	0.001	101.296	0.010	0.000	101.513
Carry Lift, Pettibone	0.5	4	100	3.20E-05	2.94E-05	2.20E-04	5.66E-05	3.45E-04	3.66E-07	3.12E-02	5.10E-06	0.00E+00	3.13E-02	0.064	0.059	0.441	0.113	0.689	0.001	62.394	0.010	0.000	62.608
Case Backhoe/Front End Loader (580)	0.5	4	90	2.41E-05	2.22E-05	1.80E-04	5.72E-05	2.65E-04	3.03E-07	2.58E-02	3.79E-06	0.00E+00	2.59E-02	0.048	0.044	0.359	0.114	0.530	0.001	51.682	0.008	0.000	51.841
Compactor (Bomag BW211)	0.5	4	130	3.18E-05	2.92E-05	3.12E-04	7.02E-05	5.70E-04	6.08E-07	5.40E-02	6.33E-06	0.00E+00	5.42E-02	0.064	0.058	0.624	0.140	1.139	0.001	108.049	0.013	0.000	108.315
Conveyor Truck for Rock/Sand	0.5	4	250	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Crane (100T)	0.25	2	290	3.12E-05	2.87E-05	3.05E-04	8.61E-05	8.24E-04	8.83E-07	9.00E-02	7.77E-06	0.00E+00	9.01E-02	0.062	0.057	0.610	0.172	1.648	0.002	179.940	0.016	0.000	180.266
Crawler Trencher	0.5	4	155	4.78E-05	4.40E-05	4.38E-04	1.08E-04	8.57E-04	8.09E-07	7.19E-02	9.73E-06	0.00E+00	7.21E-02	0.096	0.088	0.875	0.216	1.715	0.002	143.769	0.019	0.000	144.177
Dozer (D-8)	0.5	4	300	5.07E-05	4.66E-05	5.46E-04	1.39E-04	1.27E-03	1.27E-06	1.29E-01	1.25E-05	0.00E+00	1.30E-01	0.101	0.093	1.092	0.277	2.549	0.003	258.997	0.025	0.000	259.522
Excavator, Cat 235	0.5	4	195	2.32E-05	2.14E-05	1.88E-04	6.86E-05	6.84E-04	8.92E-07	7.93E-02	6.19E-06	0.00E+00	7.94E-02	0.046	0.043	0.375	0.137	1.369	0.002	158.540	0.012	0.000	158.800
Forklift (10T)	0.1	0.8	100	1.47E-05	1.36E-05	1.10E-04	2.55E-05	1.57E-04	1.83E-07	1.56E-02	2.30E-06	0.00E+00	1.56E-02	0.029	0.027	0.219	0.051	0.313	0.000	31.197	0.005	0.000	31.293
Grade All	0.5	4	100	4.03E-05	3.71E-05	2.70E-04	7.29E-05	4.38E-04	4.39E-07	3.74E-02	6.58E-06	0.00E+00	3.76E-02	0.081	0.074	0.541	0.146	0.877	0.001	74.898	0.013	0.000	75.174
Grader (CAT-12)	0.5	4	135	3.75E-05	3.45E-05	3.69E-04	8.29E-05	6.39E-04	6.97E-07	6.19E-02	7.48E-06	0.00E+00	6.21E-02	0.075	0.069	0.738	0.166	1.277	0.001	123.810	0.015	0.000	124.125
High Reach Bucket Truck	0.5	4	220	2.47E-05	2.27E-05	2.47E-04	6.18E-05	8.19E-04	1.04E-06	1.06E-01	5.58E-06	0.00E+00	1.06E-01	0.049	0.045	0.495	0.124	1.639	0.002	212.665	0.011	0.000	212.899
Hydraulic Auger Drill	0.5	4	200	1.60E-05	1.47E-05	1.72E-04	4.44E-05	5.04E-04	1.06E-06	9.40E-02	4.01E-06	0.00E+00	9.41E-02	0.032	0.029	0.344	0.089	1.008	0.002	187.933	0.008	0.000	188.101
Hydraulic Mobile Crane (15T)	0.5	4	130	2.58E-05	2.38E-05	2.43E-04	5.77E-05	4.40E-04	4.52E-07	4.01E-02	5.21E-06	0.00E+00	4.02E-02	0.052	0.048	0.485	0.115	0.880	0.001	80.272	0.010	0.000	80.491
Hydraulic Mobile Crane (35T)	0.5	4	175	2.58E-05	2.38E-05	2.43E-04	5.77E-05	4.40E-04	4.52E-07	4.01E-02	5.21E-06	0.00E+00	4.02E-02	0.052	0.048	0.485	0.115	0.880	0.001	80.272	0.010	0.000	80.491
Line Truck	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Manlift (Scissors)	0.5	4	30	8.21E-06	7.56E-06	8.81E-05	3.09E-05	9.49E-05	1.27E-07	9.80E-03	2.79E-06	0.00E+00	9.86E-03	0.016	0.015	0.176	0.062	0.190	0.000	19.595	0.006	0.000	19.712
Plate Compactor	0.05	0.4	5	6.53E-07	6.01E-07	1.32E-05	2.51E-06	1.57E-05	3.35E-08	2.15E-03	2.27E-07	0.00E+00	2.16E-03	0.001	0.001	0.026	0.005	0.031	0.000	4.310	0.000	0.000	4.319
Pressure Digger (Truck Mounted)	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Scraper, Cat 621B	0.5	4	330	6.39E-05	5.88E-05	6.95E-04	1.74E-04	1.60E-03	1.58E-06	1.61E-01	1.57E-05	0.00E+00	1.61E-01	0.128	0.118	1.390	0.347	3.209	0.003	321.140	0.031	0.000	321.798
Truck (1 ton) Conductor Reel Trailer	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Truck (1 ton), Maintenance	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Truck Tractor	0.5	4	250	3.42E-05	3.15E-05	2.54E-04	8.94E-05	8.07E-04	7.33E-07	6.52E-02	8.07E-06	0.00E+00	6.53E-02	0.068	0.063	0.507	0.179	1.614	0.001	130.300	0.016	0.000	130.639
Truck (1 ton) Trailer	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Truck (1 ton) Wire Puller/Tensioner	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Vibrating Hammer & Generator	0.5	4	51	3.15E-05	2.90E-05	2.46E-04	5.87E-05	4.05E-04	4.57E-07	3.89E-02	5.29E-06	0.00E+00	3.91E-02	0.063	0.058	0.491	0.117	0.809	0.001	77.879	0.011	0.000	78.102
Welding Machine	0.5	4	50	1.25E-05	1.15E-05	1.37E-04	5.08E-05	1.30E-04	1.68E-07	1.30E-02	4.58E-06	0.00E+00	1.31E-02	0.025	0.023	0.275	0.102	0.261	0.000	25.935	0.009	0.000	26.127
Wheel Loader (CAT 950)	0.5	4	130	3.18E-05	2.93E-05	3.15E-04	7.01E-05	5.43E-04	5.98E-07	5.31E-02	6.32E-06	0.00E+00	5.32E-02	0.064	0.059	0.630	0.140	1.086	0.001	106.220	0.013	0.000	106.485
Hogger	0.25	2	175	4.89E-05	4.50E-05	4.23E-04	1.12E-04	8.44E-04	7.33E-07	6.52E-02	1.01E-05	0.00E+00	6.54E-02	0.098	0.090	0.847	0.224	1.688	0.001	130.300	0.020	0.000	130.724
Vehicles with Onroad Engines for Emissions Estimates	**Onsite Miles per Day Travelled per Vehicle**			**Emission Factors (g/mile)**																			
Concrete Truck	1.2	8	250	1.483	1.326492	11.702	5.546	24.721	0.03	3165.447	0.0048	0.0051	3.17E+03	0.000	0.000	0.004	0.002	0.008	0.000	1.046	0.000	0.000	1.046
Concrete Pump Truck	6	8	250	1.483	1.326492	11.702	5.546	24.721	0.03	3165.447	0.0048	0.0051	3.17E+03	0.002	0.002	0.019	0.009	0.041	0.000	5.229	0.000	0.000	5.232
Dump Truck (15cy)	6	8	275	1.483	1.326492	11.702	5.546	24.721	0.03	3165.447	0.0048	0.0051	3.17E+03	0.002	0.002	0.019	0.009	0.041	0.000	5.229	0.000	0.000	5.232
Flatbed - Stake Body Truck	12	8	220	0.099	0.076657	1.963	0.294	4.777	0.005	519.492	0.0048	0.0051	5.21E+02	0.000	0.000	0.006	0.001	0.016	0.000	1.716	0.000	0.000	1.722
Fuel Truck	12	8	220	1.483	1.326492	11.702	5.546	24.721	0.03	3165.447	0.0048	0.0051	3.17E+03	0.005	0.004	0.039	0.018	0.082	0.000	10.459	0.000	0.000	10.464
Pick Up Truck	12	8	150	0.099	0.076657	1.963	0.294	4.777	0.005	519.492	0.0048	0.0051	5.21E+02	0.000	0.000	0.006	0.001	0.016	0.000	1.716	0.000	0.000	1.722
Water Truck, 4000 gal	120	8	220	0.193	0.139692	3.426	1.584	11.478	0.03	3165.447	0.0048	0.0051	3.17E+03	0.006	0.005	0.113	0.052	0.379	0.001	104.585	0.000	0.000	104.641
Total																							

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 1 Daily Emissions (Lb/Day)											Month 2 Daily Emissions (Lb/Day)											Month 3 Daily Emissions (Lb/Day)										
Equipment	Quantity Mo 1	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 2	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 3	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																																	
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.13	0.12	1.38	0.36	4.03	0.01	751.73	0.03	0.00	752.40	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.50	0.46	3.93	0.94	6.47	0.01	623.04	0.08	0.00	624.81	2	0.50	0.46	3.93	0.94	6.47	0.01	623.04	0.08	0.00	624.81
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	1	0.25	0.23	2.52	0.56	4.34	0.00	424.88	0.05	0.00	425.94	2	0.51	0.47	5.04	1.12	8.68	0.01	849.76	0.10	0.00	851.88	1	0.25	0.23	2.52	0.56	4.34	0.00	424.88	0.05	0.00	425.94
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																																	
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Dump Truck (15cy)	3	0.06	0.05	0.46	0.22	0.98	0.00	125.50	0.00	0.00	125.57	3	0.06	0.05	0.46	0.22	0.98	0.00	125.50	0.00	0.00	125.57	3	0.06	0.05	0.46	0.22	0.98	0.00	125.50	0.00	0.00	125.57
Flatbed - Stake Body Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Pick Up Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.00	0.00	0.05	0.01	0.13	0.00	13.73	0.00	0.00	13.78	1	0.00	0.00	0.05	0.01	0.13	0.00	13.73	0.00	0.00	13.78
Water Truck, 4000 gal	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13
Total	**7**	**1**	**1**	**12**	**3**	**26**	**0**	**2716**	**0**	**0**	**2721**	**23**	**4**	**4**	**36**	**10**	**78**	**0**	**9314**	**1**	**0**	**9331**	**23**	**3**	**3**	**25**	**7**	**55**	**0**	**6056**	**1**	**0**	**6069**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 4 Daily Emissions (Lb/Day)											Month 5 Daily Emissions (Lb/Day)											Month 6 Daily Emissions (Lb/Day)										
Equipment	Quantity Mo 4	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 5	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 6	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																																	
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05
Carry Lift, Pettibone	1	0.26	0.24	1.76	0.45	2.76	0.00	249.58	0.04	0.00	250.43	1	0.26	0.24	1.76	0.45	2.76	0.00	249.58	0.04	0.00	250.43	1	0.26	0.24	1.76	0.45	2.76	0.00	249.58	0.04	0.00	250.43
Case Backhoe/Front End Loader (580)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor (Bomag BW211)	2	0.51	0.47	4.99	1.12	9.11	0.01	864.39	0.10	0.00	866.52	2	0.51	0.47	4.99	1.12	9.11	0.01	864.39	0.10	0.00	866.52	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96
Hydraulic Mobile Crane (35T)	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	5	0.33	0.30	3.53	1.24	3.80	0.01	391.90	0.11	0.00	394.25	5	0.33	0.30	3.53	1.24	3.80	0.01	391.90	0.11	0.00	394.25	6	0.39	0.36	4.23	1.48	4.56	0.01	470.28	0.13	0.00	473.09
Plate Compactor	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.27	0.25	2.03	0.72	6.46	0.01	521.20	0.06	0.00	522.56
Truck (1 ton) Trailer	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	2	0.50	0.46	3.93	0.94	6.47	0.01	623.04	0.08	0.00	624.81	2	0.50	0.46	3.93	0.94	6.47	0.01	623.04	0.08	0.00	624.81	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02
Wheel Loader (CAT 950)	2	0.51	0.47	5.04	1.12	8.68	0.01	849.76	0.10	0.00	851.88	1	0.25	0.23	2.52	0.56	4.34	0.00	424.88	0.05	0.00	425.94	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																																	
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.00	0.00	0.03	0.01	0.07	0.00	8.37	0.00	0.00	8.37	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	2	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55
Fuel Truck	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	3	0.01	0.01	0.16	0.02	0.38	0.00	41.19	0.00	0.00	41.33	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55
Water Truck, 4000 gal	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**34**	**5**	**5**	**45**	**14**	**89**	**0**	**9451**	**1**	**0**	**9474**	**33**	**5**	**4**	**41**	**13**	**77**	**0**	**8282**	**1**	**0**	**8303**	**27**	**3**	**3**	**27**	**10**	**51**	**0**	**5039**	**1**	**0**	**5054**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 7 Daily Emissions (Lb/Day)											Month 8 Daily Emissions (Lb/Day)											Month 9 Daily Emissions (Lb/Day)										
Equipment	Quantity Mo 7	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 8	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 9	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																																	
AC Paver	1	0.35	0.32	2.65	0.92	8.80	0.01	776.79	0.08	0.00	778.53	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05
Carry Lift, Pettibone	1	0.26	0.24	1.76	0.45	2.76	0.00	249.58	0.04	0.00	250.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	2	0.25	0.23	2.44	0.69	6.59	0.01	719.76	0.06	0.00	721.06	3	0.37	0.34	3.66	1.03	9.89	0.01	1079.64	0.09	0.00	1081.59	3	0.37	0.34	3.66	1.03	9.89	0.01	1079.64	0.09	0.00	1081.59
Crawler Trencher	1	0.38	0.35	3.50	0.86	6.86	0.01	575.07	0.08	0.00	576.71	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	2	0.05	0.04	0.35	0.08	0.50	0.00	49.92	0.01	0.00	50.07	2	0.05	0.04	0.35	0.08	0.50	0.00	49.92	0.01	0.00	50.07	2	0.05	0.04	0.35	0.08	0.50	0.00	49.92	0.01	0.00	50.07
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	1	0.20	0.18	1.98	0.49	6.56	0.01	850.66	0.04	0.00	851.60	1	0.20	0.18	1.98	0.49	6.56	0.01	850.66	0.04	0.00	851.60	2	0.39	0.36	3.96	0.99	13.11	0.02	1701.32	0.09	0.00	1703.19
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96	11	2.27	2.09	21.36	5.08	38.71	0.04	3531.99	0.46	0.00	3541.61	11	2.27	2.09	21.36	5.08	38.71	0.04	3531.99	0.46	0.00	3541.61
Hydraulic Mobile Crane (35T)	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	3	0.62	0.57	4.91	1.86	17.79	0.02	1996.75	0.17	0.00	2000.27	3	0.62	0.57	4.91	1.86	17.79	0.02	1996.75	0.17	0.00	2000.27	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51
Manlift (Scissors)	6	0.39	0.36	4.23	1.48	4.56	0.01	470.28	0.13	0.00	473.09	1	0.07	0.06	0.71	0.25	0.76	0.00	78.38	0.02	0.00	78.85	1	0.07	0.06	0.71	0.25	0.76	0.00	78.38	0.02	0.00	78.85
Plate Compactor	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73
Pressure Digger (Truck Mounted)	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	2	0.55	0.50	4.06	1.43	12.91	0.01	1042.40	0.13	0.00	1045.11	2	0.55	0.50	4.06	1.43	12.91	0.01	1042.40	0.13	0.00	1045.11	2	0.55	0.50	4.06	1.43	12.91	0.01	1042.40	0.13	0.00	1045.11
Truck (1 ton) Trailer	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8	2.02	1.86	15.72	3.75	25.90	0.03	2492.14	0.34	0.00	2499.25	8	2.02	1.86	15.72	3.75	25.90	0.03	2492.14	0.34	0.00	2499.25
Welding Machine	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																																	
Concrete Truck	4	0.02	0.01	0.12	0.06	0.26	0.00	33.47	0.00	0.00	33.49	4	0.02	0.01	0.12	0.06	0.26	0.00	33.47	0.00	0.00	33.49	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	2	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	2	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Flatbed - Stake Body Truck	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Pick Up Truck	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88
Water Truck, 4000 gal	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13
Total	**46**	**5**	**5**	**45**	**16**	**110**	**0**	**11633**	**1**	**0**	**11659**	**72**	**10**	**9**	**91**	**27**	**196**	**0**	**20535**	**2**	**0**	**20581**	**67**	**10**	**9**	**90**	**26**	**196**	**0**	**20254**	**2**	**0**	**20300**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 10 Daily Emissions (Lb/Day)											Month 11 Daily Emissions (Lb/Day)												Month 12 Daily Emissions (Lb/Day)										
Equipment	Quantity Mo 10	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 11	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 12	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																																		
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	3	0.37	0.34	3.66	1.03	9.89	0.01	1079.64	0.09	0.00	1081.59	1	0.12	0.11	1.22	0.34	3.30	0.00	359.88	0.03	0.00	360.53	1	0.12	0.11	1.22	0.34	3.30	0.00	359.88	0.03	0.00	360.53
Crawler Trencher	1	0.38	0.35	3.50	0.86	6.86	0.01	575.07	0.08	0.00	576.71	1	0.38	0.35	3.50	0.86	6.86	0.01	575.07	0.08	0.00	576.71	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03
Grade All	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	3	0.59	0.54	5.94	1.48	19.67	0.03	2551.98	0.13	0.00	2554.79	1	0.20	0.18	1.98	0.49	6.56	0.01	850.66	0.04	0.00	851.60	1	0.20	0.18	1.98	0.49	6.56	0.01	850.66	0.04	0.00	851.60
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	11	2.27	2.09	21.36	5.08	38.71	0.04	3531.99	0.46	0.00	3541.61	11	2.27	2.09	21.36	5.08	38.71	0.04	3531.99	0.46	0.00	3541.61	18	3.72	3.42	34.95	8.31	63.34	0.07	5779.62	0.75	0.00	5795.36
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	1	0.07	0.06	0.71	0.25	0.76	0.00	78.38	0.02	0.00	78.85	1	0.07	0.06	0.71	0.25	0.76	0.00	78.38	0.02	0.00	78.85	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	2	0.55	0.50	4.06	1.43	12.91	0.01	1042.40	0.13	0.00	1045.11	1	0.27	0.25	2.03	0.72	6.46	0.01	521.20	0.06	0.00	522.56	1	0.27	0.25	2.03	0.72	6.46	0.01	521.20	0.06	0.00	522.56
Truck (1 ton) Trailer	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Truck (1 ton) Wire Puller/Tensioner	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	8	2.02	1.86	15.72	3.75	25.90	0.03	2492.14	0.34	0.00	2499.25	8	2.02	1.86	15.72	3.75	25.90	0.03	2492.14	0.34	0.00	2499.25	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70
Welding Machine	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45
Vehicles with Onroad Engines for Emissions Estimates																																		
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	7	0.02	0.01	0.36	0.05	0.88	0.00	96.12	0.00	0.00	96.43	12	0.03	0.02	0.62	0.09	1.52	0.00	164.77	0.00	0.00	165.31
Fuel Truck	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43
Pick Up Truck	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88	26	0.07	0.05	1.35	0.20	3.28	0.00	357.01	0.00	0.00	358.16	26	0.07	0.05	1.35	0.20	3.28	0.00	357.01	0.00	0.00	358.16
Water Truck, 4000 gal	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38
Total	**63**	**10**	**9**	**86**	**25**	**189**	**0**	**19796**	**2**	**0**	**19840**	**66**	**7**	**6**	**58**	**15**	**112**	**0**	**11394**	**1**	**0**	**11423**	**99**	**12**	**11**	**108**	**28**	**208**	**0**	**21572**	**2**	**0**	**21623**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 13 Daily Emissions (Lb/Day)											Month 14 Daily Emissions (Lb/Day)											Month 15 Daily Emissions (Lb/Day)										
Equipment	Quantity Mo 13	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 14	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 15	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																																	
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	18	3.72	3.42	34.95	8.31	63.34	0.07	5779.62	0.75	0.00	5795.36	18	3.72	3.42	34.95	8.31	63.34	0.07	5779.62	0.75	0.00	5795.36	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70
Welding Machine	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45
Vehicles with Onroad Engines for Emissions Estimates																																	
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	4	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	12	0.03	0.02	0.62	0.09	1.52	0.00	164.77	0.00	0.00	165.31	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43	3	0.12	0.11	0.93	0.44	1.96	0.00	251.00	0.00	0.00	251.14
Pick Up Truck	26	0.07	0.05	1.35	0.20	3.28	0.00	357.01	0.00	0.00	358.16	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38
Total	**95**	**11**	**10**	**101**	**26**	**188**	**0**	**19579**	**2**	**0**	**19627**	**83**	**11**	**10**	**95**	**24**	**175**	**0**	**17664**	**2**	**0**	**17708**	**121**	**13**	**12**	**112**	**28**	**208**	**0**	**21174**	**2**	**0**	**21226**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 16 Daily Emissions (Lb/Day)											Month 17 Daily Emissions (Lb/Day)											Month 18 Daily Emissions (Lb/Day)										
Equipment	Quantity Mo 16	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 17	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 18	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																																	
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	12	2.48	2.28	23.30	5.54	42.22	0.04	3853.08	0.50	0.00	3863.57	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	6	1.51	1.39	11.79	2.82	19.42	0.02	1869.11	0.25	0.00	1874.44	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																																	
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	3	0.12	0.11	0.93	0.44	1.96	0.00	251.00	0.00	0.00	251.14	3	0.12	0.11	0.93	0.44	1.96	0.00	251.00	0.00	0.00	251.14	3	0.12	0.11	0.93	0.44	1.96	0.00	251.00	0.00	0.00	251.14
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	72	0.19	0.15	3.74	0.56	9.09	0.01	988.64	0.01	0.01	991.84	72	0.19	0.15	3.74	0.56	9.09	0.01	988.64	0.01	0.01	991.84
Water Truck, 4000 gal	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38	4	0.20	0.15	3.62	1.67	12.14	0.03	3346.73	0.01	0.01	3348.51	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38
Total	**104**	**9**	**8**	**79**	**21**	**150**	**0**	**15852**	**2**	**0**	**15890**	**145**	**13**	**12**	**112**	**29**	**210.26**	**0.24**	**22079**	**2**	**0**	**22132**	**144**	**13**	**12**	**112**	**28**	**207**	**0**	**21242**	**2**	**0**	**21295**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 19 Daily Emissions (Lb/Day)											Month 20 Daily Emissions (Lb/Day)										
Equipment	Quantity Mo 19	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 20	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	18	3.72	3.42	34.95	8.31	63.34	0.07	5779.62	0.75	0.00	5795.36	18	3.72	3.42	34.95	8.31	63.34	0.07	5779.62	0.75	0.00	5795.36
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25
Total	**107**	**11**	**10**	**96**	**24**	**178**	**0**	**17994**	**2**	**0**	**18039**	**102**	**10**	**9**	**85**	**21**	**153**	**0**	**15354**	**2**	**0**	**15394**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 21 Daily Emissions (Lb/Day)											Month 22 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 21**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 22**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	18	3.72	3.42	34.95	8.31	63.34	0.07	5779.62	0.75	0.00	5795.36	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70	16	4.03	3.71	31.43	7.51	51.80	0.06	4984.28	0.68	0.00	4998.51
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.05	0.05	0.42	0.11	0.84	0.00	65.15	0.01	0.00	65.36	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38
TOTALS	**102**	**10**	**9**	**85**	**21**	**153**	**0**	**15419**	**2**	**0**	**15459**	**88**	**12**	**11**	**105**	**27**	**194**	**0**	**19943**	**2**	**0**	**19992**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 23 Daily Emissions (Lb/Day)											Month 24 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 23**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 24**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	16	4.03	3.71	31.43	7.51	51.80	0.06	4984.28	0.68	0.00	4998.51	16	4.03	3.71	31.43	7.51	51.80	0.06	4984.28	0.68	0.00	4998.51
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Pick Up Truck	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25
TOTALS	**86**	**12**	**11**	**103**	**26**	**188**	**0**	**18846**	**2**	**0**	**18893**	**86**	**12**	**11**	**103**	**26**	**188**	**0**	**18846**	**2**	**0**	**18893**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 25 Daily Emissions (Lb/Day)											Month 26 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 25**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 26**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	16	4.03	3.71	31.43	7.51	51.80	0.06	4984.28	0.68	0.00	4998.51	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25	4	0.20	0.15	3.62	1.67	12.14	0.03	3346.73	0.01	0.01	3348.51
TOTALS	**105**	**11**	**10**	**92**	**23**	**165**	**0**	**16536**	**2**	**0**	**16579**	**121**	**12.75**	**11.66**	**113**	**28.75**	**210**	**0**	**21927**	**2**	**0**	**21980**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 27 Daily Emissions (Lb/Day)											Month 28 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 27**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 28**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29	20	4.14	3.80	38.83	9.23	70.37	0.07	6421.80	0.83	0.00	6439.29
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70	14	3.53	3.25	27.50	6.57	45.32	0.05	4361.25	0.59	0.00	4373.70
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25
TOTALS	**119**	**12**	**11**	**110**	**28**	**204**	**0**	**20829**	**2**	**0**	**20881**	**118**	**12**	**11**	**109**	**27**	**201**	**0**	**19993**	**2**	**0**	**20044**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 29 Daily Emissions (Lb/Day)											Month 30 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 29**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 30**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	18	3.72	3.42	34.95	8.31	63.34	0.07	5779.62	0.75	0.00	5795.36	18	3.72	3.42	34.95	8.31	63.34	0.07	5779.62	0.75	0.00	5795.36
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	12	3.03	2.78	23.58	5.63	38.85	0.04	3738.21	0.51	0.00	3748.88	12	3.03	2.78	23.58	5.63	38.85	0.04	3738.21	0.51	0.00	3748.88
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	3	0.12	0.11	0.93	0.44	1.96	0.00	251.00	0.00	0.00	251.14	3	0.12	0.11	0.93	0.44	1.96	0.00	251.00	0.00	0.00	251.14
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38
TOTALS	**117**	**12**	**11**	**104**	**27**	**194**	**0**	**19908**	**2**	**0**	**19957**	**116**	**12**	**11**	**103**	**26**	**191**	**0**	**19648**	**2**	**0**	**19696**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 31 Daily Emissions (Lb/Day)											Month 32 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 31**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 32**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	1	0.25	0.23	2.49	0.56	4.56	0.00	432.20	0.05	0.00	433.26	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	3	1.15	1.06	10.50	2.59	20.57	0.02	1725.22	0.23	0.00	1730.13	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	18	3.72	3.42	34.95	8.31	63.34	0.07	5779.62	0.75	0.00	5795.36	16	3.31	3.04	31.07	7.39	56.30	0.06	5137.44	0.67	0.00	5151.43
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	12	3.03	2.78	23.58	5.63	38.85	0.04	3738.21	0.51	0.00	3748.88	12	3.03	2.78	23.58	5.63	38.85	0.04	3738.21	0.51	0.00	3748.88
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	3	0.12	0.11	0.93	0.44	1.96	0.00	251.00	0.00	0.00	251.14	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25
TOTALS	**116**	**12**	**11**	**103**	**26**	**191**	**0**	**19648**	**2**	**0**	**19696**	**98**	**9**	**8**	**77**	**19**	**139**	**0**	**14089**	**2**	**0**	**14125**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 33 Daily Emissions (Lb/Day)											Month 34 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 33**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 34**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	16	3.31	3.04	31.07	7.39	56.30	0.06	5137.44	0.67	0.00	5151.43	16	3.31	3.04	31.07	7.39	56.30	0.06	5137.44	0.67	0.00	5151.43
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	12	3.03	2.78	23.58	5.63	38.85	0.04	3738.21	0.51	0.00	3748.88	12	3.03	2.78	23.58	5.63	38.85	0.04	3738.21	0.51	0.00	3748.88
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25	3	0.15	0.11	2.72	1.26	9.10	0.02	2510.05	0.00	0.00	2511.38
TOTALS	**98**	**9**	**8**	**77**	**19**	**139**	**0**	**14089**	**2**	**0**	**14125**	**99**	**9**	**8**	**78**	**20**	**142**	**0**	**14926**	**2**	**0**	**14962**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 35 Daily Emissions (Lb/Day)											Month 36 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 35**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 36**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.77	0.70	7.00	1.73	13.72	0.01	1150.15	0.16	0.00	1153.42	1	0.38	0.35	3.50	0.86	6.86	0.01	575.07	0.08	0.00	576.71
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	16	3.31	3.04	31.07	7.39	56.30	0.06	5137.44	0.67	0.00	5151.43	8	1.65	1.52	15.53	3.69	28.15	0.03	2568.72	0.33	0.00	2575.72
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	12	3.03	2.78	23.58	5.63	38.85	0.04	3738.21	0.51	0.00	3748.88	6	1.51	1.39	11.79	2.82	19.42	0.02	1869.11	0.25	0.00	1874.44
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88
Fuel Truck	2	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	2	0.10	0.07	1.81	0.84	6.07	0.02	1673.36	0.00	0.00	1674.25	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13
TOTALS	**98**	**9**	**8**	**77**	**19**	**139**	**0**	**14089**	**2**	**0**	**14125**	**49**	**4**	**4**	**39**	**10**	**70**	**0**	**7044**	**1**	**0**	**7063**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

	Month 37 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 37**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment											
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	1	0.38	0.35	3.50	0.86	6.86	0.01	575.07	0.08	0.00	576.71
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	8	1.65	1.52	15.53	3.69	28.15	0.03	2568.72	0.33	0.00	2575.72
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	6	1.51	1.39	11.79	2.82	19.42	0.02	1869.11	0.25	0.00	1874.44
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates											
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88
Fuel Truck	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Pick Up Truck	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13
TOTALS	**49**	**4**	**4**	**39**	**10**	**70**	**0**	**7044**	**1**	**0**	**7063**

	Month 38 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 38**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment											
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	1	0.38	0.35	3.50	0.86	6.86	0.01	575.07	0.08	0.00	576.71
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	8	1.65	1.52	15.53	3.69	28.15	0.03	2568.72	0.33	0.00	2575.72
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	6	1.51	1.39	11.79	2.82	19.42	0.02	1869.11	0.25	0.00	1874.44
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates											
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88
Fuel Truck	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Pick Up Truck	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	1	0.05	0.04	0.91	0.42	3.03	0.01	836.68	0.00	0.00	837.13
TOTALS	**49**	**4**	**4**	**39**	**10**	**70**	**0**	**7044**	**1**	**0**	**7063**

	Month 39 Daily Emissions (Lb/Day)										
Diesel Construction Equipment	**Quantity Mo 39**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment											
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates											
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck, 4000 gal	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

TABLE D.2-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH
(PILE)

Monthly Comparison of Construction Equipment Emissions:

		Daily Emissions (Lb/Day)									
Month of Contruction	**Total Equipment Quantity**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	7	1.21	1.11	11.81	3.10	26.10	0.03	2715.77	0.26	0.000	2721.3
2	23	3.85	3.51	35.57	9.72	78.29	0.10	9314.13	0.77	0.003	9331.3
3	23	3.03	2.78	25.44	7.28	55.02	0.07	6056.44	0.58	0.002	6069.2
4	34	5.04	4.63	44.87	14.03	88.80	0.11	9451.06	1.04	0.002	9473.5
5	33	4.60	4.22	41.09	13.27	77.35	0.09	8281.73	0.96	0.002	8302.6
6	27	3.14	2.89	27.30	9.95	51.46	0.06	5038.73	0.71	0.001	5053.8
7	46	5.25	4.81	45.26	16.01	109.75	0.13	11633.00	1.22	0.003	11659.5
8	72	10.22	9.38	90.58	26.86	196.21	0.23	20534.52	2.12	0.005	20580.6
9	67	10.16	9.33	89.84	26.43	196.10	0.22	20254.43	2.12	0.004	20300.1
10	63	9.72	8.93	86.34	25.33	189.27	0.22	19795.91	2.03	0.004	19839.6
11	66	6.65	6.10	58.48	15.29	112.40	0.13	11393.86	1.29	0.006	11422.8
12	99	12.21	11.19	107.70	28.10	207.68	0.24	21571.54	2.31	0.010	21623.0
13	95	11.42	10.46	100.78	26.10	187.99	0.22	19579.20	2.13	0.010	19626.9
14	83	10.87	9.96	95.19	23.95	175.21	0.20	17664.07	1.99	0.008	17708.3
15	121	12.73	11.66	112.03	28.48	207.58	0.23	21173.52	2.31	0.013	21226.1
16	104	8.87	8.10	79.08	20.58	150.15	0.17	15852.06	1.60	0.013	15889.7
17	145	12.65	11.56	112.48	28.63	210.26	0.24	22079.15	2.28	0.018	22132.4
18	144	12.60	11.53	111.58	28.22	207.23	0.23	21242.47	2.27	0.016	21295.3
19	107	10.93	10.01	96.44	24.14	178.24	0.20	17993.62	2.00	0.011	18038.9
20	102	9.77	8.94	84.97	21.18	152.57	0.17	15354.20	1.73	0.011	15394.0
21	102	9.81	8.99	85.39	21.30	153.42	0.17	15419.35	1.74	0.011	15459.3
22	88	11.99	10.99	105.30	26.53	194.47	0.22	19942.90	2.20	0.009	19991.9
23	86	11.75	10.77	102.70	25.67	188.07	0.21	18845.62	2.16	0.007	18893.3
24	86	11.75	10.77	102.70	25.67	188.07	0.21	18845.62	2.16	0.007	18893.3
25	105	10.64	9.75	92.47	22.90	165.43	0.18	16535.75	1.90	0.011	16579.0
26	121	12.75	11.66	112.62	28.75	209.96	0.24	21926.54	2.31	0.014	21979.5
27	119	12.50	11.44	110.02	27.88	203.55	0.23	20829.25	2.27	0.013	20880.9
28	118	12.45	11.41	109.12	27.46	200.51	0.22	19992.57	2.27	0.012	20043.8
29	117	11.82	10.81	104.21	26.61	194.06	0.22	19908.31	2.14	0.013	19957.4
30	116	11.62	10.63	102.52	26.17	190.69	0.22	19647.71	2.10	0.013	19695.9
31	116	11.62	10.63	102.52	26.17	190.69	0.22	19647.71	2.10	0.013	19695.9
32	98	8.85	8.10	77.15	19.32	139.06	0.16	14088.99	1.57	0.011	14125.2
33	98	8.85	8.10	77.15	19.32	139.06	0.16	14088.99	1.57	0.011	14125.2
34	99	8.90	8.13	78.06	19.74	142.09	0.16	14925.67	1.57	0.012	14962.4
35	98	8.85	8.10	77.15	19.32	139.06	0.16	14088.99	1.57	0.011	14125.2
36	49	4.42	4.05	38.58	9.66	69.53	0.08	7044.49	0.78	0.005	7062.6
37	49	4.42	4.05	38.58	9.66	69.53	0.08	7044.49	0.78	0.005	7062.6
38	49	4.42	4.05	38.58	9.66	69.53	0.08	7044.49	0.78	0.005	7062.6
39	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.0
40	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.0
MAX VALUE (Lb/Day)	**145**	**12.75**	**11.66**	**112.62**	**28.75**	**210.26**	**0.24**	**22079.2**	**2.31**	**0.018**	**22132.4**

		Annual Emissions (ton/year)									
Months for Annual Contruction		**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	**12**	1.13	1.03	9.96	2.93	20.83	0.024	2190.62	0.23	0.0006	2195.66
2	**13**	1.28	1.17	11.30	3.28	23.25	0.027	2443.57	0.26	0.0008	2449.24
3	**14**	1.38	1.27	12.19	3.49	24.71	0.028	2568.82	0.28	0.0008	2574.90
4	**15**	1.53	1.40	13.49	3.81	27.00	0.031	2795.57	0.30	0.0010	2802.25
5	**16**	1.59	1.46	14.00	3.91	27.92	0.032	2891.59	0.31	0.0012	2898.49
6	**17**	1.71	1.57	15.08	4.14	29.91	0.034	3098.55	0.33	0.0014	3105.94
7	**18**	1.85	1.70	16.34	4.41	32.25	0.037	3341.61	0.35	0.0016	3349.56
8	**19**	1.94	1.77	17.11	4.53	33.27	0.038	3437.02	0.37	0.0017	3445.25
9	**20**	1.93	1.77	17.02	4.45	32.62	0.037	3359.31	0.36	0.0018	3367.45
10	**21**	1.92	1.76	16.96	4.37	31.98	0.036	3286.78	0.36	0.0019	3294.84
11	**22**	1.96	1.79	17.24	4.39	32.06	0.036	3288.99	0.36	0.0020	3297.13
12	**23**	2.03	1.86	17.90	4.54	33.19	0.038	3400.77	0.37	0.0020	3409.18
13	**24**	2.03	1.86	17.83	4.51	32.90	0.037	3359.88	0.37	0.0020	3368.24
14	**25**	2.02	1.85	17.70	4.46	32.56	0.037	3314.23	0.37	0.0020	3322.52
15	**26**	2.04	1.87	17.97	4.53	33.08	0.037	3378.16	0.37	0.0021	3386.59
16	**27**	2.04	1.87	17.94	4.52	33.02	0.037	3373.00	0.37	0.0021	3381.41
17	**28**	2.09	1.92	18.39	4.63	33.78	0.038	3435.11	0.38	0.0021	3443.72
18	**29**	2.08	1.91	18.26	4.59	33.53	0.038	3402.54	0.38	0.0020	3411.10
19	**30**	2.07	1.89	18.13	4.56	33.29	0.037	3378.62	0.38	0.0020	3387.11
20	**31**	2.08	1.90	18.22	4.59	33.47	0.038	3403.43	0.38	0.0020	3411.96
21	**32**	2.06	1.89	18.10	4.57	33.27	0.037	3384.45	0.37	0.0020	3392.93
22	**33**	2.05	1.88	17.98	4.54	33.05	0.037	3364.50	0.37	0.0020	3372.92
23	**34**	2.00	1.83	17.57	4.44	32.27	0.036	3289.24	0.36	0.0021	3297.48
24	**35**	1.96	1.79	17.19	4.34	31.53	0.036	3217.89	0.35	0.0021	3225.96
25	**36**	1.85	1.69	16.22	4.10	29.76	0.034	3040.87	0.33	0.0021	3048.50
26	**37**	1.76	1.61	15.42	3.90	28.32	0.032	2898.51	0.32	0.0020	2905.75
27	**38**	1.63	1.49	14.30	3.61	26.21	0.030	2675.27	0.29	0.0019	2682.00
28	**39**	1.44	1.32	12.65	3.20	23.16	0.026	2362.84	0.26	0.0017	2368.78
29	**40**	1.26	1.15	11.02	2.78	20.15	0.023	2062.95	0.22	0.0015	2068.13
MAX VALUE (Ton/Year)		**2.09**	**1.92**	**18.39**	**4.63**	**33.78**	**0.038**	**3437.02**	**0.38**	**0.0021**	**3445.25**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =	1	delivery trucks can arrive at the site anytime during the day or night
Construction Schedule =	8	hours per day 7 am to 3:30 pm
Days per Month =	21.65	

Vehicles with Onroad Engines for Emissions Estimates	Off-site Miles per Day Travelled per Vehicle	Hours/Day	Horsepower	Emission Factors (G/mile)										Emission Rate per Piece of Equipment (Lb/Hr)									
				PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	74.99	12	NA	2.80E-02	1.40E-02	1.72E+00	4.80E-02	1.94E-01	3.00E-03	2.92E+02	1.58E-02	1.10E-02	2.96E+02	0.000	0.000	0.024	0.001	0.003	0.000	4.016	0.000	0.000	4.07
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	24	200	1.96E-01	1.56E-01	1.33E+00	1.41E-01	7.48E+00	1.40E-02	1.51E+03	4.80E-03	5.10E-03	1.51E+03	0.001	0.001	0.010	0.001	0.054	0.000	10.939	0.000	0.000	10.95
Truck Tractor Delivery Trucks	79.2	24	275	5.10E-01	4.31E-01	2.92E+00	6.24E-01	1.30E+01	1.60E-02	1.67E+03	4.80E-03	5.10E-03	1.67E+03	0.004	0.003	0.021	0.005	0.095	0.000	12.144	0.000	0.000	12.16
	Total																						

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

		Month 1 Daily Emissions (Lb/Day)											Month 2 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Off-site Miles per Day Travelled per Vehicle**	**Quantity Mo 1**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 2**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	8	0.04	0.02	2.27	0.06	0.26	0.00	385.56	0.02	0.01	390.50	62	0.29	0.14	17.59	0.49	1.99	0.03	2988.09	0.16	0.11	3026.41
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	0	0.02	0.01	0.11	0.01	0.60	0.00	121.18	0.00	0.00	121.31	0.51	0.02	0.01	0.12	0.01	0.66	0.00	133.29	0.00	0.00	133.44
Truck Tractor Delivery Trucks	79.2	0	0.04	0.03	0.23	0.05	1.05	0.00	134.51	0.00	0.00	134.65	1.71	0.15	0.13	0.87	0.19	3.88	0.00	497.70	0.00	0.00	498.21
	Total	**9**	**0.09**	**0.07**	**2.61**	**0.13**	**1.91**	**0.01**	**641.25**	**0.02**	**0.02**	**646.46**	**64**	**0.46**	**0.29**	**18.58**	**0.69**	**6.53**	**0.04**	**3619.08**	**0.16**	**0.11**	**3658.05**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

		Month 3 Daily Emissions (Lb/Day)											Month 4 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Off-site Miles per Day Travelled per Vehicle**	**Quantity Mo 3**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 4**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	54	0.25	0.13	15.32	0.43	1.73	0.03	2602.53	0.14	0.10	2635.90	111	0.51	0.26	31.50	0.88	3.56	0.06	5349.64	0.29	0.20	5418.24
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	0.51	0.02	0.01	0.12	0.01	0.66	0.00	133.29	0.00	0.00	133.44	0.74	0.03	0.02	0.17	0.02	0.96	0.00	193.88	0.00	0.00	194.10
Truck Tractor Delivery Trucks	79.2	1.71	0.15	0.13	0.87	0.19	3.88	0.00	497.70	0.00	0.00	498.21	5.45	0.48	0.41	2.77	0.59	12.38	0.02	1587.28	0.00	0.00	1588.87
	Total	**56**	**0.42**	**0.27**	**16.31**	**0.63**	**6.28**	**0.03**	**3233.52**	**0.14**	**0.10**	**3267.55**	**117**	**1.02**	**0.69**	**34.44**	**1.49**	**16.90**	**0.07**	**7130.80**	**0.29**	**0.21**	**7201.21**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

Vehicles with Onroad Engines for Emissions Estimates	Off-site Miles per Day Travelled per Vehicle	Month 5 Daily Emissions (Lb/Day)											Month 6 Daily Emissions (Lb/Day)										
		Quantity Mo 5	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 6	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	74.99	137	0.63	0.32	38.88	1.09	4.39	0.07	6602.71	0.36	0.25	6687.38	129	0.60	0.30	36.61	1.02	4.13	0.06	6217.15	0.34	0.23	6296.88
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	0.74	0.03	0.02	0.17	0.02	0.96	0.00	193.88	0.00	0.00	194.10	0.74	0.03	0.02	0.17	0.02	0.96	0.00	193.88	0.00	0.00	194.10
Truck Tractor Delivery Trucks	79.2	2.03	0.18	0.15	1.03	0.22	4.62	0.01	591.87	0.00	0.00	592.46	0.88	0.08	0.07	0.45	0.10	1.99	0.00	255.58	0.00	0.00	255.84
	Total	**140**	**0.84**	**0.49**	**40.08**	**1.33**	**9.97**	**0.08**	**7388.45**	**0.36**	**0.25**	**7473.94**	**131**	**0.70**	**0.39**	**37.22**	**1.14**	**7.09**	**0.07**	**6666.61**	**0.34**	**0.24**	**6746.81**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

		Month 7 Daily Emissions (Lb/Day)											Month 8 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Off-site Miles per Day Travelled per Vehicle**	**Quantity Mo 7**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 8**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	130	0.60	0.30	36.75	1.03	4.15	0.06	6241.25	0.34	0.24	6321.28	291	1.34	0.67	82.44	2.30	9.31	0.14	14000.63	0.76	0.53	14180.18
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	0.42	0.01	0.01	0.10	0.01	0.54	0.00	109.06	0.00	0.00	109.18	1.52	0.05	0.04	0.35	0.04	1.99	0.00	399.88	0.00	0.00	400.32
Truck Tractor Delivery Trucks	79.2	5.63	0.50	0.42	2.87	0.61	12.80	0.02	1641.08	0.00	0.01	1642.73	10.85	0.96	0.82	5.52	1.18	24.66	0.03	3161.10	0.01	0.01	3164.28
	Total	**136**	**1.11**	**0.74**	**39.71**	**1.65**	**17.50**	**0.08**	**7991.38**	**0.34**	**0.24**	**8073.20**	**303**	**2.36**	**1.53**	**88.31**	**3.52**	**35.96**	**0.18**	**17561.61**	**0.77**	**0.54**	**17744.78**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

		Month 9 Daily Emissions (Lb/Day)											Month 10 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Off-site Miles per Day Travelled per Vehicle**	**Quantity Mo 9**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 10**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	287	1.33	0.66	81.30	2.27	9.18	0.14	13807.85	0.75	0.52	13984.93	246	1.14	0.57	69.81	1.95	7.88	0.12	11855.96	0.64	0.45	12008.00
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	1.52	0.05	0.04	0.35	0.04	1.99	0.00	399.88	0.00	0.00	400.32	1.52	0.05	0.04	0.35	0.04	1.99	0.00	399.88	0.00	0.00	400.32
Truck Tractor Delivery Trucks	79.2	6.23	0.55	0.47	3.17	0.68	14.17	0.02	1815.95	0.01	0.01	1817.78	5.77	0.51	0.43	2.94	0.63	13.12	0.02	1681.44	0.00	0.01	1683.13
	Total	**294**	**1.93**	**1.17**	**84.82**	**2.99**	**25.34**	**0.16**	**16023.68**	**0.75**	**0.53**	**16203.03**	**253**	**1.70**	**1.05**	**73.10**	**2.62**	**22.99**	**0.14**	**13937.27**	**0.65**	**0.45**	**14091.45**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

Vehicles with Onroad Engines for Emissions Estimates	Off-site Miles per Day Travelled per Vehicle	Month 11 Daily Emissions (Lb/Day)											Month 12 Daily Emissions (Lb/Day)										
		Quantity Mo 11	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 12	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	74.99	224	1.03	0.52	63.42	1.77	7.16	0.11	10771.57	0.58	0.41	10909.71	383	1.77	0.89	108.54	3.03	12.26	0.19	18434.57	1.00	0.69	18670.97
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	1.43	0.05	0.04	0.33	0.04	1.87	0.00	375.64	0.00	0.00	376.06	2.54	0.09	0.07	0.59	0.06	3.31	0.01	666.46	0.00	0.00	667.21
Truck Tractor Delivery Trucks	79.2	5.77	0.51	0.43	2.94	0.63	13.12	0.02	1681.44	0.00	0.01	1683.13	10.11	0.90	0.76	5.15	1.10	22.98	0.03	2945.88	0.01	0.01	2948.84
	Total	**231**	**1.60**	**0.99**	**66.69**	**2.44**	**22.15**	**0.13**	**12828.65**	**0.59**	**0.41**	**12968.90**	**395**	**2.76**	**1.72**	**114.28**	**4.20**	**38.55**	**0.22**	**22046.91**	**1.01**	**0.71**	**22287.02**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

		Month 13 Daily Emissions (Lb/Day)											Month 14 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Off-site Miles per Day Travelled per Vehicle**	**Quantity Mo 13**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 14**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	383	1.77	0.89	108.54	3.03	12.26	0.19	18434.57	1.00	0.69	18670.97	342	1.58	0.79	97.05	2.71	10.96	0.17	16482.67	0.89	0.62	16694.05
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	2.54	0.09	0.07	0.59	0.06	3.31	0.01	666.46	0.00	0.00	667.21	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	79.2	10.11	0.90	0.76	5.15	1.10	22.98	0.03	2945.88	0.01	0.01	2948.84	10.02	0.89	0.75	5.10	1.09	22.77	0.03	2918.97	0.01	0.01	2921.91
	Total	**395**	**2.76**	**1.72**	**114.28**	**4.20**	**38.55**	**0.22**	**22046.91**	**1.01**	**0.71**	**22287.02**	**354**	**2.55**	**1.61**	**102.66**	**3.86**	**36.62**	**0.20**	**19983.29**	**0.90**	**0.63**	**20198.25**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

		Month 15 Daily Emissions (Lb/Day)											Month 16 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Off-site Miles per Day Travelled per Vehicle**	**Quantity Mo 15**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 16**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	453	2.10	1.05	128.55	3.59	14.52	0.22	21832.31	1.18	0.82	22112.29	389	1.80	0.90	110.39	3.08	12.47	0.19	18747.84	1.02	0.71	18988.26
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	79.2	11.17	0.99	0.84	5.69	1.22	25.40	0.03	3255.26	0.01	0.01	3258.54	6.65	0.59	0.50	3.38	0.72	15.11	0.02	1937.01	0.01	0.01	1938.96
	Total	**467**	**3.20**	**1.98**	**135.00**	**4.89**	**44.25**	**0.26**	**25960.03**	**1.19**	**0.84**	**26244.26**	**399**	**2.50**	**1.49**	**114.54**	**3.89**	**31.92**	**0.22**	**21557.31**	**1.02**	**0.72**	**21800.66**
			1.11	0.93	6.45	1.30	29.73	0.04															

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

		Month 17 Daily Emissions (Lb/Day)											Month 18 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Off-site Miles per Day Travelled per Vehicle**	**Quantity Mo 17**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 18**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	445	2.06	1.03	126.28	3.53	14.26	0.22	21446.75	1.16	0.81	21721.79	445	2.06	1.03	126.28	3.53	14.26	0.22	21446.75	1.16	0.81	21721.79
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	79.2	11.12	0.99	0.84	5.66	1.21	25.29	0.03	3241.81	0.01	0.01	3245.07	11.12	0.99	0.84	5.66	1.21	25.29	0.03	3241.81	0.01	0.01	3245.07
	Total	**459**	**3.16**	**1.96**	**132.71**	**4.82**	**43.89**	**0.26**	**25561.02**	**1.17**	**0.82**	**25840.30**	**459**	**3.16**	**1.96**	**132.71**	**4.82**	**43.89**	**0.26**	**25561.02**	**1.17**	**0.82**	**25840.30**
			1.10	0.93	6.43	1.29	29.63	0.04															

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Passengers per Vehicle =
Construction Schedule =
Days per Month =

		Month 19 Daily Emissions (Lb/Day)											Month 20 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Off-site Miles per Day Travelled per Vehicle**	**Quantity Mo 19**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 20**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	334	1.54	0.77	94.78	2.65	10.70	0.17	16097.11	0.87	0.61	16303.54	334	1.54	0.77	94.78	2.65	10.70	0.17	16097.11	0.87	0.61	16303.54
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	79.2	9.97	0.89	0.75	5.07	1.09	22.67	0.03	2905.52	0.01	0.01	2908.45	9.97	0.89	0.75	5.07	1.09	22.67	0.03	2905.52	0.01	0.01	2908.45
	Total	**346**	**2.51**	**1.59**	**100.37**	**3.79**	**36.26**	**0.20**	**19584.27**	**0.88**	**0.62**	**19794.28**	**346**	**2.51**	**1.59**	**100.37**	**3.79**	**36.26**	**0.20**	**19584.27**	**0.88**	**0.62**	**19794.28**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 21 Daily Emissions (Lb/Day)											Month 22 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 21**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 22**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	334	1.54	0.77	94.78	2.65	10.70	0.17	16097.11	0.87	0.61	16303.54	350	1.62	0.81	99.32	2.77	11.22	0.17	16868.23	0.91	0.64	17084.55
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	9.97	0.89	0.75	5.07	1.09	22.67	0.03	2905.52	0.01	0.01	2908.45	11.22	1.00	0.84	5.71	1.22	25.50	0.03	3268.71	0.01	0.01	3272.00
TOTALS	**346**	**2.51**	**1.59**	**100.37**	**3.79**	**36.26**	**0.20**	**19584.27**	**0.88**	**0.62**	**19794.28**	**363**	**2.69**	**1.72**	**105.54**	**4.05**	**39.61**	**0.21**	**20718.58**	**0.92**	**0.65**	**20938.84**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 23 Daily Emissions (Lb/Day)											Month 24 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 23**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 24**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	350	1.62	0.81	99.32	2.77	11.22	0.17	16868.23	0.91	0.64	17084.55	350	1.62	0.81	99.32	2.77	11.22	0.17	16868.23	0.91	0.64	17084.55
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	11.22	1.00	0.84	5.71	1.22	25.50	0.03	3268.71	0.01	0.01	3272.00	11.22	1.00	0.84	5.71	1.22	25.50	0.03	3268.71	0.01	0.01	3272.00
TOTALS	**363**	**2.69**	**1.72**	**105.54**	**4.05**	**39.61**	**0.21**	**20718.58**	**0.92**	**0.65**	**20938.84**	**363**	**2.69**	**1.72**	**105.54**	**4.05**	**39.61**	**0.21**	**20718.58**	**0.92**	**0.65**	**20938.84**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 25 Daily Emissions (Lb/Day)											Month 26 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 25**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 26**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	350	1.62	0.81	99.32	2.77	11.22	0.17	16868.23	0.91	0.64	17084.55	445	2.06	1.03	126.28	3.53	14.26	0.22	21446.75	1.16	0.81	21721.79
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	11.22	1.00	0.84	5.71	1.22	25.50	0.03	3268.71	0.01	0.01	3272.00	11.12	0.99	0.84	5.66	1.21	25.29	0.03	3241.81	0.01	0.01	3245.07
TOTALS	**363**	**2.69**	**1.72**	**105.54**	**4.05**	**39.61**	**0.21**	**20718.58**	**0.92**	**0.65**	**20938.84**	**459**	**3.16**	**1.96**	**132.71**	**4.82**	**43.89**	**0.26**	**25561.02**	**1.17**	**0.82**	**25840.30**
													1.10	0.93	6.43	1.29	29.63	0.04				

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 27 Daily Emissions (Lb/Day)											Month 28 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 27**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 28**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	445	2.06	1.03	126.28	3.53	14.26	0.22	21446.75	1.16	0.81	21721.79	445	2.06	1.03	126.28	3.53	14.26	0.22	21446.75	1.16	0.81	21721.79
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	11.12	0.99	0.84	5.66	1.21	25.29	0.03	3241.81	0.01	0.01	3245.07	11.12	0.99	0.84	5.66	1.21	25.29	0.03	3241.81	0.01	0.01	3245.07
TOTALS	**459**	**3.16**	**1.96**	**132.71**	**4.82**	**43.89**	**0.26**	**25561.02**	**1.17**	**0.82**	**25840.30**	**459**	**3.16**	**1.96**	**132.71**	**4.82**	**43.89**	**0.26**	**25561.02**	**1.17**	**0.82**	**25840.30**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 29 Daily Emissions (Lb/Day)											Month 30 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 29**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 30**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	429	1.98	1.00	121.74	3.40	13.75	0.21	20675.63	1.12	0.78	20940.78	429	1.98	1.00	121.74	3.40	13.75	0.21	20675.63	1.12	0.78	20940.78
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	10.06	0.90	0.76	5.12	1.10	22.88	0.03	2932.42	0.01	0.01	2935.38	10.06	0.90	0.76	5.12	1.10	22.88	0.03	2932.42	0.01	0.01	2935.38
TOTALS	**442**	**2.99**	**1.84**	**127.63**	**4.58**	**40.96**	**0.25**	**24480.52**	**1.13**	**0.79**	**24749.59**	**442**	**2.99**	**1.84**	**127.63**	**4.58**	**40.96**	**0.25**	**24480.52**	**1.13**	**0.79**	**24749.59**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 31 Daily Emissions (Lb/Day)											Month 32 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 31**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 32**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	429	1.98	1.00	121.74	3.40	13.75	0.21	20675.63	1.12	0.78	20940.78	318	1.47	0.74	90.24	2.52	10.19	0.16	15325.99	0.83	0.58	15522.54
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	10.06	0.90	0.76	5.12	1.10	22.88	0.03	2932.42	0.01	0.01	2935.38	8.91	0.79	0.67	4.53	0.97	20.25	0.02	2596.14	0.01	0.01	2598.75
TOTALS	**442**	**2.99**	**1.84**	**127.63**	**4.58**	**40.96**	**0.25**	**24480.52**	**1.13**	**0.79**	**24749.59**	**329**	**2.34**	**1.47**	**95.29**	**3.55**	**33.34**	**0.19**	**18503.77**	**0.84**	**0.59**	**18703.58**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 33 Daily Emissions (Lb/Day)											Month 34 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 33**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 34**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	318	1.47	0.74	90.24	2.52	10.19	0.16	15325.99	0.83	0.58	15522.54	318	1.47	0.74	90.24	2.52	10.19	0.16	15325.99	0.83	0.58	15522.54
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	8.91	0.79	0.67	4.53	0.97	20.25	0.02	2596.14	0.01	0.01	2598.75	8.91	0.79	0.67	4.53	0.97	20.25	0.02	2596.14	0.01	0.01	2598.75
TOTALS	**329**	**2.34**	**1.47**	**95.29**	**3.55**	**33.34**	**0.19**	**18503.77**	**0.84**	**0.59**	**18703.58**	**329**	**2.34**	**1.47**	**95.29**	**3.55**	**33.34**	**0.19**	**18503.77**	**0.84**	**0.59**	**18703.58**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 35 Daily Emissions (Lb/Day)											Month 36 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 35**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 36**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	306	1.42	0.71	86.83	2.43	9.81	0.15	14747.65	0.80	0.56	14936.78	159	0.74	0.37	45.12	1.26	5.10	0.08	7663.00	0.41	0.29	7761.27
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	1.11	0.04	0.03	0.26	0.03	1.45	0.00	290.82	0.00	0.00	291.15
Truck Tractor Delivery Trucks	8.91	0.79	0.67	4.53	0.97	20.25	0.02	2596.14	0.01	0.01	2598.75	4.52	0.40	0.34	2.30	0.49	10.28	0.01	1318.25	0.00	0.00	1319.57
TOTALS	**317**	**2.28**	**1.44**	**91.88**	**3.45**	**32.95**	**0.18**	**17925.43**	**0.81**	**0.57**	**18117.82**	**165**	**1.18**	**0.74**	**47.68**	**1.78**	**16.83**	**0.09**	**9272.06**	**0.42**	**0.29**	**9371.99**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 37 Daily Emissions (Lb/Day)											Month 38 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 37**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 38**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	159	0.74	0.37	45.12	1.26	5.10	0.08	7663.00	0.41	0.29	7761.27	159	0.74	0.37	45.12	1.26	5.10	0.08	7663.00	0.41	0.29	7761.27
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	1.11	0.04	0.03	0.26	0.03	1.45	0.00	290.82	0.00	0.00	291.15	1.11	0.04	0.03	0.26	0.03	1.45	0.00	290.82	0.00	0.00	291.15
Truck Tractor Delivery Trucks	4.52	0.40	0.34	2.30	0.49	10.28	0.01	1318.25	0.00	0.00	1319.57	4.52	0.40	0.34	2.30	0.49	10.28	0.01	1318.25	0.00	0.00	1319.57
TOTALS	**165**	**1.18**	**0.74**	**47.68**	**1.78**	**16.83**	**0.09**	**9272.06**	**0.42**	**0.29**	**9371.99**	**165**	**1.18**	**0.74**	**47.68**	**1.78**	**16.83**	**0.09**	**9272.06**	**0.42**	**0.29**	**9371.99**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

	Month 39 Daily Emissions (Lb/Day)											Month 40 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 39**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 40**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor Delivery Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	**0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Monthly Comparison of Construction Equipment Emissions:

	Daily Emissions (Lb/Day)										
Month of Contruction	**Off-site Equipment Quantity**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	9	0.09	0.07	2.61	0.13	1.91	0.01	641.25	0.02	0.02	646.46
2	64	0.46	0.29	18.58	0.69	6.53	0.04	3619.08	0.16	0.11	3658.05
3	56	0.42	0.27	16.31	0.63	6.28	0.03	3233.52	0.14	0.10	3267.55
4	117	1.02	0.69	34.44	1.49	16.90	0.07	7130.80	0.29	0.21	7201.21
5	140	0.84	0.49	40.08	1.33	9.97	0.08	7388.45	0.36	0.25	7473.94
6	131	0.70	0.39	37.22	1.14	7.09	0.07	6666.61	0.34	0.24	6746.81
7	136	1.11	0.74	39.71	1.65	17.50	0.08	7991.38	0.34	0.24	8073.20
8	303	2.36	1.53	88.31	3.52	35.96	0.18	17561.61	0.77	0.54	17744.78
9	294	1.93	1.17	84.82	2.99	25.34	0.16	16023.68	0.75	0.53	16203.03
10	253	1.70	1.05	73.10	2.62	22.99	0.14	13937.27	0.65	0.45	14091.45
11	231	1.60	0.99	66.69	2.44	22.15	0.13	12828.65	0.59	0.41	12968.90
12	395	2.76	1.72	114.28	4.20	38.55	0.22	22046.91	1.01	0.71	22287.02
13	395	2.76	1.72	114.28	4.20	38.55	0.22	22046.91	1.01	0.71	22287.02
14	354	2.55	1.61	102.66	3.86	36.62	0.20	19983.29	0.90	0.63	20198.25
15	467	3.20	1.98	135.00	4.89	44.25	0.26	25960.03	1.19	0.84	26244.26
16	399	2.50	1.49	114.54	3.89	31.92	0.22	21557.31	1.02	0.72	21800.66
17	459	3.16	1.96	132.71	4.82	43.89	0.26	25561.02	1.17	0.82	25840.30
18	459	3.16	1.96	132.71	4.82	43.89	0.26	25561.02	1.17	0.82	25840.30
19	346	2.51	1.59	100.37	3.79	36.26	0.20	19584.27	0.88	0.62	19794.28
20	346	2.51	1.59	100.37	3.79	36.26	0.20	19584.27	0.88	0.62	19794.28
21	346	2.51	1.59	100.37	3.79	36.26	0.20	19584.27	0.88	0.62	19794.28
22	363	2.69	1.72	105.54	4.05	39.61	0.21	20718.58	0.92	0.65	20938.84
23	363	2.69	1.72	105.54	4.05	39.61	0.21	20718.58	0.92	0.65	20938.84
24	363	2.69	1.72	105.54	4.05	39.61	0.21	20718.58	0.92	0.65	20938.84
25	363	2.69	1.72	105.54	4.05	39.61	0.21	20718.58	0.92	0.65	20938.84
26	459	3.16	1.96	132.71	4.82	43.89	0.26	25561.02	1.17	0.82	25840.30
27	459	3.16	1.96	132.71	4.82	43.89	0.26	25561.02	1.17	0.82	25840.30
28	459	3.16	1.96	132.71	4.82	43.89	0.26	25561.02	1.17	0.82	25840.30
29	442	2.99	1.84	127.63	4.58	40.96	0.25	24480.52	1.13	0.79	24749.59
30	442	2.99	1.84	127.63	4.58	40.96	0.25	24480.52	1.13	0.79	24749.59
31	442	2.99	1.84	127.63	4.58	40.96	0.25	24480.52	1.13	0.79	24749.59
32	329	2.34	1.47	95.29	3.55	33.34	0.19	18503.77	0.84	0.59	18703.58
33	329	2.34	1.47	95.29	3.55	33.34	0.19	18503.77	0.84	0.59	18703.58
34	329	2.34	1.47	95.29	3.55	33.34	0.19	18503.77	0.84	0.59	18703.58
35	317	2.28	1.44	91.88	3.45	32.95	0.18	17925.43	0.81	0.57	18117.82
36	165	1.18	0.74	47.68	1.78	16.83	0.09	9272.06	0.42	0.29	9371.99
37	165	1.18	0.74	47.68	1.78	16.83	0.09	9272.06	0.42	0.29	9371.99
38	165	1.18	0.74	47.68	1.78	16.83	0.09	9272.06	0.42	0.29	9371.99
39	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAX VALUE (Lb/Day)	**467**	**3.20**	**1.98**	**135.00**	**4.89**	**44.25**	**0.26**	**25960.03**	**1.19**	**0.84**	**26244.26**

TABLE D.2-10
DAILY OFF-SITE EMISSIONS BY MONTHS (PILE)

Months for Annual Contruction		Annual Emissions (Ton/Year)									
		PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	12	0.162	0.102	6.670	0.247	2.286	0.013	1288.924	0.081	0.0571	1805.44
2	13	0.191	0.119	7.879	0.291	2.683	0.015	1520.641	0.096	0.0674	2130.04
3	14	0.214	0.134	8.789	0.325	3.008	0.017	1697.783	0.107	0.0752	2378.15
4	15	0.244	0.152	10.074	0.371	3.419	0.020	1943.797	0.123	0.0862	2722.80
5	16	0.260	0.161	10.941	0.397	3.582	0.021	2099.965	0.134	0.0938	2941.79
6	17	0.285	0.177	11.943	0.435	3.949	0.023	2296.683	0.146	0.1024	3217.29
7	18	0.312	0.194	12.977	0.475	4.347	0.025	2501.215	0.159	0.1112	3503.69
8	19	0.327	0.203	13.634	0.498	4.551	0.027	2626.708	0.167	0.1168	3679.50
9	20	0.328	0.204	13.764	0.501	4.554	0.027	2648.603	0.169	0.1180	3710.25
10	21	0.335	0.208	13.932	0.510	4.672	0.027	2687.146	0.171	0.1194	3764.12
11	22	0.345	0.215	14.284	0.525	4.852	0.028	2760.554	0.175	0.1223	3866.83
12	23	0.357	0.223	14.704	0.543	5.041	0.029	2845.963	0.180	0.1258	3986.38
13	24	0.356	0.223	14.610	0.541	5.052	0.029	2831.584	0.178	0.1249	3966.15
14	25	0.356	0.223	14.515	0.540	5.064	0.029	2817.204	0.177	0.1241	3945.93
15	26	0.362	0.227	14.840	0.550	5.143	0.029	2877.583	0.181	0.1269	4030.56
16	27	0.362	0.227	14.816	0.549	5.139	0.029	2873.264	0.181	0.1267	4024.50
17	28	0.369	0.232	15.012	0.559	5.268	0.030	2916.604	0.183	0.1283	4085.10
18	29	0.367	0.231	14.957	0.557	5.237	0.029	2904.908	0.183	0.1278	4068.73
19	30	0.365	0.229	14.902	0.554	5.205	0.029	2893.211	0.182	0.1274	4052.37
20	31	0.371	0.232	15.197	0.563	5.256	0.030	2946.213	0.186	0.1300	4126.70
21	32	0.369	0.231	15.142	0.560	5.224	0.030	2934.517	0.185	0.1295	4110.34
22	33	0.367	0.230	15.087	0.557	5.192	0.030	2922.820	0.184	0.1291	4093.98
23	34	0.363	0.227	14.976	0.552	5.124	0.029	2898.845	0.183	0.1282	4060.45
24	35	0.359	0.224	14.828	0.545	5.052	0.029	2868.609	0.181	0.1269	4018.14
25	36	0.342	0.213	14.202	0.521	4.806	0.028	2744.701	0.174	0.1216	3844.64
26	37	0.326	0.203	13.576	0.496	4.559	0.027	2620.792	0.166	0.1163	3671.13
27	38	0.304	0.190	12.655	0.463	4.266	0.025	2444.464	0.155	0.1084	3424.11
28	39	0.270	0.168	11.219	0.411	3.791	0.022	2167.766	0.137	0.0961	3036.50
29	40	0.236	0.147	9.782	0.359	3.316	0.019	1891.068	0.120	0.0838	2648.90
MAX VALUE (Ton/Year)		**0.371**	**0.232**	**15.197**	**0.563**	**5.268**	**0.0299**	**2946.21**	**0.186**	**0.1300**	**4126.70**

TABLE D.2-11
DISTURBED ACREAGE, EXCAVATION VOLUMES, AND FUGITIVE DUST EMISSIONS BY MONTH (PILE)

PROJECT: **NextLight Avenal Solar Ranch One**
SUBJECT: **5408-8011 ADEIR#2 Support**
CALCULATION NO.

CALCULATED BY: KFH DATE: 6-Nov-09
CHECKED BY: DATE:
SHEET NUMBER: 6 OF: 13

3.1 Disturbed Area By Month # 8 MW/Month

Disturbed Area Description	Month of Construction 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Totals
Solar Field No.1																																							
230kV T/L - 4' Dia Poles							0	0	0	0																													0.01
230kV T/L - 6' Dia Poles							0																																0.00
230kV T/L - Pole Setting Sites							1	1	1	1																													2.89
230kV T/L - Stringing Sites							0	0	0																														0.69
Site Bndry Fence - Ops Access							1	1																															1.84
Site Bndry Fence - Const. Access							1	1																															1.84
Permanent (Fire) Access Roads								5	5	5	5	5	5	5	5	5																							45.00
Tracker Foundations									1	1	1	1	1	1	1	1	1	1																					12.74
Drive Motor Foundations									0	0	0	0	0	0	0	0	0	0																					0.48
Equipment Pad Foundations									0	0	0	0	0	0	0	0	0	0																					0.43
Temp Const Access Rds								3	3	3	3	3	3	3	3	3	3	3																					33.24
DC Trenching								1																															0.72
AC Trenching								1																															0.72
Staging Area								7					7																										13.80
Laydown Area								2					2																										3.74
Infiltration Trenches								1	1	1	1	1	1	1	1	1	1	1																					13.75
Infiltration Trench Spoil Banks								3	3	3	3	3	3	3	3	3	3	3																					29.90
Solar Field No. 1 Subtotals	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*25*	*14*	*14*	*13*	*13*	*22*	*13*	*13*	*13*	*8*	*8*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	161.79
Solar Field No.2																																							
High Voltage Substation				3																																			3.29
Site Bndry Fence - Ops Access				1	1																																		2.00
Site Bndry Fence - Const. Access				1	1																																		2.00
Permanent (Fire) Access Roads												5	5	5	5	5	5	5	5	5																			45.00
Tracker Foundations													1	1	1	1	1	1	1	1	1																		11.18
Drive Motor Foundations													0	0	0	0	0	0	0	0	0																		0.45
Equipment Pad Foundations													0	0	0	0	0	0	0	0	0																		0.40
Temp Const Access Rds												3	3	3	3	3	3	3	3	3	3																		28.62
DC Trenching												1																											0.66
AC Trenching												1																											0.65
Staging Area												10					10																						20.70
Laydown Area												2				2																							4.37
Infiltration Trenches												1	1	1	1	1	1	1	1	1	1																		12.07
Infiltration Trench Spoil Banks												3	3	3	3	3	3	3	3	3	3																		26.24
Solar Field No. 2 Subtotals	*0*	*0*	*0*	*5*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*26*	*13*	*13*	*13*	*15*	*23*	*13*	*13*	*13*	*8*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	157.64

TABLE D.2-11
DISTURBED ACREAGE, EXCAVATION VOLUMES, AND FUGITIVE DUST EMISSIONS BY MONTH (PILE)

PROJECT: **NextLight Avenal Solar Ranch One**
SUBJECT: **5408-8011 ADEIR#2 Support**
CALCULATION NO.

CALCULATED BY: KFH DATE: 6-Nov-09
CHECKED BY: DATE:
SHEET NUMBER: 7 OF: 13

Month of Construction

Disturbed Area Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Totals
Solar Field No.3																																							
34.5 kV Overhead Line															0	0	0																						0.52
O&M Facility Paved Roads	1																																						1.20
O&M Facility	0																																						0.46
O&MTemp Stgi'g & Ass'mbly Area	5																																						5.20
Site Bndry Fence - Ops Access	1	1																																					1.33
Site Bndry Fence - Const. Access	1	1																																					1.33
Permanent (Fire) Access Roads																5	5	5	5	5	5	5	5	5	5	5													55.02
Tracker Foundations																1	1	1	1	1	1	1	1	1	1	1	1	1	1										15.73
Drive Motor Foundations															0	0	0	0	0	0	0	0	0	0	0	0	0	0											0.66
Equipment Pad Foundations															0	0	0	0	0	0	0	0	0	0	0	0	0	0											0.52
Temp Const Access Rds		3	3	3												5	5	5	5	5	5	5	5																50.32
DC Trenching																																							0.00
AC Trenching																																							0.00
Staging Area																	7				7				7														20.70
Laydown Area																	1				1				1														4.21
Infiltration Trenches															1	1	1	1	1	1	1	1	1	1	1	1	1	1											16.98
Infiltration Trench Spoil Banks															3	3	3	3	3	3	3	3	3	3	3	3	3	3											36.91
Solar Field No. 3 Subtotals	*8.2*	*4.7*	*3.4*	*3.4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*4.1*	*15*	*24*	*15*	*15*	*15*	*23*	*15*	*15*	*10*	*18*	*10*	*5.1*	*5.1*	*1.1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	211.08
Solar Field No. 4																																							
34.5 kV Overhead Line																		0	0	0	0																		0.48
Site Bndry Fence - Ops Access																						1	1																2.10
Site Bndry Fence - Const. Access																						1	1																2.10
Permanent (Fire) Access Roads																							5	5	5	5	5	5	5	5	5								45.00
Tracker Foundations																							1	1	1	1	1	1	1	1	1								10.91
Drive Motor Foundations																							0	0	0	0	0	0	0	0	0								0.47
Equipment Pad Foundations																							0	0	0	0	0	0	0	0	0								0.36
Temp Const Access Rds		3	3	3																			3	3	3	3	3				3								28.52
DC Trenching																						1																	0.60
AC Trenching																						1																	0.59
Staging Area																						7					7												13.80
Laydown Area																						2					2												3.74
Raw Wtr Supply Line - Trenching		0																				0																	0.00
Raw Wtr Line - Const Access		0																				0																	0.01

Con't on Next Sheet

TABLE D.2-11
DISTURBED ACREAGE, EXCAVATION VOLUMES, AND FUGITIVE DUST EMISSIONS BY MONTH (PILE)

PROJECT: **NextLight Avenal Solar Ranch One**
SUBJECT: **5408-8011 ADEIR#2 Support**
CALCULATION NO.

CALCULATED BY: KFH DATE: 6-Nov-09
CHECKED BY: DATE:
SHEET NUMBER: 8 OF: 13

Month of Construction

Disturbed Area Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Totals
Solar Field No.4 (con't)																																							
Raw Wtr Line - No Jack&Bore Pit																						0																	0.00
Raw Wtr Line - Pit Spoil Banks																						0																	0.00
Infiltration Trenches																						1	1	1	1	1	1	1	1	1	1								11.79
Infiltration Trench Spoil Banks																						3	3	3	3	3	3	3	3	3	3								25.62
Solar Field No. 4 Subtotals	*0*	*3.2*	*3.2*	*3.2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.1*	*0.1*	*0.1*	*0.1*	*16*	*15*	*13*	*13*	*13*	*22*	*10*	*10*	*10*	*13*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	146.10
Solar Field No. 5																																							
34.5 kV Overhead Line																										0	0	0	0										0.37
Site Bndry Fence - Ops Access																										1	1												1.36
Site Bndry Fence - Const. Access																										1	1												1.36
Permanent (Fire) Access Roads																										5	5	5	5	5	5	5	5	5					45.00
Tracker Foundations																											1	1	1	1	1	1	1	1	1				11.28
Drive Motor Foundations																											0	0	0	0	0	0	0	0	0				0.52
Equipment Pad Foundations																											0	0	0	0	0	0	0	0	0				0.37
Temp Const Access Rds		3																								3	3	3	3	3	3	3	3						28.11
DC Trenching																										1													0.76
AC Trenching																										1													0.76
Staging Area																										7						7							13.80
Laydown Area																										2						2							3.74
Raw Wtr Line - So Jack&Bore Pit		0																																					0.02
Raw Wtr Line - Pit Spoil Banks		0																																					0.03
Infiltration Trenches																										1	1	1	1	1	1	1	1	1	1				12.18
Infiltration Trench Spoil Banks																										3	3	3	3	3	3	3	3	3	3				26.48
Solar Field No. 5 Subtotals	*0*	*3.2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*24*	*15*	*13*	*13*	*13*	*13*	*22*	*13*	*10*	*5.2*	*0*	*0*	*0*	146.15

TABLE D.2-11
DISTURBED ACREAGE, EXCAVATION VOLUMES, AND FUGITIVE DUST EMISSIONS BY MONTH (PILE)

PROJECT: **NextLight Avenal Solar Ranch One**
SUBJECT: **5408-8011 ADEIR#2 Support**
CALCULATION NO.

CALCULATED BY: KFH DATE: 6-Nov-09
CHECKED BY: DATE:
SHEET NUMBER: 9 OF: 13

Month of Construction

Disturbed Area Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Totals
Solar Field No. 6																																							
Site Bndry Fence - Ops Access																													1	1									1.31
Site Bndry Fence - Const. Access																													1	1									1.31
Permanent (Fire) Access Roads																														5	5	5	5	5	5	5	5	5	45.00
Tracker Foundations																														1	1	1	1	1	1	1	1	1	11.91
Drive Motor Foundations																														0	0	0	0	0	0	0	0	0	0.52
Equipment Pad Foundations																														0	0	0	0	0	0	0	0	0	0.35
Temp Const Access Rds																														3	3	3	3	3	3	3	3	3	30.22
DC Trenching																													1										0.76
AC Trenching																													1										0.75
Staging Area																													7					7					13.80
Laydown Area																													2					2					4.37
Infiltration Trenches																													1	1	1	1	1	1	1	1	1	1	12.87
Infiltration Trench Spoil Banks																													3	3	3	3	3	3	3	3	3	3	27.97
Solar Field No. 6 Subtotals	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*16*	*15*	*14*	*14*	*14*	*23*	*14*	*14*	*14*	*14*	151.13
Total Disturbed Area	8	11	7	12	2	0	3	25	14	14	13	39	35	26	30	44	55	37	28	28	32	31	30	23	32	47	42	29	41	39	40	36	27	33	19	14	14	14	973.89
Onsite Cut/Fill (1000 cubic yards)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7			262.820
Offsite Cut/Fill (1000 cubic yards)							1	1	1	1																													2.016
Uncontrolled Disturbed Area PM10 (Ton/Mon	0.9	1.2	0.7	1.3	0.2	0.0	0.3	2.7	1.6	1.5	1.5	4.3	3.9	2.9	3.4	4.8	6.1	4.0	3.1	3.1	3.5	3.4	3.3	2.6	3.5	5.2	4.6	3.1	4.5	4.2	4.4	4.0	3.0	3.6	2.1	1.5	1.5	1.5	
Controlled Disturbed Area PM10 (Ton/Month)	0.1	0.2	0.1	0.2	0.0	0.0	0.0	0.4	0.3	0.2	0.2	0.7	0.6	0.5	0.5	0.8	1.0	0.6	0.5	0.5	0.6	0.5	0.5	0.4	0.6	0.8	0.7	0.5	0.7	0.7	0.7	0.6	0.5	0.6	0.3	0.2	0.2	0.2	17.1
Uncontrolled Cut/Fill PM10 (Ton/Month)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.0	0.0	15.95
Controlled Cut/Fill PM10 (Ton/Month)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	6.22
																																							Peak Tons/Year
Rolling 12 Mo Disturbed Area PM10 (Ton/Ye	0.1	0.3	0.5	0.7	0.7	0.7	0.7	1.2	1.4	1.7	1.9	2.6	3.1	3.3	3.8	4.3	5.3	5.9	6.4	6.4	6.7	7.0	7.3	7.0	7.0	7.3	7.5	7.3	7.0	7.1	7.3	7.4	7.3	7.4	7.2	7.0	6.7	6.1	7.5
																																							Peak Lb/Day
Average Disturbed Area PM10 (Lb/Day)	13.3	17.9	10.6	19.2	3.3	0.0	4.5	40.6	23.2	22.9	21.7	63.2	57.1	42.9	49.5	71.2	89.8	59.5	45.9	45.9	51.2	50.2	49.4	37.8	51.3	76.4	68.0	46.4	65.9	62.6	65.7	58.4	44.2	53.9	31.0	22.5	22.5	22.5	89.8
Average Cut/Fill PM10 (Lb/Day)	15.5	15.5	15.5	15.5	15.5	15.5	19.5	19.5	19.5	19.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	0.0	0.0	19.5
																																							Total Project (Tons)
Controlled Disturbed Area PM2.5 (Ton/Month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.6
Controlled Cut/Fill PM2.5 (Ton/Month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
																																							Peak Tons/Year
Rolling 12 Mo Disturbed Area PM2.5 (Ton/Ye	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.3	1.6
																																							Peak Lb/Day PM2.5
Average Disturbed Area PM2.5 (Lb/Day)	2.8	3.7	2.2	4.0	0.7	0.0	0.9	8.4	4.8	4.8	4.5	13.1	11.9	8.9	10.3	14.8	18.7	12.4	9.5	9.5	10.7	10.4	10.3	7.9	10.7	15.9	14.1	9.6	13.7	13.0	13.7	12.2	9.2	11.2	6.4	4.7	4.7	4.7	18.7
Average Cut/Fill PM2.5 (Lb/Day)	3.2	3.2	3.2	3.2	3.2	3.2	4.1	4.1	4.1	4.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	0.0	0.0	4.1

TABLE D.2-12
SUMMARY OF ALL SOURCES DAILY EMISSIONS BY MONTH (TOTAL) (PILE)

		On-site Sources										Fugitive Dust			
		Daily Emissions (Lb/Day)										Daily Emissions (Lb/Day)			
Month of Contruction	Total Equipment Quantity	PM10	PM2.5	CO	VOC	NOx	SO2	CO2	CH4	N2O	CO2e	Disturbed Area PM10	Cut/Fill PM10	Disturbed Area PM2.5	Cut/Fill PM2.5
1	7	1.21	1.11	11.81	3.10	26.10	0.03	2,715.77	0.26	0.00	2,721.30	13.30	15.51	2.77	3.23
2	24	3.95	3.61	36.67	10.12	79.49	0.10	9,436.51	0.81	0.00	9,454.43	17.91	15.51	3.73	3.23
3	24	3.14	2.87	26.54	7.69	56.22	0.07	6,178.83	0.61	0.00	6,192.30	10.60	15.51	2.20	3.23
4	35	5.15	4.72	45.97	14.43	90.00	0.11	9,573.44	1.07	0.00	9,596.65	19.20	15.51	3.99	3.23
5	33	4.60	4.22	41.09	13.27	77.35	0.09	8,281.73	0.96	0.00	8,302.58	3.25	15.51	0.68	3.23
6	27	3.14	2.89	27.30	9.95	51.46	0.06	5,038.73	0.71	0.00	5,053.84	0.00	15.51	0.00	3.23
7	46	5.25	4.81	45.26	16.01	109.75	0.13	11,633.00	1.22	0.00	11,659.49	4.54	19.50	0.94	4.06
8	72	10.22	9.38	90.58	26.86	196.21	0.23	20,534.52	2.12	0.01	20,580.56	40.61	19.50	8.45	4.06
9	67	10.16	9.33	89.84	26.43	196.10	0.22	20,254.43	2.12	0.00	20,300.10	23.25	19.50	4.84	4.06
10	63	9.72	8.93	86.34	25.33	189.27	0.22	19,795.91	2.03	0.00	19,839.61	22.87	19.50	4.76	4.06
11	66	6.65	6.10	58.48	15.29	112.40	0.13	11,393.86	1.29	0.01	11,422.77	21.70	15.51	4.51	3.23
12	99	12.21	11.19	107.70	28.10	207.68	0.24	21,571.54	2.31	0.01	21,623.01	63.18	15.51	13.14	3.23
13	95	11.42	10.46	100.78	26.10	187.99	0.22	19,579.20	2.13	0.01	19,626.88	57.11	15.51	11.88	3.23
14	83	10.87	9.96	95.19	23.95	175.21	0.20	17,664.07	1.99	0.01	17,708.27	42.87	15.51	8.92	3.23
15	121	12.73	11.66	112.03	28.48	207.58	0.23	21,173.52	2.31	0.01	21,226.10	49.54	15.51	10.30	3.23
16	104	8.87	8.10	79.08	20.58	150.15	0.17	15,852.06	1.60	0.01	15,889.69	71.21	15.51	14.81	3.23
17	145	12.65	11.56	112.48	28.63	210.26	0.24	22,079.15	2.28	0.02	22,132.40	89.84	15.51	18.69	3.23
18	144	12.60	11.53	111.58	28.22	207.23	0.23	21,242.47	2.27	0.02	21,295.27	59.45	15.51	12.37	3.23
19	107	10.93	10.01	96.44	24.14	178.24	0.20	17,993.62	2.00	0.01	18,038.88	45.88	15.51	9.54	3.23
20	102	9.77	8.94	84.97	21.18	152.57	0.17	15,354.20	1.73	0.01	15,393.98	45.88	15.51	9.54	3.23
21	102	9.77	8.94	84.97	21.18	152.57	0.17	15,354.20	1.73	0.01	15,393.98	51.25	15.51	10.66	3.23
22	88	11.99	10.99	105.30	26.53	194.47	0.22	19,942.90	2.20	0.01	19,991.87	50.22	15.51	10.45	3.23
23	86	11.75	10.77	102.70	25.67	188.07	0.21	18,845.62	2.16	0.01	18,893.30	49.40	15.51	10.28	3.23
24	86	11.75	10.77	102.70	25.67	188.07	0.21	18,845.62	2.16	0.01	18,893.30	37.81	15.51	7.86	3.23
25	105	10.64	9.75	92.47	22.90	165.43	0.18	16,535.75	1.90	0.01	16,579.01	51.30	15.51	10.67	3.23
26	121	12.75	11.66	112.62	28.75	209.96	0.24	21,926.54	2.31	0.01	21,979.52	76.36	15.51	15.88	3.23
27	119	12.50	11.44	110.02	27.88	203.55	0.23	20,829.25	2.27	0.01	20,880.94	67.97	15.51	14.14	3.23
28	118	12.45	11.41	109.12	27.46	200.51	0.22	19,992.57	2.27	0.01	20,043.82	46.36	15.51	9.64	3.23
29	117	11.82	10.81	104.21	26.61	194.06	0.22	19,908.31	2.14	0.01	19,957.36	65.94	15.51	13.72	3.23
30	116	11.62	10.63	102.52	26.17	190.69	0.22	19,647.71	2.10	0.01	19,695.91	62.65	15.51	13.03	3.23
31	116	11.62	10.63	102.52	26.17	190.69	0.22	19,647.71	2.10	0.01	19,695.91	65.66	15.51	13.66	3.23
32	98	8.85	8.10	77.15	19.32	139.06	0.16	14,088.99	1.57	0.01	14,125.23	58.45	15.51	12.16	3.23
33	98	8.85	8.10	77.15	19.32	139.06	0.16	14,088.99	1.57	0.01	14,125.23	44.20	15.51	9.19	3.23
34	99	8.90	8.13	78.06	19.74	142.09	0.16	14,925.67	1.57	0.01	14,962.36	53.88	15.51	11.21	3.23
35	98	8.85	8.10	77.15	19.32	139.06	0.16	14,088.99	1.57	0.01	14,125.23	31.00	15.51	6.45	3.23
36	49	4.42	4.05	38.58	9.66	69.53	0.08	7,044.49	0.78	0.01	7,062.62	22.52	15.51	4.68	3.23
37	49	4.42	4.05	38.58	9.66	69.53	0.08	7,044.49	0.78	0.01	7,062.62	22.52	0.00	4.68	0.00
38	49	4.42	4.05	38.58	9.66	69.53	0.08	7,044.49	0.78	0.01	7,062.62	22.52	0.00	4.68	0.00
39	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
40	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
MAX VALUE (Lb/Day)	145	12.75	11.66	112.62	28.75	210.26	0.24	22,079.15	2.31	0.02	22,132.40	89.84	19.50	18.69	4.06
		TOTAL CONSTRUCTION PERIOD ONSITE EMISSIONS (TONS)										TOTAL CONSTRUCTION PERIOD FUGITIVE DUST EMISSIONS (TONS)			
		3.71	3.40	32.63	8.55	61.78	0.07	6,355.89	0.69	0.00	6,371.48	17.13	6.22	3.56	1.29

TABLE D.2-12
SUMMARY OF ALL SOURCES DAILY EMISSIONS BY MONTH (TOTAL) (PILE)

	Off-site Mobile Sources Daily Emissions (Lb/Day)										All Sources Daily Emission (Lb/Day)									
Off-site Equipment Quantity	PM10	PM2.5	CO	VOC	NOx	SO2	CO2	CH4	N2O	CO2e	PM10	PM2.5	CO	VOC	NOx	SO2	CO2	CH4	N2O	CO2e
8.92	0.09	0.07	2.61	0.13	1.91	0.01	641.25	0.02	0.02	646.46	30.11	7.17	14.42	3.23	28.01	0.04	3,357.02	0.28	0.02	3,367.76
64.22	0.46	0.29	18.58	0.69	6.53	0.04	3,619.08	0.16	0.11	3,658.05	37.83	10.85	55.25	10.81	86.02	0.14	13,055.59	0.97	0.12	13,112.49
56.22	0.42	0.27	16.31	0.63	6.28	0.03	3,233.52	0.14	0.10	3,267.55	29.66	8.57	42.85	8.31	62.50	0.10	9,412.35	0.76	0.10	9,459.85
117.18	1.02	0.69	34.44	1.49	16.90	0.07	7,130.80	0.29	0.21	7,201.21	40.88	12.63	80.41	15.92	106.90	0.18	16,704.24	1.37	0.21	16,797.86
139.77	0.84	0.49	40.08	1.33	9.97	0.08	7,388.45	0.36	0.25	7,473.94	24.19	8.61	81.17	14.60	87.32	0.17	15,670.18	1.32	0.25	15,776.52
130.62	0.70	0.39	37.22	1.14	7.09	0.07	6,666.61	0.34	0.24	6,746.81	19.35	6.50	64.52	11.09	58.56	0.13	11,705.33	1.05	0.24	11,800.65
135.55	1.11	0.74	39.71	1.65	17.50	0.08	7,991.38	0.34	0.24	8,073.20	30.40	10.55	84.97	17.66	127.24	0.21	19,624.38	1.56	0.24	19,732.69
302.87	2.36	1.53	88.31	3.52	35.96	0.18	17,561.61	0.77	0.54	17,744.78	72.70	23.41	178.89	30.38	232.17	0.40	38,096.13	2.89	0.54	38,325.34
294.25	1.93	1.17	84.82	2.99	25.34	0.16	16,023.68	0.75	0.53	16,203.03	54.84	19.40	174.66	29.42	221.43	0.39	36,278.11	2.88	0.53	36,503.13
253.29	1.70	1.05	73.10	2.62	22.99	0.14	13,937.27	0.65	0.45	14,091.45	53.80	18.79	159.44	27.94	212.26	0.36	33,733.19	2.68	0.46	33,931.06
230.70	1.60	0.99	66.69	2.44	22.15	0.13	12,828.65	0.59	0.41	12,968.90	45.45	14.82	125.17	17.73	134.55	0.26	24,222.51	1.88	0.42	24,391.67
395.15	2.76	1.72	114.28	4.20	38.55	0.22	22,046.91	1.01	0.71	22,287.02	93.65	29.27	221.97	32.29	246.23	0.46	43,618.45	3.32	0.72	43,910.03
395.15	2.76	1.72	114.28	4.20	38.55	0.22	22,046.91	1.01	0.71	22,287.02	86.79	27.28	215.05	30.29	226.55	0.44	41,626.11	3.14	0.72	41,913.90
354.23	2.55	1.61	102.66	3.86	36.62	0.20	19,983.29	0.90	0.63	20,198.25	71.79	23.71	197.85	27.81	211.83	0.40	37,647.36	2.89	0.64	37,906.52
467.49	3.20	1.98	135.00	4.89	44.25	0.26	25,960.03	1.19	0.84	26,244.26	80.98	27.17	**247.03**	33.37	251.83	0.50	47,133.56	3.51	0.85	47,470.37
398.97	2.50	1.49	114.54	3.89	31.92	0.22	21,557.31	1.02	0.72	21,800.66	98.09	27.63	193.62	24.47	182.07	0.39	37,409.37	2.62	0.73	37,690.35
459.45	3.16	1.96	132.71	4.82	43.89	0.26	25,561.02	1.17	0.82	25,840.30	**121.16**	**35.44**	245.19	33.46	**254.15**	**0.50**	47,640.17	3.45	0.84	47,972.69
459.45	3.16	1.96	132.71	4.82	43.89	0.26	25,561.02	1.17	0.82	25,840.30	90.72	29.08	244.29	33.04	251.12	0.49	46,803.49	3.45	0.84	47,135.56
346.18	2.51	1.59	100.37	3.79	36.26	0.20	19,584.27	0.88	0.62	19,794.28	74.83	24.37	196.81	27.93	214.50	0.40	37,577.89	2.88	0.63	37,833.16
346.18	2.51	1.59	100.37	3.79	36.26	0.20	19,584.27	0.88	0.62	19,794.28	73.66	23.29	185.33	24.97	188.84	0.37	34,938.48	2.62	0.63	35,188.26
346.18	2.51	1.59	100.37	3.79	36.26	0.20	19,584.27	0.88	0.62	19,794.28	79.03	24.41	185.33	24.97	188.84	0.37	34,938.48	2.62	0.63	35,188.26
363.43	2.69	1.72	105.54	4.05	39.61	0.21	20,718.58	0.92	0.65	20,938.84	80.41	26.38	210.84	30.58	234.08	0.43	40,661.49	3.13	0.66	40,930.72
363.43	2.69	1.72	105.54	4.05	39.61	0.21	20,718.58	0.92	0.65	20,938.84	79.35	25.99	208.24	29.72	227.67	0.42	39,564.21	3.08	0.66	39,832.14
363.43	2.69	1.72	105.54	4.05	39.61	0.21	20,718.58	0.92	0.65	20,938.84	67.76	23.58	208.24	29.72	227.67	0.42	39,564.21	3.08	0.66	39,832.14
363.43	2.69	1.72	105.54	4.05	39.61	0.21	20,718.58	0.92	0.65	20,938.84	80.14	25.36	198.01	26.95	205.04	0.39	37,254.33	2.83	0.66	37,517.85
459.45	3.16	1.96	132.71	4.82	43.89	0.26	25,561.02	1.17	0.82	25,840.30	107.78	32.73	245.33	**33.57**	253.85	0.50	47,487.56	3.49	0.84	47,819.81
459.45	3.16	1.96	132.71	4.82	43.89	0.26	25,561.02	1.17	0.82	25,840.30	99.14	30.77	242.73	32.70	247.44	0.49	46,390.28	3.44	0.83	46,721.24
459.45	3.16	1.96	132.71	4.82	43.89	0.26	25,561.02	1.17	0.82	25,840.30	77.48	26.23	241.83	32.28	244.40	0.48	45,553.59	3.44	0.83	45,884.11
442.38	2.99	1.84	127.63	4.58	40.96	0.25	24,480.52	1.13	0.79	24,749.59	96.26	29.60	231.84	31.19	235.03	0.47	44,388.83	3.27	0.80	44,706.95
442.38	2.99	1.84	127.63	4.58	40.96	0.25	24,480.52	1.13	0.79	24,749.59	92.77	28.73	230.15	30.75	231.65	0.46	44,128.23	3.23	0.80	44,445.51
442.38	2.99	1.84	127.63	4.58	40.96	0.25	24,480.52	1.13	0.79	24,749.59	95.79	29.36	230.15	30.75	231.65	0.46	44,128.23	3.23	0.80	44,445.51
329.12	2.34	1.47	95.29	3.55	33.34	0.19	18,503.77	0.84	0.59	18,703.58	85.14	24.95	172.44	22.87	172.40	0.34	32,592.76	2.41	0.60	32,828.81
329.12	2.34	1.47	95.29	3.55	33.34	0.19	18,503.77	0.84	0.59	18,703.58	70.89	21.98	172.44	22.87	172.40	0.34	32,592.76	2.41	0.60	32,828.81
329.12	2.34	1.47	95.29	3.55	33.34	0.19	18,503.77	0.84	0.59	18,703.58	80.62	24.03	173.35	23.29	175.43	0.35	33,429.44	2.41	0.60	33,665.94
317.12	2.28	1.44	91.88	3.45	32.95	0.18	17,925.43	0.81	0.57	18,117.82	57.64	19.21	169.03	22.77	172.01	0.34	32,014.42	2.37	0.58	32,243.05
164.63	1.18	0.74	47.68	1.78	16.83	0.09	9,272.06	0.42	0.29	9,371.99	43.63	12.70	86.26	11.44	86.36	0.17	16,316.56	1.20	0.30	16,434.60
164.63	1.18	0.74	47.68	1.78	16.83	0.09	9,272.06	0.42	0.29	9,371.99	28.12	9.47	86.26	11.44	86.36	0.17	16,316.56	1.20	0.30	16,434.60
164.63	1.18	0.74	47.68	1.78	16.83	0.09	9,272.06	0.42	0.29	9,371.99	28.12	9.47	86.26	11.44	86.36	0.17	16,316.56	1.20	0.30	16,434.60
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
467.49	3.20	1.98	135.00	4.89	44.25	0.26	25,960.03	1.19	0.84	26,244.26	121.16	35.44	247.03	33.57	254.15	0.50	47,640.17	3.51	0.85	47,972.69

TOTAL CONSTRUCTION PERIOD OFFSITE EMISSIONS (TONS)										TOTAL CONSTRUCTION PERIOD EMISSIONS (TONS)									
0.89	0.55	36.51	1.35	12.51	0.07	7,065.95	0.32	0.23	7,142.61	27.94	8.81	69.15	9.89	74.29	0.14	13,421.83	1.01	0.23	13,514.09

TABLE D.2-13
SUMMARY OF ALL SOURCES AND THRESHOLD EMISSIONS (TOTAL) (PILE)

Activity	Tons					
	PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x
On-Site Combustion Emissions	3.71	3.40	32.63	8.55	61.78	0.07
On-Site Fugitive Dust Emissions						
Disturbed Area	17.13	3.56				
Cut/Fill	6.22	1.29				
Subtotal of On-Site Fugitive Emissions	23.34	4.86				
Subtotal of On-Site Emissions	27.05	8.25	32.63	8.55	61.78	0.07
Off-Site Combustion Emissions	0.89	0.55	36.51	1.35	12.51	0.07
Total Emissions	27.94	8.81	69.15	9.89	74.29	0.14
AVAQMD Threshold	46.80		312.06	78.01	78.01	78.01

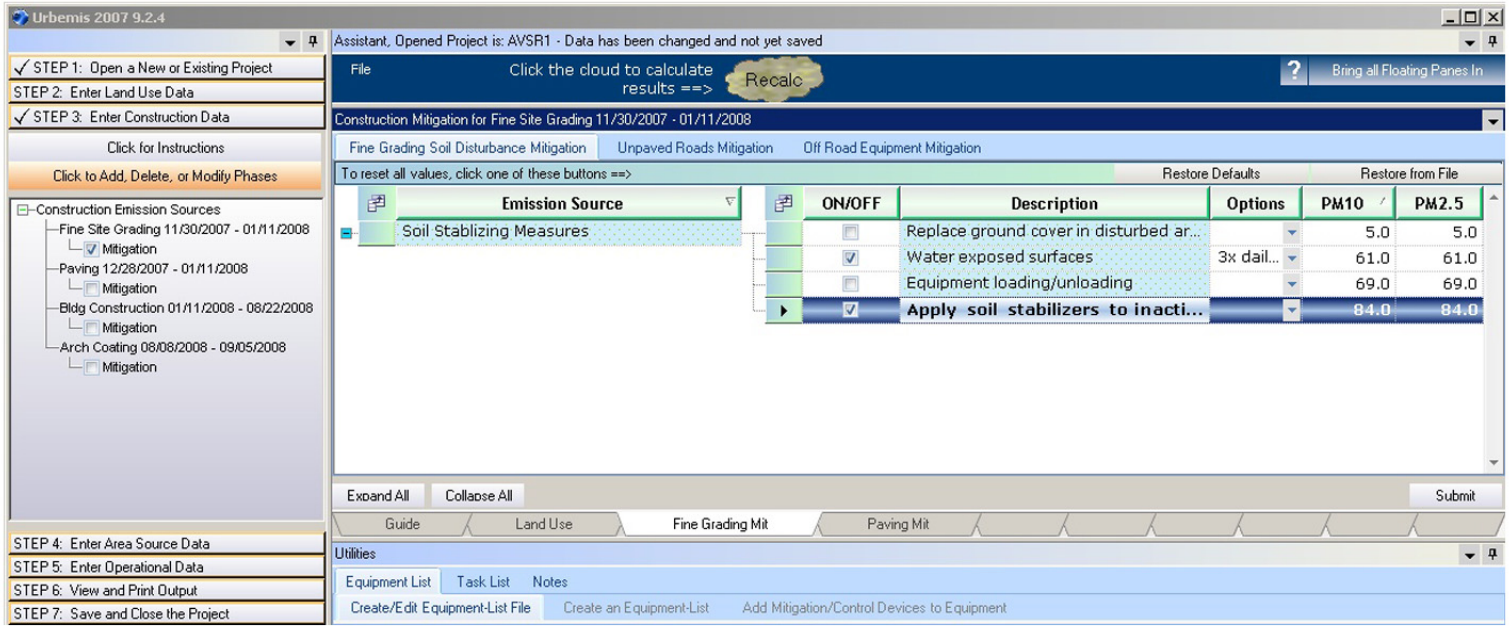
TABLE D.2-14
SUMMARY OF GHG EMISSIONS (TOTAL)
(PILE)

Activity	Tons			
	CO_2	CH_4	N_2O	CO_2e
On-Site Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment	5330.74	0.68	0.00	5345.10
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1004.241	0.003	0.004	1005.396
Worker Vehicles				
Security Vehicles				
Delivery Trucks				
Subtotal of On-site Combustion Emissions	**6334.99**	**0.69**	**0.00**	**6350.49**
On-Site Fugitive Dust Emissions				
Construction Equipment				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Security Vehicles				
Delivery Trucks				
Subtotal of On-Site Fugitive Emissions				
Subtotal of On-Site Emissions	**6334.99**	**0.69**	**0.00**	**6350.49**
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles	8152.42	0.44	0.31	8256.96
Delivery Trucks	1640.00	0.00	0.01	1641.68
Subtotal of Off-Site Combustion Emissions	**9792.41**	**0.45**	**0.31**	**9898.65**
Off-Site Paved Road Fugitive Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Delivery Trucks				
Subtotal of Off-Site Fugitive Emissions				
Subtotal of Off-Site Emissions	**9792.41**	**0.45**	**0.31**	**9898.65**
Total Entire Construction Period Emissions	**16127.40**	**1.13**	**0.32**	**16249.14**

TABLE D.2-14
SUMMARY OF GHG EMISSIONS (TOTAL)
(PILE)

Activity	Metric tons			
	CO_2	CH_4	N_2O	CO_2e
On-Site Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment	4,835.97	0.62	-	4,848.99
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	911.03	0.00	0.00	912.08
Worker Vehicles	-	-	-	-
Security Vehicles	-	-	-	-
Delivery Trucks	-	-	-	-
Subtotal of On-site Combustion Emissions	**5,747.00**	**0.62**	**0.00**	**5,761.07**
On-Site Fugitive Dust Emissions				
Construction Equipment				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Security Vehicles				
Delivery Trucks				
Subtotal of On-Site Fugitive Emissions				
Subtotal of On-Site Emissions	**5,747.00**	**0.62**	**0.00**	**5,761.07**
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	-	-	-	-
Worker Vehicles	7,395.75	0.40	0.28	7,490.59
Delivery Trucks	1,487.78	0.00	0.00	1,489.31
Subtotal of Off-Site Combustion Emissions	**8,883.53**	**0.40**	**0.28**	**8,979.90**
Off-Site Paved Road Fugitive Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Delivery Trucks				
Subtotal of Off-Site Fugitive Emissions				
Subtotal of Off-Site Emissions	**8,883.53**	**0.40**	**0.28**	**8,979.90**
Total Entire Construction Period Emissions	**14,630.53**	**1.03**	**0.29**	**14,740.97**

Figure D.2-1
Input from Urbemis 2007 Documenting Fugitive Dust Estimation Approach



Basis for Emission Factor	Recommended PM10 Construction Emission Factor
Default Level: Only area and duration known	Apply 0.22 tons/acre-month (average conditions)[1] Apply 0.42 ton/acre-month (worst-case conditions)
Low Level of Detail: Area and amount of earthmoving known	Apply 0.11 ton/acre-month for each month of construction activity Plus 0.059 ton/1,000 yd^3 of onsite cut/fill Plus 0.22 ton/1,000 yd^3 of offsite cut/fill These values assume that one scrapper can move 70,000 yd^3 of earth in one month and 35,000 yd^3 of material can be moved by truck in one month. If the on-/offsite fraction is not known, assume 100% onsite.
Medium Level of Detail: More detailed information available on duration of earthmoving and other material movement	Apply 0.13 lb/acre-work hr Plus 49 lb/scraper-hr for onsite haulage Plus 94 lb/hr for offsite haulage
High Level of Detail: Detailed information known on acres, hours or construction work, number of truck units or VMT, and truck travel distances.	Apply 0.13 lb/acre-work hr Plus 0.21 lb/ton-mile for onsite haulage Plus 0.62 lb/ton-mile for offsite haulage

D.3 CONSTRUCTION PHASE EMISSION CALCULATIONS FOR CONCRETE BALLAST FOUNDATION SCENARIO

D.3.1 Summary

This section presents the following tables:

- Table D.3-1 Monthly Construction Personnel Projection (Ballast)
- Table D.3-2 Equipment Mobilization by Activity (Ballast)
- Table D.3-3 Monthly Construction Equipment Projection (Ballast)
- Table D.3-4 Truck Trips (Ballast)
- Table D.3-5 Off-site Vehicles Distance Travelled (Ballast)
- Table D.3-6 Offroad 2007 Emission Factors (Ballast)
- Table D.3-7 EMFAC Emission Factors (Ballast)
- Table D.3-8 Greenhouse Gas Emission Factors (Ballast)
- Table D.3-9 Daily On-site Combustion Emissions by Month (Ballast)
- Table D.3-10 Daily Off-site Emissions by Month (Ballast)
- Table D.3-11 Disturbed Acreage, Excavation Volumes, and Fugitive Dust Emissions by Month (Ballast)
- Table D.3-12 Batch Plant (Ballast)
- Table D.3-13 Summary of All Sources Daily Emissions by Month (Total) (Ballast)
- Table D.3-14 Summary of All Sources and Threshold Emissions (Total) (Ballast)
- Table D.3-15 Summary of GHG Emissions (Total) (Ballast)
- Figure D.3-1 Input from URBEMIS 2007 Documenting Fugitive Dust Estimation Approach

D.3.2 Key Assumptions

The key assumptions used for the quantification of construction emissions for the concrete ballast foundation scenario are listed below.

D.3.2.1 General Assumptions

- 8 hours per day, 21.65 days per month, 12 months per year, for 38 months.

- Worst-case daily emissions are based on monthly equipment mobilizations provided by Applicant.
- Use 84 percent control for PM_{10} dust from disturbed area by use of water, soil palliatives, and operational controls. Use 61 percent control for PM_{10} dust from excavation (cut and fill) by use of watering.
- One commuter per car for all craft and supervisor personnel.
- Diesel-fueled equipment used for all on-site and off-site delivery trucks.
- Load Factor includes consideration of engine horsepower utilization and fraction of 8-hour day used.
- Use of OFFROAD 2007 and EMFAC 2007 fleet makeup and emission factors for offroad and onroad engines emission quantification.

D.3.2.2 Specific Assumptions for Equipment

- EMFAC 2007 Model using Calendar Year (CY) 2011 fleet average for all deliveries and on-site equipment with on-road engines.
- Use of 15T Mobile Hydraulic Cranes in Drainage "A" Sheet Pile and Solar Fields 1 to 6 Installations.
- Use 155-HP Crawler Trencher and 250-HP Truck Tractor in offroad equipment.
- OFFROAD 2007 using CY 2011 fleet average for calculation of ROG, $S0_2$, and CO for on-site offroad engines.
- Quantity of Concrete required = 150,000 yards based on input from Patch Services.
- Demolition of 10,000 square feet of residential structures and sheds to occur in Month 1 of construction.
- Electrical power from local grid used for concrete batch plant operation and groundwater pumping as well as temporary fabrication/assembly facility operations during construction.

TABLE D.3-1
MONTHLY CONSTRUCTION PERSONNEL PROJECTION (BALLAST)

Construction Equipment Description	Hrs/Mth	Construction Trade and Field Non-Labor Resources per Month																																									Total Man Months	Total Man-hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
230 kV Transmission Line																																												
Journeyman Lineman	165							4	4	4	4																																16	2,640
Apprentice Lineman	165							5	5	5	5																																20	3,300
Groundman/Helper	165							2	2	2	2																																8	1,320
Operating Engineers	165							7	7	7	7																																28	4,620
Cement Masons	165							3	3	3	3																																12	1,980
Area Craft Labor (Man-Months)		0	0	0	0	0	0	21	21	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	13,860
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	3,465	3,465	3,465	3,465	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165							1.5	1.5	1.5	1.5																														6	990
Area Manpower (Man-Months)		0	0	0	0	0	0	23	23	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	
Area Manpower (Man-Hours)		0	0	0	0	0	0	3,713	3,713	3,713	3,713	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		14,850
High Voltage Substation																																												
Cement Masons	165					6	6																																				12	1,980
Iron Workers/Sheetmetal	165				6	6	6	6																																			24	3,960
Welders	165				4	4	4	4	2	2	2	2	2	2																													28	4,620
Laborers	165				2	2	2	2	2	2	2	2	2	2																													20	3,300
Electricians	165								4	4	4	4	4	4																													24	3,960
Technicians	165									4	4	4	4	4																													20	3,300
Operating Engineers	165				1	1	1	1	1	1	1	1	1	1																													10	1,650
Area Craft Labor (Man-Months)		0	0	0	13	19	19	13	9	13	13	13	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	138	22,770
Area Craft Labor (Man-Hours)		0	0	0	2,145	3,135	3,135	2,145	1,485	2,145	2,145	2,145	2,145	2,145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165				2	2	2	2	2	2	1.5	1.5	1.5	1.5																											18	2,970
Area Manpower (Man-Months)		0	0	0	15	21	21	15	11	15	15	15	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	156	
Area Manpower (Man-Hours)		0	0	0	2,475	3,465	3,465	2,475	1,815	2,475	2,393	2,393	2,393	2,393	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25,740
Medium Voltage Substation/Infrastructure																																												
Carpenters	165					2	4																																				6	990
Cement Masons	165				2	2	12	2	2	2	2	2	2	2																													30	4,950
Electricians	165					4	4	4	4	4	8	14	14	14																													70	11,550
Iron Workers/Sheetmetal	165						4	4	4																																		12	1,980
Laborers	165				5	5	6	3	3	3	3	3	3	3																													37	6,105
Operating Engineers	165				7	7	3	3	3	3	3	3	3	3																													38	6,270
Teamsters	165				2	2	2	2	2	2	2	2	2	2																													20	3,300
Technicians	165				2	2	2	2	2	2	2	2	2	2																													20	3,300
Area Craft Labor (Man-Months)		0	0	0	18	24	37	20	20	16	20	26	26	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	233	38,445
Area Craft Labor (Man-Hours)		0	0	0	2,970	3,960	6,105	3,300	3,300	2,640	3,300	4,290	4,290	4,290	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165				5	6	7	8	8	8	8	8	8	8	8	8	8																								80	13,200
Area Manpower (Man-Months)		0	0	0	23	30	44	28	28	24	28	34	34	34	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	313	
Area Manpower (Man-Hours)		0	0	0	3,795	4,950	7,260	4,620	4,620	3,960	4,620	5,610	5,610	5,610	1,320	1,320	1,320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		51,645
Operations and Maintenance Facility																																												
Carpenters	165				10																																						10	1,650
Cement Masons	165				10	10																																					20	3,300
Electricians	165			4	4	4	4	4	4	4																																	28	4,620
Iron Workers/Sheetmetal	165					10	10	10																																			30	4,950
Laborers	165				4	4	4	4	4																																		20	3,300
Miscellaneous Crews	165					20	20	20	20	20																																	100	16,500
Operating Engineers	165	8	8	2	2	2	2	2	2	2																																	30	4,950
Painters	165						2	2	2	2																																	8	1,320
Pipefitters/Plumbers	165				2	2	2	2	2	2																																	12	1,980
Teamsters	165		10	10	10	10	10	10	10	10																																	80	13,200
Technicians	165						4	4	4	4																																	16	2,640
Area Craft Labor (Man-Months)		8	18	16	42	62	58	58	48	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	354	58,410
Area Craft Labor (Man-Hours)		1,320	2,970	2,640	6,930	10,230	9,570	9,570	7,920	7,260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165		6	6	6	6	6	6	6	6	6																														54	8,910
Area Manpower (Man-Months)		8	24	22	48	68	64	64	54	50	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	408	
Area Manpower (Man-Hours)		1,320	3,960	3,630	7,920	11,220	10,560	10,560	8,910	8,250	990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		67,320

TABLE D.3-1
MONTHLY CONSTRUCTION PERSONNEL PROJECTION (BALLAST)

Construction Equipment Description	Hrs/Mth	Construction Trade and Field Non-Labor Resources per Month																																							Total Man Months	Total Man-hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Drainage "A" Sheet Pile Installation																																										
Laborers	165		10	10	10	10																																			40	6,600
Operating Engineers	165		7	7	7	7																																			28	4,620
Teamsters	165																																								0	0
Area Craft Labor (Man-Months)		0	17	17	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	11,220
Area Craft Labor (Man-Hours)		0	2,805	2,805	2,805	2,805	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165		1	1	1	1																																			4	660
Area Manpower (Man-Months)		0	18	18	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	
Area Manpower (Man-Hours)		0	2,970	2,970	2,970	2,970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		11,880
Raw Water Supply Pipelin																																										
Laborers	165		13	8	4																																				25	4,125
Operating Engineers	165		4	3	1																																				8	1,320
Teamsters	165		2	2	1																																				5	825
Area Craft Labor (Man-Months)		0	19	13	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	6,270
Area Craft Labor (Man-Hours)		0	3,135	2,145	990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165		1	1	1																																				3	495
Area Manpower (Man-Months)		0	20	14	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	
Area Manpower (Man-Hours)		0	3,300	2,310	1,155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6,765
Solar Field Area One																																										
Carpenters	165								2	2	2	2	2	2	2	2	2	2	2																						22	3,630
Foundationman	165								6	6	6	6	6	6	6	6	6	6	6																						66	10,890
Electricians	165								50	50	50	50	50	50	50	50	50	50	50																						550	90,750
Trackerman	165								20	20	20	20	20	20	20	20	20	20	20																						220	36,300
Laborers	165								6	6	6	6	6	6	6	6	6	6	6																						66	10,890
Miscellaneous Crews	165								10	10	10	10	10	10	10	10	10	10	10																						110	18,150
Operating Engineers	165								5	5	5	5	5	5	5	5	5	5	5																						55	9,075
Technicians	165								4	4	4	4	4	4	4	4	4	4	4																						44	7,260
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	103	103	103	103	103	103	103	103	103	103	103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1133	186,945
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165								8	8	8	8	8	8	8	8	8	8	8																						88	14,520
Area Manpower (Man-Months)		0	0	0	0	0	0	0	111	111	111	111	111	111	111	111	111	111	111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1221	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		201,465
Solar Field Area Two																																										
Carpenters	165												2	2	2	2	2	2	2	2	2																				20	3,300
Foundationman	165												6	6	6	6	6	6	6	6	6																				60	9,900
Electricians	165												50	50	50	50	50	50	50	50	50																				500	82,500
Trackerman	165												20	20	20	20	20	20	20	20	20																				200	33,000
Laborers	165												6	6	6	6	6	6	6	6	6																				60	9,900
Miscellaneous Crews	165												10	10	10	10	10	10	10	10	10																				100	16,500
Operating Engineers	165												5	5	5	5	5	5	5	5	5																				50	8,250
Technicians	165												4	4	4	4	4	4	4	4	4																				40	6,600
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	103	103	103	103	103	103	103	103	103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1030	169,950
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165												8	8	8	8	8	8	8	8	8																				80	13,200
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	111	111	111	111	111	111	111	111	111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1110	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		183,150
Solar Field Area Three																																										
Carpenters	165															2	2	2	2	2	2	2	2	2	2	2	2	2													28	4,620
Foundationman	165															6	6	6	6	6	6	6	6	6	6	6	6	6													84	13,860
Electricians	165															50	50	50	50	50	50	50	50	50	50	50	50	50													700	115,500
Trackerman	165															20	20	20	20	20	20	20	20	20	20	20	20	20													280	46,200
Laborers	165															6	6	6	6	6	6	6	6	6	6	6	6	6													84	13,860
Miscellaneous Crews	165															10	10	10	10	10	10	10	10	10	10	10	10	10													140	23,100
Operating Engineers	165															5	5	5	5	5	5	5	5	5	5	5	5	5													70	11,550
Technicians	165															4	4	4	4	4	4	4	4	4	4	4	4	4													56	9,240
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	103	103	103	103	103	103	103	103	103	103	103	103	103	0	0	0	0	0	0	0	0	0	0	0	0	1442	237,930
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	0	0	0	0	0	0	0	0	0	0	0	0		
Field Non-Manual	165															8	8	8	8	8	8	8	8	8	8	8	8	8													112	18,480
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	111	111	111	111	111	111	111	111	111	111	111	111	0	0	0	0	0	0	0	0	0	0	0	0	1554	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	0	0	0	0	0	0	0	0	0	0	0	0		256,410

TABLE D.3-1
MONTHLY CONSTRUCTION PERSONNEL PROJECTION (BALLAST)

Construction Equipment Description	Hrs/Mth	Construction Trade and Field Non-Labor Resources per Month																																								Total Man Months	Total Man-hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Solar Field Area Four																																											
Carpenters	165																						2	2	2	2	2	2	2	2	2	2									20	3,300
Foundationman	165																						6	6	6	6	6	6	6	6	6	6									60	9,900
Electricians	165																						50	50	50	50	50	50	50	50	50	50									500	82,500
Trackerman	165																						20	20	20	20	20	20	20	20	20	20									200	33,000
Laborers	165																						6	6	6	6	6	6	6	6	6	6									60	9,900
Miscellaneous Crews	165																						10	10	10	10	10	10	10	10	10	10									100	16,500
Operating Engineers	165																						5	5	5	5	5	5	5	5	5	5									50	8,250
Technicians	165																						4	4	4	4	4	4	4	4	4	4									40	6,600
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103	103	103	103	103	103	103	103	103	103	0	0	0	0	0	0	0	0	1030	169,950
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	0	0	0	0	0	0	0	0		
Field Non-Manual	165																						8	8	8	8	8	8	8	8	8	8									80	13,200
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	111	111	111	111	111	111	111	111	111	0	0	0	0	0	0	0	0	1110	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	0	0	0	0	0	0	0	0		183,150
Solar Field Area Five																																											
Carpenters	165																										2	2	2	2	2	2	2	2	2	2					20	3,300
Foundationman	165																										6	6	6	6	6	6	6	6	6	6					60	9,900
Electricians	165																										50	50	50	50	50	50	50	50	50	50					500	82,500
Trackerman	165																										20	20	20	20	20	20	20	20	20	20					200	33,000
Laborers	165																										6	6	6	6	6	6	6	6	6	6					60	9,900
Miscellaneous Crews	165																										10	10	10	10	10	10	10	10	10	10					100	16,500
Operating Engineers	165																										5	5	5	5	5	5	5	5	5	5					50	8,250
Technicians	165																										4	4	4	4	4	4	4	4	4	4					40	6,600
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103	103	103	103	103	103	103	103	103	103	0	0	0	0	1030	169,950
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	0	0	0	0		
Field Non-Manual	165																										8	8	8	8	8	8	8	8	8	8					80	13,200
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	111	111	111	111	111	111	111	111	111	0	0	0	0	1110	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	0	0	0	0		183,150
Solar Field Area Six																																											
Carpenters	165																													2	2	2	2	2	2	2	2	2	2		20	3,300
Foundationman	165																													6	6	6	6	6	6	6	6	6	6		60	9,900
Electricians	165																													50	50	50	50	50	50	50	50	50	50		500	82,500
Trackerman	165																													20	20	20	20	20	20	20	20	20	20		200	33,000
Laborers	165																													6	6	6	6	6	6	6	6	6	6		60	9,900
Miscellaneous Crews	165																													10	10	10	10	10	10	10	10	10	10		100	16,500
Operating Engineers	165																													5	5	5	5	5	5	5	5	5	5		50	8,250
Technicians	165																													4	4	4	4	4	4	4	4	4	4		40	6,600
Area Craft Labor (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103	103	103	103	103	103	103	103	103	103	0	1030	169,950
Area Craft Labor (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	16,995	0		
Field Non-Manual	165																													8	8	8	8	8	8	8	8	8	8		80	13,200
Area Manpower (Man-Months)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	111	111	111	111	111	111	111	111	111	0	1110	
Area Manpower (Man-Hours)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	18,315	0		183,150
Project Totals																																											
Journeyman Lineman	165	0	0	0	0	0	0	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	2,640
Apprentice Lineman	165	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	3,300
Groundman/Helper	165	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1,320
Operating Engineers	165	8	19	12	18	17	6	13	18	18	16	9	14	14	10	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	10	10	10	5	5	5	0		467	77,055
Carpenters	165	0	0	0	10	2	4	0	2	2	2	2	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	146	24,090
Cement Masons	165	0	0	0	12	18	18	5	5	5	5	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74	12,210
Foundationman	165	0	0	0	0	0	0	0	6	6	6	6	12	12	12	18	18	18	18	12	12	12	12	12	12	12	18	18	18	18	18	18	12	12	12	12	6	6	6	0	390	64,350
Electricians	165	0	0	4	4	8	8	8	62	62	62	68	118	118	100	150	150	150	150	100	100	100	100	100	100	100	150	150	150	150	150	150	100	100	100	100	50	50	50	0	3372	556,380
Trackerman	165	0	0	0	0	0	0	0	20	20	20	20	40	40	40	60	60	60	60	40	40	40	40	40	40	40	60	60	60	60	60	60	40	40	40	40	20	20	20	0	1300	214,500
Iron Workers/Sheetmetal	165	0	0	0	6	16	20	20	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	10,890
Welders	165	0	0	0	4	4	4	4	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	4,620
Laborers	165	0	23	18	25	21	12	9	15	11	11	11	17	17	12	18	18	18	18	12	12	12	12	12	12	12	18	18	18	18	18	18	12	12	12	12	6	6	6	0	532	87,780
Miscellaneous Crews	165	0	0	0	0	20	20	20	30	30	10	10	20	20	20	30	30	30	30	20	20	20	20	20	20	20	30	30	30	30	30	30	20	20	20	20	10	10	10	0	750	123,750
Painters	165	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1,320
Pipefitters/Plumbers	165	0	0	0	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1,980
Teamsters	165	0	12	12	13	12	12	12	12	12	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	17,325
Technicians	165	0	0	0	2	2	6	6	10	14	10	10	14	14	8	12	12	12	12	8	8	8	8	8	8	8	12	12	12	12	12	12	8	8	8	8	4	4	4	0	316	52,140
Area Craft Labor (Man-Months)		8	54	46	96	122	114	112	201	197	157	142	245	245	206	309	309	309	309	206	206	206	206	206	206	206	309	309	309	309	309	309	206	206	206	206	103	103	103	0	7610	1,255,650
Area Craft Labor (Man-Hours)		1,320	8,910	7,590	15,840	20,130	18,810	18,480	33,165	32,505	25,905	23,430	40,425	40,425	33,990	50,985	50,985	50,985	50,985	33,990	33,990	33,990	33,990	33,990	33,990	33,990	50,985	50,985	50,985	50,985	50,985	50,985	33,990	33,990	33,990	33,990	16,995	16,995	16,995	0		
Field Non-Manual	165	0	8	8	15	15	15	18	26	26	25	18	26	26	24	32	32	24	24	16	16	16	16	16	16	16	24	24	24	24	24	24	16	16	16	16	8	8	8	0	703	115,995
Area Manpower (Man-Months)		8	62	54	111	137	129	130	227	223	182	160	271	271	230	341	341	333	333	222	222	222	222	222	222	222	333	333	333	333	333	333	222	222	222	222	111	111	111	0	8313	
Area Manpower (Man-Hours)		1,320	10,230	8,910	18,315	22,605	21,285	21,368	37,373	36,713	30,030	26,318	44,633	44,633	37,950	56,265	56,265	54,945	54,945	36,630	36,630	36,630	36,630	36,630	36,630	36,630	54,945	54,945	54,945	54,945	54,945	54,945	36,630	36,630	36,630	36,630	18,315	18,315	18,315	0		1,371,645

NOTE:
Unless noted, construction manhours are based on 165 hours per month

TABLE D.3-2
EQUIPMENT MOBILIZATION BY ACTIVITY (BALLAST)

Construction Equipment Description	HP	Construction Duration in Months/Equipment Pieces per Month																																							Total Pieces per Month	Total Hrs With Util
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
230 kV Transmission Line																																										
Truck Tractor	250							1	1	1	1																														4	330
Pick Up Truck	150							3	3	3	3																														12	990
Flatbed – Stake Body Truck	220							3	3	3	3																														12	990
Line Truck	220							3	3	2	2																														10	825
Pressure Digger (Truck Mounted)	220							1	1	1																															3	248
Truck (1 ton) Conductor Reel Trailer	220									1	1																														2	165
Truck (1 ton) Wire Puller/Tensioner	220									1	1																														2	165
Truck (1 ton) Trailer	220							1	1																																2	165
Crane (100T)[1]	290							2	2	2	2																														8	330
High Reach Bucket Truck (1 ton)	220							1	1	2	2																														6	495
Backhoe (CAT-225)	135							1	1	1	1																														4	330
Forklift (10T)[3]	100							1	1	1																															3	50
Concrete Truck	250							4	4																																8	660
Dump Truck (15cy)[3]	275								1	1																															2	33
Sub-totals		0	0	0	0	0	0	21	22	19	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78	5,775
High Voltage Substation																																										
Truck Tractor[1]	250						1	1	1	1	1	1	1																												7	289
Pick Up Truck	150				2	2	2	2	2	2	2	2	2	2																											20	1,650
Flatbed – Stake Body Truck	220				2	2	2	2	2	2	2	2	2	2																											20	1,650
Truck (1 ton) Trailer[2]	220				1	1	1	1	1	1	1	1	1	1																											10	83
Crane (100T)[1]	290								1	1	1	1	1																												5	206
High Reach Bucket Truck (1 ton)[3]	220										1	1	1																												3	50
Backhoe (CAT-225)	135				1	1	1																																		3	248
Forklift (10T)[3]	100				1	1	1	1	1	1	1	1	1	1																											10	165
Concrete Truck	250					1	1																																		2	165
Dump Truck (15cy)[3]	275					1	1	1					3	3																											9	149
Crawler Trencher[3]	155							1	1	1																															3	50
Portable Welding Machine	50					2	2	2	2	2	2	2	2	2																											18	1,485
Compactor (Bomag BW211)[3]	130				1	1	1																																		3	50
Plate Compactor[2]	5							1	1	1																															3	25
Sub-totals		0	0	0	8	12	13	12	12	12	11	11	14	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	116	6,262
Medium Voltage Substation/Infrastructure																																										
Wheel Loader (CAT 950)	130				1	1																																			2	165
Grader (CAT-12)	135				1	1																																			2	165
Excavator, Cat 235	195				1	1																																			2	165
Dump Truck (15cy)	275				1	1																																			2	165
Concrete Truck	250						1																																		1	83
Compactor (Bomag BW211)	130				1	1																																			2	165
Conveyor Truck for Rock/Sand	250						1																																		1	83
Concrete Pump Truck	250						1																																		1	83
Hydraulic Mobile Crane (15T)	130						1	1	1	1	1	1																													6	495
Manlift (Scissors)	30						1	1	1	1	1	1																													6	495
Sub-totals		0	0	0	5	5	5	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	2,063

TABLE D.3-2
EQUIPMENT MOBILIZATION BY ACTIVITY (BALLAST)

Construction Equipment Description	HP	Construction Duration in Months/Equipment Pieces per Month																																							Total Pieces per Month	Total Hrs With Util
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Operations and Maintenance Facility																																										
Wheel Loader (CAT 950)	130	1	1																																						2	165
Grader (CAT-12)	135	1	1																																						2	165
Excavator, Cat 235	195	1	1																																						2	165
Dozer (D-8)	300	1	1																																						2	165
Dump Truck (15cy)	275	3	3	3																																					9	743
AC Paver	200							1																																	1	83
Concrete Truck	250			3																																					3	248
Compactor (Bomag BW211)	130		1																																						1	83
Carry Lift, Pettibone	100				1	1	1	1																																	4	330
Conveyor Truck for Rock/Sand	250			1																																					1	83
Concrete Pump Truck	250			1																																					1	83
Hydraulic Mobile Crane (35T)	175			1	1	1	1	1																																	5	413
Grade All	100				2	2	2	2																																	8	660
Manlift (Scissors)	30				5	5	5	5																																	20	1,650
Sub-totals		7	8	9	9	9	9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	5,033
Drainage "A" Sheet Pile Installation																																										
Hydraulic Mobile Crane (15T)	175		2	2	2	2																																			8	660
Vibrator Hammer & Generator	51		2	2	2	2																																			8	660
Truck (1 ton), Maintenance	220		1	1	1	1																																			4	330
Fuel Truck	220		1	1	1	1																																			4	330
Water Truck, 4000 gal	220		2	1	1	1																																			5	413
Sub-totals		0	8	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	2,393
Raw Water Supply Pipeline																																										
Hydraulic Auger Drill	200		1																																						1	83
Hydraulic Mobile Crane (35T)	175		1	1	1																																				3	248
Grade All	100		1	2																																					3	248
Butt Fusion Machine & Generator	51		1	1	1																																				3	248
Plate Compactor[2)]	5		1	1	1																																				3	248
Wheel Loader (CAT 950)	130		1	1	1																																				3	248
Pick Up Truck	150		1	1	1																																				3	248
Truck (1 ton), Maintenance	220		1	1	1																																				3	248
Sub-totals		0	8	8	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	1,815
Solar Field Area One																																										
Grader (CAT-12)	135								1	1	1																														3	248
Excavator, Cat 235	195								1	1	1																														3	248
Dozer (D-8)	300								1	1	1																														3	248
Dump Truck (15cy)	275								1	1	1																														3	248
Compactor (Bomag BW211)	130								1	1	1																														3	248
Water Truck, 4000 gal	220							1	2	1	1	1	1	1	1	1	1	1	1																						13	1,073
Concrete Truck	250								1	1	1	1	1	1	1	1	1	1	1																						11	908
Case Backhoe/Front End Loader (580)	90								2	2	2	2	2	2	2	2	2	2	2																						22	1,815
Hydraulic Mobile Crane (15T)	130								2	2	2	2	2	2	2	2	2	2	2																						22	1,815
Grade All	100								1	1	1	1	1	1	1	1	1	1	1																						11	908
Flatbed – Stake Body Truck	220								5	5	5	5	5	5	5	5	5	5	5																						55	4,538
Crawler Trencher	155								1	1	1	1	1	1	1	1	1	1	1																						11	908
Pick Up Truck	150											24	24	24	24	24	24	24	24																						192	15,840
Hogger[1)]	175								1																																1	41
Sub-totals		0	0	0	0	0	0	1	20	18	18	37	37	37	37	37	37	37	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	353	29,081

TABLE D.3-2
EQUIPMENT MOBILIZATION BY ACTIVITY (BALLAST)

Construction Equipment Description	HP	Construction Duration in Months/Equipment Pieces per Month																																							Total Pieces per Month	Total Hrs With Util
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Solar Field Area Two																																										
Grader (CAT-12)	135												1	1	1																										3	248
Excavator, Cat 235	195												1	1	1																										3	248
Dozer (D-8)	300												1	1	1																										3	248
Dump Truck (15cy)	275												1	1	1																										3	248
Compactor (Bomag BW211)	130												1	1	1																										3	248
Water Truck, 4000 gal	220												2	2	1	1	1	2	1	1	1	1																			13	1,073
Concrete Truck	250												1	1	1	1	1	1	1	1	1	1																			10	825
Case Backhoe/Front End Loader (580)	90												2	2	2	2	2	2	2	2	2	2																			20	1,650
Hydraulic Mobile Crane (15T)	130												2	2	2	2	2	2	2	2	2	2																			20	1,650
Grade All	100												1	1	1	1	1	1	1	1	1	1																			10	825
Flatbed – Stake Body Truck	220												5	5	5	5	5	5	5	5	5	5																			50	4,125
Crawler Trencher	155												1	1	1	1	1	1	1	1	1	1																			10	825
Pick Up Truck	150															24	24	24	24	24	24	24																			168	13,860
Hogger[1)]	175												1																												1	41
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	20	19	18	37	37	38	37	37	37	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	317	26,111
Solar Field Area Three																																										
Grader (CAT-12)	135															1	1	1	1	1																					5	413
Excavator, Cat 235	195															1	1	1	1	1																					5	413
Dozer (D-8)	300															1	1	1	1	1																					5	413
Dump Truck (15cy)	275															1	1	1	1	1																					5	413
Compactor (Bomag BW211)	130															1	1	1	1	1																					5	413
Water Truck, 4000 gal	220															1	1	1	1	1	1	1	1	1	1	1	1	1													13	1,073
Concrete Truck	250															1	1	1	1	1	1	1	1	1	1	1	1	1	1												14	1,155
Case Backhoe/Front End Loader (580)	90															2	2	2	2	2	2	2	2	2	2	2	2	2	2												28	2,310
Hydraulic Mobile Crane (15T)	130															2	2	2	2	2	2	2	2	2	2	2	2	2	2												28	2,310
Grade All	100															1	1	1	1	1	1	1	1	1	1	1	1	1	1												14	1,155
Flatbed – Stake Body Truck	220															5	5	5	5	5	5	5	5	5	5	5	5	5	5												70	5,775
Crawler Trencher	155															1	1	1	1	1	1	1	1	1	1	1	1	1	1												14	1,155
Pick Up Truck	150																	24	24	24	24	24	24	24	24	24	24	24	24												288	23,760
Hogger[1)]	175															1																									1	41
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	18	42	42	42	37	37	37	37	37	37	37	37	36	0	0	0	0	0	0	0	0	0	0	0	495	40,796
Solar Field Area Four																																										
Grader (CAT-12)	135																						1	1	1																3	248
Excavator, Cat 235	195																						1	1	1																3	248
Dozer (D-8)	300																						1	1	1																3	248
Dump Truck (15cy)	275																						1	1	1																3	248
Compactor (Bomag BW211)	130																						1	1	1																3	248
Water Truck, 4000 gal	220																						2	1	1	1	2	1	1	1	1	1									12	990
Concrete Truck	250																						1	1	1	1	1	1	1	1	1	1									10	825
Case Backhoe/Front End Loader (580)	90																						2	2	2	2	2	2	2	2	2	2									20	1,650
Hydraulic Mobile Crane (15T)	130																						2	2	2	2	2	2	2	2	2	2									20	1,650
Grade All	100																						1	1	1	1	1	1	1	1	1	1									10	825
Flatbed – Stake Body Truck	220																						5	5	5	5	5	5	5	5	5	5									50	4,125
Crawler Trencher	155																						1	1	1	1	1	1	1	1	1	1									10	825
Pick Up Truck	150																									24	24	24	24	24	24	24									168	13,860
Hogger[1)]	175																						1																		1	41
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	18	18	37	38	37	37	37	37	37	0	0	0	0	0	0	0	0	316	26,029

TABLE D.3-2
EQUIPMENT MOBILIZATION BY ACTIVITY (BALLAST)

Construction Equipment Description	HP	Construction Duration in Months/Equipment Pieces per Month																																							Total Pieces per Month	Total Hrs With Util
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Solar Field Area Five																																										
Grader (CAT-12)	135																										1	1	1												3	248
Excavator, Cat 235	195																										1	1	1												3	248
Dozer (D-8)	300																										1	1	1												3	248
Dump Truck (15cy)	275																										1	1	1												3	248
Compactor (Bomag BW211)	130																										1	1	1												3	248
Water Truck, 4000 gal	220																										1	1	1	1	1	1	1	1	1	1					10	825
Concrete Truck	250																										1	1	1	1	1	1	1	1	1	1					10	825
Case Backhoe/Front End Loader (580)	90																										2	2	2	2	2	2	2	2	2	2					20	1,650
Hydraulic Mobile Crane (15T)	130																										2	2	2	2	2	2	2	2	2	2					20	1,650
Grade All	100																										1	1	1	1	1	1	1	1	1	1					10	825
Flatbed – Stake Body Truck	220																										5	5	5	5	5	5	5	5	5	5					50	4,125
Crawler Trencher	155																										1	1	1	1	1	1	1	1	1	1					10	825
Pick Up Truck	150																													24	24	24	24	24	24	24					168	13,860
Hogger[1)]	175																										1														1	41
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	18	18	37	37	37	37	37	37	37	0	0	0	0	314	25,864
Solar Field Area Six																																										
Grader (CAT-12)	135																													1	1	1									3	248
Excavator, Cat 235	195																													1	1	1									3	248
Dozer (D-8)	300																													1	1	1									3	248
Dump Truck (15cy)	275																													1	1	1									3	248
Compactor (Bomag BW211)	130																													1	1	1									3	248
Water Truck, 4000 gal	220																													1	1	1	1	1	2	1	1	1	1		11	908
Concrete Truck	250																													1	1	1	1	1	1	1	1	1	1		10	825
Case Backhoe/Front End Loader (580)	90																													2	2	2	2	2	2	2	2	2	2		20	1,650
Hydraulic Mobile Crane (15T)	130																													2	2	2	2	2	2	2	2	2	2		20	1,650
Grade All	100																													1	1	1	1	1	1	1	1	1	1		10	825
Flatbed – Stake Body Truck	220																													5	5	5	5	5	5	5	5	5	5		50	4,125
Crawler Trencher	155																													1	1	1	1	1	1	1	1	1	1		10	825
Pick Up Truck	150																																24	24	24	24	24	24	24		168	13,860
Hogger[1)]	175																													1											1	41
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	18	18	37	37	38	37	37	37	37	0	315	25,946

TABLE D.3-2
EQUIPMENT MOBILIZATION BY ACTIVITY (BALLAST)

Construction Equipment Description	HP	Construction Duration in Months/Equipment Pieces per Month																																									Total Pieces per Month	Total Hrs With Util
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Project Totals																																												
Truck Tractor	250	0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	618.75
Line Truck	220	0	0	0	0	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	825
Pressure Digger (Truck Mounted)	220	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	247.5
Truck (1 ton) Conductor Reel Trailer	220	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Truck (1 ton) Wire Puller/Tensioner	220	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Truck (1 ton) Trailer	220	0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	247.5
Crane (100T)[1)]	290	0	0	0	0	0	0	2	3	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	536.25
High Reach Bucket Truck (1 ton)	220	0	0	0	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	544.5
Hydraulic Auger Drill	200	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	82.5
Backhoe (CAT-225)	135	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	577.5
Forklift (10T)[3)]	100	0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	214.5
Portable Welding Machine	50	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	1485
Plate Compactor[2)]	5	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	272.25
Wheel Loader (CAT 950)	130	1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	577.5
Conveyor Truck for Rock/Sand	250	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Concrete Pump Truck	250	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Manlift (Scissors)	30	0	0	0	5	5	6	6	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	2145
AC Paver	200	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	82.5
Carry Lift, Pettibone	100	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	330
Hydraulic Mobile Crane (35T)	175	0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	660
Vibrator Hammer & Generator	51	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	660
Scraper, Cat 621B	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1 ton), Maintenance	220	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	577.5
Fuel Truck	220	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	330
Grader (CAT-12)	135	1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	24	1980
Excavator, Cat 235	195	1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	24	1980
Dozer (D-8)	300	1	1	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	22	1815
Dump Truck (15cy)	275	3	3	3	1	2	1	1	2	2	1	0	4	4	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	42	2739
Compactor (Bomag BW211)	130	0	1	0	2	2	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	26	1947
Water Truck, 4000 gal	220	0	2	1	1	1	0	1	2	1	1	1	3	3	2	3	3	4	3	2	2	2	3	2	2	2	4	3	2	3	3	3	2	2	3	2	1	1	1	0	77	6352.5
Concrete Truck	250	0	0	3	0	1	2	4	5	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	79	6517.5
Case Backhoe/Front End Loader (580)	90	0	0	0	0	0	0	0	2	2	2	2	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	130	10725
Hydraulic Mobile Crane (15T)	130	0	2	2	2	2	1	1	3	3	3	3	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	144	11880
Grade All	100	0	1	2	2	2	2	2	1	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	76	6270
Flatbed – Stake Body Truck	220	0	0	0	2	2	2	5	10	10	10	7	12	12	10	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	10	10	10	10	5	5	5	0	357	29452.5
Crawler Trencher	155	0	0	0	0	0	0	1	2	2	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	68	5412
Pick Up Truck	150	0	1	1	3	2	2	5	5	5	5	26	26	26	24	48	48	72	72	48	48	48	24	24	24	48	48	48	48	48	48	48	48	48	48	48	24	24	24	0	1187	97927.5
Butt Fusion Machine & Generator	51	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	247.5
Hogger[1)]	175	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	6	247.5
Project Totals		7	24	24	35	33	27	46	56	51	47	50	71	67	55	93	92	117	116	79	74	74	57	55	55	74	94	92	91	93	92	92	74	74	75	74	37	37	37	0	2,441	197,167

NOTE:
Unless noted, construction equipment hours are based on 165 hours per month and 50% utilization.
1) Based on 25% utilization
2) Based on 5% utilization
3) Based on 10% utilization

TABLE D.3-3
MONTHLY CONSTRUCTION EQUIPMENT PROJECTION
(BALLAST)

					Month After Construction Start																																															
Construction Equipment Description	**HP**	**D**	**G**	**P**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
AC Paver	200	X			0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Backhoe (CAT-225)	135	X			0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Carry Lift, Pettibone	100	X			0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Case Backhoe/Front End Loader (580)	90	X			0	0	0	0	0	0	0	2	2	2	2	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	
Compactor (Bomag BW211)	130	X			0	1	0	2	2	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Conveyor Truck for Rock/Sand	250	X			0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Crane (100T)	290	X			0	0	0	0	0	0	2	3	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Crawler Trencher	155	X			0	0	0	0	0	0	1	2	2	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	
Dozer (D-8)	300	X			1	1	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Excavator, Cat 235	195	X			1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Forklift (10T)	100	X			0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grade All	100	X			0	1	2	2	2	2	2	1	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	
Grader (CAT-12)	135	X			1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
High Reach Bucket Truck	220	X			0	0	0	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hydraulic Auger Drill	200	X			0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hydraulic Mobile Crane (15T)	130	X			0	2	2	2	2	1	1	3	3	3	3	4	4	4	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	
Hydraulic Mobile Crane (35T)	175	X			0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Line Truck	220	X			0	0	0	0	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Manlift (Scissors)	30	X			0	0	0	5	5	6	6	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Plate Compactor	5	X			0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pressure Digger (Truck Mounted)	220	X			0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Scraper, Cat 621B	330	X			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck (1 ton) Conductor Reel Trailer	220	X			0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck (1 ton), Maintenance	220	X			0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck Tractor	250	X			0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck (1 ton) Trailer	220	X			0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truck (1 ton) Wire Puller/Tensioner	220	X			0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Vibrating Hammer & Generator	51	X			0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	50	X			0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Wheel Loader (CAT 950)	130	X			1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hogger	175	x			0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	
Vehicles with Onroad Engines for Emissions Estimates																																												
Concrete Truck	250	X			0	0	3	0	1	2	4	5	1	1	1	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	
Concrete Pump Truck	250	X			0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Dump Truck (15cy)	275	X			3	3	3	1	2	1	1	2	2	1	0	4	4	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Flatbed - Stake Body Truck	220	X			0	0	0	2	2	2	5	10	10	10	7	12	12	10	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	10	10	10	10	5	5	5	0	
Fuel Truck	220	X			0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pick Up Truck	150		X		0	1	1	3	2	2	5	5	5	5	26	26	26	24	48	48	72	72	48	48	48	24	24	24	48	48	48	48	48	48	48	48	48	48	48	24	24	24	0	
Water Truck, 4000 gal	220	X			0	2	1	1	1	0	1	2	1	1	1	3	3	2	3	3	4	3	2	2	2	3	2	2	2	4	3	2	3	3	3	2	2	3	2	1	1	1	0	
Total					7	23	23	34	33	27	46	56	51	47	50	71	67	55	93	92	117	116	79	74	74	57	55	55	74	94	92	91	93	92	92	74	74	75	74	37	37	37	0	0
Delivery Trucks per Month																																												
Light Weight & Delivery Trucks	200				10	11	11	16	16	16	9	33	33	33	31	55	55	48	72	72	72	72	48	48	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	0	
Truck Tractor Delivery Trucks	275				10	37	98	46	49	17	105	280	197	187	187	372	372	370	555	555	555	555	370	370	370	370	370	370	370	555	555	555	555	555	555	370	370	370	370	185	185	185	0	

HP=horsepower
G=gasoline
D=diesel
P=propane

TABLE D.3-3
MONTHLY CONSTRUCTION EQUIPMENT PROJECTION
(BALLAST)

					12-month Period for 12-month Rolling Total																													
Construction Equipment Description	**HP**	**D**	**G**	**P**	**1-12**	**2-13**	**3-14**	**4-15**	**5-16**	**6-17**	**7-18**	**8-19**	**9-20**	**10-21**	**11-22**	**12-23**	**13-24**	**14-25**	**15-26**	**16-27**	**17-28**	**18-29**	**19-30**	**20-31**	**21-32**	**22-33**	**23-34**	**24-35**	**25-36**	**26-37**	**27-38**	**28-39**	**29-40**	**1-40 (entire construction)**
AC Paver	200	X			1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Backhoe (CAT-225)	135	X			7	7	7	7	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Carry Lift, Pettibone	100	X			4	4	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Case Backhoe/Front End Loader (580)	90	X			12	16	20	26	32	38	44	48	50	52	54	56	56	56	58	58	58	58	58	60	60	60	60	60	58	56	52	46	40	130
Compactor (Bomag BW211)	130	X			10	11	11	12	11	10	10	11	10	9	9	10	10	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	26
Conveyor Truck for Rock/Sand	250	X			2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Crane (100T)	290	X			13	13	13	13	13	13	13	11	8	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Crawler Trencher	155	X			9	11	13	16	19	22	25	26	26	26	27	28	28	28	29	29	29	29	29	30	30	30	30	30	29	28	26	23	20	68
Dozer (D-8)	300	X			6	6	6	7	8	9	10	11	10	9	9	10	10	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	22
Excavator, Cat 235	195	X			8	8	8	9	9	9	10	11	10	9	9	10	10	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	24
Forklift (10T)	100	X			12	13	13	13	12	11	10	8	6	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Grade All	100	X			17	19	20	21	22	23	24	24	25	26	27	28	28	28	29	29	29	29	29	30	30	30	30	30	29	28	26	23	20	76
Grader (CAT-12)	135	X			8	8	8	9	9	9	10	11	10	9	9	10	10	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	24
High Reach Bucket Truck	220	X			9	9	9	9	9	9	9	8	7	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Hydraulic Auger Drill	200	X			1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hydraulic Mobile Crane (15T)	130	X			26	30	32	36	40	44	49	52	53	54	55	56	56	56	58	58	58	58	58	60	60	60	60	60	58	56	52	46	40	144
Hydraulic Mobile Crane (35T)	175	X			8	8	7	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Line Truck	220	X			10	10	10	10	10	10	10	7	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Manlift (Scissors)	30	X			26	26	26	26	21	16	10	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
Plate Compactor	5	X			6	6	5	4	3	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Pressure Digger (Truck Mounted)	220	X			3	3	3	3	3	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Scraper, Cat 621B	330	X			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1 ton) Conductor Reel Trailer	220	X			2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Truck (1 ton), Maintenance	220	X			7	7	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Truck Tractor	250	X			11	11	11	11	11	11	10	8	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Truck (1 ton) Trailer	220	X			11	12	12	12	11	10	9	7	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
Truck (1 ton) Wire Puller/Tensioner	220	X			2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Vibrating Hammer & Generator	51	X			0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Welding Machine	50	X			16	18	18	18	18	16	14	12	10	8	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
Wheel Loader (CAT 950)	130	X			7	6	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Hogger	175	x																																
Vehicles with Onroad Engines for Emissions Estimates					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Truck	250	X			20	22	24	24	27	29	30	28	25	26	27	28	28	28	29	29	29	29	29	30	30	30	30	30	29	28	26	23	20	79
Concrete Pump Truck	250	X			2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Dump Truck (15cy)	275	X			23	24	22	20	20	19	19	19	17	15	15	16	13	9	9	9	9	9	9	9	9	9	8	7	6	6	5	4	3	42
Flatbed - Stake Body Truck	220	X			60	72	82	97	110	123	136	141	141	141	141	144	142	140	145	145	145	145	145	150	150	150	150	150	145	140	130	115	100	357
Fuel Truck	220	X			4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Pick Up Truck	150		X		81	107	130	177	222	292	362	405	448	491	510	508	506	528	552	552	552	528	504	504	504	504	528	552	552	528	504	456	408	1187
Water Truck, 4000 gal	220	X			14	17	17	19	21	24	27	28	28	29	31	32	31	30	32	32	31	30	30	31	31	31	31	31	30	29	26	23	21	77
Total					458	518	552	623	683	769	858	891	910	933	942	947	932	939	977	977	976	951	927	940	940	940	959	978	960	923	867	775	684	2,432
Delivery Trucks per Month																																		
Light Weight & Delivery Trucks	200				274	319	356	417	473	529	585	624	639	654	669	686	679	672	696	696	696	696	696	720	720	720	720	720	696	672	624	552	480	1697
Truck Tractor Delivery Trucks	275				1585	1947	2280	2737	3246	3752	4290	4555	4645	4818	5001	5184	5182	5180	5365	5365	5365	5365	5365	5550	5550	5550	5550	5550	5365	5180	4810	4255	3700	12502

HP=horsepower
G=gasoline
D=diesel
P=propane

TABLE D.3-4
TRUCK TRIPS (BALLAST)

Construction Equipment Description	HP	Construction Deliveries per Month																																										Total Pieces per Month
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
230 kV Transmission Line																																												
Light Weight & Delivery Trucks	200							2	2	2	2																																	8
Truck Tractor	275							20	20	10																																		50
Sub-totals		0	0	0	0	0	0	22	22	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		58
High Voltage Substation																																												
Light Weight & Delivery Trucks	200				1	1	1	2	2	2	2	2	2	2																														17
Truck Tractor	275				5	5	5	10																																				25
Sub-totals		0	0	0	6	6	6	12	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		42
Medium Voltage Substation/Infrastructure																																												
Light Weight & Delivery Trucks	200				5	5	5	5	5	5	5	5	5	5																														50
Truck Tractor	275				2	2	2	2	2	2	2	2	2	2																														20
Sub-totals		0	0	0	7	7	7	7	7	7	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		70
Operations and Maintenance Facility and Concrete Batch Plant																																												
Light Weight & Delivery Trucks	200	10	10	10	10	10	10																																					60
Truck Tractor	275	10	10	10	10	10	10																																					60
Concrete Batch Deliveries	27			61	3	6		73	234	161	161	161	322	322	322	483	483	483	483	322	322	322	322	322	322	322	483	483	483	483	483	483	322	322	322	322	161	161	161			10,681
Sub-totals		20	20	81	23	26	20	73	234	161	161	161	322	322	322	483	483	483	483	322	322	322	322	322	322	322	483	483	483	483	483	483	322	322	322	322	161	161	161	0		10,801
Drainage "A" Sheet Pile Installation																																												
Light Weight & Delivery Trucks	200																																											0
Truck Tractor	275		26	26	26	26																																						104
Sub-totals		0	26	26	26	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		104
Raw Water Supply Pipeline																																												
Light Weight & Delivery Trucks	200		1	1																																								2
Truck Tractor	275		1	1																																								2
Sub-totals		0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
Solar Field Area One																																												
Light Weight & Delivery Trucks	200								24	24	24	24	24	24	24	24	24	24	24																									264
Truck Tractor	275								24	24	24	24	24	24	24	24	24	24	24																									264
Sub-totals		0	0	0	0	0	0	0	48	48	48	48	48	48	48	48	48	48	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		528
Solar Field Area Two																																												
Light Weight & Delivery Trucks	200												24	24	24	24	24	24	24	24	24	24																						240
Truck Tractor	275												24	24	24	24	24	24	24	24	24	24																						240
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	48	48	48	48	48	48	48	48	48	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		480
Solar Field Area Three																																												
Light Weight & Delivery Trucks	200															24	24	24	24	24	24	24	24	24	24	24	24	24	24														336
Truck Tractor	275															24	24	24	24	24	24	24	24	24	24	24	24	24	24														336
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	48	48	48	48	48	48	48	48	48	48	48	48	48	0	0	0	0	0	0	0	0	0	0	0		672
Solar Field Area Four																																												
Light Weight & Delivery Trucks	200																						24	24	24	24	24	24	24	24	24												240
Truck Tractor	275																						24	24	24	24	24	24	24	24	24	24											240
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	48	48	48	48	48	48	48	48	48	0	0	0	0	0	0	0	0		480
Solar Field Area Five																																												
Light Weight & Delivery Trucks	200																										24	24	24	24	24	24	24	24	24	24							240
Truck Tractor	275																										24	24	24	24	24	24	24	24	24	24							240
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	48	48	48	48	48	48	48	48	48	0	0	0	0		480
Solar Field Area Six																																												
Light Weight & Delivery Trucks	200																													24	24	24	24	24	24	24	24	24	24				240
Truck Tractor	275																													24	24	24	24	24	24	24	24	24	24				240
Sub-totals		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	48	48	48	48	48	48	48	48	48	0		480
Total Light Weight & Delivery Trucks		10	11	11	16	16	16	9	33	33	33	31	55	55	48	72	72	72	72	48	48	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	0		1697
Light Weight & Delivery Truck Trips/Day		0.5	0.5	0.5	0.7	0.7	0.7	0.4	1.5	1.5	1.5	1.4	2.5	2.5	2.2	3.3	3.3	3.3	3.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.3	3.3	3.3	3.3	3.3	3.3	2.2	2.2	2.2	2.2	1.1	1.1	1.1	0.0		
Total Truck Tractor		10	37	37	43	43	17	32	46	36	26	26	50	50	48	72	72	72	72	48	48	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	0		1821
Total Concrete Truck		0	0	61	3	6	0	73	234	161	161	161	322	322	322	483	483	483	483	322	322	322	322	322	322	322	483	483	483	483	483	483	322	322	322	322	161	161	161	0		10681
Total HDD Trucks		10	37	98	46	49	17	105	280	197	187	187	372	372	370	555	555	555	555	370	370	370	370	370	370	370	555	555	555	555	555	555	370	370	370	370	185	185	185	0		
Total HDD Truck Trips/Day		0.5	1.7	4.5	2.1	2.3	0.8	4.8	12.9	9.1	8.6	8.6	17.2	17.2	17.1	25.6	25.6	25.6	25.6	17.1	17.1	17.1	17.1	17.1	17.1	17.1	25.6	25.6	25.6	25.6	25.6	25.6	17.1	17.1	17.1	17.1	8.5	8.5	8.5	0.0		
Totals		20	48	109	62	65	33	114	313	230	220	218	427	427	418	627	627	627	627	418	418	418	418	418	418	418	627	627	627	627	627	627	418	418	418	418	209	209	209	0		14199
Total Truck Trips/Day		0.9	2.2	5.0	2.9	3.0	1.5	5.3	14.4	10.6	10.2	10.1	19.7	19.7	19.3	28.9	28.9	28.9	28.9	19.3	19.3	19.3	19.3	19.3	19.3	19.3	28.9	28.9	28.9	28.9	28.9	28.9	19.3	19.3	19.3	19.3	9.6	9.6	9.6	0.0		

Note: Truck trips per day calculated as total deliveries per month divided by work days per month (assumed to be 21.65)

TABLE D.3-5
OFF-SITE VEHICLES DISTANCE TRAVELLED (BALLAST)

	Trip Distribution			One-way Distance			Weighted One-way Distance				Weighted Round-Trip Distance			
	Acton	Gorman	Mojave	Acton	Gorman	Mojave	Acton	Gorman	Mojave	**Average**	Acton	Gorman	Mojave	**Average**
	%	%	%	miles	miles	miles	miles	miles	miles	**miles**	miles	miles	miles	**miles**
Worker Vehicles	70%	5%	25%	39.6	25.5	34.0	27.72	1.275	8.5	**37.495**	55.44	2.55	17	**74.99**
Delivery Trucks	100%	0%	0%	39.6	25.5	34.0	39.6	0	0	**39.6**	79.2	0	0	**79.2**

TABLE 4-5
PROJECT CONSTRUCTION AND OPERATIONS
TRIP DISTRIBUTION ASSUMPTIONS

Land Use Trip Category	To SR-14 South (Percent)	To SR-14 North (Percent)	To SR-138 West (Percent)
Construction Worker	70	5	25
Construction Delivery	100	0	0
Operations and Maintenance Trips	90	0	10

TABLE D.3-6
OFFROAD 2007 EMISSION FACTORS
(BALLAST)

Equipment	Fuel	Max HP	Class	C/R	Pre	Hand	Port	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	CO Exhaust
Aerial Lifts	D	500	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.36E+00	1.44E+00	1.38E+01	8.87E-05	3.55E-04
Aerial Lifts	D	750	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.10E-01	1.15E-01	2.01E+00	1.33E-05	5.16E-05
Air Compressors	G4	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	5.98E-01	7.92E-01	5.43E+00	7.68E-05	1.73E-03
Air Compressors	D	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.59E+00	3.54E+00	1.43E+01	1.93E-04	8.85E-04
Air Compressors	D	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.23E+00	4.98E+00	2.96E+01	2.57E-04	7.53E-04
Air Compressors	D	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.91E+00	6.49E+00	6.81E+01	5.35E-04	1.87E-03
Air Compressors	D	750	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.09E+00	2.43E+00	3.94E+01	3.15E-04	1.08E-03
Air Compressors	D	1000	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.69E-02	5.99E-02	1.32E+00	1.33E-05	4.62E-05
Bore/Drill Rigs	G4	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.14E-01	3.34E-02	3.02E-01	4.09E-06	8.76E-05
Bore/Drill Rigs	D	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	5.21E-01	1.20E+00	7.73E+00	4.98E-05	4.54E-04
Bore/Drill Rigs	D	250	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.48E-01	1.04E+00	8.81E+00	4.60E-05	1.78E-04
Bore/Drill Rigs	D	500	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	9.98E-01	2.31E+00	3.24E+01	1.63E-04	6.38E-04
Bore/Drill Rigs	D	750	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.11E+01	4.88E+01	1.36E+03	6.86E-03	2.67E-02
Bore/Drill Rigs	D	1000	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	3.54E+01	8.17E+01	3.43E+03	1.99E-02	6.90E-02
Concrete/Industrial Saws	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.12E-02	1.78E-02	1.30E-01	1.62E-06	7.80E-06
Cranes	G4	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	9.10E-03	1.04E-02	5.56E-02	8.71E-07	1.79E-05
Cranes	D	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	2.09E+00	7.34E+00	2.70E+01	4.24E-04	1.78E-03
Cranes	D	250	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.05E+00	1.42E+01	7.25E+01	8.32E-04	2.32E-03
Cranes	D	500	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.49E+00	5.22E+00	4.27E+01	4.49E-04	1.59E-03
Cranes	D	750	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.42E+01	1.55E+02	2.14E+03	2.27E-02	7.97E-02
Cranes	D	9999	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	5.56E+01	1.95E+02	8.61E+03	1.01E-01	3.73E-01
Crawler Tractors	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.51E+01	4.35E+01	2.41E+02	4.04E-03	1.64E-02
Crawler Tractors	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.29E+01	3.74E+01	2.82E+02	3.63E-03	1.02E-02
Crawler Tractors	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	8.87E+00	2.56E+01	3.02E+02	3.55E-03	1.40E-02
Crawler Tractors	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.82E+01	5.24E+01	1.11E+03	1.31E-02	5.13E-02
Crawler Tractors	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.82E+01	5.23E+01	1.57E+03	1.98E-02	8.12E-02
Crushing/Proc. Equipment	D	175	Construction and Mining Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.07E+00	2.80E+00	2.14E+01	3.15E-04	1.36E-03
Crushing/Proc. Equipment	D	250	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.07E-01	2.79E-01	3.09E+00	2.90E-05	8.12E-05
Crushing/Proc. Equipment	D	500	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	6.00E-01	1.57E+00	2.66E+01	2.27E-04	7.52E-04
Crushing/Proc. Equipment	D	750	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.13E+00	2.97E+00	7.93E+01	6.87E-04	2.20E-03
Crushing/Proc. Equipment	D	9999	Construction and Mining Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.13E+00	2.97E+00	1.76E+02	1.93E-03	6.54E-03
Excavators	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	4.09E+01	1.60E+02	8.18E+02	1.11E-02	5.34E-02
Excavators	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.66E+01	6.50E+01	4.67E+02	4.46E-03	1.22E-02
Excavators	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.20E+01	4.69E+01	4.96E+02	4.42E-03	1.35E-02
Excavators	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.07E+01	4.16E+01	7.31E+02	6.56E-03	1.99E-02
Forklifts	G4	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.81E+00	8.91E+00	3.59E+01	3.39E-04	1.35E-02
Forklifts	C4	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.63E+00	1.79E+01	8.75E+01	5.30E-05	2.00E-02
Forklifts	D	175	Industrial Equipment	U	P	NHH	NP	Los Angeles	MD	AV	5.73E+00	2.83E+01	7.24E+01	9.05E-04	4.64E-03
Forklifts	D	250	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	5.69E+00	2.81E+01	9.81E+01	8.35E-04	2.29E-03
Forklifts	D	500	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.44E+00	1.20E+01	6.04E+01	4.82E-04	1.34E-03
Gas Compressors	C4	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	6.72E-02	1.56E+00	2.41E+01	1.39E-05	5.26E-03
Gas Compressors	C4	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	5.38E-02	1.25E+00	2.50E+01	1.07E-05	6.05E-03
Gas Compressors	C4	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.70E-02	1.10E+00	3.52E+01	1.50E-05	8.52E-03
Generator Sets	G4	175	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.65E+00	5.18E-01	4.66E+00	4.88E-05	1.34E-03
Generator Sets	C4	175	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.08E+00	3.38E-01	3.70E+00	2.38E-06	6.42E-04
Generator Sets	D	175	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.74E+00	2.54E+00	1.64E+01	1.79E-04	9.33E-04
Generator Sets	D	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.53E+00	1.42E+00	1.36E+01	9.51E-05	3.18E-04
Generator Sets	D	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	3.41E+00	3.15E+00	4.80E+01	2.99E-04	1.20E-03
Generator Sets	D	750	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.12E+00	1.96E+00	4.82E+01	3.11E-04	1.21E-03
Generator Sets	D	9999	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	5.51E-01	5.10E-01	2.42E+01	2.17E-04	7.71E-04
Graders	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.79E+01	4.68E+01	2.65E+02	3.88E-03	1.73E-02
Graders	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.11E+01	2.90E+01	2.26E+02	2.41E-03	6.80E-03
Graders	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.14E-01	8.20E-01	8.54E+00	8.38E-05	2.87E-04
Graders	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.81E-01	1.78E+00	3.92E+01	3.87E-04	1.32E-03
Off-Highway Tractors	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	6.86E+00	2.11E+01	1.26E+02	2.35E-03	8.92E-03
Off-Highway Tractors	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.48E+00	1.99E+01	1.18E+02	1.78E-03	5.05E-03
Off-Highway Tractors	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.14E+02	3.50E+02	9.07E+03	1.24E-01	5.76E-01
Off-Highway Tractors	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.20E+01	3.69E+01	1.37E+03	1.97E-02	9.45E-02
Off-Highway Trucks	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	3.64E-01	1.99E+00	1.14E+01	1.63E-04	7.56E-04
Off-Highway Trucks	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.69E+00	1.47E+01	1.11E+02	1.14E-03	3.00E-03
Off-Highway Trucks	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.79E+00	2.07E+01	2.55E+02	2.45E-03	7.27E-03
Off-Highway Trucks	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.43E+02	7.79E+02	1.56E+04	1.51E-01	4.44E-01
Off-Highway Trucks	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.69E+01	3.65E+02	1.03E+04	1.11E-01	3.49E-01
Other Construction Equipment	G4	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	3.19E-01	3.24E-01	1.78E+00	8.48E-06	5.38E-04
Other Construction Equipment	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.10E+00	2.12E+00	1.03E+01	1.16E-04	6.23E-04
Other Construction Equipment	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.55E+00	4.92E+00	5.66E+01	3.93E-04	1.39E-03

TABLE D.3-6
OFFROAD 2007 EMISSION FACTORS
(BALLAST)

Equipment	NOX Exhaust	CO2 Exhaust	SO2 Exhaust	PM Exhaust	N2O Exhaust	CH4 Exhaust	PM Exhaust/Activity (Tons/Hr)	CO Exhaust/Activity (Tons/Hr)	ROG Exhaust/Activity (Tons/Hr)	NOX Exhaust/Activity (Tons/Hr)	SO2 Exhaust/Activity (Tons/Hr)	CO2 Exhaust/Activity (Tons/Hr)	CH4 Exhaust/Activity (Tons/Hr)	N2O Exhaust/Activity (Tons/Hr)
Aerial Lifts	1.18E-03	1.53E-01	1.50E-06	3.54E-05	0.00E+00	8.00E-06	2.47E-05	2.47E-04	6.18E-05	8.19E-04	1.04E-06	1.06E-01	5.58E-06	0.00E+00
Aerial Lifts	1.76E-04	2.22E-02	2.23E-07	5.23E-06	0.00E+00	1.20E-06	4.54E-05	4.47E-04	1.16E-04	1.53E-03	1.93E-06	1.92E-01	1.04E-05	0.00E+00
Air Compressors	5.26E-04	4.93E-02	4.90E-07	3.93E-06	1.01E-05	4.33E-06	4.96E-06	2.19E-03	9.69E-05	6.64E-04	6.19E-07	6.23E-02	5.47E-06	1.27E-05
Air Compressors	1.56E-03	1.56E-01	1.76E-06	8.88E-05	0.00E+00	1.74E-05	2.51E-05	2.50E-04	5.45E-05	4.42E-04	4.97E-07	4.42E-02	4.91E-06	0.00E+00
Air Compressors	3.01E-03	3.26E-01	3.67E-06	9.44E-05	0.00E+00	2.32E-05	1.90E-05	1.51E-04	5.17E-05	6.05E-04	7.38E-07	6.56E-02	4.67E-06	0.00E+00
Air Compressors	6.12E-03	7.51E-01	7.37E-06	2.02E-04	0.00E+00	4.83E-05	3.11E-05	2.88E-04	8.25E-05	9.44E-04	1.14E-06	1.16E-01	7.44E-06	0.00E+00
Air Compressors	3.65E-03	4.34E-01	4.37E-06	1.19E-04	0.00E+00	2.84E-05	4.90E-05	4.44E-04	1.30E-04	1.50E-03	1.80E-06	1.79E-01	1.17E-05	0.00E+00
Air Compressors	1.62E-04	1.46E-02	1.46E-07	4.69E-06	0.00E+00	1.20E-06	7.83E-05	7.71E-04	2.21E-04	2.70E-03	2.44E-06	2.43E-01	2.00E-05	0.00E+00
Bore/Drill Rigs	3.18E-05	2.76E-03	2.74E-08	2.20E-07	5.24E-07	2.31E-07	6.58E-06	2.62E-03	1.23E-04	9.54E-04	8.21E-07	8.26E-02	6.93E-06	1.57E-05
Bore/Drill Rigs	4.96E-04	8.49E-02	9.55E-07	2.68E-05	0.00E+00	4.49E-06	2.23E-05	3.76E-04	4.13E-05	4.11E-04	7.93E-07	7.05E-02	3.73E-06	0.00E+00
Bore/Drill Rigs	5.22E-04	9.74E-02	1.10E-06	1.66E-05	0.00E+00	4.15E-06	1.60E-05	1.72E-04	4.44E-05	5.04E-04	1.06E-06	9.40E-02	4.01E-06	0.00E+00
Bore/Drill Rigs	1.71E-03	3.59E-01	3.52E-06	5.96E-05	0.00E+00	1.47E-05	2.58E-05	2.77E-04	7.05E-05	7.42E-04	1.53E-06	1.56E-01	6.36E-06	0.00E+00
Bore/Drill Rigs	7.30E-02	1.50E+01	1.51E-04	2.51E-03	0.00E+00	6.19E-04	5.15E-05	5.47E-04	1.41E-04	1.50E-03	3.09E-06	3.07E-01	1.27E-05	0.00E+00
Bore/Drill Rigs	3.01E-01	3.79E+01	3.81E-04	7.64E-03	0.00E+00	1.79E-03	9.35E-05	8.44E-04	2.43E-04	3.68E-03	4.66E-06	4.64E-01	2.19E-05	0.00E+00
Concrete/Industrial Saws	1.38E-05	1.43E-03	1.61E-08	7.40E-07	0.00E+00	1.46E-07	4.15E-05	4.37E-04	9.07E-05	7.76E-04	9.00E-07	8.00E-02	8.19E-06	0.00E+00
Cranes	6.18E-06	5.05E-04	5.02E-09	4.03E-08	1.28E-07	4.92E-08	3.89E-06	1.73E-03	8.41E-05	5.96E-04	4.85E-07	4.88E-02	4.75E-06	1.23E-05
Cranes	3.23E-03	2.95E-01	3.32E-06	1.90E-04	0.00E+00	3.82E-05	2.58E-05	2.43E-04	5.77E-05	4.40E-04	4.52E-07	4.01E-02	5.21E-06	0.00E+00
Cranes	8.21E-03	7.98E-01	8.97E-06	3.04E-04	0.00E+00	7.51E-05	2.13E-05	1.63E-04	5.84E-05	5.77E-04	6.30E-07	5.60E-02	5.27E-06	0.00E+00
Cranes	4.30E-03	4.69E-01	4.61E-06	1.63E-04	0.00E+00	4.05E-05	3.12E-05	3.05E-04	8.61E-05	8.24E-04	8.83E-07	9.00E-02	7.77E-06	0.00E+00
Cranes	2.21E-01	2.35E+01	2.37E-04	8.28E-03	0.00E+00	2.04E-03	5.33E-05	5.13E-04	1.46E-04	1.42E-03	1.52E-06	1.51E-01	1.32E-05	0.00E+00
Cranes	1.13E+00	9.46E+01	9.51E-04	3.49E-02	0.00E+00	9.11E-03	1.79E-04	1.91E-03	5.18E-04	5.77E-03	4.88E-06	4.85E-01	4.67E-05	0.00E+00
Crawler Tractors	3.05E-02	2.63E+00	2.96E-05	1.79E-03	0.00E+00	3.65E-04	4.11E-05	3.77E-04	9.29E-05	7.02E-04	6.81E-07	6.05E-02	8.38E-06	0.00E+00
Crawler Tractors	3.41E-02	3.10E+00	3.49E-05	1.35E-03	0.00E+00	3.28E-04	3.61E-05	2.72E-04	9.72E-05	9.12E-04	9.34E-07	8.30E-02	8.77E-06	0.00E+00
Crawler Tractors	3.27E-02	3.32E+00	3.26E-05	1.30E-03	0.00E+00	3.20E-04	5.07E-05	5.46E-04	1.39E-04	1.27E-03	1.27E-06	1.29E-01	1.25E-05	0.00E+00
Crawler Tractors	1.23E-01	1.22E+01	1.22E-04	4.82E-03	0.00E+00	1.18E-03	9.20E-05	9.79E-04	2.50E-04	2.34E-03	2.33E-06	2.32E-01	2.25E-05	0.00E+00
Crawler Tractors	2.14E-01	1.72E+01	1.73E-04	6.93E-03	0.00E+00	1.79E-03	1.32E-04	1.55E-03	3.78E-04	4.08E-03	3.31E-06	3.29E-01	3.41E-05	0.00E+00
Crushing/Proc. Equipment	2.46E-03	2.34E-01	2.64E-06	1.44E-04	0.00E+00	2.84E-05	5.14E-05	4.85E-04	1.12E-04	8.78E-04	9.40E-07	8.36E-02	1.01E-05	0.00E+00
Crushing/Proc. Equipment	3.31E-04	3.41E-02	3.83E-07	1.05E-05	0.00E+00	2.62E-06	3.76E-05	2.91E-04	1.04E-04	1.19E-03	1.37E-06	1.22E-01	9.39E-06	0.00E+00
Crushing/Proc. Equipment	2.51E-03	2.93E-01	2.88E-06	8.39E-05	0.00E+00	2.04E-05	5.34E-05	4.79E-04	1.44E-04	1.60E-03	1.83E-06	1.87E-01	1.30E-05	0.00E+00
Crushing/Proc. Equipment	7.80E-03	8.74E-01	8.79E-06	2.55E-04	0.00E+00	6.20E-05	8.58E-05	7.41E-04	2.31E-04	2.62E-03	2.96E-06	2.94E-01	2.09E-05	0.00E+00
Crushing/Proc. Equipment	2.26E-02	1.94E+00	1.95E-05	6.71E-04	0.00E+00	1.74E-04	2.26E-04	2.20E-03	6.48E-04	7.60E-03	6.57E-06	6.53E-01	5.85E-05	0.00E+00
Excavators	8.31E-02	8.95E+00	1.01E-04	5.04E-03	0.00E+00	9.97E-04	3.15E-05	3.34E-04	6.92E-05	5.20E-04	6.31E-07	5.61E-02	6.24E-06	0.00E+00
Excavators	4.44E-02	5.15E+00	5.79E-05	1.51E-03	0.00E+00	4.02E-04	2.32E-05	1.88E-04	6.86E-05	6.84E-04	8.92E-07	7.93E-02	6.19E-06	0.00E+00
Excavators	4.13E-02	5.47E+00	5.37E-05	1.50E-03	0.00E+00	3.99E-04	3.19E-05	2.89E-04	9.44E-05	8.82E-04	1.15E-06	1.17E-01	8.52E-06	0.00E+00
Excavators	6.30E-02	8.06E+00	8.10E-05	2.24E-03	0.00E+00	5.92E-04	5.39E-05	4.78E-04	1.58E-04	1.51E-03	1.95E-06	1.94E-01	1.42E-05	0.00E+00
Forklifts	1.69E-03	3.24E-01	3.22E-06	2.58E-05	6.26E-05	1.88E-05	2.90E-06	1.52E-03	3.81E-05	1.90E-04	3.61E-07	3.64E-02	2.11E-06	7.02E-06
Forklifts	2.59E-03	5.83E-01	0.00E+00	5.19E-05	0.00E+00	4.44E-04	2.90E-06	1.12E-03	2.96E-06	1.45E-04	0.00E+00	3.26E-02	2.48E-05	0.00E+00
Forklifts	6.88E-03	7.92E-01	8.92E-06	4.19E-04	0.00E+00	8.17E-05	1.48E-05	1.64E-04	3.20E-05	2.43E-04	3.15E-07	2.80E-02	2.89E-06	0.00E+00
Forklifts	8.69E-03	1.08E+00	1.22E-05	2.75E-04	0.00E+00	7.53E-05	9.80E-06	8.16E-05	2.97E-05	3.09E-04	4.33E-07	3.85E-02	2.68E-06	0.00E+00
Forklifts	4.59E-03	6.66E-01	6.54E-06	1.59E-04	0.00E+00	4.35E-05	1.32E-05	1.12E-04	4.01E-05	3.81E-04	5.44E-07	5.54E-02	3.62E-06	0.00E+00
Gas Compressors	5.24E-04	1.61E-01	0.00E+00	1.28E-05	0.00E+00	1.16E-04	8.21E-06	3.36E-03	8.86E-06	3.35E-04	0.00E+00	1.03E-01	7.43E-05	0.00E+00
Gas Compressors	5.08E-04	1.66E-01	0.00E+00	1.48E-05	0.00E+00	8.94E-05	1.18E-05	4.84E-03	8.52E-06	4.06E-04	0.00E+00	1.33E-01	7.14E-05	0.00E+00
Gas Compressors	7.15E-04	2.34E-01	0.00E+00	2.08E-05	0.00E+00	1.26E-04	1.90E-05	7.78E-03	1.37E-05	6.53E-04	0.00E+00	2.14E-01	1.15E-04	0.00E+00
Generator Sets	3.92E-04	4.27E-02	4.24E-07	3.40E-06	7.35E-06	2.76E-06	6.57E-06	2.58E-03	9.42E-05	7.56E-04	8.19E-07	8.24E-02	5.33E-06	1.42E-05
Generator Sets	1.98E-04	2.50E-02	0.00E+00	2.22E-06	0.00E+00	2.00E-05	6.57E-06	1.90E-03	7.04E-06	5.84E-04	0.00E+00	7.38E-02	5.90E-05	0.00E+00
Generator Sets	1.65E-03	1.80E-01	2.02E-06	8.13E-05	0.00E+00	1.62E-05	3.20E-05	3.68E-04	7.06E-05	6.51E-04	7.98E-07	7.09E-02	6.37E-06	0.00E+00
Generator Sets	1.28E-03	1.50E-01	1.69E-06	3.63E-05	0.00E+00	8.58E-06	2.56E-05	2.24E-04	6.71E-05	9.00E-04	1.19E-06	1.06E-01	6.06E-06	0.00E+00
Generator Sets	4.05E-03	5.30E-01	5.20E-06	1.20E-04	0.00E+00	2.70E-05	3.81E-05	3.82E-04	9.50E-05	1.29E-03	1.65E-06	1.68E-01	8.57E-06	0.00E+00
Generator Sets	4.19E-03	5.32E-01	5.35E-06	1.23E-04	0.00E+00	2.81E-05	6.26E-05	6.17E-04	1.59E-04	2.14E-03	2.73E-06	2.72E-01	1.43E-05	0.00E+00
Generator Sets	2.78E-03	2.67E-01	2.68E-06	7.84E-05	0.00E+00	1.95E-05	1.54E-04	1.51E-03	4.25E-04	5.46E-03	5.27E-06	5.24E-01	3.83E-05	0.00E+00
Graders	2.99E-02	2.89E+00	3.26E-05	1.75E-03	0.00E+00	3.50E-04	3.75E-05	3.69E-04	8.29E-05	6.39E-04	6.97E-07	6.19E-02	7.48E-06	0.00E+00
Graders	2.41E-02	2.49E+00	2.81E-05	8.73E-04	0.00E+00	2.18E-04	3.01E-05	2.34E-04	8.32E-05	8.32E-04	9.67E-07	8.60E-02	7.50E-06	0.00E+00
Graders	8.06E-04	9.41E-02	9.23E-07	3.01E-05	0.00E+00	7.56E-06	3.67E-05	3.50E-04	1.02E-04	9.82E-04	1.13E-06	1.15E-01	9.21E-06	0.00E+00
Graders	3.81E-03	4.32E-01	4.34E-06	1.40E-04	0.00E+00	3.49E-05	7.90E-05	7.41E-04	2.18E-04	2.14E-03	2.44E-06	2.43E-01	1.96E-05	0.00E+00
Off-Highway Tractors	1.78E-02	1.37E+00	1.54E-05	1.03E-03	0.00E+00	2.12E-04	4.89E-05	4.23E-04	1.12E-04	8.44E-04	7.33E-07	6.52E-02	1.01E-05	0.00E+00
Off-Highway Tractors	1.61E-02	1.30E+00	1.46E-05	6.82E-04	0.00E+00	1.61E-04	3.42E-05	2.54E-04	8.94E-05	8.07E-04	7.33E-07	6.52E-02	8.07E-06	0.00E+00
Off-Highway Tractors	1.13E+00	9.93E+01	9.99E-04	4.68E-02	0.00E+00	1.12E-02	1.34E-04	1.65E-03	3.54E-04	3.24E-03	2.85E-06	2.84E-01	3.19E-05	0.00E+00
Off-Highway Tractors	2.02E-01	1.50E+01	1.51E-04	7.01E-03	0.00E+00	1.78E-03	1.90E-04	2.56E-03	5.34E-04	5.48E-03	4.09E-06	4.07E-01	4.81E-05	0.00E+00
Off-Highway Trucks	1.19E-03	1.24E-01	1.40E-06	7.30E-05	0.00E+00	1.47E-05	3.67E-05	3.80E-04	8.20E-05	5.98E-04	7.03E-07	6.25E-02	7.40E-06	0.00E+00
Off-Highway Trucks	1.09E-02	1.22E+00	1.37E-05	3.78E-04	0.00E+00	1.03E-04	2.57E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00
Off-Highway Trucks	2.20E-02	2.81E+00	2.76E-05	8.11E-04	0.00E+00	2.21E-04	3.92E-05	3.52E-04	1.18E-04	1.06E-03	1.34E-06	1.36E-01	1.07E-05	0.00E+00
Off-Highway Trucks	1.39E+00	1.72E+02	1.73E-03	5.04E-02	0.00E+00	1.36E-02	6.47E-05	5.70E-04	1.94E-04	1.78E-03	2.22E-06	2.21E-01	1.75E-05	0.00E+00
Off-Highway Trucks	1.25E+00	1.14E+02	1.15E-03	3.78E-02	0.00E+00	1.00E-02	1.04E-04	9.55E-04	3.05E-04	3.42E-03	3.14E-06	3.12E-01	2.75E-05	0.00E+00
Other Construction Equipment	4.16E-05	1.63E-02	1.62E-07	1.30E-06	1.71E-06	4.79E-07	4.00E-06	1.66E-03	2.62E-05	1.28E-04	4.99E-07	5.02E-02	1.48E-06	5.28E-06
Other Construction Equipment	9.84E-04	1.13E-01	1.27E-06	5.49E-05	0.00E+00	1.05E-05	2.59E-05	2.94E-04	5.47E-05	4.65E-04	5.99E-07	5.32E-02	4.94E-06	0.00E+00
Other Construction Equipment	4.46E-03	6.24E-01	6.13E-06	1.49E-04	0.00E+00	3.54E-05	3.02E-05	2.83E-04	7.98E-05	9.06E-04	1.25E-06	1.27E-01	7.20E-06	0.00E+00

TABLE D.3-6
OFFROAD 2007 EMISSION FACTORS
(BALLAST)

Equipment	Fuel	Max HP	Class	C/R	Pre	Hand	Port	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	CO Exhaust
Other General Industrial Equipment	G4	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.29E-02	8.39E-02	7.17E-01	4.01E-06	2.30E-04
Other General Industrial Equipment	D	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.67E+00	1.82E+01	7.99E+01	1.19E-03	5.20E-03
Other General Industrial Equipment	D	250	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.65E+00	1.82E+01	1.12E+02	1.09E-03	2.96E-03
Other General Industrial Equipment	D	500	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.64E+00	1.81E+01	2.18E+02	1.97E-03	6.16E-03
Other General Industrial Equipment	D	750	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.16E+00	4.53E+00	8.97E+01	8.18E-04	2.54E-03
Other General Industrial Equipment	D	1000	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	7.05E-01	2.75E+00	6.99E+01	7.56E-04	2.51E-03
Other Material Handling Equipment	D	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.14E-01	7.75E-01	4.32E+00	6.38E-05	2.80E-04
Other Material Handling Equipment	D	250	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	5.10E-01	1.84E+00	1.21E+01	1.17E-04	3.20E-04
Other Material Handling Equipment	D	500	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	9.53E-02	3.44E-01	2.99E+00	2.66E-05	8.43E-05
Other Material Handling Equipment	D	9999	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.86E-02	1.03E-01	3.48E+00	3.75E-05	1.24E-04
Pavers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	3.58E+00	8.21E+00	4.81E+01	8.06E-04	3.24E-03
Pavers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.32E-01	9.89E-01	8.74E+00	1.13E-04	3.28E-04
Pavers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.43E-01	1.02E+00	1.08E+01	1.26E-04	5.41E-04
Paving Equipment	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	8.35E-01	1.92E+00	8.85E+00	1.47E-04	5.90E-04
Paving Equipment	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.35E-01	5.41E-01	3.00E+00	3.84E-05	1.11E-04
Pumps	G4	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	2.76E-01	1.67E-01	1.50E+00	1.63E-05	4.49E-04
Pumps	D	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	2.84E+00	3.13E+00	2.00E+01	2.26E-04	1.15E-03
Pumps	D	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.04E+00	2.25E+00	2.05E+01	1.49E-04	4.87E-04
Pumps	D	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	4.03E-02	4.45E-02	6.95E-01	4.51E-06	1.79E-05
Pumps	D	750	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	6.72E-03	7.41E-03	1.91E-01	1.28E-06	4.94E-06
Pumps	D	9999	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	1.48E-01	1.63E-01	1.00E+01	9.13E-05	3.27E-04
Rollers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	9.52E+00	1.83E+01	9.05E+01	1.29E-03	5.72E-03
Rollers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.35E+00	2.60E+00	1.81E+01	1.87E-04	5.56E-04
Rollers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	9.47E-01	1.82E+00	1.81E+01	1.70E-04	6.56E-04
Rough Terrain Forklifts	G4	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	2.28E-02	2.58E-02	2.11E-01	3.30E-06	6.77E-05
Rough Terrain Forklifts	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	3.82E+00	1.19E+01	6.76E+01	9.20E-04	4.32E-03
Rough Terrain Forklifts	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.13E-01	6.62E-01	5.12E+00	4.72E-05	1.33E-04
Rough Terrain Forklifts	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.40E-01	4.36E-01	5.06E+00	4.31E-05	1.38E-04
Rubber Tired Dozers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	5.61E-02	2.51E-01	1.49E+00	2.90E-05	1.08E-04
Rubber Tired Dozers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.37E+00	6.16E+00	5.14E+01	8.14E-04	2.27E-03
Rubber Tired Dozers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.11E+00	9.47E+00	1.15E+02	1.64E-03	7.63E-03
Rubber Tired Dozers	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.02E+01	1.35E+02	2.46E+03	3.54E-02	1.64E-01
Rubber Tired Dozers	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.04E+00	9.14E+00	2.47E+02	3.70E-03	1.78E-02
Rubber Tired Loaders	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	2.34E+01	6.25E+01	3.03E+02	4.38E-03	1.97E-02
Rubber Tired Loaders	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.32E+01	6.22E+01	4.20E+02	4.37E-03	1.24E-02
Rubber Tired Loaders	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	9.67E+00	2.59E+01	2.78E+02	2.66E-03	9.22E-03
Rubber Tired Loaders	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.75E+01	7.35E+01	1.62E+03	1.56E-02	5.36E-02
Rubber Tired Loaders	D	1000	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.95E+00	7.88E+00	2.13E+02	2.28E-03	8.18E-03
Scrapers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	2.00E+00	6.12E+00	4.15E+01	7.01E-04	2.82E-03
Scrapers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.95E+00	5.97E+00	5.68E+01	7.41E-04	2.08E-03
Scrapers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	5.37E+00	1.64E+01	2.40E+02	2.86E-03	1.14E-02
Scrapers	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.56E+01	1.09E+02	2.75E+03	3.29E-02	1.31E-01
Signal Boards	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	7.96E-01	1.17E+00	8.23E+00	1.05E-04	4.90E-04
Signal Boards	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.68E-01	2.47E-01	2.85E+00	2.32E-05	7.08E-05
Surfacing Equipment	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	1.68E-02	2.09E-02	8.17E-02	1.06E-06	4.97E-06
Surfacing Equipment	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.36E-02	4.18E-02	2.56E-01	2.44E-06	7.68E-06
Surfacing Equipment	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.80E-01	3.48E-01	3.49E+00	3.01E-05	1.26E-04
Surfacing Equipment	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.81E+00	8.46E+00	1.33E+02	1.17E-03	4.78E-03
Sweepers/Scrubbers	G4	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.91E-02	2.70E-02	2.43E-01	1.00E-06	7.50E-05
Sweepers/Scrubbers	D	175	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.96E+00	1.32E+01	8.40E+01	1.05E-03	5.26E-03
Sweepers/Scrubbers	D	250	Industrial Equipment	U	N	NHH	NP	Los Angeles	MD	AV	6.34E-01	2.12E+00	1.56E+01	1.27E-04	3.64E-04
Tractors/Loaders/Backhoes	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	9.43E+00	2.50E+01	1.16E+02	1.43E-03	7.34E-03
Tractors/Loaders/Backhoes	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	3.05E+00	8.09E+00	6.29E+01	5.42E-04	1.57E-03
Tractors/Loaders/Backhoes	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	4.92E+00	1.31E+01	2.04E+02	1.63E-03	5.25E-03
Tractors/Loaders/Backhoes	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.37E+02	3.64E+02	8.53E+03	6.90E-02	2.20E-01
Trenchers	D	175	Construction and Mining Equipment	U	P	NHH	NP	Los Angeles	MD	AV	2.50E+00	4.34E+00	2.85E+01	4.68E-04	1.90E-03
Trenchers	D	250	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.24E-01	3.89E-01	3.94E+00	5.08E-05	1.50E-04
Trenchers	D	500	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	2.86E-01	4.96E-01	7.04E+00	8.14E-05	3.72E-04
Trenchers	D	750	Construction and Mining Equipment	U	N	NHH	NP	Los Angeles	MD	AV	1.36E+00	2.36E+00	6.32E+01	7.38E-04	3.34E-03
Welders	G4	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.01E+00	5.74E-01	3.46E+00	4.30E-05	1.02E-03
Welders	D	175	Light Commercial Equipment	U	P	NHH	P	Los Angeles	MD	AV	1.21E-01	2.13E-01	9.53E-01	1.21E-05	5.75E-05
Welders	D	250	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	2.69E-02	4.73E-02	2.55E-01	2.09E-06	6.34E-06
Welders	D	500	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV	6.72E-02	1.18E-01	8.97E-01	6.59E-06	2.42E-05
Generator Sets	D	50	Light Commercial Equipment	U	N	NHH	P	Los Angeles	MD	AV					

Notes: Consumption is gal/day for total population. Activity is hours per day for total population

TABLE D.3-6
OFFROAD 2007 EMISSION FACTORS
(BALLAST)

Equipment	NOX Exhaust	CO2 Exhaust	SO2 Exhaust	PM Exhaust	N2O Exhaust	CH4 Exhaust	PM Exhaust/Activity (Tons/Hr)	CO Exhaust/Activity (Tons/Hr)	ROG Exhaust/Activity (Tons/Hr)	NOX Exhaust/Activity (Tons/Hr)	SO2 Exhaust/Activity (Tons/Hr)	CO2 Exhaust/Activity (Tons/Hr)	CH4 Exhaust/Activity (Tons/Hr)	N2O Exhaust/Activity (Tons/Hr)
Other General Industrial Equipment	2.73E-05	6.54E-03	6.50E-08	5.21E-07	7.95E-07	2.26E-07	6.21E-06	2.74E-03	4.78E-05	3.26E-04	7.75E-07	7.80E-02	2.70E-06	9.48E-06
Other General Industrial Equipment	9.03E-03	8.74E-01	9.83E-06	5.42E-04	0.00E+00	1.08E-04	2.97E-05	2.85E-04	6.54E-05	4.95E-04	5.39E-07	4.79E-02	5.90E-06	0.00E+00
Other General Industrial Equipment	1.17E-02	1.23E+00	1.38E-05	3.81E-04	0.00E+00	9.88E-05	2.10E-05	1.63E-04	6.03E-05	6.47E-04	7.62E-07	6.77E-02	5.44E-06	0.00E+00
Other General Industrial Equipment	2.01E-02	2.40E+00	2.36E-05	6.90E-04	0.00E+00	1.78E-04	3.81E-05	3.40E-04	1.09E-04	1.11E-03	1.30E-06	1.33E-01	9.81E-06	0.00E+00
Other General Industrial Equipment	8.54E-03	9.89E-01	9.94E-06	2.90E-04	0.00E+00	7.38E-05	6.40E-05	5.61E-04	1.81E-04	1.89E-03	2.20E-06	2.19E-01	1.63E-05	0.00E+00
Other General Industrial Equipment	8.82E-03	7.70E-01	7.74E-06	2.65E-04	0.00E+00	6.82E-05	9.62E-05	9.11E-04	2.75E-04	3.20E-03	2.81E-06	2.80E-01	2.48E-05	0.00E+00
Other Material Handling Equipment	4.88E-04	4.73E-02	5.32E-07	2.91E-05	0.00E+00	5.76E-06	3.76E-05	3.61E-04	8.23E-05	6.29E-04	6.86E-07	6.10E-02	7.43E-06	0.00E+00
Other Material Handling Equipment	1.27E-03	1.34E-01	1.50E-06	4.11E-05	0.00E+00	1.06E-05	2.23E-05	1.74E-04	6.36E-05	6.90E-04	8.15E-07	7.24E-02	5.74E-06	0.00E+00
Other Material Handling Equipment	2.75E-04	3.30E-02	3.24E-07	9.41E-06	0.00E+00	2.40E-06	2.73E-05	2.45E-04	7.73E-05	7.98E-04	9.40E-07	9.57E-02	6.97E-06	0.00E+00
Other Material Handling Equipment	4.37E-04	3.83E-02	3.76E-07	1.31E-05	0.00E+00	3.38E-06	1.27E-04	1.20E-03	3.63E-04	4.23E-03	3.64E-06	3.70E-01	3.27E-05	0.00E+00
Pavers	6.27E-03	5.26E-01	5.92E-06	3.58E-04	0.00E+00	7.27E-05	4.36E-05	3.94E-04	9.81E-05	7.64E-04	7.21E-07	6.41E-02	8.85E-06	0.00E+00
Pavers	1.09E-03	9.61E-02	1.08E-06	4.35E-05	0.00E+00	1.02E-05	4.40E-05	3.32E-04	1.15E-04	1.10E-03	1.09E-06	9.71E-02	1.03E-05	0.00E+00
Pavers	1.21E-03	1.18E-01	1.16E-06	4.80E-05	0.00E+00	1.14E-05	4.73E-05	5.33E-04	1.24E-04	1.19E-03	1.14E-06	1.17E-01	1.12E-05	0.00E+00
Paving Equipment	1.15E-03	9.68E-02	1.09E-06	6.52E-05	0.00E+00	1.32E-05	3.40E-05	3.07E-04	7.66E-05	5.99E-04	5.68E-07	5.05E-02	6.91E-06	0.00E+00
Paving Equipment	3.73E-04	3.30E-02	3.72E-07	1.47E-05	0.00E+00	3.46E-06	2.73E-05	2.06E-04	7.10E-05	6.89E-04	6.87E-07	6.11E-02	6.41E-06	0.00E+00
Pumps	1.18E-04	1.37E-02	1.37E-07	1.09E-06	2.11E-06	9.20E-07	6.57E-06	2.69E-03	9.76E-05	7.05E-04	8.20E-07	8.25E-02	5.52E-06	1.27E-05
Pumps	2.04E-03	2.19E-01	2.46E-06	1.03E-04	0.00E+00	2.04E-05	3.29E-05	3.68E-04	7.23E-05	6.52E-04	7.88E-07	7.00E-02	6.52E-06	0.00E+00
Pumps	1.95E-03	2.27E-01	2.55E-06	5.67E-05	0.00E+00	1.35E-05	2.52E-05	2.16E-04	6.62E-05	8.65E-04	1.13E-06	1.01E-01	5.98E-06	0.00E+00
Pumps	5.92E-05	7.67E-03	7.53E-08	1.80E-06	0.00E+00	4.07E-07	4.04E-05	4.03E-04	1.01E-04	1.33E-03	1.69E-06	1.72E-01	9.15E-06	0.00E+00
Pumps	1.68E-05	2.11E-03	2.12E-08	5.03E-07	0.00E+00	1.16E-07	6.79E-05	6.66E-04	1.73E-04	2.27E-03	2.87E-06	2.85E-01	1.56E-05	0.00E+00
Pumps	1.16E-03	1.10E-01	1.11E-06	3.29E-05	0.00E+00	8.24E-06	2.02E-04	2.01E-03	5.60E-04	7.13E-03	6.81E-06	6.77E-01	5.06E-05	0.00E+00
Rollers	1.04E-02	9.90E-01	1.11E-05	5.82E-04	0.00E+00	1.16E-04	3.18E-05	3.12E-04	7.02E-05	5.70E-04	6.08E-07	5.40E-02	6.33E-06	0.00E+00
Rollers	1.97E-03	1.99E-01	2.24E-06	7.11E-05	0.00E+00	1.69E-05	2.74E-05	2.14E-04	7.19E-05	7.58E-04	8.60E-07	7.65E-02	6.49E-06	0.00E+00
Rollers	1.77E-03	2.00E-01	1.96E-06	6.50E-05	0.00E+00	1.53E-05	3.56E-05	3.60E-04	9.30E-05	9.71E-04	1.07E-06	1.09E-01	8.39E-06	0.00E+00
Rough Terrain Forklifts	2.34E-05	1.91E-03	1.90E-08	1.53E-07	3.98E-07	1.86E-07	5.92E-06	2.63E-03	1.28E-04	9.07E-04	7.38E-07	7.43E-02	7.22E-06	1.54E-05
Rough Terrain Forklifts	7.17E-03	7.40E-01	8.33E-06	4.24E-04	0.00E+00	8.30E-05	3.58E-05	3.64E-04	7.76E-05	6.04E-04	7.02E-07	6.24E-02	7.00E-06	0.00E+00
Rough Terrain Forklifts	5.08E-04	5.65E-02	6.36E-07	1.68E-05	0.00E+00	4.26E-06	2.53E-05	2.01E-04	7.13E-05	7.67E-04	9.60E-07	8.53E-02	6.43E-06	0.00E+00
Rough Terrain Forklifts	4.40E-04	5.58E-02	5.48E-07	1.54E-05	0.00E+00	3.89E-06	3.53E-05	3.16E-04	9.89E-05	1.01E-03	1.26E-06	1.28E-01	8.92E-06	0.00E+00
Rubber Tired Dozers	2.15E-04	1.63E-02	1.83E-07	1.26E-05	0.00E+00	2.62E-06	5.00E-05	4.29E-04	1.15E-04	8.54E-04	7.28E-07	6.47E-02	1.04E-05	0.00E+00
Rubber Tired Dozers	7.14E-03	5.64E-01	6.35E-06	3.08E-04	0.00E+00	7.35E-05	5.00E-05	3.69E-04	1.32E-04	1.16E-03	1.03E-06	9.17E-02	1.19E-05	0.00E+00
Rubber Tired Dozers	1.44E-02	1.25E+00	1.23E-05	6.06E-04	0.00E+00	1.48E-04	6.40E-05	8.05E-04	1.73E-04	1.52E-03	1.30E-06	1.32E-01	1.56E-05	0.00E+00
Rubber Tired Dozers	3.14E-01	2.69E+01	2.71E-04	1.31E-02	0.00E+00	3.19E-03	9.72E-05	1.21E-03	2.62E-04	2.32E-03	2.00E-06	1.99E-01	2.36E-05	0.00E+00
Rubber Tired Dozers	3.71E-02	2.70E+00	2.72E-05	1.31E-03	0.00E+00	3.34E-04	1.43E-04	1.94E-03	4.05E-04	4.06E-03	2.97E-06	2.96E-01	3.65E-05	0.00E+00
Rubber Tired Loaders	3.39E-02	3.32E+00	3.74E-05	1.99E-03	0.00E+00	3.95E-04	3.18E-05	3.15E-04	7.01E-05	5.43E-04	5.98E-07	5.31E-02	6.32E-06	0.00E+00
Rubber Tired Loaders	4.43E-02	4.63E+00	5.21E-05	1.59E-03	0.00E+00	3.95E-04	2.55E-05	2.00E-04	7.04E-05	7.13E-04	8.37E-07	7.44E-02	6.35E-06	0.00E+00
Rubber Tired Loaders	2.60E-02	3.06E+00	3.01E-05	9.62E-04	0.00E+00	2.40E-04	3.72E-05	3.56E-04	1.03E-04	1.00E-03	1.16E-06	1.18E-01	9.29E-06	0.00E+00
Rubber Tired Loaders	1.55E-01	1.78E+01	1.79E-04	5.69E-03	0.00E+00	1.41E-03	7.74E-05	7.30E-04	2.13E-04	2.12E-03	2.44E-06	2.43E-01	1.92E-05	0.00E+00
Rubber Tired Loaders	2.65E-02	2.34E+00	2.35E-05	7.99E-04	0.00E+00	2.06E-04	1.01E-04	1.04E-03	2.90E-04	3.36E-03	2.98E-06	2.97E-01	2.61E-05	0.00E+00
Scrapers	5.32E-03	4.53E-01	5.10E-06	3.10E-04	0.00E+00	6.33E-05	5.07E-05	4.60E-04	1.14E-04	8.69E-04	8.32E-07	7.40E-02	1.03E-05	0.00E+00
Scrapers	6.96E-03	6.25E-01	7.03E-06	2.77E-04	0.00E+00	6.68E-05	4.63E-05	3.49E-04	1.24E-04	1.17E-03	1.18E-06	1.05E-01	1.12E-05	0.00E+00
Scrapers	2.64E-02	2.64E+00	2.59E-05	1.05E-03	0.00E+00	2.58E-04	6.39E-05	6.95E-04	1.74E-04	1.60E-03	1.58E-06	1.61E-01	1.57E-05	0.00E+00
Scrapers	3.09E-01	3.02E+01	3.04E-04	1.22E-02	0.00E+00	2.97E-03	1.12E-04	1.20E-03	3.02E-04	2.84E-03	2.79E-06	2.77E-01	2.72E-05	0.00E+00
Signal Boards	8.93E-04	9.02E-02	1.01E-06	4.75E-05	0.00E+00	9.47E-06	4.07E-05	4.20E-04	8.99E-05	7.65E-04	8.69E-07	7.72E-02	8.11E-06	0.00E+00
Signal Boards	2.88E-04	3.15E-02	3.54E-07	8.70E-06	0.00E+00	2.09E-06	3.53E-05	2.87E-04	9.41E-05	1.17E-03	1.43E-06	1.28E-01	8.49E-06	0.00E+00
Surfacing Equipment	9.08E-06	8.95E-04	1.01E-08	4.75E-07	0.00E+00	9.56E-08	2.28E-05	2.38E-04	5.07E-05	4.35E-04	4.82E-07	4.28E-02	4.58E-06	0.00E+00
Surfacing Equipment	2.69E-05	2.82E-03	3.17E-08	9.42E-07	0.00E+00	2.21E-07	2.25E-05	1.84E-04	5.85E-05	6.44E-04	7.58E-07	6.74E-02	5.28E-06	0.00E+00
Surfacing Equipment	3.33E-04	3.85E-02	3.78E-07	1.18E-05	0.00E+00	2.72E-06	3.38E-05	3.61E-04	8.66E-05	9.55E-04	1.08E-06	1.11E-01	7.81E-06	0.00E+00
Surfacing Equipment	1.30E-02	1.47E+00	1.47E-05	4.55E-04	0.00E+00	1.06E-04	5.37E-05	5.66E-04	1.39E-04	1.54E-03	1.74E-06	1.73E-01	1.25E-05	0.00E+00
Sweepers/Scrubbers	7.87E-06	2.23E-03	2.21E-08	1.77E-07	2.45E-07	5.66E-08	6.57E-06	2.78E-03	3.72E-05	2.92E-04	8.20E-07	8.25E-02	2.10E-06	9.09E-06
Sweepers/Scrubbers	8.28E-03	9.20E-01	1.04E-05	4.94E-04	0.00E+00	9.48E-05	3.73E-05	3.97E-04	7.93E-05	6.25E-04	7.81E-07	6.94E-02	7.15E-06	0.00E+00
Sweepers/Scrubbers	1.43E-03	1.72E-01	1.93E-06	4.42E-05	0.00E+00	1.14E-05	2.08E-05	1.72E-04	5.97E-05	6.74E-04	9.11E-07	8.09E-02	5.39E-06	0.00E+00
Tractors/Loaders/Backhoes	1.13E-02	1.27E+00	1.43E-05	6.68E-04	0.00E+00	1.29E-04	2.67E-05	2.94E-04	5.72E-05	4.50E-04	5.70E-07	5.06E-02	5.16E-06	0.00E+00
Tractors/Loaders/Backhoes	5.73E-03	6.94E-01	7.81E-06	1.89E-04	0.00E+00	4.89E-05	2.34E-05	1.94E-04	6.69E-05	7.08E-04	9.65E-07	8.58E-02	6.04E-06	0.00E+00
Tractors/Loaders/Backhoes	1.62E-02	2.25E+00	2.53E-05	5.73E-04	0.00E+00	1.47E-04	4.38E-05	4.02E-04	1.25E-04	1.24E-03	1.94E-06	1.72E-01	1.13E-05	0.00E+00
Tractors/Loaders/Backhoes	7.03E-01	9.41E+01	1.06E-03	2.44E-02	0.00E+00	6.22E-03	6.71E-05	6.03E-04	1.89E-04	1.93E-03	2.91E-06	2.58E-01	1.71E-05	0.00E+00
Trenchers	3.72E-03	3.12E-01	3.51E-06	2.08E-04	0.00E+00	4.23E-05	4.78E-05	4.38E-04	1.08E-04	8.57E-04	8.09E-07	7.19E-02	9.73E-06	0.00E+00
Trenchers	4.92E-04	4.34E-02	4.88E-07	1.98E-05	0.00E+00	4.59E-06	5.09E-05	3.86E-04	1.31E-04	1.26E-03	1.25E-06	1.11E-01	1.18E-05	0.00E+00
Trenchers	7.94E-04	7.72E-02	7.58E-07	3.15E-05	0.00E+00	7.34E-06	6.35E-05	7.49E-04	1.64E-04	1.60E-03	1.53E-06	1.56E-01	1.48E-05	0.00E+00
Trenchers	7.27E-03	6.93E-01	6.97E-06	2.86E-04	0.00E+00	6.66E-05	1.21E-04	1.41E-03	3.12E-04	3.08E-03	2.95E-06	2.93E-01	2.82E-05	0.00E+00
Welders	3.19E-04	3.16E-02	3.14E-07	2.52E-06	6.58E-06	2.43E-06	4.38E-06	1.78E-03	7.49E-05	5.57E-04	5.47E-07	5.50E-02	4.24E-06	1.15E-05
Welders	1.02E-04	1.04E-02	1.17E-07	5.55E-06	0.00E+00	1.09E-06	2.61E-05	2.70E-04	5.68E-05	4.78E-04	5.52E-07	4.91E-02	5.12E-06	0.00E+00
Welders	2.53E-05	2.81E-03	3.17E-08	7.79E-07	0.00E+00	1.88E-07	1.65E-05	1.34E-04	4.41E-05	5.36E-04	6.69E-07	5.95E-02	3.98E-06	0.00E+00
Welders	7.92E-05	9.90E-03	9.72E-08	2.55E-06	0.00E+00	5.95E-07	2.15E-05	2.05E-04	5.58E-05	6.70E-04	8.22E-07	8.37E-02	5.03E-06	0.00E+00
Generator Sets							1.32677E-05	0.00013761	5.02871E-05	0.000149893	1.97762E-07	0.015297744	4.53732E-06	0

TABLE D.3-7
EMFAC EMISSION FACTORS
(BALLAST)

Pollutant Name: Reactive Org Gases Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22.028	23.429	3.173	3.173	11.69	22.198
5	17.318	0.233	0.408	0.316	18.309	0.273	0.195	0.617	18.065	0.362	0.325	0.45	22.905	0.431	0.185	0.567	18.021	1.186	0.375	0.562	9.975	3.258
10	12.304	0.148	0.32	0.208	13.01	0.177	0.153	0.424	12.836	0.235	0.255	0.297	16.282	0.278	0.145	0.375	11.774	0.772	0.294	0.441	5.546	2.111
20	7.109	0.071	0.211	0.105	7.519	0.087	0.101	0.231	7.418	0.115	0.168	0.151	9.421	0.135	0.095	0.191	5.675	0.369	0.194	0.291	1.419	0.994
30	4.925	0.042	0.151	0.066	5.21	0.053	0.072	0.154	5.14	0.069	0.121	0.094	6.535	0.08	0.069	0.119	3.217	0.207	0.139	0.209	0.935	0.547
40	4.099	0.031	0.119	0.051	4.338	0.04	0.057	0.124	4.279	0.051	0.095	0.072	5.445	0.059	0.054	0.092	2.151	0.138	0.109	0.164	0.67	0.356
50	4.108	0.028	0.102	0.048	4.347	0.037	0.049	0.121	4.288	0.046	0.081	0.067	5.456	0.054	0.046	0.087	1.703	0.108	0.094	0.141	0.624	0.276
60	4.955	0.032	0.095	0.056	5.242	0.042	0.046	0.142	5.172	0.052	0.076	0.077	6.575	0.061	0.043	0.101	1.604	0.102	0.088	0.132	0.798	0.259
65	5.831	0.037	0.095	0.065	6.168	0.048	0.046	0.166	6.085	0.059	0.076	0.089	7.732	0.071	0.043	0.117	1.662	0.106	0.088	0.132	0.967	0.269

Pollutant Name: Carbon Monoxide Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136.515	141.648	26.3	26.3	47.206	137.138
5	147.349	3.199	2.677	3.9	150.522	4.577	2.128	7.265	147.759	5.029	2.639	5.729	271.514	5.068	2.078	6.678	323.587	11.401	2.847	7.309	16.231	40.104
10	107.398	2.839	1.846	3.347	109.711	3.953	1.467	5.864	107.697	4.417	1.819	4.922	197.898	4.409	1.433	5.575	215.286	7.585	1.963	5.04	11.702	26.682
20	66.637	2.301	1.006	2.612	68.072	3.1	0.8	4.233	66.823	3.528	0.992	3.836	122.789	3.494	0.781	4.21	112.389	3.96	1.07	2.747	6.254	13.929
30	50.855	1.922	0.658	2.159	51.95	2.559	0.523	3.405	50.997	2.927	0.648	3.16	93.709	2.898	0.511	3.442	73.11	2.576	0.7	1.796	4.55	9.061
40	47.737	1.65	0.516	1.873	48.765	2.209	0.41	3.013	47.87	2.512	0.508	2.732	87.962	2.501	0.4	3.013	59.262	2.088	0.549	1.408	3.438	7.345
50	55.115	1.458	0.485	1.718	56.302	2.005	0.386	2.967	55.268	2.235	0.478	2.493	101.558	2.256	0.377	2.853	59.858	2.109	0.516	1.325	2.918	7.419
60	78.268	1.338	0.548	1.711	79.954	1.952	0.435	3.378	78.486	2.084	0.54	2.458	144.222	2.17	0.425	3.028	75.337	2.654	0.583	1.495	2.991	9.337
65	100.799	1.309	0.623	1.792	102.969	2.005	0.495	3.874	101.079	2.063	0.614	2.549	185.738	2.209	0.484	3.319	91.787	3.234	0.663	1.701	3.249	11.376

Pollutant Name: Oxides of Nitrogen Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.436	1.533	75.051	75.051	112.434	1.448
5	3.508	0.308	2.219	0.327	3.521	0.402	2.238	0.559	3.467	0.708	2.146	0.724	5.796	0.789	2.249	0.824	1.801	0.52	5.758	11.196	35.694	2.858
10	3.688	0.266	1.841	0.286	3.702	0.345	1.857	0.49	3.645	0.605	1.781	0.622	6.095	0.676	1.866	0.712	1.893	0.547	4.777	9.289	24.721	3.003
20	4.062	0.212	1.41	0.232	4.077	0.273	1.421	0.407	4.014	0.473	1.364	0.492	6.711	0.531	1.429	0.572	2.075	0.6	3.658	7.112	15.246	3.293
30	4.448	0.182	1.244	0.204	4.465	0.235	1.254	0.371	4.396	0.403	1.203	0.424	7.351	0.455	1.261	0.499	2.258	0.652	3.228	6.276	13.921	3.583
40	4.846	0.168	1.266	0.193	4.864	0.22	1.276	0.365	4.789	0.373	1.224	0.396	8.007	0.423	1.282	0.472	2.44	0.705	3.283	6.384	13.184	3.873
50	5.25	0.168	1.484	0.194	5.27	0.222	1.496	0.387	5.189	0.375	1.435	0.4	8.676	0.426	1.503	0.48	2.623	0.758	3.849	7.484	13.034	4.163
60	5.658	0.18	2.005	0.21	5.679	0.244	2.021	0.443	5.591	0.411	1.939	0.439	9.349	0.467	2.031	0.526	2.806	0.811	5.201	10.113	13.471	4.452
65	5.862	0.192	2.458	0.224	5.884	0.264	2.478	0.489	5.793	0.445	2.377	0.474	9.686	0.505	2.491	0.567	2.897	0.837	6.376	12.398	13.91	4.597

Pollutant Name: Carbon Dioxide Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4776.9	4776.9	4098	4098	6617.135	4776.901
5	1313.986	949.64	358.513	950.427	1315.26	1184.957	346.459	1143.2	1316.204	1186.769	351.013	1185.937	1667.943	1624.53	346.459	1620.703	2513.51	2513.51	519.492	1505	3845.361	2513.51
10	992.919	717.6	358.513	718.341	993.882	895.418	346.459	868.334	994.595	896.788	351.013	896.31	1260.389	1227.583	346.459	1224.963	1672.267	1672.267	519.492	1505	3165.447	1672.267
20	633.91	458.138	358.513	458.828	634.525	571.663	346.459	560.985	634.98	572.537	351.013	572.455	804.671	783.727	346.459	782.455	873	873	519.492	1505	2183.16	873
30	469.639	339.417	358.513	340.083	470.095	423.523	346.459	420.353	470.432	424.17	351.013	424.27	596.15	580.633	346.459	579.978	567.895	567.895	519.492	1505	1924.234	567.895
40	403.761	291.805	358.513	292.462	404.152	364.113	346.459	363.954	404.443	364.67	351.013	364.842	512.525	499.185	346.459	498.777	460.326	460.326	519.492	1505	1753.407	460.326
50	402.817	291.123	358.513	291.779	403.207	363.262	346.459	363.146	403.497	363.817	351.013	363.99	511.326	498.017	346.459	497.613	464.953	464.953	519.492	1505	1670.679	464.953
60	466.351	337.04	358.513	337.706	466.803	420.557	346.459	417.538	467.139	421.201	351.013	421.304	591.976	576.568	346.459	575.925	585.19	585.19	519.492	1505	1676.049	585.19
65	530.579	383.458	358.513	384.133	531.093	478.478	346.459	472.523	531.474	479.21	351.013	479.242	673.505	655.975	346.459	655.09	712.968	712.968	519.492	1505	1711.772	712.968

TABLE D.3-7
EMFAC EMISSION FACTORS
(BALLAST)

Pollutant Name: Reactive Org Gases

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	3.173	12.357	0	0	0	0	0	0	0	0	22.028	22.864	3.173	5.622	0	0	0	0	0.201	0.638	7.569	1.048
5	0.658	2.01	0	6.399	0.818	1.757	5.483	4.058	0	4.867	27.082	7.578	0.909	1.821	27.082	1.621	0.258	2.053	11.748	0.362	5.84	0.838
10	0.517	1.35	0	4.187	0.593	1.198	4.31	2.981	0	3.735	17.711	4.951	0.714	1.294	17.711	1.051	0.203	1.338	8.537	0.236	3.292	0.526
20	0.34	0.687	0	2.029	0.347	0.63	3.054	1.883	0	2.548	8.562	2.387	0.47	0.734	8.562	0.496	0.134	0.64	5.199	0.116	0.905	0.229
30	0.244	0.408	0	1.16	0.233	0.389	2.604	1.474	0	2.115	4.874	1.354	0.338	0.479	4.874	0.275	0.096	0.36	3.84	0.071	0.602	0.152
40	0.192	0.283	0	0.783	0.18	0.282	2.679	1.436	0	2.141	3.272	0.906	0.265	0.355	3.272	0.181	0.075	0.239	3.452	0.054	0.436	0.121
50	0.165	0.228	0	0.624	0.16	0.238	3.324	1.74	0	2.639	2.6	0.718	0.227	0.296	2.6	0.141	0.065	0.188	3.783	0.05	0.402	0.12
60	0.154	0.214	0	0.589	0.164	0.236	4.958	2.608	0	3.941	2.451	0.676	0.213	0.278	2.451	0.133	0.06	0.177	5.05	0.06	0.498	0.15
65	0.154	0.219	0	0.609	0.175	0.248	6.481	3.45	0	5.17	2.538	0.701	0.213	0.281	2.538	0.138	0.06	0.183	6.277	0.071	0.593	0.182

Pollutant Name: Carbon Monoxide

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	26.3	79.808	0	0	0	0	0	0	0	0	136.515	139.578	26.3	40.396	0	0	0	0	1.247	3.862	34.65	5.671
5	7.932	25.275	0	29.208	7.094	10.817	39.773	15.962	0	29.473	485.38	74.488	11.727	21.248	485.38	34.369	3.416	41.352	104.508	4.635	11.251	6.327
10	5.469	16.915	0	19.433	4.465	6.985	32.62	14.003	0	24.567	322.929	49.558	8.086	14.385	322.929	22.866	2.356	27.52	77.493	3.929	8.04	5.129
20	2.981	8.895	0	10.145	2.118	3.469	25.626	11.543	0	19.534	168.584	25.872	4.407	7.672	168.584	11.937	1.284	14.372	50.311	3.023	4.307	3.713
30	1.949	5.791	0	6.599	1.277	2.173	24.762	10.365	0	18.534	109.665	16.83	2.881	5.003	109.665	7.765	0.839	9.35	40.776	2.475	3.075	3.008
40	1.528	4.668	0	5.349	0.978	1.714	29.43	10.311	0	21.16	88.893	13.642	2.26	3.989	88.893	6.294	0.658	7.577	41.269	2.128	2.338	2.648
50	1.438	4.66	0	5.403	0.953	1.702	43.022	11.9	0	29.56	89.786	13.779	2.126	3.892	89.786	6.358	0.619	7.648	52.172	1.926	2.021	2.584
60	1.623	5.769	0	6.8	1.181	2.127	77.356	17.063	0	51.275	113.005	17.342	2.399	4.657	113.005	8.002	0.699	9.618	82.39	1.876	2.111	2.935
65	1.846	6.96	0	8.285	1.438	2.591	112.1	22.604	0	73.387	137.68	21.129	2.729	5.504	137.68	9.749	0.795	11.713	112.539	1.933	2.317	3.39

Pollutant Name: Oxides of Nitrogen

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	75.051	39.517	0	0	0	0	0	0	0	0	1.436	1.494	75.051	65.889	0	0	0	0	0.013	0.042	86.287	5.203
5	14.062	8.652	0	1.793	14.545	12.398	1.089	1.305	0	1.183	2.702	2.132	20.836	18.509	2.702	1.091	12.467	2.239	2.342	0.497	23.732	1.911
10	11.666	7.483	0	1.884	11.125	9.57	1.142	1.223	0	1.177	2.839	2.24	17.287	15.415	2.839	1.146	10.343	2.083	2.461	0.433	16.909	1.445
20	8.933	6.209	0	2.066	7.563	6.637	1.249	1.122	0	1.194	3.113	2.456	13.236	11.896	3.113	1.256	7.92	1.949	2.705	0.351	10.851	1.01
30	7.883	5.806	0	2.248	6.279	5.6	1.36	1.086	0	1.242	3.387	2.672	11.681	10.562	3.387	1.367	6.989	1.962	2.958	0.309	9.834	0.914
40	8.018	6.016	0	2.429	6.368	5.705	1.472	1.102	0	1.312	3.661	2.888	11.881	10.764	3.661	1.478	7.109	2.077	3.217	0.293	9.451	0.879
50	9.4	6.871	0	2.611	7.887	6.999	1.586	1.166	0	1.404	3.935	3.104	13.929	12.584	3.935	1.588	8.334	2.3	3.48	0.297	9.716	0.902
60	12.701	8.718	0	2.793	11.932	10.393	1.698	1.286	0	1.52	4.208	3.32	18.821	16.894	4.208	1.699	11.261	2.689	3.744	0.323	10.808	0.995
65	15.572	10.272	0	2.884	15.819	13.642	1.754	1.372	0	1.589	4.345	3.428	23.074	20.631	4.345	1.754	13.806	2.99	3.875	0.346	11.795	1.077

Pollutant Name: Carbon Dioxide

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	4098	4425.763	0	0	0	0	0	0	0	0	4776.899	4776.899	4098	4182.559	0	0	0	0	43.648	130.385	4981.696	419.6
5	1505	1991.892	0	2513.51	2473.495	2480.231	227.849	273.047	0	247.4	2513.51	2513.51	1505	1630.612	2513.51	2513.51	1505	2414.894	786.453	1164.57	2568.864	1243.708
10	1505	1585.754	0	1672.267	2473.495	2338.615	194.934	226.334	0	208.516	1672.267	1672.267	1505	1525.833	1672.267	1672.267	1505	1655.911	601.589	872.282	2184.539	947.306
20	1505	1199.88	0	873	2473.495	2204.065	149.45	171.673	0	159.063	873	873	1505	1426.283	873	873	1505	934.8	393.23	550.323	1629.295	612.859
30	1505	1052.58	0	567.895	2473.495	2152.703	121.883	148.543	0	133.415	567.895	567.895	1505	1388.282	567.895	567.895	1505	659.528	295.584	405.109	1482.936	468.193
40	1505	1000.648	0	460.326	2473.495	2134.595	105.737	147.05	0	123.608	460.326	460.326	1505	1374.884	460.326	460.326	1505	562.479	254.045	347.427	1386.375	408.395
50	1505	1002.882	0	464.953	2473.495	2135.374	97.579	167.479	0	127.815	464.953	464.953	1505	1375.46	464.953	464.953	1505	566.653	249.394	346.928	1339.612	405.073
60	1505	1060.93	0	585.19	2473.495	2155.615	95.79	220.926	0	149.92	585.19	585.19	1505	1390.436	585.19	585.19	1505	675.132	280.637	403.42	1342.648	458.038
65	1505	1122.619	0	712.968	2473.495	2177.125	97.133	268.624	0	171.314	712.968	712.968	1505	1406.351	712.968	712.968	1505	790.416	314.012	460.707	1362.84	512.795

TABLE D.3-7
EMFAC EMISSION FACTORS
(BALLAST)

Pollutant Name: Sulfur Dioxide Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.049	0.049	0.039	0.039	0.063	0.049
5	0.015	0.009	0.003	0.009	0.015	0.011	0.003	0.011	0.015	0.011	0.003	0.011	0.021	0.016	0.003	0.016	0.03	0.024	0.005	0.014	0.037	0.025
10	0.012	0.007	0.003	0.007	0.012	0.009	0.003	0.008	0.012	0.009	0.003	0.009	0.016	0.012	0.003	0.012	0.02	0.016	0.005	0.014	0.03	0.017
20	0.007	0.004	0.003	0.004	0.007	0.006	0.003	0.005	0.007	0.006	0.003	0.006	0.01	0.008	0.003	0.008	0.01	0.008	0.005	0.014	0.021	0.009
30	0.005	0.003	0.003	0.003	0.005	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.007	0.006	0.003	0.006	0.007	0.005	0.005	0.014	0.018	0.006
40	0.005	0.003	0.003	0.003	0.005	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.006	0.005	0.003	0.005	0.005	0.004	0.005	0.014	0.017	0.005
50	0.005	0.003	0.003	0.003	0.005	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.007	0.005	0.003	0.005	0.005	0.004	0.005	0.014	0.016	0.005
60	0.006	0.003	0.003	0.003	0.006	0.004	0.003	0.004	0.006	0.004	0.003	0.004	0.008	0.006	0.003	0.006	0.007	0.006	0.005	0.014	0.016	0.006
65	0.007	0.004	0.003	0.004	0.007	0.005	0.003	0.005	0.007	0.005	0.003	0.005	0.01	0.006	0.003	0.006	0.008	0.007	0.005	0.014	0.016	0.007

Pollutant Name: PM10 Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.759	0.989	1.554	0
5	0.104	0.046	0.307	0.047	0.103	0.052	0.125	0.057	0.104	0.11	0.229	0.11	0.106	0.105	0.118	0.105	0.101	0.039	0.095	0.683	2.085	0.062
10	0.074	0.03	0.241	0.031	0.073	0.034	0.098	0.038	0.074	0.072	0.18	0.072	0.076	0.069	0.093	0.069	0.066	0.026	0.074	0.537	1.419	0.041
20	0.043	0.015	0.159	0.015	0.042	0.017	0.065	0.02	0.043	0.036	0.118	0.036	0.044	0.035	0.061	0.035	0.032	0.012	0.049	0.353	0.653	0.02
30	0.03	0.009	0.114	0.009	0.03	0.011	0.047	0.013	0.03	0.022	0.085	0.022	0.031	0.021	0.044	0.021	0.019	0.007	0.035	0.254	0.474	0.011
40	0.025	0.007	0.089	0.007	0.025	0.008	0.037	0.01	0.025	0.017	0.067	0.017	0.026	0.016	0.034	0.016	0.013	0.005	0.028	0.199	0.405	0.008
50	0.025	0.006	0.077	0.007	0.025	0.007	0.031	0.009	0.025	0.016	0.057	0.016	0.026	0.015	0.03	0.015	0.01	0.004	0.024	0.171	0.446	0.006
60	0.03	0.007	0.072	0.008	0.03	0.008	0.029	0.01	0.03	0.018	0.054	0.018	0.031	0.017	0.028	0.017	0.009	0.004	0.022	0.16	0.597	0.006
65	0.035	0.009	0.072	0.009	0.035	0.01	0.029	0.011	0.036	0.02	0.054	0.02	0.036	0.019	0.028	0.02	0.01	0.004	0.022	0.16	0.714	0.006

Pollutant Name: PM10 - Tire Wear Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
10	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
20	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
30	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
40	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
50	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
60	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012
65	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.036	0.012

Pollutant Name: PM10 - Brake Wear Temperature: 70F Relative Humidity: 20%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	MHD DSL	HHD DSL	OBUS CAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
10	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
20	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
30	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
40	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
50	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
60	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013
65	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.013

TABLE D.3-7
EMFAC EMISSION FACTORS
(BALLAST)

Pollutant Name: Sulfur Dioxide

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0.039	0.044	0	0	0	0	0	0	0	0	0.049	0.049	0.039	0.04	0	0	0	0	0	0.001	0.048	0.004
5	0.014	0.019	0	0.025	0.024	0.024	0.003	0.003	0	0.003	0.032	0.025	0.014	0.016	0.032	0.025	0.014	0.024	0.009	0.011	0.025	0.012
10	0.014	0.015	0	0.016	0.024	0.022	0.002	0.002	0	0.002	0.021	0.017	0.014	0.015	0.021	0.016	0.014	0.016	0.007	0.008	0.021	0.009
20	0.014	0.012	0	0.009	0.024	0.021	0.002	0.002	0	0.002	0.011	0.009	0.014	0.014	0.011	0.009	0.014	0.009	0.005	0.005	0.016	0.006
30	0.014	0.01	0	0.006	0.024	0.021	0.002	0.002	0	0.002	0.007	0.006	0.014	0.013	0.007	0.006	0.014	0.006	0.004	0.004	0.014	0.005
40	0.014	0.01	0	0.005	0.024	0.02	0.002	0.002	0	0.002	0.006	0.005	0.014	0.013	0.006	0.005	0.014	0.006	0.003	0.003	0.013	0.004
50	0.014	0.01	0	0.005	0.024	0.02	0.002	0.002	0	0.002	0.006	0.005	0.014	0.013	0.006	0.005	0.014	0.006	0.003	0.003	0.013	0.004
60	0.014	0.01	0	0.006	0.024	0.021	0.002	0.002	0	0.002	0.007	0.006	0.014	0.013	0.007	0.006	0.014	0.007	0.004	0.004	0.013	0.004
65	0.014	0.011	0	0.007	0.024	0.021	0.003	0.003	0	0.003	0.009	0.007	0.014	0.013	0.009	0.007	0.014	0.008	0.005	0.004	0.013	0.005

Pollutant Name: PM10

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	1.234	0.638	0	0	0	0	0	0	0	0	0	0	1.384	1.211	0	0	0	0	0	0	1.163	0.07
5	0.766	0.426	0	0.062	0.409	0.351	0.08	0.005	0	0.048	0.101	0.055	1.328	1.17	0.101	0.016	0.448	0.06	0.091	0.069	1.345	0.145
10	0.601	0.331	0	0.041	0.297	0.254	0.063	0.004	0	0.038	0.066	0.036	1.043	0.917	0.066	0.01	0.352	0.045	0.068	0.045	0.932	0.098
20	0.396	0.214	0	0.02	0.173	0.148	0.045	0.003	0	0.027	0.032	0.017	0.686	0.603	0.032	0.005	0.232	0.028	0.044	0.022	0.454	0.049
30	0.284	0.153	0	0.011	0.117	0.099	0.039	0.002	0	0.023	0.019	0.01	0.493	0.433	0.019	0.003	0.167	0.019	0.034	0.014	0.329	0.033
40	0.223	0.119	0	0.008	0.09	0.076	0.04	0.002	0	0.024	0.013	0.007	0.387	0.34	0.013	0.002	0.131	0.015	0.033	0.01	0.277	0.027
50	0.191	0.102	0	0.006	0.08	0.068	0.049	0.002	0	0.029	0.01	0.005	0.332	0.291	0.01	0.002	0.112	0.013	0.037	0.01	0.294	0.027
60	0.179	0.096	0	0.006	0.082	0.069	0.073	0.004	0	0.043	0.009	0.005	0.311	0.273	0.009	0.001	0.105	0.012	0.052	0.011	0.376	0.033
65	0.179	0.096	0	0.006	0.088	0.074	0.095	0.005	0	0.056	0.01	0.005	0.311	0.273	0.01	0.002	0.105	0.012	0.066	0.013	0.442	0.039

Pollutant Name: PM10 - Tire Wear

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
10	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
20	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
30	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
40	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
50	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
60	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009
65	0.012	0.012	0	0.012	0.008	0.009	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.025	0.009

Pollutant Name: PM10 - Brake Wear

Speed MPH	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
10	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
20	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
30	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
40	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
50	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
60	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013
65	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.009	0.013	0.021	0.013

TABLE D.3-7
EMFAC EMISSION FACTORS
(BALLAST)

For on-site activity (mean vehicle speed = 10 mph, Temperature: 70F, Relative Humidity: 20%)

	Emission Factors (g/mile)									
	PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Assumptions for CH_4 and N_2O from Reference sources TAB
LDA-ALL	0.0520	0.0362	3.3470	0.2080	0.2860	0.0070	718.3410	0.0158	0.0110	Passenger Cars - Gasoline - Model Year 2001
LHD1-DSL	0.0990	0.0767	1.9630	0.2940	4.7770	0.0050	519.4920	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
MHD-DSL								0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
HHD-DSL	1.4830	1.3265	11.7020	5.5460	24.7210	0.0300	3165.4470	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
OBUS-CAT	0.0660	0.0463	26.6820	2.1110	3.0030	0.0170	1672.2670			

For off-site activity (mean vehicle speed = 50 mph, Temperature: 70F, Relative Humidity: 20%)

	Emission Factors (g/mile)									
	PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Assumptions for CH_4 and N_2O from Reference sources TAB
LDA-ALL	0.0280	0.0140	1.7180	0.0480	0.1940	0.0030	291.7790	0.0158	0.0110	Passenger Cars - Gasoline - Model Year 2001
LHD1-DSL	0.0490	0.0307	0.5160	0.0940	3.8490	0.0050	519.4920	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
MHD-DSL	0.1960	0.1558	1.3250	0.1410	7.4840	0.0140	1505.0000	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
HHD-DSL	0.5100	0.4313	2.9180	0.6240	13.0340	0.0160	1670.6790	0.0048	0.0051	Diesel Heavy Duty Vehicles - All Years
OBUS-CAT	0.0310	0.0141	7.4190	0.2760	4.1630	0.0050	464.9530			

Note:

$PM_{2.5}$ emission factors determined using guidance from SCAQMD
Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds
10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions

On-road vehicles

- $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
- $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
- $PM_{2.5}$ Fraction of PM_{10}, Gasoline-catalyst: 0.928
- $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.250

TABLE D.3-8
GREENHOUSE GAS EMISSION FACTORS
(BALLAST)

Table C.4 Methane and Nitrous Oxide Emission Factors for Highway Vehicles by Model Year

Vehicle Types/Model Years	N_2O (g/mile)	CH_4 (g/mile)
Gasoline Passenger Cars		
Model Years 1984-1993	0.0647	0.0704
Model Year 1994	0.0560	0.0531
Model Year 1995	0.0473	0.0358
Model Year 1996	0.0426	0.0272
Model Year 1997	0.0422	0.0268
Model Year 1998	0.0393	0.0249
Model Year 1999	0.0337	0.0216
Model Year 2000	0.0273	0.0178
Model Year 2001	0.0158	0.0110
Model Year 2002	0.0153	0.0107
Model Year 2003	0.0135	0.0114
Model Year 2004	0.0083	0.0145
Model Year 2005 - Present	0.0079	0.0147
Gasoline Light Trucks (Vans, Pickup Trucks, SUVs)		
Model Years 1987-1993	0.1035	0.0813
Model Year 1994	0.0982	0.0646
Model Year 1995	0.0908	0.0517
Model Year 1996	0.0871	0.0452
Model Year 1997	0.0871	0.0452
Model Year 1998	0.0728	0.0391
Model Year 1999	0.0564	0.0321
Model Year 2000	0.0621	0.0346
Model Year 2001	0.0164	0.0151
Model Year 2002	0.0228	0.0178
Model Year 2003	0.0114	0.0155
Model Year 2004	0.0132	0.0152
Model Year 2005 - Present	0.0101	0.0157

TABLE D.3-8
GREENHOUSE GAS EMISSION FACTORS
(BALLAST)

Table C.4 Methane and Nitrous Oxide Emission Factors for Highway Vehicles by Model Year (continued)

Vehicle Types/Model Years	N_2O (g/mile)	CH_4 (g/mile)
Gasoline Heavy-Duty Vehicles		
Model Years 1985-1986	0.0515	0.4090
Model Year 1987	0.0849	0.3675
Model Years 1988-1989	0.0933	0.3492
Model Years 1990-1995	0.1142	0.3246
Model Year 1996	0.1680	0.1278
Model Year 1997	0.1726	0.0924
Model Year 1998	0.1693	0.0641
Model Year 1999	0.1435	0.0578
Model Year 2000	0.1092	0.0493
Model Year 2001	0.1235	0.0528
Model Year 2002	0.1307	0.0546
Model Year 2003	0.1240	0.0533
Model Year 2004	0.0285	0.0341
Model Year 2005 - Present	0.0177	0.0326
Diesel Passenger Cars		
Model Years 1960-1982	0.0012	0.0006
Model Years 1983 - Present	0.0010	0.0005
Diesel Light Trucks		
Model Years 1960-1982	0.0017	0.0011
Model Years 1983-1995	0.0014	0.0009
Model Years 1996 - Present	0.0015	0.0010
Diesel Heavy-Duty Vehicles		
All Model Years	0.0048	0.0051

Source: Gasoline vehicle factors from EPA Climate Leaders, Mobile Combustion Guidance, (2008) based on U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005 (2007). Diesel vehicle factors based on U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005 (2007), Annex 3.2, Table A-98.

TABLE D.3-8
GREENHOUSE GAS EMISSION FACTORS
(BALLAST)

Table C.6 Methane and Nitrous Oxide Emission Factors for Non-Highway Vehicles

Vehicle Type/Fuel Type	N_2O (g/gallon)	CH_4 (g/gallon)
Ships & Boats		
Residual Fuel Oil	0.30	0.86
Diesel Fuel	0.26	0.74
Gasoline	0.22	0.64
Locomotives		
Diesel Fuel	0.26	0.80
Agricultural Equipment		
Gasoline	0.22	1.26
Diesel Fuel	0.26	1.44
Construction		
Gasoline	0.22	0.50
Diesel Fuel	0.26	0.58
Other Non-Highway		
Snowmobiles (Gasoline)	0.22	0.50
Other Recreational (Gasoline)	0.22	0.50
Other Small Utility (Gasoline)	0.22	0.50
Other Large Utility (Gasoline)	0.22	0.50
Other Large Utility (Diesel)	0.26	0.58
Aircraft		
Jet Fuel	0.31	0.27
Aviation Gasoline	0.11	7.04
All Non-Highway/Construction Vehicles		
Butane*	0.41	0.09
Propane*	0.41	0.09

Source: U.S. EPA, Climate Leaders, Mobile Combustion Guidance (2008) based on U.S. EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005 (2007), Annex 3.2, Table A-101, except butane and propane.

* Butane and propane emission factors based on stationary combustion emission factors for these fuels from U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2000 (2002).

TABLE D.3-8
GREENHOUSE GAS EMISSION FACTORS
(BALLAST)

Table C.2 Carbon Dioxide, Methane and Nitrous Oxide Electricity Emission Factors by eGRID Subregion

eGRID Subregion Acronym	eGRID Subregion Name	CO_2 (lbs/MWh)	CH_4 (lbs/MWh)	N_2O (lbs/MWh)
AKGD	ASCC Alaska Grid	1,232.36	0.0256	0.0065
AKMS	ASCC Miscellaneous	498.86	0.0208	0.0041
AZNM	WECC Southwest	1,311.05	0.0175	0.0179
CAMX	WECC California	724.12	0.0302	0.0081
ERCT	ERCOT All	1,324.35	0.0187	0.0151
FRCC	FRCC All	1,318.57	0.0459	0.0169
HIMS	HICC Miscellaneous	1,514.92	0.3147	0.0469
HIOA	HICC Oahu	1,811.98	0.1095	0.0236
MROE	MRO East	1,834.72	0.0276	0.0304
MROW	MRO West	1,821.84	0.0280	0.0307
NEWE	NPCC New England	927.68	0.0865	0.0170
NWPP	WECC Northwest	902.24	0.0191	0.0149
NYCW	NPCC NYC/Westchester	815.45	0.0360	0.0055
NYLI	NPCC Long Island	1,536.80	0.1154	0.0181
NYUP	NPCC Upstate NY	720.80	0.0248	0.0112
RFCE	RFC East	1,139.07	0.0303	0.0187
RFCM	RFC Michigan	1,563.28	0.0339	0.0272
RFCW	RFC West	1,537.82	0.0182	0.0257
RMPA	WECC Rockies	1,883.08	0.0229	0.0288
SPNO	SPP North	1,960.94	0.0238	0.0321
SPSO	SPP South	1,658.14	0.0250	0.0226
SRMV	SERC Mississippi Valley	1,019.74	0.0243	0.0117
SRMW	SERC Midwest	1,830.51	0.0212	0.0305
SRSO	SERC South	1,489.54	0.0263	0.0255
SRTV	SERC Tennessee Valley	1,510.44	0.0201	0.0256
SRVC	SERC Virginia/Carolina	1,134.88	0.0238	0.0198

Source: eGRID2007 Version 1.1, December 2008 (Year 2005 data).
Note: Reporters calculating historical data for calendar years 1990-2007 should use the electricity emission factors in Appendix E.

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

construction schedule = 8 hours per day 7 am to 3:30 pm
delivery trucks can arrive at the site anytime during the day or night

				Emission factors (ton/hr)										Emission rate per piece of equipment (lb/hr)									
Equipment	Load Factor	Hours/Day	Horsepower	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																							
AC Paver	0.5	4	200	4.40E-05	4.05E-05	3.32E-04	1.15E-04	1.10E-03	1.09E-06	9.71E-02	1.03E-05	0.00E+00	9.73E-02	0.088	0.081	0.663	0.229	2.200	0.002	194.197	0.021	0.000	194.632
Backhoe (CAT-225)	0.5	4	135	2.67E-05	2.46E-05	2.94E-04	2.94E-04	4.50E-04	5.70E-07	5.06E-02	5.16E-06	0.00E+00	5.08E-02	0.053	0.049	0.587	0.587	0.900	0.001	101.296	0.010	0.000	101.513
Carry Lift, Pettibone	0.5	4	100	3.20E-05	2.94E-05	2.20E-04	5.66E-05	3.45E-04	3.66E-07	3.12E-02	5.10E-06	0.00E+00	3.13E-02	0.064	0.059	0.441	0.113	0.689	0.001	62.394	0.010	0.000	62.608
Case Backhoe/Front End Loader (580)	0.5	4	90	2.41E-05	2.22E-05	1.80E-04	5.72E-05	2.65E-04	3.03E-07	2.58E-02	3.79E-06	0.00E+00	2.59E-02	0.048	0.044	0.359	0.114	0.530	0.001	51.682	0.008	0.000	51.841
Compactor (Bomag BW211)	0.46	3.68	130	3.18E-05	2.92E-05	3.12E-04	7.02E-05	5.70E-04	6.08E-07	5.40E-02	6.33E-06	0.00E+00	5.42E-02	0.064	0.058	0.624	0.140	1.139	0.001	108.049	0.013	0.000	108.315
Conveyor Truck for Rock/Sand	0.5	4	250	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Crane (100T)	0.25	2	290	3.12E-05	2.87E-05	3.05E-04	8.61E-05	8.24E-04	8.83E-07	9.00E-02	7.77E-06	0.00E+00	9.01E-02	0.062	0.057	0.610	0.172	1.648	0.002	179.940	0.016	0.000	180.266
Crawler Trencher	0.48	3.84	155	4.78E-05	4.40E-05	4.38E-04	1.08E-04	8.57E-04	8.09E-07	7.19E-02	9.73E-06	0.00E+00	7.21E-02	0.096	0.088	0.875	0.216	1.715	0.002	143.769	0.019	0.000	144.177
Dozer (D-8)	0.5	4	300	5.07E-05	4.66E-05	5.46E-04	1.39E-04	1.27E-03	1.27E-06	1.29E-01	1.25E-05	0.00E+00	1.30E-01	0.101	0.093	1.092	0.277	2.549	0.003	258.997	0.025	0.000	259.522
Excavator, Cat 235	0.5	4	195	2.32E-05	2.14E-05	1.88E-04	6.86E-05	6.84E-04	8.92E-07	7.93E-02	6.19E-06	0.00E+00	7.94E-02	0.046	0.043	0.375	0.137	1.369	0.002	158.540	0.012	0.000	158.800
Forklift (10T)	0.1	0.8	100	1.47E-05	1.36E-05	1.10E-04	2.55E-05	1.57E-04	1.83E-07	1.56E-02	2.30E-06	0.00E+00	1.56E-02	0.029	0.027	0.219	0.051	0.313	0.000	31.197	0.005	0.000	31.293
Grade All	0.5	4	100	4.03E-05	3.71E-05	2.70E-04	7.29E-05	4.38E-04	4.39E-07	3.74E-02	6.58E-06	0.00E+00	3.76E-02	0.081	0.074	0.541	0.146	0.877	0.001	74.898	0.013	0.000	75.174
Grader (CAT-12)	0.5	4	135	3.75E-05	3.45E-05	3.69E-04	8.29E-05	6.39E-04	6.97E-07	6.19E-02	7.48E-06	0.00E+00	6.21E-02	0.075	0.069	0.738	0.166	1.277	0.001	123.810	0.015	0.000	124.125
High Reach Bucket Truck	0.37	2.96	220	2.47E-05	2.27E-05	2.47E-04	6.18E-05	8.19E-04	1.04E-06	1.06E-01	5.58E-06	0.00E+00	1.06E-01	0.049	0.045	0.495	0.124	1.639	0.002	212.665	0.011	0.000	212.899
Hydraulic Auger Drill	0.5	4	200	1.60E-05	1.47E-05	1.72E-04	4.44E-05	5.04E-04	1.06E-06	9.40E-02	4.01E-06	0.00E+00	9.41E-02	0.032	0.029	0.344	0.089	1.008	0.002	187.933	0.008	0.000	188.101
Hydraulic Mobile Crane (15T)	0.5	4	130	2.58E-05	2.38E-05	2.43E-04	5.77E-05	4.40E-04	4.52E-07	4.01E-02	5.21E-06	0.00E+00	4.02E-02	0.052	0.048	0.485	0.115	0.880	0.001	80.272	0.010	0.000	80.491
Hydraulic Mobile Crane (35T)	0.5	4	175	2.58E-05	2.38E-05	2.43E-04	5.77E-05	4.40E-04	4.52E-07	4.01E-02	5.21E-06	0.00E+00	4.02E-02	0.052	0.048	0.485	0.115	0.880	0.001	80.272	0.010	0.000	80.491
Line Truck	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Manlift (Scissors)	0.5	4	30	8.21E-06	7.56E-06	8.81E-05	3.09E-05	9.49E-05	1.27E-07	9.80E-03	2.79E-06	0.00E+00	9.86E-03	0.016	0.015	0.176	0.062	0.190	0.000	19.595	0.006	0.000	19.712
Plate Compactor	0.05	0.4	5	6.53E-07	6.01E-07	1.32E-05	2.51E-06	1.57E-05	3.35E-08	2.15E-03	2.27E-07	0.00E+00	2.16E-03	0.001	0.001	0.026	0.005	0.031	0.000	4.310	0.000	0.000	4.319
Pressure Digger (Truck Mounted)	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Scraper, Cat 621B	0.5	4	330	6.39E-05	5.88E-05	6.95E-04	1.74E-04	1.60E-03	1.58E-06	1.61E-01	1.57E-05	0.00E+00	1.61E-01	0.128	0.118	1.390	0.347	3.209	0.003	321.140	0.031	0.000	321.798
Truck (1 ton) Conductor Reel Trailer	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Truck (1 ton), Maintenance	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Truck Tractor	0.5	4	250	3.42E-05	3.15E-05	2.54E-04	8.94E-05	8.07E-04	7.33E-07	6.52E-02	8.07E-06	0.00E+00	6.53E-02	0.068	0.063	0.507	0.179	1.614	0.001	130.300	0.016	0.000	130.639
Truck (1 ton) Trailer	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Truck (1 ton) Wire Puller/Tensioner	0.5	4	220	2.57E-05	2.37E-05	2.05E-04	7.75E-05	7.41E-04	9.36E-07	8.32E-02	6.99E-06	0.00E+00	8.33E-02	0.051	0.047	0.409	0.155	1.483	0.002	166.396	0.014	0.000	166.689
Vibrating Hammer & Generator	0.5	4	51	3.15E-05	2.90E-05	2.46E-04	5.87E-05	4.05E-04	4.57E-07	3.89E-02	5.29E-06	0.00E+00	3.91E-02	0.063	0.058	0.491	0.117	0.809	0.001	77.879	0.011	0.000	78.102
Welding Machine	0.5	4	50	1.25E-05	1.15E-05	1.37E-04	5.08E-05	1.30E-04	1.68E-07	1.30E-02	4.58E-06	0.00E+00	1.31E-02	0.025	0.023	0.275	0.102	0.261	0.000	25.935	0.009	0.000	26.127
Wheel Loader (CAT 950)	0.5	4	130	3.18E-05	2.93E-05	3.15E-04	7.01E-05	5.43E-04	5.98E-07	5.31E-02	6.32E-06	0.00E+00	5.32E-02	0.064	0.059	0.630	0.140	1.086	0.001	106.220	0.013	0.000	106.485
Hogger	0.25	2	175	4.89E-05	4.50E-05	4.23E-04	1.12E-04	8.44E-04	7.33E-07	6.52E-02	1.01E-05	0.00E+00	6.54E-02	0.098	0.090	0.847	0.224	1.688	0.001	130.300	0.020	0.000	130.724
Vehicles with Onroad Engines for Emissions Estimates	Onsite Miles per Day Travelled per Vehicle			Emission factors (g/mile)																			
Concrete Truck	1.2	8	250	1.483	1.326492	11.702	5.546	24.721	0.03	3165.447	0.0048	0.0051	3.17E+03	0.000	0.000	0.004	0.002	0.008	0.000	1.046	0.000	0.000	1.046
Concrete Pump Truck	6	8	250	1.483	1.326492	11.702	5.546	24.721	0.03	3165.447	0.0048	0.0051	3.17E+03	0.002	0.002	0.019	0.009	0.041	0.000	5.229	0.000	0.000	5.232
Dump Truck (15cy)	6	8	275	1.483	1.326492	11.702	5.546	24.721	0.03	3165.447	0.0048	0.0051	3.17E+03	0.002	0.002	0.019	0.009	0.041	0.000	5.229	0.000	0.000	5.232
Flatbed - Stake Body Truck	12	8	220	0.099	0.076657	1.963	0.294	4.777	0.005	519.492	0.0048	0.0051	5.21E+02	0.000	0.000	0.006	0.001	0.016	0.000	1.716	0.000	0.000	1.722
Fuel Truck	12	8	220	1.483	1.326492	11.702	5.546	24.721	0.03	3165.447	0.0048	0.0051	3.17E+03	0.005	0.004	0.039	0.018	0.082	0.000	10.459	0.000	0.000	10.464
Pick Up Truck	12	8	150	0.099	0.076657	1.963	0.294	4.777	0.005	519.492	0.0048	0.0051	5.21E+02	0.000	0.000	0.006	0.001	0.016	0.000	1.716	0.000	0.000	1.722
Water Truck, 4000 gal	120	8	220	1.483	1.326492	11.702	5.546	24.721	0.03	3165.447	0.0048	0.0051	3.17E+03	0.049	0.044	0.387	0.183	0.817	0.001	104.585	0.000	0.000	104.641
																						Total	

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 1 Daily Emissions (lb/day)											Month 2 Daily Emissions (lb/day)										
Equipment	Quantity Mo 1	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 2	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.13	0.12	1.38	0.36	4.03	0.01	751.73	0.03	0.00	752.40
Hydraulic Mobile Crane (15T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.50	0.46	3.93	0.94	6.47	0.01	623.04	0.08	0.00	624.81
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	1	0.25	0.23	2.52	0.56	4.34	0.00	424.88	0.05	0.00	425.94	2	0.51	0.47	5.04	1.12	8.68	0.01	849.76	0.10	0.00	851.88
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	3	0.06	0.05	0.46	0.22	0.98	0.00	125.50	0.00	0.00	125.57	3	0.06	0.05	0.46	0.22	0.98	0.00	125.50	0.00	0.00	125.57
Flatbed - Stake Body Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Pick Up Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.00	0.00	0.05	0.01	0.13	0.00	13.73	0.00	0.00	13.78
Water Truck, 4000 gal	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25
	7	**1**	**1**	**12**	**3**	**26**	**0**	**2716**	**0**	**0**	**2721**	**23**	**5**	**4**	**40**	**12**	**85**	**0**	**9280**	**1**	**0**	**9297**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 3 Daily Emissions (lb/day)											Month 4 Daily Emissions (lb/day)										
Equipment	Quantity Mo 3	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 4	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.26	0.24	1.76	0.45	2.76	0.00	249.58	0.04	0.00	250.43
Case Backhoe/Front End Loader (580)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.47	0.43	4.59	1.03	8.38	0.01	795.24	0.09	0.00	797.20
Conveyor Truck for Rock/Sand	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93
Hydraulic Mobile Crane (35T)	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5	0.33	0.30	3.53	1.24	3.80	0.01	391.90	0.11	0.00	394.25
Plate Compactor	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	2	0.50	0.46	3.93	0.94	6.47	0.01	623.04	0.08	0.00	624.81	2	0.50	0.46	3.93	0.94	6.47	0.01	623.04	0.08	0.00	624.81
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	1	0.25	0.23	2.52	0.56	4.34	0.00	424.88	0.05	0.00	425.94	2	0.51	0.47	5.04	1.12	8.68	0.01	849.76	0.10	0.00	851.88
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	3	0.06	0.05	0.46	0.22	0.98	0.00	125.50	0.00	0.00	125.57	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55
Fuel Truck	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Pick Up Truck	1	0.00	0.00	0.05	0.01	0.13	0.00	13.73	0.00	0.00	13.78	3	0.01	0.01	0.16	0.02	0.38	0.00	41.19	0.00	0.00	41.33
Water Truck, 4000 gal	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13
	23	**3**	**3**	**28**	**8**	**59**	**0**	**6056**	**1**	**0**	**6069**	**34**	**5**	**5**	**47**	**15**	**92**	**0**	**9382**	**1**	**0**	**9404**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 5 Daily Emissions (lb/day)											Month 6 Daily Emissions (lb/day)										
Equipment	**Quantity Mo 5**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 6**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05
Carry Lift, Pettibone	1	0.26	0.24	1.76	0.45	2.76	0.00	249.58	0.04	0.00	250.43	1	0.26	0.24	1.76	0.45	2.76	0.00	249.58	0.04	0.00	250.43
Case Backhoe/Front End Loader (580)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor (Bomag BW211)	2	0.47	0.43	4.59	1.03	8.38	0.01	795.24	0.09	0.00	797.20	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96
Hydraulic Mobile Crane (35T)	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	5	0.33	0.30	3.53	1.24	3.80	0.01	391.90	0.11	0.00	394.25	6	0.39	0.36	4.23	1.48	4.56	0.01	470.28	0.13	0.00	473.09
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.27	0.25	2.03	0.72	6.46	0.01	521.20	0.06	0.00	522.56
Truck (1 ton) Trailer	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	2	0.50	0.46	3.93	0.94	6.47	0.01	623.04	0.08	0.00	624.81	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02
Wheel Loader (CAT 950)	1	0.25	0.23	2.52	0.56	4.34	0.00	424.88	0.05	0.00	425.94	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	1	0.00	0.00	0.03	0.01	0.07	0.00	8.37	0.00	0.00	8.37	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Dump Truck (15cy)	2	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55
Fuel Truck	1	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55	2	0.01	0.00	0.10	0.02	0.25	0.00	27.46	0.00	0.00	27.55
Water Truck, 4000 gal	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	33	**5**	**4**	**43**	**14**	**80**	**0**	**8213**	**1**	**0**	**8233**	**27**	**3**	**3**	**27**	**10**	**51**	**0**	**5004**	**1**	**0**	**5019**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 7 Daily Emissions (lb/day)											Month 8 Daily Emissions (lb/day)										
Equipment	Quantity Mo 7	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 8	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	1	0.35	0.32	2.65	0.92	8.80	0.01	776.79	0.08	0.00	778.53	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05
Carry Lift, Pettibone	1	0.26	0.24	1.76	0.45	2.76	0.00	249.58	0.04	0.00	250.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	2	0.25	0.23	2.44	0.69	6.59	0.01	719.76	0.06	0.00	721.06	3	0.37	0.34	3.66	1.03	9.89	0.01	1079.64	0.09	0.00	1081.59
Crawler Trencher	1	0.37	0.34	3.36	0.83	6.58	0.01	552.07	0.07	0.00	553.64	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	2	0.05	0.04	0.35	0.08	0.50	0.00	49.92	0.01	0.00	50.07	2	0.05	0.04	0.35	0.08	0.50	0.00	49.92	0.01	0.00	50.07
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	1	0.15	0.13	1.46	0.37	4.85	0.01	629.49	0.03	0.00	630.18	1	0.15	0.13	1.46	0.37	4.85	0.01	629.49	0.03	0.00	630.18
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96	3	0.62	0.57	5.83	1.38	10.56	0.01	963.27	0.12	0.00	965.89
Hydraulic Mobile Crane (35T)	1	0.21	0.19	1.94	0.46	3.52	0.00	321.09	0.04	0.00	321.96	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	3	0.62	0.57	4.91	1.86	17.79	0.02	1996.75	0.17	0.00	2000.27	3	0.62	0.57	4.91	1.86	17.79	0.02	1996.75	0.17	0.00	2000.27
Manlift (Scissors)	6	0.39	0.36	4.23	1.48	4.56	0.01	470.28	0.13	0.00	473.09	1	0.07	0.06	0.71	0.25	0.76	0.00	78.38	0.02	0.00	78.85
Plate Compactor	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73
Pressure Digger (Truck Mounted)	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	2	0.55	0.50	4.06	1.43	12.91	0.01	1042.40	0.13	0.00	1045.11	2	0.55	0.50	4.06	1.43	12.91	0.01	1042.40	0.13	0.00	1045.11
Truck (1 ton) Trailer	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	4	0.02	0.01	0.12	0.06	0.26	0.00	33.47	0.00	0.00	33.49	5	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	2	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71
Flatbed - Stake Body Truck	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88
Water Truck, 4000 gal	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25
	46	**6**	**5**	**47**	**17**	**111**	**0**	**11389**	**1**	**0**	**11415**	**56**	**7**	**7**	**62**	**21**	**146**	**0**	**15097**	**1**	**0**	**15128**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 9 Daily Emissions (lb/day)											Month 10 Daily Emissions (lb/day)										
Equipment	**Quantity Mo 9**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 10**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05	1	0.21	0.20	2.35	2.35	3.60	0.00	405.18	0.04	0.00	406.05
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73
Compactor (Bomag BW211)	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	3	0.37	0.34	3.66	1.03	9.89	0.01	1079.64	0.09	0.00	1081.59	3	0.37	0.34	3.66	1.03	9.89	0.01	1079.64	0.09	0.00	1081.59
Crawler Trencher	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28	1	0.37	0.34	3.36	0.83	6.58	0.01	552.07	0.07	0.00	553.64
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	2	0.05	0.04	0.35	0.08	0.50	0.00	49.92	0.01	0.00	50.07	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03
Grade All	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	2	0.29	0.27	2.93	0.73	9.70	0.01	1258.98	0.07	0.00	1260.36	3	0.44	0.40	4.39	1.10	14.55	0.02	1888.46	0.10	0.00	1890.54
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	3	0.62	0.57	5.83	1.38	10.56	0.01	963.27	0.12	0.00	965.89	3	0.62	0.57	5.83	1.38	10.56	0.01	963.27	0.12	0.00	965.89
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51	2	0.41	0.38	3.27	1.24	11.86	0.01	1331.17	0.11	0.00	1333.51
Manlift (Scissors)	1	0.07	0.06	0.71	0.25	0.76	0.00	78.38	0.02	0.00	78.85	1	0.07	0.06	0.71	0.25	0.76	0.00	78.38	0.02	0.00	78.85
Plate Compactor	1	0.00	0.00	0.01	0.00	0.01	0.00	1.72	0.00	0.00	1.73	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	2	0.55	0.50	4.06	1.43	12.91	0.01	1042.40	0.13	0.00	1045.11	2	0.55	0.50	4.06	1.43	12.91	0.01	1042.40	0.13	0.00	1045.11
Truck (1 ton) Trailer	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Truck (1 ton) Wire Puller/Tensioner	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	1	0.00	0.00	0.03	0.01	0.07	0.00	8.37	0.00	0.00	8.37	1	0.00	0.00	0.03	0.01	0.07	0.00	8.37	0.00	0.00	8.37
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	2	0.04	0.04	0.31	0.15	0.65	0.00	83.67	0.00	0.00	83.71	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88
Water Truck, 4000 gal	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13
	51	**7**	**6**	**59**	**20**	**141**	**0**	**14595**	**1**	**0**	**14626**	**47**	**6**	**6**	**55**	**18**	**132**	**0**	**13939**	**1**	**0**	**13967**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 11 Daily Emissions (lb/day)											Month 12 Daily Emissions (lb/day)										
Equipment	**Quantity Mo 11**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 12**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	1	0.12	0.11	1.22	0.34	3.30	0.00	359.88	0.03	0.00	360.53	1	0.12	0.11	1.22	0.34	3.30	0.00	359.88	0.03	0.00	360.53
Crawler Trencher	1	0.37	0.34	3.36	0.83	6.58	0.01	552.07	0.07	0.00	553.64	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03
Grade All	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	1	0.15	0.13	1.46	0.37	4.85	0.01	629.49	0.03	0.00	630.18	1	0.15	0.13	1.46	0.37	4.85	0.01	629.49	0.03	0.00	630.18
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	3	0.62	0.57	5.83	1.38	10.56	0.01	963.27	0.12	0.00	965.89	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	1	0.07	0.06	0.71	0.25	0.76	0.00	78.38	0.02	0.00	78.85	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	1	0.27	0.25	2.03	0.72	6.46	0.01	521.20	0.06	0.00	522.56	1	0.27	0.25	2.03	0.72	6.46	0.01	521.20	0.06	0.00	522.56
Truck (1 ton) Trailer	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	1	0.00	0.00	0.03	0.01	0.07	0.00	8.37	0.00	0.00	8.37	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43
Flatbed - Stake Body Truck	7	0.02	0.01	0.36	0.05	0.88	0.00	96.12	0.00	0.00	96.43	12	0.03	0.02	0.62	0.09	1.52	0.00	164.77	0.00	0.00	165.31
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	26	0.07	0.05	1.35	0.20	3.28	0.00	357.01	0.00	0.00	358.16	26	0.07	0.05	1.35	0.20	3.28	0.00	357.01	0.00	0.00	358.16
Water Truck, 4000 gal	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38
	50	**3**	**3**	**28**	**9**	**59**	**0**	**6014**	**1**	**0**	**6028**	**71**	**7**	**6**	**58**	**18**	**120**	**0**	**12263**	**1**	**0**	**12289**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 13 Daily Emissions (lb/day)											Month 14 Daily Emissions (lb/day)										
Equipment	**Quantity Mo 13**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 14**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	1	0.02	0.02	0.18	0.04	0.25	0.00	24.96	0.00	0.00	25.03	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	1	0.21	0.19	1.64	0.62	5.93	0.01	665.58	0.06	0.00	666.76	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	2	0.20	0.18	2.20	0.81	2.09	0.00	207.48	0.07	0.00	209.02	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	4	0.08	0.07	0.62	0.29	1.31	0.00	167.34	0.00	0.00	167.43	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	12	0.03	0.02	0.62	0.09	1.52	0.00	164.77	0.00	0.00	165.31	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	26	0.07	0.05	1.35	0.20	3.28	0.00	357.01	0.00	0.00	358.16	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25
	67	**6**	**5**	**52**	**16**	**102**	**0**	**10492**	**1**	**0**	**10514**	**55**	**5**	**5**	**44**	**13**	**86**	**0**	**8576**	**1**	**0**	**8596**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 15 Daily Emissions (lb/day)											Month 16 Daily Emissions (lb/day)										
Equipment	**Quantity Mo 15**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 16**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38
	93	**7**	**7**	**62**	**18**	**121**	**0**	**11988**	**1**	**0**	**12015**	**92**	**7**	**6**	**61**	**18**	**117**	**0**	**11727**	**1**	**0**	**11754**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 17 Daily Emissions (lb/day)											Month 18 Daily Emissions (lb/day)										
Equipment	**Quantity Mo 17**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 18**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	72	0.19	0.15	3.74	0.56	9.09	0.01	988.64	0.01	0.01	991.84	72	0.19	0.15	3.74	0.56	9.09	0.01	988.64	0.01	0.01	991.84
Water Truck, 4000 gal	4	1.57	1.40	12.37	5.86	26.14	0.03	3346.73	0.01	0.01	3348.51	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38
	117	**7**	**7**	**65**	**19**	**127**	**0**	**12893**	**1**	**0**	**12921**	**116**	**7**	**6**	**62**	**18**	**120**	**0**	**12056**	**1**	**0**	**12084**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Highest activity occurs in month __.

	Month 19 Daily Emissions (lb/day)											Month 20 Daily Emissions (lb/day)										
Equipment	**Quantity Mo 19**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 20**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25
	79	**5**	**5**	**45**	**13**	**89**	**0**	**8906**	**1**	**0**	**8926**	**74**	**4**	**4**	**34**	**10**	**63**	**0**	**6301**	**1**	**0**	**6316**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

	Month 21 Daily Emissions (lb/day)											Month 22 Daily Emissions (lb/day)										
Diesel Construction Equipment	Quantity Mo 21	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 22	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38
TOTALS	**74**	**4**	**4**	**34**	**10**	**63**	**0**	**6301**	**1**	**0**	**6316**	**57**	**6**	**5**	**49**	**15**	**95**	**0**	**9674**	**1**	**0**	**9694**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

	Month 23 Daily Emissions (lb/day)											Month 24 Daily Emissions (lb/day)										
Diesel Construction Equipment	Quantity Mo 23	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 24	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25
TOTALS	**55**	**5**	**5**	**44**	**13**	**86**	**0**	**8576**	**1**	**0**	**8596**	**55**	**5**	**5**	**44**	**13**	**86**	**0**	**8576**	**1**	**0**	**8596**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

	Month 25 Daily Emissions (lb/day)											Month 26 Daily Emissions (lb/day)										
Diesel Construction Equipment	Quantity Mo 25	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 26	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25	4	1.57	1.40	12.37	5.86	26.14	0.03	3346.73	0.01	0.01	3348.51
TOTALS	**74**	**4**	**4**	**34**	**10**	**63**	**0**	**6301**	**1**	**0**	**6316**	**94**	**8**	**7**	**66**	**20**	**127**	**0**	**12824**	**1**	**0**	**12852**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

	Month 27 Daily Emissions (lb/day)											Month 28 Daily Emissions (lb/day)										
Diesel Construction Equipment	Quantity Mo 27	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 28	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25
TOTALS	**92**	**7**	**6**	**61**	**18**	**117**	**0**	**11727**	**1**	**0**	**11754**	**91**	**7**	**6**	**58**	**16**	**111**	**0**	**10890**	**1**	**0**	**10916**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

	Month 29 Daily Emissions (lb/day)											Month 30 Daily Emissions (lb/day)										
Diesel Construction Equipment	Quantity Mo 29	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 30	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18
Compactor (Bomag BW211)	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	1	0.20	0.18	1.69	0.45	3.38	0.00	260.60	0.04	0.00	261.45	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86
Flatbed - Stake Body Truck	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38
TOTALS	**93**	**7**	**7**	**62**	**18**	**121**	**0**	**11988**	**1**	**0**	**12015**	**92**	**7**	**6**	**61**	**18**	**117**	**0**	**11727**	**1**	**0**	**11754**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

	Month 31 Daily Emissions (lb/day)											Month 32 Daily Emissions (lb/day)										
Diesel Construction Equipment	Quantity Mo 31	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 32	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	6	1.16	1.06	8.62	2.75	12.73	0.01	1240.36	0.18	0.00	1244.18	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	1	0.23	0.21	2.30	0.52	4.19	0.00	397.62	0.05	0.00	398.60	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	3	1.10	1.01	10.08	2.49	19.75	0.02	1656.22	0.22	0.00	1660.92	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28
Dozer (D-8)	1	0.41	0.37	4.37	1.11	10.20	0.01	1035.99	0.10	0.00	1038.09	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	1	0.19	0.17	1.50	0.55	5.47	0.01	634.16	0.05	0.00	635.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	3	0.97	0.89	6.49	1.75	10.52	0.01	898.77	0.16	0.00	902.09	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	1	0.30	0.28	2.95	0.66	5.11	0.01	495.24	0.06	0.00	496.50	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	6	1.24	1.14	11.65	2.77	21.11	0.02	1926.54	0.25	0.00	1931.79	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	3	0.01	0.01	0.09	0.04	0.20	0.00	25.10	0.00	0.00	25.11	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	1	0.02	0.02	0.15	0.07	0.33	0.00	41.83	0.00	0.00	41.86	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	15	0.04	0.03	0.78	0.12	1.89	0.00	205.97	0.00	0.00	206.63	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25
TOTALS	**92**	**7**	**6**	**61**	**18**	**117**	**0**	**11727**	**1**	**0**	**11754**	**74**	**4**	**4**	**34**	**10**	**63**	**0**	**6301**	**1**	**0**	**6316**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

	Month 33 Daily Emissions (lb/day)											Month 34 Daily Emissions (lb/day)										
Diesel Construction Equipment	Quantity Mo 33	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 34	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22
Water Truck, 4000 gal	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25	3	1.18	1.05	9.28	4.40	19.60	0.02	2510.05	0.00	0.00	2511.38
TOTALS	**74**	**4**	**4**	**34**	**10**	**63**	**0**	**6301**	**1**	**0**	**6316**	**75**	**4**	**4**	**37**	**11**	**70**	**0**	**7138**	**1**	**0**	**7153**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

	Month 35 Daily Emissions (lb/day)											Month 36 Daily Emissions (lb/day)										
Diesel Construction Equipment	Quantity Mo 35	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 36	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	4	0.77	0.71	5.75	1.83	8.49	0.01	826.91	0.12	0.00	829.45	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	2	0.73	0.68	6.72	1.66	13.17	0.01	1104.14	0.15	0.00	1107.28	1	0.37	0.34	3.36	0.83	6.58	0.01	552.07	0.07	0.00	553.64
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	2	0.65	0.59	4.33	1.17	7.01	0.01	599.18	0.11	0.00	601.39	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	4	0.83	0.76	7.77	1.85	14.07	0.01	1284.36	0.17	0.00	1287.86	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	2	0.01	0.01	0.06	0.03	0.13	0.00	16.73	0.00	0.00	16.74	1	0.00	0.00	0.03	0.01	0.07	0.00	8.37	0.00	0.00	8.37
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	10	0.03	0.02	0.52	0.08	1.26	0.00	137.31	0.00	0.00	137.76	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	48	0.13	0.10	2.49	0.37	6.06	0.01	659.09	0.01	0.01	661.22	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	2	0.78	0.70	6.19	2.93	13.07	0.02	1673.36	0.00	0.00	1674.25	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13
TOTALS	**74**	**4**	**4**	**34**	**10**	**63**	**0**	**6301**	**1**	**0**	**6316**	**37**	**2**	**2**	**17**	**5**	**32**	**0**	**3151**	**0**	**0**	**3158**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

	Month 37 Daily Emissions (lb/day)											Month 38 Daily Emissions (lb/day)										
Diesel Construction Equipment	Quantity Mo 37	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 38	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73	2	0.39	0.35	2.87	0.92	4.24	0.00	413.45	0.06	0.00	414.73
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	1	0.37	0.34	3.36	0.83	6.58	0.01	552.07	0.07	0.00	553.64	1	0.37	0.34	3.36	0.83	6.58	0.01	552.07	0.07	0.00	553.64
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70	1	0.32	0.30	2.16	0.58	3.51	0.00	299.59	0.05	0.00	300.70
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93	2	0.41	0.38	3.88	0.92	7.04	0.01	642.18	0.08	0.00	643.93
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates																						
Concrete Truck	1	0.00	0.00	0.03	0.01	0.07	0.00	8.37	0.00	0.00	8.37	1	0.00	0.00	0.03	0.01	0.07	0.00	8.37	0.00	0.00	8.37
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88	5	0.01	0.01	0.26	0.04	0.63	0.00	68.66	0.00	0.00	68.88
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61	24	0.06	0.05	1.25	0.19	3.03	0.00	329.55	0.00	0.00	330.61
Water Truck, 4000 gal	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13	1	0.39	0.35	3.09	1.47	6.53	0.01	836.68	0.00	0.00	837.13
TOTALS	**37**	**2**	**2**	**17**	**5**	**32**	**0**	**3151**	**0**	**0**	**3158**	**37**	**2**	**2**	**17**	**5**	**32**	**0**	**3151**	**0**	**0**	**3158**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

		Month 39 Daily Emissions (lb/day)									
Diesel Construction Equipment	Quantity Mo 39	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
AC Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe (CAT-225)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carry Lift, Pettibone	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Case Backhoe/Front End Loader (580)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor (Bomag BW211)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conveyor Truck for Rock/Sand	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane (100T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Trencher	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer (D-8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator, Cat 235	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift (10T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade All	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader (CAT-12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Reach Bucket Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Auger Drill	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (15T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Mobile Crane (35T)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlift (Scissors)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pressure Digger (Truck Mounted)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper, Cat 621B	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Conductor Reel Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton), Maintenance	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Trailer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck (1 ton) Wire Puller/Tensioner	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vibrating Hammer & Generator	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheel Loader (CAT 950)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hogger	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates											
Concrete Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck (15cy)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed - Stake Body Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pick Up Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck, 4000 gal	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

Monthly Comparison of Construction Equipment Emissions:

	Daily Emissions (lb/day)										
Month of Contruction	**Total Equipment Quantity**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	7	1.21	1.11	11.81	3.10	26.10	0.03	2715.77	0.26	0.000	2721.3
2	23	4.51	4.12	39.75	11.77	84.93	0.10	9279.55	0.77	0.003	9296.6
3	23	3.37	3.09	27.63	8.33	58.52	0.07	6056.44	0.58	0.002	6069.2
4	34	5.34	4.90	46.66	14.98	91.57	0.11	9381.91	1.03	0.002	9404.2
5	33	4.90	4.49	42.88	14.23	80.12	0.09	8212.58	0.95	0.002	8233.3
6	27	3.12	2.87	27.10	9.91	51.10	0.06	5004.15	0.71	0.001	5019.2
7	46	5.52	5.07	46.79	16.90	111.27	0.13	11388.82	1.21	0.003	11415.0
8	56	7.10	6.50	62.43	21.13	145.96	0.16	15096.60	1.42	0.005	15128.0
9	51	6.64	6.09	58.99	19.53	140.64	0.16	14595.34	1.42	0.004	14626.2
10	47	6.17	5.66	55.11	18.33	132.38	0.15	13938.66	1.31	0.003	13967.3
11	50	3.22	2.94	28.48	8.60	59.29	0.06	6013.53	0.60	0.006	6028.0
12	71	6.64	6.06	58.02	17.70	119.80	0.13	12262.68	1.11	0.009	12288.9
13	67	5.90	5.38	51.62	15.83	101.82	0.11	10491.51	0.94	0.009	10514.2
14	55	5.00	4.57	43.84	12.64	85.53	0.09	8576.39	0.81	0.007	8595.6
15	93	7.16	6.53	62.44	18.04	120.54	0.13	11987.53	1.12	0.013	12015.0
16	92	6.97	6.35	60.75	17.59	117.17	0.13	11726.93	1.08	0.013	11753.6
17	117	7.42	6.75	65.09	19.25	126.73	0.14	12893.16	1.09	0.017	12921.3
18	116	7.03	6.40	62.00	17.78	120.20	0.13	12056.48	1.08	0.016	12084.2
19	79	5.07	4.62	45.09	12.82	88.56	0.10	8905.93	0.81	0.011	8926.2
20	74	3.92	3.57	33.82	9.91	63.26	0.07	6301.09	0.55	0.011	6316.0
21	74	3.92	3.57	33.82	9.91	63.26	0.07	6301.09	0.55	0.011	6316.0
22	57	5.59	5.10	48.63	14.55	95.44	0.10	9673.67	0.85	0.009	9694.2
23	55	5.00	4.57	43.84	12.64	85.53	0.09	8576.39	0.81	0.007	8595.6
24	55	5.00	4.57	43.84	12.64	85.53	0.09	8576.39	0.81	0.007	8595.6
25	74	3.92	3.57	33.82	9.91	63.26	0.07	6301.09	0.55	0.011	6316.0
26	94	7.55	6.88	65.54	19.51	127.08	0.14	12824.21	1.12	0.014	12852.1
27	92	6.97	6.35	60.75	17.59	117.17	0.13	11726.93	1.08	0.013	11753.6
28	91	6.57	6.00	57.66	16.13	110.63	0.12	10890.25	1.08	0.011	10916.4
29	93	7.16	6.53	62.44	18.04	120.54	0.13	11987.53	1.12	0.013	12015.0
30	92	6.97	6.35	60.75	17.59	117.17	0.13	11726.93	1.08	0.013	11753.6
31	92	6.97	6.35	60.75	17.59	117.17	0.13	11726.93	1.08	0.013	11753.6
32	74	3.92	3.57	33.82	9.91	63.26	0.07	6301.09	0.55	0.011	6316.0
33	74	3.92	3.57	33.82	9.91	63.26	0.07	6301.09	0.55	0.011	6316.0
34	75	4.31	3.92	36.91	11.38	69.80	0.08	7137.77	0.55	0.012	7153.1
35	74	3.92	3.57	33.82	9.91	63.26	0.07	6301.09	0.55	0.011	6316.0
36	37	1.96	1.78	16.91	4.96	31.63	0.03	3150.54	0.28	0.005	3158.0
37	37	1.96	1.78	16.91	4.96	31.63	0.03	3150.54	0.28	0.005	3158.0
38	37	1.96	1.78	16.91	4.96	31.63	0.03	3150.54	0.28	0.005	3158.0
39	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.0
40	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.0
MAX VALUE (lb/day)	**117**	**7.55**	**6.88**	**65.54**	**21.13**	**145.96**	**0.16**	**15096.6**	**1.42**	**0.017**	**15128.0**

TABLE D.3-9
DAILY ON-SITE COMBUSTION EMISSIONS BY MONTH (BALLAST)

		Annual Emissions (ton/year)									
Months for Annual Contruction		**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	**12**	0.62	0.57	5.47	1.78	11.93	0.01	1233.47	0.12	0.00	1236.18
2	**13**	0.68	0.62	5.90	1.92	12.75	0.01	1317.64	0.13	0.00	1320.54
3	**14**	0.68	0.62	5.95	1.93	12.75	0.01	1310.03	0.13	0.00	1312.95
4	**15**	0.72	0.66	6.33	2.03	13.42	0.01	1374.23	0.14	0.00	1377.32
5	**16**	0.74	0.68	6.48	2.06	13.70	0.02	1399.62	0.14	0.00	1402.75
6	**17**	0.77	0.70	6.72	2.12	14.20	0.02	1450.28	0.14	0.00	1453.50
7	**18**	0.81	0.74	7.10	2.20	14.95	0.02	1526.62	0.14	0.00	1529.98
8	**19**	0.80	0.73	7.08	2.16	14.71	0.02	1499.75	0.14	0.00	1503.03
9	**20**	0.77	0.70	6.77	2.04	13.81	0.02	1404.54	0.13	0.00	1407.64
10	**21**	0.74	0.68	6.50	1.93	12.97	0.01	1314.75	0.12	0.00	1317.69
11	**22**	0.73	0.67	6.43	1.89	12.57	0.01	1268.58	0.11	0.00	1271.43
12	**23**	0.75	0.69	6.59	1.93	12.86	0.01	1296.32	0.12	0.00	1299.22
13	**24**	0.74	0.67	6.44	1.88	12.49	0.01	1256.42	0.11	0.00	1259.24
14	**25**	0.71	0.65	6.25	1.82	12.07	0.01	1211.06	0.11	0.00	1213.80
15	**26**	0.74	0.68	6.48	1.89	12.52	0.01	1257.04	0.11	0.00	1259.87
16	**27**	0.74	0.67	6.46	1.88	12.48	0.01	1254.22	0.11	0.00	1257.04
17	**28**	0.74	0.67	6.43	1.87	12.41	0.01	1245.16	0.11	0.00	1247.98
18	**29**	0.73	0.67	6.40	1.86	12.35	0.01	1235.36	0.11	0.00	1238.17
19	**30**	0.73	0.67	6.39	1.85	12.31	0.01	1231.79	0.11	0.00	1234.59
20	**31**	0.75	0.69	6.56	1.91	12.62	0.01	1262.33	0.12	0.00	1265.20
21	**32**	0.75	0.69	6.56	1.91	12.62	0.01	1262.33	0.12	0.00	1265.20
22	**33**	0.75	0.69	6.56	1.91	12.62	0.01	1262.33	0.12	0.00	1265.20
23	**34**	0.74	0.67	6.43	1.87	12.34	0.01	1234.88	0.11	0.00	1237.69
24	**35**	0.73	0.66	6.32	1.84	12.10	0.01	1210.25	0.11	0.00	1213.02
25	**36**	0.69	0.63	6.03	1.76	11.52	0.01	1151.51	0.10	0.00	1154.15
26	**37**	0.67	0.61	5.85	1.70	11.18	0.01	1117.41	0.10	0.00	1119.97
27	**38**	0.61	0.56	5.32	1.55	10.14	0.01	1012.69	0.09	0.00	1015.03
28	**39**	0.54	0.49	4.66	1.36	8.88	0.01	885.75	0.08	0.00	887.80
29	**40**	0.47	0.42	4.04	1.18	7.68	0.01	767.86	0.07	0.00	769.63
MAX VALUE (ton/year)		**0.81**	**0.74**	**7.10**	**2.20**	**14.95**	**0.016**	**1526.62**	**0.14**	**0.0015**	**1529.98**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers per Vehicle = 1
Construction Schedule = 8 hours per day 7 am to 3:30 pm
Days per Month = 21.65

delivery trucks can arrive at the site anytime during the day or night

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Hours/Day	Horsepower	Emission factors (G/Mile)										Emission rate per piece of equipment (Lb/Hr)									
				PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	74.99	12	NA	2.80E-02	1.40E-02	1.72E+00	4.80E-02	1.94E-01	3.00E-03	2.92E+02	1.58E-02	1.10E-02	2.96E+02	0.000	0.000	0.024	0.001	0.003	0.000	4.016	0.000	0.000	4.07
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	24	200	1.96E-01	1.56E-01	1.33E+00	1.41E-01	7.48E+00	1.40E-02	1.51E+03	4.80E-03	5.10E-03	1.51E+03	0.001	0.001	0.010	0.001	0.054	0.000	10.939	0.000	0.000	10.95
Truck Tractor Delivery Trucks	79.2	24	275	5.10E-01	4.31E-01	2.92E+00	6.24E-01	1.30E+01	1.60E-02	1.67E+03	4.80E-03	5.10E-03	1.67E+03	0.004	0.003	0.021	0.005	0.095	0.000	12.144	0.000	0.000	12.16
Total																							

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers p
Construction S
Days per Mon

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Month 1 Daily Emissions (Lb/Day)											Month 2 Daily Emissions (Lb/Day)										
		Quantity Mo 1	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 2**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	8	0.04	0.02	2.27	0.06	0.26	0.00	385.56	0.02	0.01	390.50	62	0.29	0.14	17.59	0.49	1.99	0.03	2988.09	0.16	0.11	3026.41
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	0	0.02	0.01	0.11	0.01	0.60	0.00	121.18	0.00	0.00	121.31	0.51	0.02	0.01	0.12	0.01	0.66	0.00	133.29	0.00	0.00	133.44
Truck Tractor Delivery Trucks	79.2	0	0.04	0.03	0.23	0.05	1.05	0.00	134.51	0.00	0.00	134.65	1.71	0.15	0.13	0.87	0.19	3.88	0.00	497.70	0.00	0.00	498.21
	Total	**9**	**0.09**	**0.07**	**2.61**	**0.13**	**1.91**	**0.01**	**641.25**	**0.02**	**0.02**	**646.46**	**64**	**0.46**	**0.29**	**18.58**	**0.69**	**6.53**	**0.04**	**3619.08**	**0.16**	**0.11**	**3658.05**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers p
Construction S
Days per Mon

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Month 3 Daily Emissions (Lb/Day)											Month 4 Daily Emissions (Lb/Day)										
		Quantity Mo 3	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 4**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	54	0.25	0.13	15.32	0.43	1.73	0.03	2602.53	0.14	0.10	2635.90	111	0.51	0.26	31.50	0.88	3.56	0.06	5349.64	0.29	0.20	5418.24
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	0.51	0.02	0.01	0.12	0.01	0.66	0.00	133.29	0.00	0.00	133.44	0.74	0.03	0.02	0.17	0.02	0.96	0.00	193.88	0.00	0.00	194.10
Truck Tractor Delivery Trucks	79.2	4.52	0.40	0.34	2.30	0.49	10.28	0.01	1318.25	0.00	0.00	1319.57	2.12	0.19	0.16	1.08	0.23	4.83	0.01	618.77	0.00	0.00	619.39
	Total	**59**	**0.67**	**0.48**	**17.74**	**0.93**	**12.68**	**0.04**	**4054.07**	**0.15**	**0.10**	**4088.92**	**114**	**0.73**	**0.44**	**32.75**	**1.13**	**9.35**	**0.06**	**6162.29**	**0.29**	**0.20**	**6231.73**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Vehicles with Onroad Engines for Emissions Estimates	Passengers p Construction S Days per Mon: Offsite Miles per Day Travelled per Vehicle	Month 5 Daily Emissions (Lb/Day)											Month 6 Daily Emissions (Lb/Day)										
		Quantity Mo 5	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 6**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	137	0.63	0.32	38.88	1.09	4.39	0.07	6602.71	0.36	0.25	6687.38	129	0.60	0.30	36.61	1.02	4.13	0.06	6217.15	0.34	0.23	6296.88
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	0.74	0.03	0.02	0.17	0.02	0.96	0.00	193.88	0.00	0.00	194.10	0.74	0.03	0.02	0.17	0.02	0.96	0.00	193.88	0.00	0.00	194.10
Truck Tractor Delivery Trucks	79.2	2.26	0.20	0.17	1.15	0.25	5.14	0.01	659.12	0.00	0.00	659.79	0.78	0.07	0.06	0.40	0.09	1.78	0.00	228.68	0.00	0.00	228.91
	Total	**140**	**0.86**	**0.51**	**40.20**	**1.35**	**10.50**	**0.08**	**7455.71**	**0.36**	**0.25**	**7541.27**	**131**	**0.69**	**0.38**	**37.18**	**1.13**	**6.88**	**0.07**	**6639.70**	**0.34**	**0.24**	**6719.88**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers p
Construction S
Days per Mon

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Month 7 Daily Emissions (Lb/Day)											Month 8 Daily Emissions (Lb/Day)										
		Quantity Mo 7	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 8**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	130	0.60	0.30	36.75	1.03	4.15	0.06	6241.25	0.34	0.24	6321.28	227	1.05	0.53	64.27	1.80	7.26	0.11	10916.16	0.59	0.41	11056.15
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	0.42	0.01	0.01	0.10	0.01	0.54	0.00	109.06	0.00	0.00	109.18	1.52	0.05	0.04	0.35	0.04	1.99	0.00	399.88	0.00	0.00	400.32
Truck Tractor Delivery Trucks	79.2	4.85	0.43	0.36	2.47	0.53	11.02	0.01	1412.41	0.00	0.00	1413.83	12.92	1.15	0.97	6.58	1.41	29.38	0.04	3766.42	0.01	0.01	3770.21
	Total	**135**	**1.04**	**0.68**	**39.31**	**1.56**	**15.71**	**0.08**	**7762.71**	**0.34**	**0.24**	**7844.29**	**241**	**2.25**	**1.54**	**71.20**	**3.24**	**38.63**	**0.15**	**15082.45**	**0.60**	**0.42**	**15226.68**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers p
Construction S
Days per Mon

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Month 9 Daily Emissions (Lb/Day)											Month 10 Daily Emissions (Lb/Day)										
		Quantity Mo 9	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 10**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	223	1.03	0.52	63.14	1.76	7.13	0.11	10723.38	0.58	0.40	10860.89	182	0.84	0.42	51.65	1.44	5.83	0.09	8771.48	0.47	0.33	8883.97
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	1.52	0.05	0.04	0.35	0.04	1.99	0.00	399.88	0.00	0.00	400.32	1.52	0.05	0.04	0.35	0.04	1.99	0.00	399.88	0.00	0.00	400.32
Truck Tractor Delivery Trucks	79.2	9.09	0.81	0.68	4.63	0.99	20.67	0.03	2649.94	0.01	0.01	2652.61	8.63	0.77	0.65	4.39	0.94	19.62	0.02	2515.43	0.01	0.01	2517.96
	Total	**233**	**1.89**	**1.24**	**68.12**	**2.79**	**29.79**	**0.14**	**13773.20**	**0.59**	**0.41**	**13913.83**	**192**	**1.66**	**1.11**	**56.39**	**2.42**	**27.44**	**0.12**	**11686.79**	**0.48**	**0.34**	**11802.25**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers p
Construction S
Days per Mon

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Month 11 Daily Emissions (Lb/Day)											Month 12 Daily Emissions (Lb/Day)										
		Quantity Mo 11	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 12**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	160	0.74	0.37	45.26	1.26	5.11	0.08	7687.09	0.42	0.29	7785.67	271	1.25	0.63	76.76	2.14	8.67	0.13	13036.73	0.71	0.49	13203.92
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	1.43	0.05	0.04	0.33	0.04	1.87	0.00	375.64	0.00	0.00	376.06	2.54	0.09	0.07	0.59	0.06	3.31	0.01	666.46	0.00	0.00	667.21
Truck Tractor Delivery Trucks	79.2	8.63	0.77	0.65	4.39	0.94	19.62	0.02	2515.43	0.01	0.01	2517.96	17.17	1.53	1.29	8.74	1.87	39.04	0.05	5003.95	0.01	0.02	5008.99
	Total	**170**	**1.55**	**1.06**	**49.99**	**2.24**	**26.60**	**0.11**	**10578.17**	**0.42**	**0.30**	**10679.70**	**290**	**2.87**	**1.99**	**86.09**	**4.08**	**51.02**	**0.19**	**18707.15**	**0.72**	**0.51**	**18880.12**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers p
Construction S
Days per Mon

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Month 13 Daily Emissions (Lb/Day)											Month 14 Daily Emissions (Lb/Day)										
		Quantity Mo 13	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 14**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	271	1.25	0.63	76.76	2.14	8.67	0.13	13036.73	0.71	0.49	13203.92	230	1.06	0.53	65.27	1.82	7.37	0.11	11084.84	0.60	0.42	11226.99
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	2.54	0.09	0.07	0.59	0.06	3.31	0.01	666.46	0.00	0.00	667.21	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	79.2	17.17	1.53	1.29	8.74	1.87	39.04	0.05	5003.95	0.01	0.02	5008.99	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06
	Total	**290**	**2.87**	**1.99**	**86.09**	**4.08**	**51.02**	**0.19**	**18707.15**	**0.72**	**0.51**	**18880.12**	**249**	**2.66**	**1.88**	**74.47**	**3.74**	**49.09**	**0.17**	**16643.53**	**0.62**	**0.44**	**16791.34**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers p
Construction S
Days per Mon

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Month 15 Daily Emissions (Lb/Day)											Month 16 Daily Emissions (Lb/Day)										
		Quantity Mo 15	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 16**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	341	1.58	0.79	96.77	2.70	10.93	0.17	16434.48	0.89	0.62	16645.24	341	1.58	0.79	96.77	2.70	10.93	0.17	16434.48	0.89	0.62	16645.24
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	79.2	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09
	Total	**370**	**3.97**	**2.81**	**110.57**	**5.57**	**73.51**	**0.25**	**24772.51**	**0.91**	**0.65**	**24991.76**	**370**	**3.97**	**2.81**	**110.57**	**5.57**	**73.51**	**0.25**	**24772.51**	**0.91**	**0.65**	**24991.76**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers p
Construction S
Days per Mon

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Month 17 Daily Emissions (Lb/Day)											Month 18 Daily Emissions (Lb/Day)										
		Quantity Mo 17	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 18**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	333	1.54	0.77	94.50	2.64	10.67	0.17	16048.92	0.87	0.61	16254.73	333	1.54	0.77	94.50	2.64	10.67	0.17	16048.92	0.87	0.61	16254.73
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	79.2	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09
	Total	**362**	**3.93**	**2.79**	**108.30**	**5.51**	**73.25**	**0.24**	**24386.95**	**0.89**	**0.63**	**24601.26**	**362**	**3.93**	**2.79**	**108.30**	**5.51**	**73.25**	**0.24**	**24386.95**	**0.89**	**0.63**	**24601.26**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Passengers p
Construction S
Days per Mon

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Month 19 Daily Emissions (Lb/Day)											Month 20 Daily Emissions (Lb/Day)										
		Quantity Mo 19	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 20**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	74.99	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49
Delivery Transport Trucks																							
Light Weight & Delivery Trucks	79.2	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	79.2	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06
	Total	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 21 Daily Emissions (Lb/Day)											Month 22 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	Quantity Mo 21	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 22	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06
TOTALS	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 23 Daily Emissions (Lb/Day)											Month 24 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	Quantity Mo 23	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 24	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06
TOTALS	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 25 Daily Emissions (Lb/Day)											Month 26 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	**Quantity Mo 25**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Quantity Mo 26**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Passenger Vehicles	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49	333	1.54	0.77	94.50	2.64	10.67	0.17	16048.92	0.87	0.61	16254.73
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09
TOTALS	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**	**362**	**3.93**	**2.79**	**108.30**	**5.51**	**73.25**	**0.24**	**24386.95**	**0.89**	**0.63**	**24601.26**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 27 Daily Emissions (Lb/Day)											Month 28 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	Quantity Mo 27	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 28	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	333	1.54	0.77	94.50	2.64	10.67	0.17	16048.92	0.87	0.61	16254.73	333	1.54	0.77	94.50	2.64	10.67	0.17	16048.92	0.87	0.61	16254.73
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09
TOTALS	**362**	**3.93**	**2.79**	**108.30**	**5.51**	**73.25**	**0.24**	**24386.95**	**0.89**	**0.63**	**24601.26**	**362**	**3.93**	**2.79**	**108.30**	**5.51**	**73.25**	**0.24**	**24386.95**	**0.89**	**0.63**	**24601.26**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 29 Daily Emissions (Lb/Day)											Month 30 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	Quantity Mo 29	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 30	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	333	1.54	0.77	94.50	2.64	10.67	0.17	16048.92	0.87	0.61	16254.73	333	1.54	0.77	94.50	2.64	10.67	0.17	16048.92	0.87	0.61	16254.73
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44
Truck Tractor Delivery Trucks	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09
TOTALS	**362**	**3.93**	**2.79**	**108.30**	**5.51**	**73.25**	**0.24**	**24386.95**	**0.89**	**0.63**	**24601.26**	**362**	**3.93**	**2.79**	**108.30**	**5.51**	**73.25**	**0.24**	**24386.95**	**0.89**	**0.63**	**24601.26**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 31 Daily Emissions (Lb/Day)											Month 32 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	Quantity Mo 31	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 32	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	333	1.54	0.77	94.50	2.64	10.67	0.17	16048.92	0.87	0.61	16254.73	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	3.32	0.11	0.09	0.77	0.08	4.34	0.01	872.46	0.00	0.00	873.44	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	25.62	2.28	1.93	13.04	2.79	58.24	0.07	7465.57	0.02	0.02	7473.09	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06
TOTALS	**362**	**3.93**	**2.79**	**108.30**	**5.51**	**73.25**	**0.24**	**24386.95**	**0.89**	**0.63**	**24601.26**	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 33 Daily Emissions (Lb/Day)											Month 34 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	Quantity Mo 33	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 34	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29
Truck Tractor Delivery Trucks	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06
TOTALS	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 35 Daily Emissions (Lb/Day)											Month 36 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	Quantity Mo 35	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 36	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	222	1.03	0.52	63.00	1.76	7.11	0.11	10699.28	0.58	0.40	10836.49	111	0.51	0.26	31.50	0.88	3.56	0.06	5349.64	0.29	0.20	5418.24
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	2.22	0.08	0.06	0.51	0.05	2.89	0.01	581.64	0.00	0.00	582.29	1.11	0.04	0.03	0.26	0.03	1.45	0.00	290.82	0.00	0.00	291.15
Truck Tractor Delivery Trucks	17.08	1.52	1.28	8.69	1.86	38.83	0.05	4977.05	0.01	0.02	4982.06	8.54	0.76	0.64	4.35	0.93	19.41	0.02	2488.52	0.01	0.01	2491.03
TOTALS	**241**	**2.62**	**1.86**	**72.20**	**3.67**	**48.84**	**0.16**	**16257.97**	**0.60**	**0.42**	**16400.84**	**121**	**1.31**	**0.93**	**36.10**	**1.84**	**24.42**	**0.08**	**8128.98**	**0.30**	**0.21**	**8200.42**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 37 Daily Emissions (Lb/Day)											Month 38 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	Quantity Mo 37	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 38	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	111	0.51	0.26	31.50	0.88	3.56	0.06	5349.64	0.29	0.20	5418.24	111	0.51	0.26	31.50	0.88	3.56	0.06	5349.64	0.29	0.20	5418.24
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	1.11	0.04	0.03	0.26	0.03	1.45	0.00	290.82	0.00	0.00	291.15	1.11	0.04	0.03	0.26	0.03	1.45	0.00	290.82	0.00	0.00	291.15
Truck Tractor Delivery Trucks	8.54	0.76	0.64	4.35	0.93	19.41	0.02	2488.52	0.01	0.01	2491.03	8.54	0.76	0.64	4.35	0.93	19.41	0.02	2488.52	0.01	0.01	2491.03
TOTALS	**121**	**1.31**	**0.93**	**36.10**	**1.84**	**24.42**	**0.08**	**8128.98**	**0.30**	**0.21**	**8200.42**	**121**	**1.31**	**0.93**	**36.10**	**1.84**	**24.42**	**0.08**	**8128.98**	**0.30**	**0.21**	**8200.42**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

	Month 39 Daily Emissions (Lb/Day)											Month 40 Daily Emissions (Lb/Day)										
Vehicles with Onroad Engines for Emissions Estimates	Quantity Mo 39	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity Mo 40	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Delivery Transport Trucks																						
Light Weight & Delivery Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck Tractor Delivery Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	**0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

Monthly Comparison of Construction Equipment Emissions:

	Daily Emissions (Lb/Day)										
Month of Contruction	**Offroad Equipment Quantity**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	9	0.09	0.07	2.61	0.13	1.91	0.01	641.25	0.02	0.02	646.46
2	64	0.46	0.29	18.58	0.69	6.53	0.04	3619.08	0.16	0.11	3658.05
3	59	0.67	0.48	17.74	0.93	12.68	0.04	4054.07	0.15	0.10	4088.92
4	114	0.73	0.44	32.75	1.13	9.35	0.06	6162.29	0.29	0.20	6231.73
5	140	0.86	0.51	40.20	1.35	10.50	0.08	7455.71	0.36	0.25	7541.27
6	131	0.69	0.38	37.18	1.13	6.88	0.07	6639.70	0.34	0.24	6719.88
7	135	1.04	0.68	39.31	1.56	15.71	0.08	7762.71	0.34	0.24	7844.29
8	241	2.25	1.54	71.20	3.24	38.63	0.15	15082.45	0.60	0.42	15226.68
9	233	1.89	1.24	68.12	2.79	29.79	0.14	13773.20	0.59	0.41	13913.83
10	192	1.66	1.11	56.39	2.42	27.44	0.12	11686.79	0.48	0.34	11802.25
11	170	1.55	1.06	49.99	2.24	26.60	0.11	10578.17	0.42	0.30	10679.70
12	290	2.87	1.99	86.09	4.08	51.02	0.19	18707.15	0.72	0.51	18880.12
13	290	2.87	1.99	86.09	4.08	51.02	0.19	18707.15	0.72	0.51	18880.12
14	249	2.66	1.88	74.47	3.74	49.09	0.17	16643.53	0.62	0.44	16791.34
15	370	3.97	2.81	110.57	5.57	73.51	0.25	24772.51	0.91	0.65	24991.76
16	370	3.97	2.81	110.57	5.57	73.51	0.25	24772.51	0.91	0.65	24991.76
17	362	3.93	2.79	108.30	5.51	73.25	0.24	24386.95	0.89	0.63	24601.26
18	362	3.93	2.79	108.30	5.51	73.25	0.24	24386.95	0.89	0.63	24601.26
19	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
20	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
21	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
22	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
23	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
24	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
25	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
26	362	3.93	2.79	108.30	5.51	73.25	0.24	24386.95	0.89	0.63	24601.26
27	362	3.93	2.79	108.30	5.51	73.25	0.24	24386.95	0.89	0.63	24601.26
28	362	3.93	2.79	108.30	5.51	73.25	0.24	24386.95	0.89	0.63	24601.26
29	362	3.93	2.79	108.30	5.51	73.25	0.24	24386.95	0.89	0.63	24601.26
30	362	3.93	2.79	108.30	5.51	73.25	0.24	24386.95	0.89	0.63	24601.26
31	362	3.93	2.79	108.30	5.51	73.25	0.24	24386.95	0.89	0.63	24601.26
32	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
33	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
34	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
35	241	2.62	1.86	72.20	3.67	48.84	0.16	16257.97	0.60	0.42	16400.84
36	121	1.31	0.93	36.10	1.84	24.42	0.08	8128.98	0.30	0.21	8200.42
37	121	1.31	0.93	36.10	1.84	24.42	0.08	8128.98	0.30	0.21	8200.42
38	121	1.31	0.93	36.10	1.84	24.42	0.08	8128.98	0.30	0.21	8200.42
39	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAX VALUE (Lb/Day)	**370**	**3.97**	**2.81**	**110.57**	**5.57**	**73.51**	**0.25**	**24772.51**	**0.91**	**0.65**	**24991.76**

TABLE D.3-10
DAILY OFF-SITE EMISSIONS BY MONTH
(BALLAST)

		Annual Emissions (Ton/Year)									
Months for Annual Contruction		**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	**12**	0.160	0.106	5.631	0.235	2.566	0.012	1149.210	0.049	0.034	1160.799
2	**13**	0.190	0.127	6.534	0.278	3.098	0.014	1344.773	0.056	0.039	1358.178
3	**14**	0.214	0.144	7.139	0.310	3.558	0.015	1485.763	0.061	0.043	1500.346
4	**15**	0.249	0.169	8.144	0.361	4.217	0.017	1710.040	0.069	0.049	1726.620
5	**16**	0.284	0.195	8.987	0.409	4.911	0.019	1911.496	0.076	0.054	1929.697
6	**17**	0.318	0.219	9.724	0.454	5.591	0.021	2094.776	0.082	0.058	2114.371
7	**18**	0.353	0.246	10.494	0.501	6.309	0.023	2286.890	0.088	0.062	2307.937
8	**19**	0.370	0.258	10.850	0.524	6.668	0.024	2378.851	0.091	0.064	2400.562
9	**20**	0.374	0.262	10.861	0.529	6.778	0.024	2391.576	0.091	0.064	2413.272
10	**21**	0.382	0.269	10.905	0.538	6.984	0.024	2418.474	0.091	0.064	2440.194
11	**22**	0.392	0.277	11.076	0.552	7.216	0.025	2467.957	0.092	0.065	2489.974
12	**23**	0.404	0.285	11.317	0.567	7.457	0.025	2529.441	0.094	0.066	2551.905
13	**24**	0.401	0.284	11.166	0.563	7.433	0.025	2502.929	0.092	0.065	2525.067
14	**25**	0.399	0.283	11.016	0.559	7.409	0.025	2476.416	0.091	0.064	2498.229
15	**26**	0.412	0.292	11.382	0.578	7.671	0.026	2560.239	0.094	0.066	2582.771
16	**27**	0.412	0.292	11.358	0.577	7.668	0.026	2556.065	0.094	0.066	2578.544
17	**28**	0.412	0.292	11.333	0.577	7.665	0.026	2551.892	0.093	0.066	2574.317
18	**29**	0.412	0.292	11.333	0.577	7.665	0.026	2551.892	0.093	0.066	2574.317
19	**30**	0.412	0.292	11.333	0.577	7.665	0.026	2551.892	0.093	0.066	2574.317
20	**31**	0.426	0.302	11.724	0.596	7.930	0.026	2639.888	0.097	0.068	2663.086
21	**32**	0.426	0.302	11.724	0.596	7.930	0.026	2639.888	0.097	0.068	2663.086
22	**33**	0.426	0.302	11.724	0.596	7.930	0.026	2639.888	0.097	0.068	2663.086
23	**34**	0.426	0.302	11.724	0.596	7.930	0.026	2639.888	0.097	0.068	2663.086
24	**35**	0.426	0.302	11.724	0.596	7.930	0.026	2639.888	0.097	0.068	2663.086
25	**36**	0.412	0.292	11.333	0.577	7.665	0.026	2551.892	0.093	0.066	2574.317
26	**37**	0.397	0.282	10.942	0.557	7.401	0.025	2463.895	0.090	0.064	2485.547
27	**38**	0.369	0.262	10.161	0.517	6.872	0.023	2287.903	0.084	0.059	2308.008
28	**39**	0.326	0.232	8.988	0.457	6.079	0.020	2023.914	0.074	0.052	2041.699
29	**40**	0.284	0.201	7.816	0.398	5.286	0.018	1759.925	0.064	0.046	1775.391
MAX VALUE (Ton/Year)		**0.426**	**0.302**	**11.724**	**0.596**	**7.930**	**0.0265**	**2639.89**	**0.097**	**0.0683**	**2663.09**

TABLE D.3-11
DISTURBED ACREAGE, EXCAVATION VOLUMES, AND FUGITIVE DUST EMISSIONS BY MONTH (BALLAST)

PROJECT:	NextLight Avenal Solar Ranch One	CALCULATED BY:	KFH	DATE:	6-Nov-09
SUBJECT:	5408-8011 ADEIR#2 Support	CHECKED BY:		DATE:	
CALCULATION NO.		SHEET NUMBER:	6	OF:	13

3.1 Disturbed Area By Month # 8 MW/Month

Disturbed Area Description	Month of Construction 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Totals
Solar Field No.1																																							
230kV T/L - 4' Dia Poles							0	0	0	0																													0.01
230kV T/L - 6' Dia Poles							0																																0.00
230kV T/L - Pole Setting Sites							1	1	1	1																													2.89
230kV T/L - Stringing Sites							0	0	0																														0.69
Site Bndry Fence - Ops Access							1	1																															1.84
Site Bndry Fence - Const. Access							1	1																															1.84
Permanent (Fire) Access Roads								5	5	5	5	5	5	5	5	5																							45.00
Tracker Foundations									1	1	1	1	1	1	1	1	1	1																					12.74
Drive Motor Foundations									0	0	0	0	0	0	0	0	0	0																					0.48
Equipment Pad Foundations									0	0	0	0	0	0	0	0	0	0																					0.43
Temp Const Access Rds								3	3	3	3	3	3	3	3	3	3	3																					33.24
DC Trenching								1																															0.72
AC Trenching								1																															0.72
Staging Area								7					7																										13.80
Laydown Area								2					2																										3.74
Infiltration Trenches								1	1	1	1	1	1	1	1	1	1	1																					13.75
Infiltration Trench Spoil Banks								3	3	3	3	3	3	3	3	3	3	3																					29.90
Solar Field No. 1 Subtotals	*0*	*0*	*0*	*0*	*0*	*0*	*3*	*25*	*14*	*14*	*13*	*13*	*22*	*13*	*13*	*13*	*8*	*8*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	161.79
Solar Field No.2																																							
High Voltage Substation				3																																			3.29
Site Bndry Fence - Ops Access				1	1																																		2.00
Site Bndry Fence - Const. Access				1	1																																		2.00
Permanent (Fire) Access Roads												5	5	5	5	5	5	5	5	5																			45.00
Tracker Foundations													1	1	1	1	1	1	1	1	1																		11.18
Drive Motor Foundations													0	0	0	0	0	0	0	0	0																		0.45
Equipment Pad Foundations													0	0	0	0	0	0	0	0	0																		0.40
Temp Const Access Rds												3	3	3	3	3	3	3	3	3	3																		28.62
DC Trenching												1																											0.66
AC Trenching												1																											0.65
Staging Area												10					10																						20.70
Laydown Area												2				2																							4.37
Infiltration Trenches												1	1	1	1	1	1	1	1	1	1																		12.07
Infiltration Trench Spoil Banks												3	3	3	3	3	3	3	3	3	3																		26.24
Solar Field No. 2 Subtotals	*0*	*0*	*0*	*5*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*26*	*13*	*13*	*13*	*15*	*23*	*13*	*13*	*13*	*8*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	157.64

TABLE D.3-11
DISTURBED ACREAGE, EXCAVATION VOLUMES, AND FUGITIVE DUST EMISSIONS BY MONTH (BALLAST)

PROJECT: **NextLight Avenal Solar Ranch One**
SUBJECT: **5408-8011 ADEIR#2 Support**
CALCULATION NO.

CALCULATED BY: KFH DATE: 6-Nov-09
CHECKED BY: DATE:
SHEET NUMBER: 7 OF: 13

Month of Construction

Disturbed Area Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Totals
Solar Field No.3																																							
34.5 kV Overhead Line															0	0	0																						0.52
O&M Facility Paved Roads	1																																						1.20
O&M Facility	0																																						0.46
O&MTemp Stgi'g & Ass'mbly Area	5																																						5.20
Site Bndry Fence - Ops Access	1	1																																					1.33
Site Bndry Fence - Const. Access	1	1																																					1.33
Permanent (Fire) Access Roads																5	5	5	5	5	5	5	5	5	5	5													55.02
Tracker Foundations																1	1	1	1	1	1	1	1	1	1	1	1	1	1										15.73
Drive Motor Foundations															0	0	0	0	0	0	0	0	0	0	0	0	0	0											0.66
Equipment Pad Foundations															0	0	0	0	0	0	0	0	0	0	0	0	0	0											0.52
Temp Const Access Rds		3	3	3												5	5	5	5	5	5	5	5																50.32
DC Trenching																																							0.00
AC Trenching																																							0.00
Staging Area																	7				7				7														20.70
Laydown Area																	1				1				1														4.21
Infiltration Trenches															1	1	1	1	1	1	1	1	1	1	1	1	1	1											16.98
Infiltration Trench Spoil Banks															3	3	3	3	3	3	3	3	3	3	3	3	3	3											36.91
Solar Field No. 3 Subtotals	*8.2*	*4.7*	*3.4*	*3.4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*4.1*	*15*	*24*	*15*	*15*	*15*	*23*	*15*	*15*	*10*	*18*	*10*	*5.1*	*5.1*	*1.1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	211.08
Solar Field No. 4																																							
34.5 kV Overhead Line																		0	0	0	0																		0.48
Site Bndry Fence - Ops Access																						1	1																2.10
Site Bndry Fence - Const. Access																						1	1																2.10
Permanent (Fire) Access Roads																							5	5	5	5	5	5	5	5	5								45.00
Tracker Foundations																							1	1	1	1	1	1	1	1	1								10.91
Drive Motor Foundations																							0	0	0	0	0	0	0	0	0								0.47
Equipment Pad Foundations																							0	0	0	0	0	0	0	0	0								0.36
Temp Const Access Rds		3	3	3																			3	3	3	3	3				3								28.52
DC Trenching																						1																	0.60
AC Trenching																						1																	0.59
Staging Area																						7					7												13.80
Laydown Area																						2					2												3.74
Raw Wtr Supply Line - Trenching		0																				0																	0.00
Raw Wtr Line - Const Access		0																				0																	0.01

Con't on Next Sheet

TABLE D.3-11
DISTURBED ACREAGE, EXCAVATION VOLUMES, AND FUGITIVE DUST EMISSIONS BY MONTH (BALLAST)

PROJECT: **NextLight Avenal Solar Ranch One**
SUBJECT: **5408-8011 ADEIR#2 Support**
CALCULATION NO.

CALCULATED BY: KFH DATE: 6-Nov-09
CHECKED BY: DATE:
SHEET NUMBER: 8 OF: 13

Month of Construction

Disturbed Area Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Totals
Solar Field No.4 (con't)																																							
Raw Wtr Line - No Jack&Bore Pit																						0																	0.00
Raw Wtr Line - Pit Spoil Banks																						0																	0.00
Infiltration Trenches																						1	1	1	1	1	1	1	1	1	1								11.79
Infiltration Trench Spoil Banks																						3	3	3	3	3	3	3	3	3	3								25.62
Solar Field No. 4 Subtotals	*0*	*3.2*	*3.2*	*3.2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.1*	*0.1*	*0.1*	*0.1*	*16*	*15*	*13*	*13*	*13*	*22*	*10*	*10*	*10*	*13*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	146.10
Solar Field No. 5																																							
34.5 kV Overhead Line																										0	0	0	0										0.37
Site Bndry Fence - Ops Access																										1	1												1.36
Site Bndry Fence - Const. Access																										1	1												1.36
Permanent (Fire) Access Roads																										5	5	5	5	5	5	5	5	5					45.00
Tracker Foundations																											1	1	1	1	1	1	1	1	1				11.28
Drive Motor Foundations																											0	0	0	0	0	0	0	0	0				0.52
Equipment Pad Foundations																											0	0	0	0	0	0	0	0	0				0.37
Temp Const Access Rds		3																								3	3	3	3	3	3	3	3						28.11
DC Trenching																										1													0.76
AC Trenching																										1													0.76
Staging Area																										7						7							13.80
Laydown Area																										2						2							3.74
Raw Wtr Line - So Jack&Bore Pit		0																																					0.02
Raw Wtr Line - Pit Spoil Banks		0																																					0.03
Infiltration Trenches																										1	1	1	1	1	1	1	1	1	1				12.18
Infiltration Trench Spoil Banks																										3	3	3	3	3	3	3	3	3	3				26.48
Solar Field No. 5 Subtotals	*0*	*3.2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*24*	*15*	*13*	*13*	*13*	*13*	*22*	*13*	*10*	*5.2*	*0*	*0*	*0*	146.15

TABLE D.3-11
DISTURBED ACREAGE, EXCAVATION VOLUMES, AND FUGITIVE DUST EMISSIONS BY MONTH (BALLAST)

PROJECT: **NextLight Avenal Solar Ranch One**
SUBJECT: **5408-8011 ADEIR#2 Support**
CALCULATION NO.

CALCULATED BY: KFH DATE: 6-Nov-09
CHECKED BY: DATE:
SHEET NUMBER: 9 OF: 13

Month of Construction

Disturbed Area Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Totals
Solar Field No. 6																																							
Site Bndry Fence - Ops Access																													1	1									1.31
Site Bndry Fence - Const. Access																													1	1									1.31
Permanent (Fire) Access Roads																														5	5	5	5	5	5	5	5	5	45.00
Tracker Foundations																														1	1	1	1	1	1	1	1	1	11.91
Drive Motor Foundations																														0	0	0	0	0	0	0	0	0	0.52
Equipment Pad Foundations																														0	0	0	0	0	0	0	0	0	0.35
Temp Const Access Rds																														3	3	3	3	3	3	3	3	3	30.22
DC Trenching																													1										0.76
AC Trenching																													1										0.75
Staging Area																													7					7					13.80
Laydown Area																													2					2					4.37
Infiltration Trenches																													1	1	1	1	1	1	1	1	1	1	12.87
Infiltration Trench Spoil Banks																													3	3	3	3	3	3	3	3	3	3	27.97
Solar Field No. 6 Subtotals	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*16*	*15*	*14*	*14*	*14*	*23*	*14*	*14*	*14*	*14*	151.13
Total Disturbed Area	8	11	7	12	2	0	3	25	14	14	13	39	35	26	30	44	55	37	28	28	32	31	30	23	32	47	42	29	41	39	40	36	27	33	19	14	14	14	973.89
Onsite Cut/Fill (1000 cubic yards)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6			220.32
Offsite Cut/Fill (1000 cubic yards)							1	1	1	1																													2.02
Uncontrolled Disturbed Area PM10 (Ton/Month	0.9	1.2	0.7	1.3	0.2	0.0	0.3	2.7	1.6	1.5	1.5	4.3	3.9	2.9	3.4	4.8	6.1	4.0	3.1	3.1	3.5	3.4	3.3	2.6	3.5	5.2	4.6	3.1	4.5	4.2	4.4	4.0	3.0	3.6	2.1	1.5	1.5	1.5	107.13
Controlled Disturbed Area PM10 (Ton/Month)	0.1	0.2	0.1	0.2	0.0	0.0	0.0	0.4	0.3	0.2	0.2	0.7	0.6	0.5	0.5	0.8	1.0	0.6	0.5	0.5	0.6	0.5	0.5	0.4	0.6	0.8	0.7	0.5	0.7	0.7	0.7	0.6	0.5	0.6	0.3	0.2	0.2	0.2	17.14
Uncontrolled Cut/Fill PM10 (Ton/Month)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.0	0.0	13.44
Controlled Cut/Fill PM10 (Ton/Month)	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	5.24
																																							Peak Tons/Year
Rolling 12 Mo Disturbed Area PM10 (Ton/Year	0.1	0.3	0.5	0.7	0.7	0.7	0.7	1.2	1.4	1.7	1.9	2.6	3.1	3.3	3.8	4.3	5.3	5.9	6.4	6.4	6.7	7.0	7.3	7.0	7.0	7.3	7.5	7.3	7.0	7.1	7.3	7.4	7.3	7.4	7.2	7.0	6.7	6.1	7.5
																																							Peak Lb/Day
Average Disturbed Area PM10 (Lb/Day)	13.3	17.9	10.6	19.2	3.3	0.0	4.5	40.6	23.2	22.9	21.7	63.2	57.1	42.9	49.5	71.2	89.8	59.5	45.9	45.9	51.2	50.2	49.4	37.8	51.3	76.4	68.0	46.4	65.9	62.6	65.7	58.4	44.2	53.9	31.0	22.5	22.5	22.5	89.8
Average Cut/Fill PM10 (Lb/Day)	13.0	13.0	13.0	13.0	13.0	13.0	17.0	17.0	17.0	17.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	0.0	0.0	17.0
																																							Total Project (Tons)
Controlled Disturbed Area PM2.5 (Ton/Month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.6
Controlled Cut/Fill PM2.5 (Ton/Month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
																																							Peak Tons/Year
Rolling 12 Mo Disturbed Area PM2.5 (Ton/Yea	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.3	1.6
																																							Peak Lb/Day PM2.5
Average Disturbed Area PM2.5 (Lb/Day)	2.8	3.7	2.2	4.0	0.7	0.0	0.9	8.4	4.8	4.8	4.5	13.1	11.9	8.9	10.3	14.8	18.7	12.4	9.5	9.5	10.7	10.4	10.3	7.9	10.7	15.9	14.1	9.6	13.7	13.0	13.7	12.2	9.2	11.2	6.4	4.7	4.7	4.7	18.7
Average Cut/Fill PM2.5 (Lb/Day)	2.7	2.7	2.7	2.7	2.7	2.7	3.5	3.5	3.5	3.5	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	0.0	0.0	3.5

TABLE D.3-12
BATCH PLANT (BALLAST)

7.0 Concrete Batch Plant Materials Deliveries

Delivery of materials for batch processing of concrete was seemingly overlooked in the previous estimate of deliveries. This will attempt to correct the oversight. The largest volume of concrete required will be for the solar tracker ballast foundations, motor drive foundations and equipment pads.

7.1

Estimated Volume of Concrete

	No. Units	Ft^3/Unit	Total Ft^3	Total CY
Ballast Foundations	165,552	19	3,145,488	116,500
Drive Motor Fdn's	1,609	208	334,672	12,395
Equipment Pads	182	325	59,150	2,191
230kV T/L	37	1300	48,100	1,781
230 kV Substation	1	400	400	15
MV Substation	1	250	250	9
O&M Facility	1	20,000	20,000	741
Totals	N/A	N/A	3,608,060	133,632

7.2 Estimated Concrete Batch Materials

The quantity of raw materials are estimated assuming a typical A40 Class of concrete with a minimum of 585 lb of Portland cement per CY of concrete with ~12% by weight concrete, ~34% by weight sand, 48% by weight crushed stone, and 6% water.

7.2 **Estimated Weights of Raw Materials for On Site Concrete Batch Processing**

Vol of Concrete (CY)	Minimum Cement (lb/CY)	% Cement by Wght	Total Est Weight of Concrete	Total Est Weight of Cement	Total Est Weight of Sand	Total Est Weight of Stone	Total Est Weight of Water	Total Est Gallons of Water	Total Est Acre Feet of Water
133,632	594	15.38%	*516,107,412*	*79,377,320*	*175,476,520*	*247,731,558*	*30,966,445*	*3,712,877*	*11.39*

7.3 Estimated construction deliveries will be estimated based on the weight of the raw materials (water is from on site well).

Gross Weight Limit (lbs)	Max. Cargo Wgt (lbs)
80,000	44,800

Estimated Total Deliveries Required

Cement	Sand	Stone	Total	lb/CY Concrete
1,772	3,917	5,530	11,218	3,862

Estimated Numer of Concrete Raw Materials Deliveries

Month of Construction

	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Total Concrete Deliveries	74	4	7	88	293	195	195	195	390	390	390	585	585	585	585	390	390	390	390	390	390	390	585	585	585	585	585	585	390	390	390	390	195	195	195
Total lbs of Concrete	3,308,562	162,716	325,432	3,959,427	12,691,861	8,732,435	8,732,435	8,732,435	17,464,869	17,464,869	17,464,869	26,197,304	26,197,304	26,197,304	26,197,304	17,464,869	17,464,869	17,464,869	17,464,869	17,464,869	17,464,869	17,464,869	26,197,304	26,197,304	26,197,304	26,197,304	26,197,304	26,197,304	17,464,869	17,464,869	17,464,869	17,464,869	8,732,435	8,732,435	8,732,435
Total CY's of Concrete	857	42	84	1,025	3,296	2,261	2,261	2,261	4,522	4,522	4,522	6,783	6,783	6,783	6,783	4,522	4,522	4,522	4,522	4,522	4,522	4,522	6,783	6,783	6,783	6,783	6,783	6,783	4,522	4,522	4,522	4,522	2,261	2,261	2,261
Batch Plant Rate CY/hr	*5*	*0.2*	*0.5*	*6*	*19*	*13*	*13*	*13*	*26*	*26*	*26*	*39*	*39*	*39*	*39*	*26*	*26*	*26*	*26*	*26*	*26*	*26*	*39*	*39*	*39*	*39*	*39*	*39*	*26*	*26*	*26*	*26*	*13*	*13*	*13*
PM_{10} Emissions (lb/day)	0.662	0.03256	0.06511137	0.79219	2.539343	1.74716	1.74716	1.747	3.494	3.494	3.494	5.241	5.241	5.241	5.241	3.494	3.494	3.494	3.494	3.494	3.494	3.494	5.241	5.241	5.241	5.241	5.241	5.241	3.494	3.494	3.494	3.494	1.747	1.747	1.747
$PM_{2.5}$ Emissions (lb/day)	0.112	0.00552	0.01103276	0.13423	0.430278	0.29605	0.29605	0.296	0.592	0.592	0.592	0.888	0.888	0.888	0.888	0.592	0.592	0.592	0.592	0.592	0.592	0.592	0.888	0.888	0.888	0.888	0.888	0.888	0.592	0.592	0.592	0.592	0.296	0.296	0.296
hrs	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176
load	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
util	13%	1%	1%	15%	48%	33%	33%	33%	67%	67%	67%	100%	100%	100%	100%	67%	67%	67%	67%	67%	67%	67%	100%	100%	100%	100%	100%	100%	67%	67%	67%	67%	33%	33%	33%
kWh	2,223	109	219	2,660	8,527	5,867	5,867	5,867	11,733	11,733	11,733	17,600	17,600	17,600	17,600	11,733	11,733	11,733	11,733	11,733	11,733	11,733	17,600	17,600	17,600	17,600	17,600	17,600	11,733	11,733	11,733	11,733	5,867	5,867	5,867

total kWh 389,204

PLANT WIDE EMISSION FACTORS PER YARD OF CENTRAL MIX CONCRETE[a]

		Uncontrolled		Controlled	
		PM	PM_{10}	PM	PM_{10}
Activity (Process or Operation)	**SCC**	**(lb/yd 3)**	**(lb/yd 3)**	**(lb/yd 3)**	**(lb/yd 3)**
Aggregate delivery to ground storage	3-05-011-21	0.0064	0.0031	0.0064	0.0031
Sand delivery to ground storage	3-05-011-22	0.0015	0.0007	0.0015	0.0007
Aggregate transfer to conveyor	3-05-011-23	0.0064	0.0031	0.0064	0.0031
Sand transfer to conveyor	3-05-011-24	0.0015	0.0007	0.0015	0.0007
Aggregate transfer to elevated storage	3-05-011-04	0.0064	0.0031	0.0064	0.0031
Sand transfer to elevated storage	3-05-011-05	0.0015	0.0007	0.0015	0.0007
Cement delivery to Silo	3-05-011-07	0.0002	0.0001	0.0002	0.0001
Cement supplement delivery to Silo	3-05-011-17	0.0003	0.0002	0.0003	0.0002
Weigh hopper loading	3-05-011-08	0.0079	0.0038	0.0079	0.0038
Central mix loading	3-05-011-09	0.0630	0.0220	0.0031	0.0011
Total Facility	3-05-011-01	0.0950	0.0370	0.0360	0.0170

$PM_{2.5}/PM_{10}$ ratio 0.17

TABLE D.3-13
SUMMARY OF ALL SOURCES DAILY EMISSIONS BY MONTH (TOTAL) (BALLAST)

		Onsite Sources									
		Daily Emissions (lb/day)									
Month of Contruction	Total Equipment Quantity	PM10	PM2.5	CO	VOC	NOx	SO2	CO2	CH4	N2O	CO2e
1	7	1.21	1.11	11.81	3.10	26.10	0.03	2,715.77	0.26	0.00	2,721.30
2	24	4.61	4.22	40.85	12.17	86.13	0.10	9,401.93	0.80	0.00	9,419.77
3	24	3.48	3.19	28.73	8.73	59.72	0.07	6,178.83	0.61	0.00	6,192.30
4	35	5.45	5.00	47.76	15.39	92.77	0.11	9,504.29	1.06	0.00	9,527.32
5	33	4.90	4.49	42.88	14.23	80.12	0.09	8,212.58	0.95	0.00	8,233.26
6	27	3.12	2.87	27.10	9.91	51.10	0.06	5,004.15	0.71	0.00	5,019.18
7	46	5.52	5.07	46.79	16.90	111.27	0.13	11,388.82	1.21	0.00	11,415.01
8	56	7.10	6.50	62.43	21.13	145.96	0.16	15,096.60	1.42	0.00	15,128.04
9	51	6.64	6.09	58.99	19.53	140.64	0.16	14,595.34	1.42	0.00	14,626.16
10	47	6.17	5.66	55.11	18.33	132.38	0.15	13,938.66	1.31	0.00	13,967.32
11	50	3.22	2.94	28.48	8.60	59.29	0.06	6,013.53	0.60	0.01	6,027.97
12	71	6.64	6.06	58.02	17.70	119.80	0.13	12,262.68	1.11	0.01	12,288.91
13	67	5.90	5.38	51.62	15.83	101.82	0.11	10,491.51	0.94	0.01	10,514.20
14	55	5.00	4.57	43.84	12.64	85.53	0.09	8,576.39	0.81	0.01	8,595.59
15	93	7.16	6.53	62.44	18.04	120.54	0.13	11,987.53	1.12	0.01	12,015.02
16	92	6.97	6.35	60.75	17.59	117.17	0.13	11,726.93	1.08	0.01	11,753.57
17	117	7.42	6.75	65.09	19.25	126.73	0.14	12,893.16	1.09	0.02	12,921.31
18	116	7.03	6.40	62.00	17.78	120.20	0.13	12,056.48	1.08	0.02	12,084.18
19	79	5.07	4.62	45.09	12.82	88.56	0.10	8,905.93	0.81	0.01	8,926.20
20	74	3.92	3.57	33.82	9.91	63.26	0.07	6,301.09	0.55	0.01	6,315.96
21	74	3.92	3.57	33.82	9.91	63.26	0.07	6,301.09	0.55	0.01	6,315.96
22	57	5.59	5.10	48.63	14.55	95.44	0.10	9,673.67	0.85	0.01	9,694.16
23	55	5.00	4.57	43.84	12.64	85.53	0.09	8,576.39	0.81	0.01	8,595.59
24	55	5.00	4.57	43.84	12.64	85.53	0.09	8,576.39	0.81	0.01	8,595.59
25	74	3.92	3.57	33.82	9.91	63.26	0.07	6,301.09	0.55	0.01	6,315.96
26	94	7.55	6.88	65.54	19.51	127.08	0.14	12,824.21	1.12	0.01	12,852.14
27	92	6.97	6.35	60.75	17.59	117.17	0.13	11,726.93	1.08	0.01	11,753.57
28	91	6.57	6.00	57.66	16.13	110.63	0.12	10,890.25	1.08	0.01	10,916.44
29	93	7.16	6.53	62.44	18.04	120.54	0.13	11,987.53	1.12	0.01	12,015.02
30	92	6.97	6.35	60.75	17.59	117.17	0.13	11,726.93	1.08	0.01	11,753.57
31	92	6.97	6.35	60.75	17.59	117.17	0.13	11,726.93	1.08	0.01	11,753.57
32	74	3.92	3.57	33.82	9.91	63.26	0.07	6,301.09	0.55	0.01	6,315.96
33	74	3.92	3.57	33.82	9.91	63.26	0.07	6,301.09	0.55	0.01	6,315.96
34	75	4.31	3.92	36.91	11.38	69.80	0.08	7,137.77	0.55	0.01	7,153.09
35	74	3.92	3.57	33.82	9.91	63.26	0.07	6,301.09	0.55	0.01	6,315.96
36	37	1.96	1.78	16.91	4.96	31.63	0.03	3,150.54	0.28	0.01	3,157.98
37	37	1.96	1.78	16.91	4.96	31.63	0.03	3,150.54	0.28	0.01	3,157.98
38	37	1.96	1.78	16.91	4.96	31.63	0.03	3,150.54	0.28	0.01	3,157.98
39	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAX VALUE (lb/day)	117	7.55	6.88	65.54	21.13	145.96	0.16	15,096.60	1.42	0.02	15,128.04

TOTAL CONSTRUCTION PERIOD ONSITE EMISSIONS (TONS)									
2.10	1.92	18.34	5.54	36.66	0.04	3,713.58	0.35	0.00	3,721.95

TABLE D.3-13
SUMMARY OF ALL SOURCES DAILY EMISSIONS BY MONTH (TOTAL) (BALLAST)

		Offsite Sources									
		Daily Emissions (Lb/Day)									
Month of Contruction	Offroad Equipment Quantity	PM10	PM2.5	CO	VOC	NOx	SO2	CO2	CH4	N2O	CO2e
1	8.92	0.09	0.07	2.61	0.13	1.91	0.01	641.25	0.02	0.02	646.46
2	64.22	0.46	0.29	18.58	0.69	6.53	0.04	3,619.08	0.16	0.11	3,658.05
3	59.03	0.67	0.48	17.74	0.93	12.68	0.04	4,054.07	0.15	0.10	4,088.92
4	113.86	0.73	0.44	32.75	1.13	9.35	0.06	6,162.29	0.29	0.20	6,231.73
5	140.00	0.86	0.51	40.20	1.35	10.50	0.08	7,455.71	0.36	0.25	7,541.27
6	130.52	0.69	0.38	37.18	1.13	6.88	0.07	6,639.70	0.34	0.24	6,719.88
7	134.76	1.04	0.68	39.31	1.56	15.71	0.08	7,762.71	0.34	0.24	7,844.29
8	240.95	2.25	1.54	71.20	3.24	38.63	0.15	15,082.45	0.60	0.42	15,226.68
9	233.12	1.89	1.24	68.12	2.79	29.79	0.14	13,773.20	0.59	0.41	13,913.83
10	192.15	1.66	1.11	56.39	2.42	27.44	0.12	11,686.79	0.48	0.34	11,802.25
11	169.56	1.55	1.06	49.99	2.24	26.60	0.11	10,578.17	0.42	0.30	10,679.70
12	290.21	2.87	1.99	86.09	4.08	51.02	0.19	18,707.15	0.72	0.51	18,880.12
13	290.21	2.87	1.99	86.09	4.08	51.02	0.19	18,707.15	0.72	0.51	18,880.12
14	249.29	2.66	1.88	74.47	3.74	49.09	0.17	16,643.53	0.62	0.44	16,791.34
15	369.94	3.97	2.81	110.57	5.57	73.51	0.25	24,772.51	0.91	0.65	24,991.76
16	369.94	3.97	2.81	110.57	5.57	73.51	0.25	24,772.51	0.91	0.65	24,991.76
17	361.94	3.93	2.79	108.30	5.51	73.25	0.24	24,386.95	0.89	0.63	24,601.26
18	361.94	3.93	2.79	108.30	5.51	73.25	0.24	24,386.95	0.89	0.63	24,601.26
19	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
20	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
21	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
22	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
23	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
24	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
25	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
26	361.94	3.93	2.79	108.30	5.51	73.25	0.24	24,386.95	0.89	0.63	24,601.26
27	361.94	3.93	2.79	108.30	5.51	73.25	0.24	24,386.95	0.89	0.63	24,601.26
28	361.94	3.93	2.79	108.30	5.51	73.25	0.24	24,386.95	0.89	0.63	24,601.26
29	361.94	3.93	2.79	108.30	5.51	73.25	0.24	24,386.95	0.89	0.63	24,601.26
30	361.94	3.93	2.79	108.30	5.51	73.25	0.24	24,386.95	0.89	0.63	24,601.26
31	361.94	3.93	2.79	108.30	5.51	73.25	0.24	24,386.95	0.89	0.63	24,601.26
32	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
33	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
34	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
35	241.29	2.62	1.86	72.20	3.67	48.84	0.16	16,257.97	0.60	0.42	16,400.84
36	120.65	1.31	0.93	36.10	1.84	24.42	0.08	8,128.98	0.30	0.21	8,200.42
37	120.65	1.31	0.93	36.10	1.84	24.42	0.08	8,128.98	0.30	0.21	8,200.42
38	120.65	1.31	0.93	36.10	1.84	24.42	0.08	8,128.98	0.30	0.21	8,200.42
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAX VALUE (lb/day)	369.94	3.97	2.81	110.57	5.57	73.51	0.25	24,772.51	0.91	0.65	24,991.76

TOTAL CONSTRUCTION PERIOD OFFSITE EMISSIONS (TONS)									
1.00	0.70	28.91	1.41	18.19	0.06	6,380.02	0.24	0.17	6,437.72

TABLE D.3-13
SUMMARY OF ALL SOURCES DAILY EMISSIONS BY MONTH (TOTAL) (BALLAST)

	Fugitive Dust				Concrete Batch Plant	
	Daily Emissions (lb/day)				Daily Emissions (lb/day)	
Month of Contruction	Disturbed Area PM10	Cut/Fill PM10	Disturbed Area PM2.5	Cut/Fill PM2.5	PM10	PM2.5
1	13.30	13.00	2.77	2.70		
2	17.91	13.00	3.73	2.70		
3	10.60	13.00	2.20	2.70		
4	19.20	13.00	3.99	2.70	0.66	0.11
5	3.25	13.00	0.68	2.70	0.03	0.01
6	0.00	13.00	0.00	2.70	0.07	0.01
7	4.54	16.99	0.94	3.53	0.79	0.13
8	40.61	16.99	8.45	3.53	2.54	0.43
9	23.25	16.99	4.84	3.53	1.75	0.30
10	22.87	16.99	4.76	3.53	1.75	0.30
11	21.70	13.00	4.51	2.70	1.75	0.30
12	63.18	13.00	13.14	2.70	3.49	0.59
13	57.11	13.00	11.88	2.70	3.49	0.59
14	42.87	13.00	8.92	2.70	3.49	0.59
15	49.54	13.00	10.30	2.70	5.24	0.89
16	71.21	13.00	14.81	2.70	5.24	0.89
17	89.84	13.00	18.69	2.70	5.24	0.89
18	59.45	13.00	12.37	2.70	5.24	0.89
19	45.88	13.00	9.54	2.70	3.49	0.59
20	45.88	13.00	9.54	2.70	3.49	0.59
21	51.25	13.00	10.66	2.70	3.49	0.59
22	50.22	13.00	10.45	2.70	3.49	0.59
23	49.40	13.00	10.28	2.70	3.49	0.59
24	37.81	13.00	7.86	2.70	3.49	0.59
25	51.30	13.00	10.67	2.70	3.49	0.59
26	76.36	13.00	15.88	2.70	5.24	0.89
27	67.97	13.00	14.14	2.70	5.24	0.89
28	46.36	13.00	9.64	2.70	5.24	0.89
29	65.94	13.00	13.72	2.70	5.24	0.89
30	62.65	13.00	13.03	2.70	5.24	0.89
31	65.66	13.00	13.66	2.70	5.24	0.89
32	58.45	13.00	12.16	2.70	3.49	0.59
33	44.20	13.00	9.19	2.70	3.49	0.59
34	53.88	13.00	11.21	2.70	3.49	0.59
35	31.00	13.00	6.45	2.70	3.49	0.59
36	22.52	13.00	4.68	2.70	1.75	0.30
37	22.52	0.00	4.68	0.00	1.75	0.30
38	22.52	0.00	4.68	0.00	1.75	0.30
39					0.00	0.00
40					0.00	0.00
MAX VALUE (lb/day)	89.84	16.99	18.69	3.53	5.24	0.00

TOTAL CONSTRUCTION PERIOD FUGITIVE DUST EMISSIONS (TONS)				TOTAL CONSTRUCTION PERIOD CONCRETE BATCH PLANT EMISSIONS (TONS)	
17.13	5.24	3.56	1.09	1.25	0.21

TABLE D.3-13
SUMMARY OF ALL SOURCES DAILY EMISSIONS BY MONTH (TOTAL) (BALLAST)

	All Sources									
	Daily Emissions (lb/day)									
Month of Contruction	PM10	PM2.5	CO	VOC	NOx	SO2	CO2	CH4	N2O	CO2e
1	27.60	6.64	14.42	3.23	28.01	0.04	3,357.02	0.28	0.02	3,367.76
2	35.98	10.94	59.43	12.86	92.66	0.14	13,021.02	0.97	0.12	13,077.83
3	27.75	8.58	46.47	9.67	72.40	0.11	10,232.89	0.76	0.10	10,281.22
4	39.04	12.25	80.51	16.51	102.12	0.17	15,666.58	1.36	0.21	15,759.06
5	22.04	8.39	83.08	15.58	90.61	0.17	15,668.29	1.31	0.25	15,774.52
6	16.88	5.96	64.28	11.03	57.98	0.13	11,643.85	1.04	0.24	11,739.06
7	28.89	10.36	86.10	18.46	126.98	0.20	19,151.53	1.55	0.24	19,259.30
8	69.49	20.45	133.64	24.37	184.59	0.32	30,179.05	2.03	0.43	30,354.71
9	50.52	16.00	127.11	22.32	170.43	0.30	28,368.54	2.00	0.42	28,539.99
10	49.44	15.36	111.51	20.75	159.83	0.27	25,625.45	1.80	0.34	25,769.57
11	41.21	11.51	78.47	10.83	85.89	0.17	16,591.69	1.03	0.30	16,707.67
12	89.18	24.48	144.11	21.78	170.82	0.32	30,969.83	1.83	0.52	31,169.03
13	82.37	22.54	137.70	19.90	152.84	0.30	29,198.66	1.66	0.52	29,394.31
14	67.02	18.66	118.32	16.37	134.63	0.26	25,219.92	1.42	0.44	25,386.93
15	78.91	23.24	173.02	23.62	194.05	0.38	36,760.04	2.04	0.66	37,006.78
16	100.39	27.57	171.33	23.17	190.68	0.37	36,499.44	2.00	0.66	36,745.33
17	**119.44**	**31.82**	173.39	24.76	199.98	**0.38**	37,280.11	1.98	0.65	37,522.57
18	88.66	25.15	170.30	23.29	193.45	0.37	36,443.43	1.98	0.65	36,685.44
19	70.06	19.32	117.29	16.50	137.40	0.26	25,163.90	1.40	0.43	25,327.04
20	68.92	18.27	106.02	13.59	112.10	0.23	22,559.06	1.15	0.43	22,716.80
21	74.28	19.38	106.02	13.59	112.10	0.23	22,559.06	1.15	0.43	22,716.80
22	74.93	20.70	120.83	18.22	144.28	0.27	25,931.64	1.44	0.43	26,095.00
23	73.52	20.00	116.05	16.31	134.37	0.25	24,834.36	1.40	0.43	24,996.43
24	61.93	17.59	116.05	16.31	134.37	0.25	24,834.36	1.40	0.43	24,996.43
25	74.34	19.39	106.02	13.59	112.10	0.23	22,559.06	1.15	0.43	22,716.80
26	106.09	29.15	**173.84**	**25.02**	**200.33**	0.38	37,211.17	2.02	0.64	37,453.40
27	97.11	26.87	169.06	23.10	190.42	0.37	36,113.88	1.98	0.64	36,354.83
28	75.11	22.03	165.96	21.64	183.88	0.36	35,277.20	1.97	0.64	35,517.70
29	95.27	26.63	170.75	23.55	193.79	0.37	36,374.48	2.02	0.64	36,616.27
30	91.78	25.77	169.06	23.10	190.42	0.37	36,113.88	1.98	0.64	36,354.83
31	94.80	26.39	169.06	23.10	190.42	0.37	36,113.88	1.98	0.64	36,354.83
32	81.48	20.88	106.02	13.59	112.10	0.23	22,559.06	1.15	0.43	22,716.80
33	67.23	17.92	106.02	13.59	112.10	0.23	22,559.06	1.15	0.43	22,716.80
34	77.31	20.28	109.11	15.05	118.63	0.24	23,395.74	1.15	0.43	23,553.92
35	54.04	15.17	106.02	13.59	112.10	0.23	22,559.06	1.15	0.43	22,716.80
36	40.54	10.40	53.01	6.79	56.05	0.12	11,279.53	0.57	0.22	11,358.40
37	27.54	7.69	53.01	6.79	56.05	0.12	11,279.53	0.57	0.22	11,358.40
38	27.54	7.69	53.01	6.79	56.05	0.12	11,279.53	0.57	0.22	11,358.40
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAX VALUE (lb/day)	119.44	31.82	173.84	25.02	200.33	0.38	37,280.11	2.04	0.66	37,522.57

TOTAL CONSTRUCTION PERIOD EMISSIONS (TONS)									
26.72	7.48	47.25	6.95	54.85	0.10	10,093.61	0.59	0.17	10,159.67

TABLE D.3-14
SUMMARY OF ALL SOURCES AND THRESHOLD EMISSIONS (TOTAL) (BALLAST)

Activity	Tons					
	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-site Combustion Emissions	2.10	1.92	18.34	5.54	36.66	0.04
On-Site Fugitive Dust Emissions						
Construction Equipment	17.13	3.56				
Cut/Fill	5.24	1.09				
Concrete Batch Plant	1.25	0.21				
Subtotal of On-site Fugitive Emissions	23.62	4.86				
Subtotal of On-Site Emissions	25.72	6.78	18.34	5.54	36.66	0.04
Off-site Emissions	1.00	0.70	28.91	1.41	18.19	0.06
Total Emissions	26.72	7.48	47.25	6.95	54.85	0.10
AVAQMD Threshold	46.80		312.06	78.01	78.01	78.01

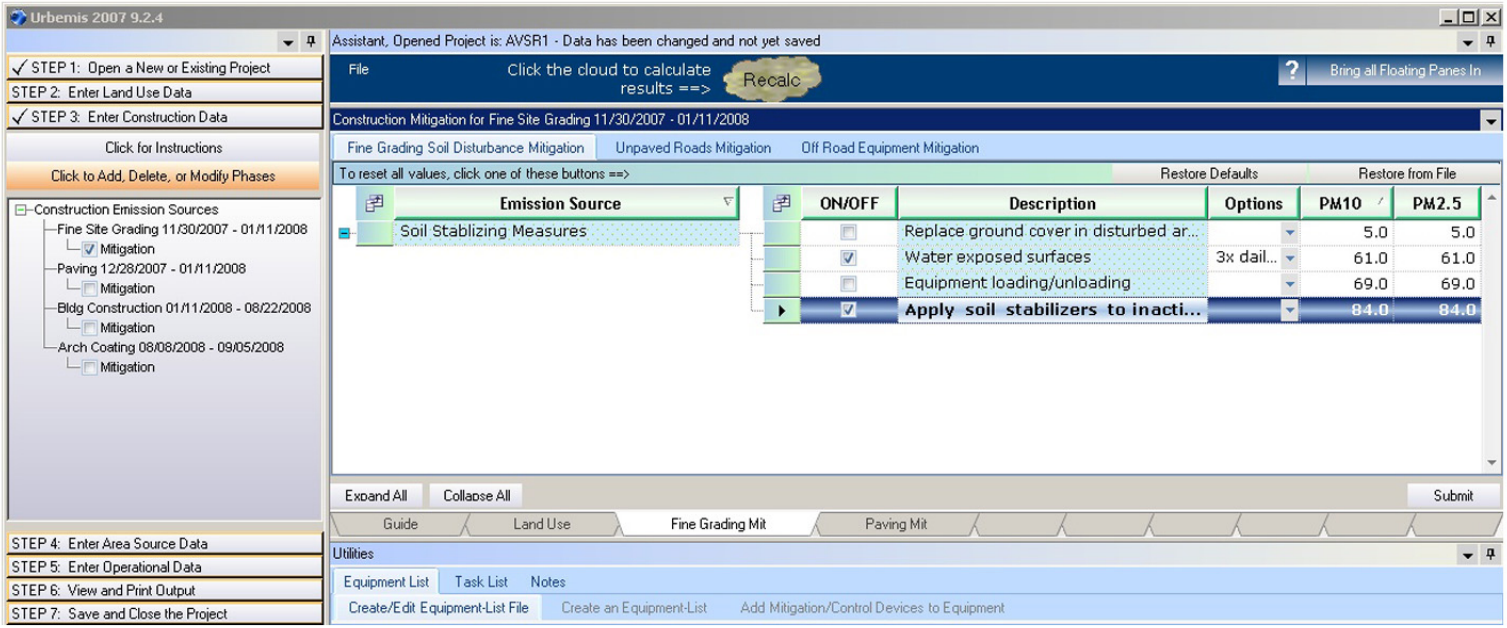
TABLE D.3-15
SUMMARY OF GHG EMISSIONS (TOTAL)
(BALLAST)

	Tons			
Activity	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
On-Site Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment	2735.09	0.34	0.00	2742.24
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	957.597	0.003	0.003	958.727
Worker Vehicles				
Security Vehicles				
Delivery Trucks				
Subtotal of On-site Combustion Emissions	**3692.68**	**0.34**	**0.00**	**3700.97**
On-Site Fugitive Dust Emissions				
Construction Equipment				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Security Vehicles				
Delivery Trucks				
Subtotal of On-Site Fugitive Emissions				
Subtotal of On-Site Emissions	**3692.68**	**0.34**	**0.00**	**3700.97**
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles	6009.67	0.33	0.23	6086.74
Delivery Trucks	2833.19	0.01	0.01	2836.07
Subtotal of Off-Site Combustion Emissions	**8842.86**	**0.33**	**0.24**	**8922.81**
Off-Site Paved Road Fugitive Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Delivery Trucks				
Subtotal of Off-Site Fugitive Emissions				
Subtotal of Off-Site Emissions	**8842.86**	**0.33**	**0.24**	**8922.81**
Total Entire Construction Period Emissions	**12535.54**	**0.68**	**0.24**	**12623.78**

TABLE D.3-15
SUMMARY OF GHG EMISSIONS (TOTAL)
(BALLAST)

	Metric Tons			
Activity	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
On-Site Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment	2,481.23	0.31	-	2,487.72
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	868.72	0.00	0.00	869.74
Worker Vehicles	-	-	-	-
Security Vehicles	-	-	-	-
Delivery Trucks	-	-	-	-
Subtotal of On-site Combustion Emissions	**3,349.95**	**0.31**	**0.00**	**3,357.46**
On-Site Fugitive Dust Emissions				
Construction Equipment				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Security Vehicles				
Delivery Trucks				
Subtotal of On-Site Fugitive Emissions				
Subtotal of On-Site Emissions	**3,349.95**	**0.31**	**0.00**	**3,357.46**
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	-	-	-	-
Worker Vehicles	5,451.88	0.30	0.21	5,521.80
Delivery Trucks	2,570.22	0.01	0.01	2,572.84
Subtotal of Off-Site Combustion Emissions	**8,022.10**	**0.30**	**0.21**	**8,094.64**
Off-Site Paved Road Fugitive Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Delivery Trucks				
Subtotal of Off-Site Fugitive Emissions				
Subtotal of Off-Site Emissions	**8,022.10**	**0.30**	**0.21**	**8,094.64**
Total Entire Construction Period Emissions	**11,372.05**	**0.61**	**0.22**	**11,452.10**

Figure D.3-1
Input from Urbemis 2007 Documenting Fugitive Dust Estimation Approach



Basis for Emission Factor	Recommended PM10 Construction Emission Factor
Default Level: Only area and duration known	Apply 0.22 tons/acre-month (average conditions)[1] Apply 0.42 ton/acre-month (worst-case conditions)
Low Level of Detail: Area and amount of earthmoving known	Apply 0.11 ton/acre-month for each month of construction activity Plus 0.059 ton/1,000 yd^3 of onsite cut/fill Plus 0.22 ton/1,000 yd^3 of offsite cut/fill These values assume that one scrapper can move 70,000 yd^3 of earth in one month and 35,000 yd^3 of material can be moved by truck in one month. If the on-/offsite fraction is not known, assume 100% onsite.
Medium Level of Detail: More detailed information available on duration of earthmoving and other material movement	Apply 0.13 lb/acre-work hr Plus 49 lb/scraper-hr for onsite haulage Plus 94 lb/hr for offsite haulage
High Level of Detail: Detailed information known on acres, hours or construction work, number of truck units or VMT, and truck travel distances.	Apply 0.13 lb/acre-work hr Plus 0.21 lb/ton-mile for onsite haulage Plus 0.62 lb/ton-mile for offsite haulage

D.4 OPERATIONAL PHASE EMISSION CALCULATIONS

This section presents the following tables:

- Table D.4-1 Daily Operational Emissions without Washing
- Table D.4-2 Daily Operational Emissions with Washing
- Table D.4-3 Daily Off-site Combustion Emissions
- Table D.4-4 Annual Off-site Emissions
- Table D.4-5 Emergency Firewater Pump Emissions
- Table D.4-6 Estimated Potential GHG Emissions from SF_6 Leakage from Circuit Breakers and other Transmissions Systems
- Table D.4-7 Estimated Daily Maximum Operational Emissions of Criteria Pollutants
- Table D.4-8 Estimated Maximum Annual Operational Emissions of Criteria Pollutants and Greenhouse Gases

Table D.4-1
Daily Operational Emissions
without Washing

Assumptions = 8 hours per day

Equipment	Miles per Day	Hours/ Day	HP	Emission Rate per Piece of Equipment (G/Mile)										Daily Emissions (Lb/Day)										
				PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Mobile Source																								
Water Truck	15	8	220	1.48	1.33	11.70	5.55	24.72	0.03	3,165.45	0.00	0.01	3,167.13	1	0.05	0.04	0.39	0.18	0.82	0.00	104.59	0.00	0.00	104.64
Fugitive Dust				67.13	56.84										2.22	1.88								
Pickup Truck	24	8	150	0.10	0.08	1.96	0.29	4.78	0.01	519.49	0.00	0.01	521.17	2	0.01	0.01	0.21	0.03	0.51	0.00	54.92	0.00	0.00	55.10
Fugitive Dust				0.41	0.35										0.04	0.04								

Equipment	Hours/Day	Emission Rate per Piece of Equipment (Lb/Hr)										Emission Rate (Lb/Day)										
		PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e		PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Hogger =Tractor	8	0.10	0.09	0.85	0.22	1.69	0.00	130.30	0.02	0.00	130.72	1	0.78	0.72	6.77	1.79	13.50	0.01	1,042.40	0.16	0.00	1,045.79
												Total	**3.11**	**2.69**	**7.37**	**2.00**	**14.82**	**0.01**	**1201.91**	**0.16**	**0.00**	**1205.53**

CO_2 GWP (SAR, 1996)	=	1
CH_4 GWP (SAR, 1996)	=	21
N_2O GWP (SAR, 1996)	=	310

Emission Factor from EMFAC for Heavy Duty Diesel Truck at 5 MPH

$PM_{2.5}/PM_{10}$ 0.15

Table D.4-2
Daily Operational Emissions with Washing

Assumptions = 8 hours per day

				Emission Rate per Piece of Equipment (G/Mile)										Daily Emissions (Lb/Day)										
Equipment	Miles per Day	Hours/ Day	HP	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Mobile Source																								
Water Truck	28.5	8	220	2.15	1.94	16.23	9.98	35.69	0.04	3,845.36	0.00	0.01	3,847.04	4	0.54	0.49	4.07	2.50	8.95	0.01	964.45	0.00	0.00	964.87
Fugitive Dust				67.13	10.07										16.85	2.53								
Pickup Truck	24	8	150	0.06	0.01	3.90	0.32	292.46	0.01	950.43	0.02	0.01	954.17	2	0.01	0.00	0.41	0.03	30.92	0.00	100.49	0.00	0.00	100.88
Fugitive Dust				0.41	0.06										0.04	0.01								

Emission Factor from EMFAC for Heavy Duty Diesel Truck at 5 MPH

$PM_{2.5}/PM_{10}$ 0.15

CO_2 GWP (SAR, 1996)	=	1
CH_4 GWP (SAR, 1996)	=	21
N_2O GWP (SAR, 1996)	=	310

Derivation of Miles Travelled:

Total Miles of Solar Array	127
Washing Period (weeks)	3
Speed of Truck (mph)	2
Miles per Week	42.3
Miles per Day	8.5
Miles to Water Connection	0.5
Trips per Day	20
Daily Mileage to Water	20

Table D.4-3
Daily Off-site Combustion Emissions

Passengers per Vehicle	=	1
Hours per Day	=	8
Days per Month	=	30.31

Vehicles with Onroad Engines for Emissions Estimates	Off-site Miles per Day Travelled per Vehicle	Hours/Day	Horsepower	Emission Factors (G/Mile)										Emission Rate per Piece of Equipment (Lb/Hr)										Daily Emissions (Lb/Day)										
				PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Quantity	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Passenger Vehicles	74.99	12	NA	2.80E-02	1.40E-02	1.72E+00	4.80E-02	1.94E-01	3.00E-03	2.92E+02	1.58E-02	1.10E-02	2.96E+02	0.000	0.000	0.024	0.001	0.003	0.000	4.016	0.000	0.000	4.068	15	0.07	0.03	4.26	0.12	0.48	0.01	722.92	0.04	0.03	732.20

Table D.4-4
Annual Off-site Emissions

Assumptions - 30.31 days per month

Passengers per Vehicle = 1

Equipment	Number of Vehicles per year	Off-site Miles per Day Travelled per Vehicle	Off-site Miles per Year Travelled all Vehicle	Emission factors (G/Mile)										Annual Emissions (Ton/Year)									
				PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Vehicles with Onroad Engines for Emissions Estimates																							
Passenger Vehicles	15	75	409130	0.028	0.014	1.718	0.048	0.194	0.003	291.779	0.016	0.011	295.521	0.01	0.01	0.77	0.02	0.09	0.00	131.47	0.01	0.00	133.16

Table D.4-5
Emergency Firewater Pump Emissions (Criteria and GHG)

Fire water Pump Engine Data

Engine Size			Basis
HP		180	assumption
Kw		134.28	
Other parameters			
Load		80%	
hours/week		1	Project Description
weeks/year		50	Project Description
Rated Fuel use	gal/hr	9.3	Cummins CFP7E-F30
btu/lb		19500	
lb/gal		7.9	
Hourly fuel	MMBtu/hr	1.146132	
	Lb/hr	58.776	

Tier 3 Emission Factors (Pollutant/units)

	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
	g//kW-hr	g//kW-hr	g//kW-hr	g//kW-hr	g//kW-hr	ppm Sulfur in Fuel	kg/mmbtu	kg/gal	kg/gal	
Cummins CFP7E-F30	0.2	0.184	3.5	0.125	2.5	15	73.15	0.0003	0.0001	

Fire Water Pump Emissions

	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Hourly emissions (lb/hr)	5.92E-02	5.45E-02	1.04E+00	3.70E-02	7.40E-01	1.76E-03	1.85E+02	6.15E-03	2.05E-03	
Annual emissions (lbs/year)	2.96	2.72	51.81	1.85	37.00	0.09	9241.57	0.31	0.10	
Annual emissions (tons/year)	0.00	0.00	0.03	0.00	0.02	0.00	4.62	0.00	0.00	
Annual emissions (MT/year)							4.19	0.00014	4.65E-05	4.21

Table D.4-6
Estimated Potential GHG Emissions from SF6 Leakage from Circuit Breakers and other Transmission Systems.

Breaker	Quantity	Typical Make	Typical Model	SF6 Mass	Annual Leakage Rate	Annual Leakage	Leakage	CO_2e
				lbs/breaker	(%)	lbs/year per breaker	lbs/year all breakers	MT/year
230kV main breaker (2000A)	1	GE-Hitachi HVB	HP Series	240	0.01	2.4	2.4	26.02
230kV Transformer breaker (2000A)	2	GE-Hitachi HVB	HP Series	240	0.01	2.4	4.8	52.04
34.5 kv Capaciator Breaker (1,2000 A)	3	GE-Hitachi HVB	HP Series	31	0.01	0.31	0.93	10.08
48.3 capacitor switcher	5	Southern States	Cap Switcher	7	0.01	0.07	0.35	3.79

Global Warning Potential for SF6	23900	Total	91.93

Table D.4-7
Estimated Daily Maximum Operational Emissions of Criteria Pollutants

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-site Emissions						
On-site Combustion Emissions						
Stationary Source						
Emergency Firewater Pump	0.06	0.05	1.04	0.04	0.74	0.00
Mobile Source						
Water Trucks (washing)	0.539	0.486	4.071	2.502	8.952	0.009
Pickup Trucks	0.539	0.008	0.208	0.031	0.505	0.001
Subtotal of On-site Combustion Emissions	1.14	0.55	5.31	2.57	10.20	0.01
On-site Fugitive Emissions						
Mobile Source						
Water Trucks (washing)	16.85	2.53				
Pickup Trucks	0.04	0.01				
Subtotal of On-site Fugitive Emissions	16.90	2.53				
Subtotal of On-site Emissions	18.03	3.08	5.31	2.57	10.20	0.01
Off-site Combustion Emissions						
Worker Vehicles	0.07	0.03	4.26	0.12	0.48	0.01
Subtotal of Off-site Emissions	0.07	0.03	4.26	0.12	0.48	0.01
Total Maximum Daily Emissions	18.10	3.12	9.57	2.69	10.68	0.02

Table D.4-8
Estimated Maximum Annual Operational Emissions of Criteria Pollutants and Greenhouse Gases (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x	CO_2	CH_4	N_2O	CO_2e
On-Site Emissions										
Emergency Firewater Pump	0.00	0.00	0.03	0.00	0.02	0.00	4.62	0.00	0.00	4.64
Mobile Source										
Water Truck	0.019	0.017	0.148	0.082	0.319	0.000	37.092	0.000	0.000	37.109
Pickup Truck	0.002	0.001	0.042	0.006	0.731	0.000	10.953	0.000	0.000	10.990
Hogger	0.025	0.023	0.220	0.058	0.439	0.000	33.878	0.005	0.000	33.988
Subtotal of On-site Combustion Emissions	0.05	0.04	0.44	0.15	1.51	0.00	86.54	0.01	0.00	86.73
On-Site Fugitive Dust Emissions										
Mobile Source										
Water Truck	0.711	0.356								
Pickup Truck	0.008	0.006								
Subtotal of On-Site Fugitive Emissions	0.72	0.36								
SF6 Leakage										101.34
Subtotal of On-Site Emissions	0.77	0.41	0.44	0.15	1.51	0.00	86.54	0.01	0.00	188.06
Off-Site On-Road Emissions										
Off-Site Combustion Emissions										
Worker Vehicles	0.01	0.01	0.77	0.02	0.09	0.00	131.47	0.01	0.00	133.16
Subtotal of Off-Site Emissions	0.01	0.01	0.77	0.02	0.09	0.00	131.47	0.01	0.00	133.16
Total Maximum Annual Emissions	0.78	0.41	1.21	0.17	1.59	0.00	218.01	0.01	0.01	321.22

D.5 WIND DATA FOR PROJECT AREA

D.5.1 Wind Data

This section presents wind data for the Project area.

Climate data was obtained from the National Oceanic and Atmospheric Agency (NOAA) National Climatic Data Center (NCDC). The Project site is located between the Sandburg (Station 72383023187) and Lancaster Gen Wm Fox Field (Station 72381603159) (Figure D.5-1).

Wind data for the Sanburg Station is presented graphically on Figure D.5-2, and summary wind data for this station is presented in Table D.5-1.

Wind data for the Lancaster Gen Wm Fox Field Station is presented graphically on Figure D.5-3, and summary wind data for this station is presented in Table D.5-2.

Wind data for Mojave Station is presented on Figure D.5-3 and in Table D.5-3.

FIGURE D.5-1
NCDC STATION LOCATIONS IN PROXIMITY TO PROJECT SITE

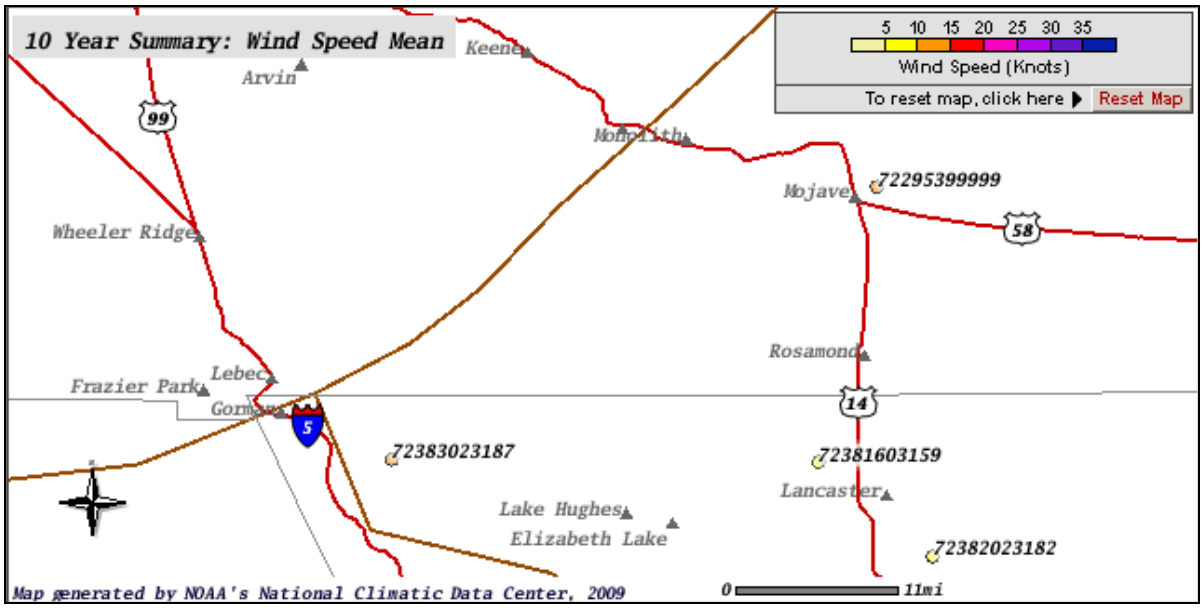
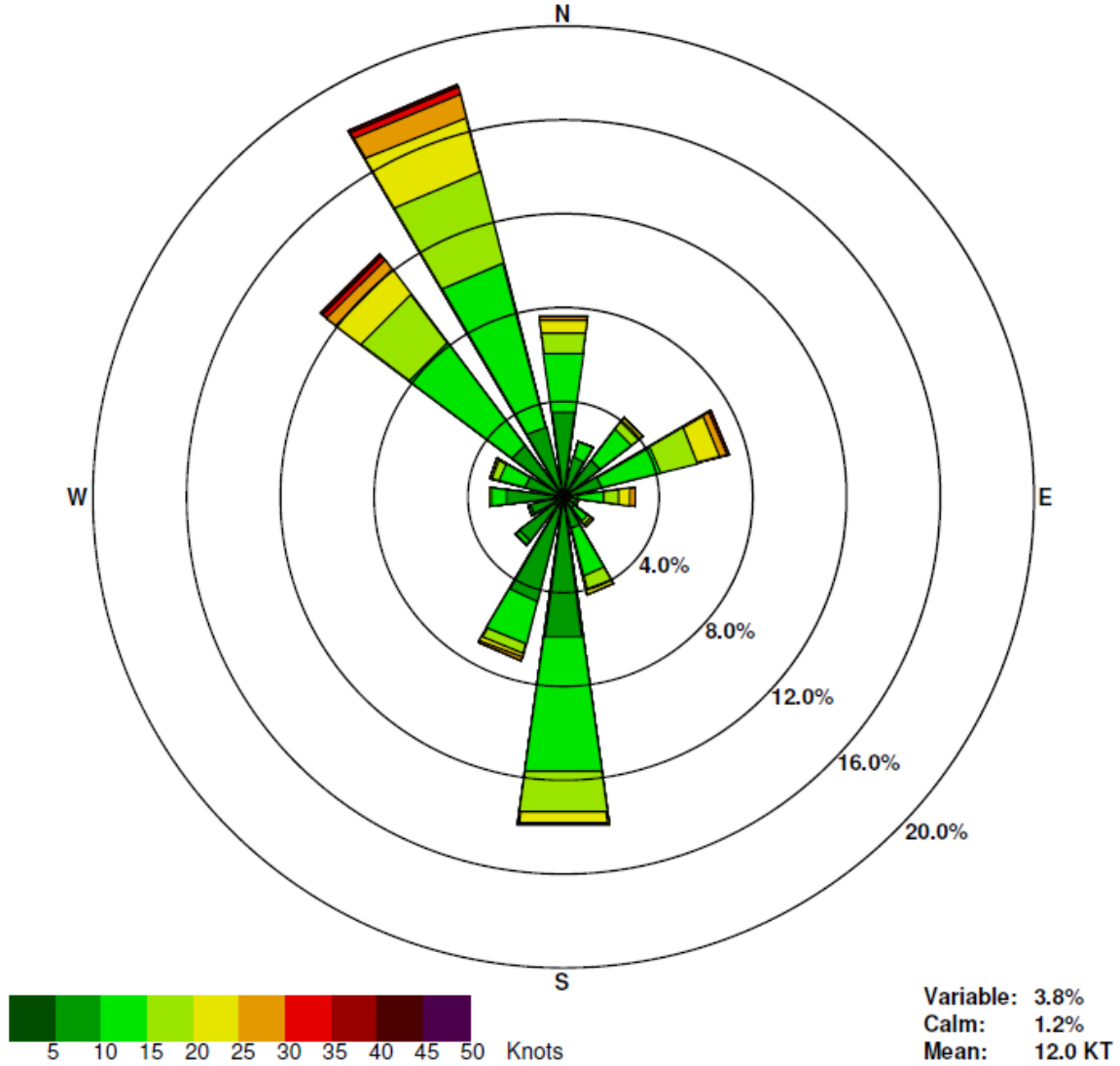


FIGURE D.5-2
SANDBURG (STATION 72383023187) WIND ROSE
10-YEAR SUMMARY: 1999–2008



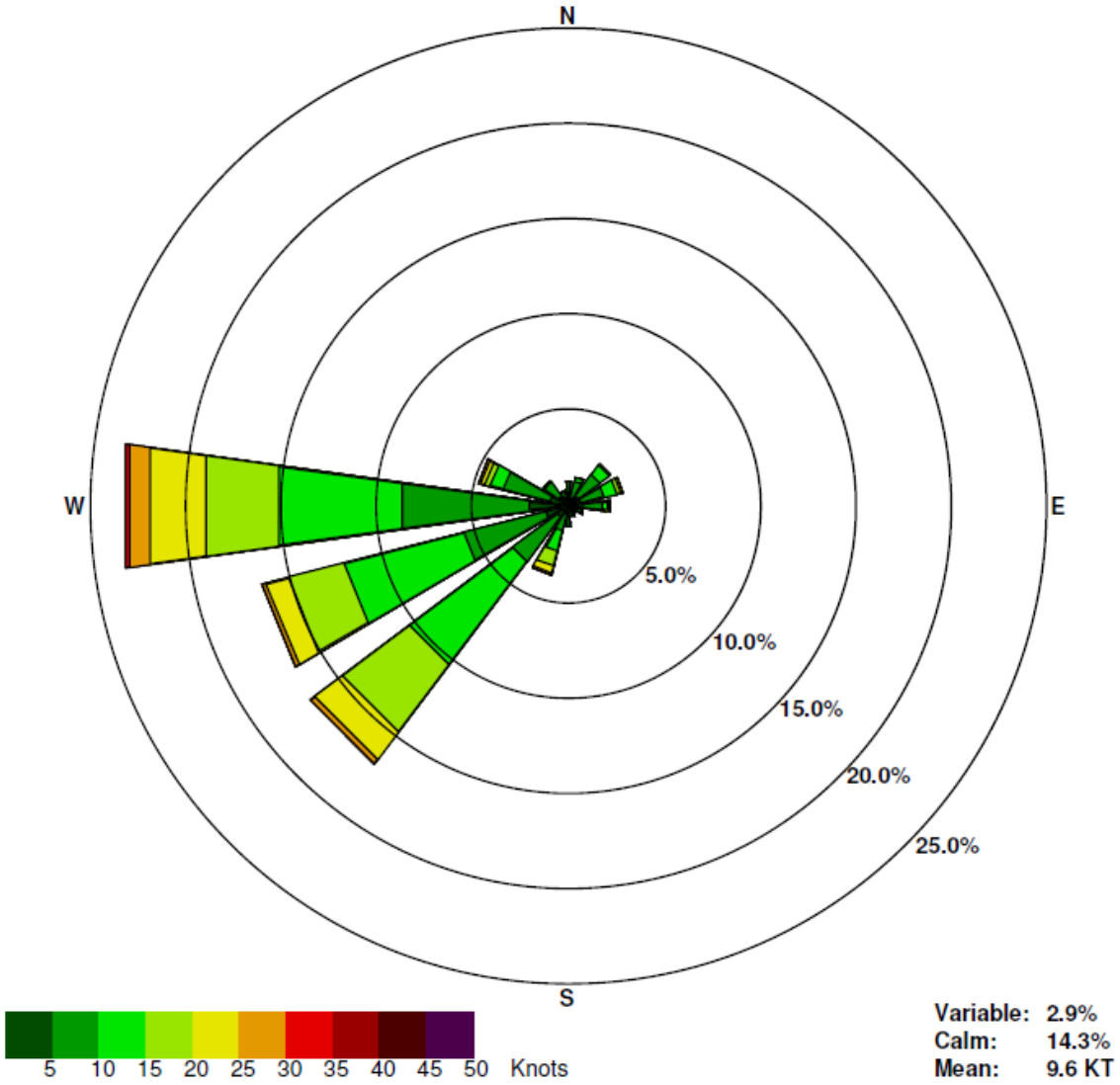
Source: NCDC 2009.

TABLE D.5-1
SANDBURG (STATION 72383023187) HOURLY WIND SUMMARY
PERIOD OF RECORD 01/01/1999–12/31/2008

Speed (knots)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	Total %	Mean Spd
N	0.3	3.4	2.5	0.9	0.5	0.2	0.0	0.0	0.0	0.0	7.8	11.7
NNE	0.2	1.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	8.6
NE	0.2	1.8	1.7	0.4	0.2	0.0	0.0	0.0	0.0	0.0	4.3	10.9
ENE	0.1	1.6	2.6	1.6	1.0	0.3	0.1	0.0	0.0	0.0	7.4	14.7
E	0.1	0.6	1.1	0.6	0.5	0.2	0.0	0.0	0.0	0.0	3.2	14.9
ESE	0.0	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6	10.7
SE	0.0	0.6	0.7	0.2	0.1	0.0	0.0	0.0	0.0	0.0	1.6	11.8
SSE	0.1	1.3	2.1	0.6	0.2	0.0	0.0	0.0	0.0	0.0	4.3	12.1
S	0.4	5.6	5.8	1.7	0.5	0.1	0.0	0.0	0.0	0.0	14.2	11.5
SSW	0.5	4.1	1.9	0.4	0.2	0.1	0.0	0.0	0.0	0.0	7.2	9.6
SW	0.5	1.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	6.8
WSW	0.3	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	6.7
W	0.3	2.2	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.3	8.6
WNW	0.1	1.6	1.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	3.4	10.6
NW	0.1	2.7	5.5	2.5	1.4	0.5	0.2	0.1	0.0	0.0	12.9	14.4
NNW	0.1	3.0	7.2	4.0	2.4	1.0	0.3	0.1	0.0	0.0	18.0	15.4
CLM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0
VAR	1.6	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	4.7
ALL	3.3	33.5	34.3	13.4	7.0	2.5	0.7	0.2	0.1	0.0	100.0	12.0

Source: NCDC 2009.

FIGURE D.5-3
LANCASTER GEN WM FOX FIELD (STATION 72381603159)
WIND ROSE 10-YEAR SUMMARY: 1999–2008



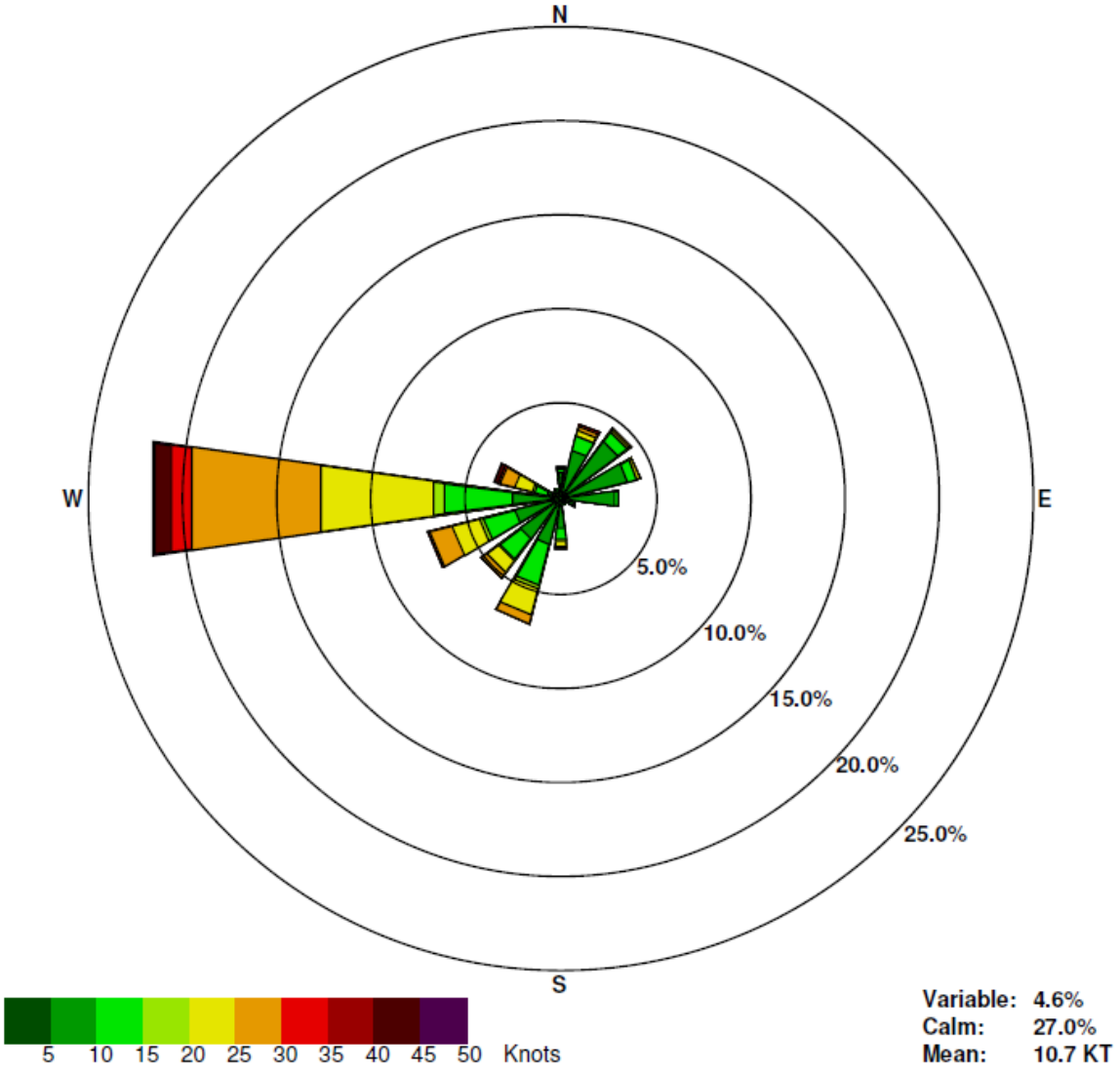
Source: NCDC 2009.

TABLE D.5-2
LANCASTER GEN WM FOX FIELD (STATION 72381603159)
HOURLY WIND SUMMARY PERIOD OF RECORD 01/01/1999–12/31/2008

Speed (knots)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	Total %	Mean Spd
N	0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	5.2
NNE	0.5	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	6.8
NE	0.7	1.4	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.9	7.9
ENE	0.7	1.3	0.7	0.2	0.1	0.0	0.0	0.0	0.0	0.0	3.0	8.6
E	0.8	1.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.2	6.5
ESE	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	4.8
SE	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	4.6
SSE	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	4.7
S	0.6	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	5.9
SSW	0.5	0.9	1.1	0.8	0.4	0.1	0.0	0.0	0.0	0.0	3.8	12.2
SW	0.8	2.9	6.7	4.4	1.9	0.2	0.0	0.0	0.0	0.0	16.9	13.8
WSW	1.3	4.4	6.5	3.0	1.2	0.2	0.0	0.0	0.0	0.0	16.6	12.4
W	2.1	6.7	6.5	3.9	2.9	1.1	0.2	0.0	0.0	0.0	23.4	13.1
WNW	1.1	2.5	0.7	0.3	0.2	0.1	0.0	0.0	0.0	0.0	5.1	8.9
NW	0.7	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	6.0
NNW	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	5.3
CLM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	0.0
VAR	2.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	3.8
ALL	12.2	25.2	23.6	13.0	6.8	1.7	0.3	0.0	0.0	0.0	100.0	9.6

Source: NCDC 2009.

FIGURE D.5-5
MOJAVE (STATION 72295399999) WIND ROSE
10-YEAR SUMMARY: 1999–2008



Source: NCDC 2009

TABLE D.5-3
MOJAVE (STATION 72295399999) HOURLY WIND SUMMARY
PERIOD OF RECORD 01/01/1999–12/31/2008

Speed (knots)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	Total %	Mean Spd
N	0.2	1.2	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.7	9.1
NNE	0.3	2.4	0.8	0.0	0.3	0.2	0.1	0.0	0.0	0.0	4.0	11.2
NE	0.3	3.5	0.7	0.0	0.1	0.1	0.0	0.0	0.0	0.0	4.7	8.8
ENE	0.3	3.4	0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	4.4	8.5
E	0.5	2.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	6.9
ESE	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	6.1
SE	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	6.7
SSE	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	7.4
S	0.1	1.5	0.6	0.1	0.3	0.1	0.0	0.0	0.0	0.0	2.7	11.6
SSW	0.1	2.5	2.2	0.2	1.4	0.5	0.0	0.0	0.0	0.0	7.0	14.6
SW	0.1	2.6	1.4	0.1	0.8	0.3	0.0	0.0	0.0	0.0	5.1	13.0
WSW	0.1	2.5	1.7	0.2	1.5	1.2	0.1	0.0	0.0	0.0	7.3	16.3
W	0.1	2.5	3.7	0.6	6.0	6.9	1.1	0.0	0.8	0.1	21.8	21.8
WNW	0.0	0.8	0.7	0.1	1.0	0.8	0.1	0.0	0.2	0.0	3.7	19.8
NW	0.0	0.4	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6	10.9
NNW	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	6.9
CLM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.0	0.0
VAR	1.5	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	4.8
ALL	2.3	27.2	12.8	1.3	11.9	10.1	1.4	0.0	1.0	0.2	100.0	10.7

Source: NCDC 2009.

D.6 INDIRECT EMISSIONS AND EMISSIONS AVOIDANCE FROM GRID-SUPPLIED POWER

This section presents the following tables:

- Table D.6-1 Indirect Emissions from Grid-supplied Power During Construction
- Table D.6-2 Indirect Emissions Avoided from Displacement of Grid-supplied Power

D.6-1
INDIRECT EMISSIONS FROM GRID-SUPPLIED POWER DURING CONSTRUCTION

Construction Phase Electric Energy Use		
Water Pumping		
Water Volume (Mgal)	Energy Intensity (MWh/Mgal)	Energy Use (MWh)
154.779225	2.915	451
Concrete Batch Plant		
Concrete Volume (CY)	Energy Intensity (MWh/CY)	Energy Use (MWh)
150,000	0.002594694	389
Water Pumping and Concrete Batch Plant		
		Total Energy Use (MWh)
		840

Ballast Foundation Case

Indirect Emissions from Grid-Supplied Power (Assuming CA Grid Mix from Wolffe 1995 and eGRID 2007)						
Pollutant	**g/kWh**	**Source**	**Lb/MWh**	**Lbs (Total Construction)**	**Tons (Total Construction)**	**MT CO_2e (Total Construction)**
CO	0.22105	Wolffe (CEC,1995)	0.487	409.5	0.205	
NO_X	0.10307	Wolffe (CEC,1995)	0.227	191.0	0.095	
PM_{10}	0.01816	Wolffe (CEC,1995)	0.040	33.6	0.017	
ROGs	0.01472	Wolffe (CEC,1995)	0.032	27.3	0.014	
SOx	0.000982	Wolffe (CEC,1995)	0.002	1.8	0.001	
CO_2		eGRID (2007)	724	608,439.2	304.220	276.2
CH_4		eGRID (2007)	0.03023	25.4	0.013	0.2
N_20		eGRID (2007)	0.0080756	6.8	0.003	1.0
Total CO_2e						277.4

GHG Global Warming Potential		
GHG	**Global Warming Potential**	**Source**
CO_2	1	CCAR (2008)
CH_4	21	CCAR (2008)
N_20	310	CCAR (2008)

Pile Foundation Case

Indirect Emissions from Grid-Supplied Power (Assuming CA Grid Mix from Wolffe 1995 and eGRID 2007)						
Pollutant	**g/kWh**	**Source**	**Lb/MWh**	**Lbs (Total Construction)**	**Tons (Total Construction)**	**MT CO_2e (Total Construction)**
CO	0.22105	Wolffe (CEC,1995)	0.487	219.9	0.110	
NO_X	0.10307	Wolffe (CEC,1995)	0.227	102.5	0.051	
PM_{10}	0.01816	Wolffe (CEC,1995)	0.040	18.1	0.009	
ROGs	0.01472	Wolffe (CEC,1995)	0.032	14.6	0.007	
SOx	0.000982	Wolffe (CEC,1995)	0.002	1.0	0.000	
CO_2		eGRID (2007)	724	326,655.4	163.328	148.3
CH_4		eGRID (2007)	0.03023	13.6	0.007	0.1
N_20		eGRID (2007)	0.0080756	3.6	0.002	0.0
Total CO_2e						148.4

APPENDIX E
BIOTA REPORT

NOTE TO READER:

This Biota Report was prepared and submitted by the Applicant to the Los Angeles County Significant Ecological Areas (SEA) Technical Advisory Committee (SEATAC) in November 2009, during preparation of the Draft EIR for the AV Solar One Project. Subsequent to submittal of the Biota Report, the Applicant voluntarily proposed modifications to the Project design that would avoid any Project overlap with designated SEAs. The modified design no longer proposes solar development in the northwest corner of the site, and the proposed transmission line route has been re-aligned to the east side of 170th Street West in the Los Angeles County portion, away from SEA #60 (Joshua Tree Woodland).

These refinements (and others) to the proposed Project have changed the details of the Project's impacts and related mitigation, and the Draft EIR reflects these changes. Thus, the Draft EIR represents the most up-to-date analysis of the Project's impacts, and supersedes the language presented in this Biota Report where differences exist. Impacts to biological resources are evaluated in Section 5.7 (Biological Resources) of the Draft EIR. However, this Biota Report presents relevant information regarding biological survey methods and results and the Project's environmental setting.

BIOTA REPORT

FOR THE
AV SOLAR RANCH ONE PROJECT

ANTELOPE VALLEY, CALIFORNIA

Los Angeles County Project Number:

- R2009-02239

Tract Map Number:

- TR071035

Assessor's Parcel Numbers:

- 3258-012-024 through 3258-012-083
- 3258-025-001 through 3258-025-059
- 3258-024-001 through 3258-024-028

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URS Project Number 28907103

Revised November 9, 2009

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List of Acronyms and Abbreviated Terms

Applicant	The project applicant, Antelope Valley Solar Ranch One, LLC
AB	Assembly Bill
AC	Alternating Current
AVAQMD	Antelope Valley Air Quality Management District
BCA	Biological Constraints Analysis
CAISO	California Independent Systems Operator
Cal-IPC	California Invasive Plant Council
CBC	California Building Code
CBOC	California Burrowing Owl Consortium
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Corps	The United States Army Corps of Engineers
County	The County of Los Angeles
CSC	California Species of Special Concern
CUP	Conditional Use Permit
CWA	Clean Water Act
DC	Direct Current
EIR	Environmental Impact Report
ESA	The United States Endangered Species Act
General Plan	The Los Angeles County General Plan
GHG	Greenhouse Gas
IEEE	Institute of Electrical and Electronics Engineers
LACBBA	Los Angeles County Breeding Bird Atlas
LACDRP	Los Angeles County Department of Regional Planning
LSE	Load-Serving Entity
NHD	National Hydrography Dataset
NEMA	National Electric Manufacturers Association
O&M	Operations and Maintenance
OHV	Off-Highway Vehicle
MW	Megawatt
PCS	Plant Control System
Project	The proposed solar generating facility and associated transmission line
PV	Photovoltaic
ROW	Right-of-Way
RWQCB	Regional Water Quality Control Board
SB	Senate Bill

List of Acronyms and Abbreviated Terms (Continued)

SBS	Los Angeles County Sensitive Bird Species
SCADA	Supervisory Control and Data Acquisition
SCE	Southern California Edison
SEA	Significant Ecological Area
SEATAC	Significant Ecological Areas Technical Advisory Committee
SMS	Solar Meteorological Station
SR-138	California State Route 138
SWRCB	State Water Resources Control Board
URS	URS Corporation
USFWS	Unites States Fish and Wildlife Service
USGS	United States Geologic Survey
WDR	Waste Discharge Requirements

EXECUTIVE SUMMARY

ES.1 INTRODUCTION AND BACKGROUND

AV Solar Ranch 1 (the Applicant) has retained URS Corporation (URS) to prepare this Biota Report for the AV Solar Ranch One project (Project), a proposed solar photovoltaic (PV) energy production facility near the City of Lancaster in unincorporated Los Angeles County, California (County). This Biota Report has been prepared in accordance with the County Department of Regional Planning's Significant Ecological Areas Technical Advisory Committee (SEATAC) *Procedures and Guidelines* (County 2004), which require preparation of a Biota Report whenever a proposed development project is to be located wholly or in part in any area containing significant biological resources. The proposed Project meets this criterion, due to its partial location within a County-designated Significant Ecological Area (SEA).

This Biota Report is organized as follows:

- **Section 1.0, Introduction and Background –** Explains the purpose of the Biota Report, and provides an introduction to the report's content.
- **Section 2.0, Project Description –** Provides a detailed description of all components of the proposed Project.
- **Section 3.0, Environmental Setting –** Describes the existing physical and biological characteristics of the Project site and the surrounding vicinity.
- **Section 4.0, Biological Field Surveys and Results –** Presents the biological investigations that have been conducted on the Project site to date, including survey methods and results.
- **Section 5.0, Impacts of the Proposed Project on Biological Resources –** Describes the effects of the Project on biological resources, and identifies those effects determined to be significant.
- **Section 6.0, Mitigation –** Recommends feasible mitigation measures that would avoid or substantially lessen the significant biological impacts of the proposed Project, and presents the level of impact significance that would be achieved by incorporating the recommended measures.
- **Section 7.0, Significant Ecological Area Design Compatibility –** Discusses the Project's consistency with the County's compatibility criteria for projects within SEAs.
- **Section 8.0, List of Preparers –** Includes the names and resumes of all individuals, including URS staff and contractors, involved in preparation of this Biota Report.

- **Section 9.0, References Cited –** Provides bibliographical citations for all data sources referenced in this Biota Report.

A Biological Constraints Analysis (BCA) was submitted to the County on March 18, 2009 in conjunction with a Conditional Use Permit Application for the Project. The BCA presented the results of preliminary biological investigations of the Project site. The BCA for the proposed Project was reviewed by the SEATAC on May 11, 2009. On that date, the Applicant was informed that the BCA was adequate, and that URS was to begin preparation of the Biota Report.

A Draft Biota Report was prepared by URS and submitted to SEATAC on August 17, 2009. URS received comments from SEATAC at a meeting on September 14, 2009 as documented in the SEATAC Meeting Minutes received on October 22, 2009. This revised Biota Report (November 2009) considers and addresses SEATAC's comments on the Draft Biota Report as well as recent changes made to the Project Description by the Applicant.

ES.1.1 Project Description

The proposed Project consists of a 230-MW solar PV power-generating facility and associated infrastructure, including a 4.5-mile transmission line. The site comprises approximately 2,100 acres (3.3 square miles) of largely natural habitat, on land that was previously farmed from the 1940s to the mid-1990s. The Project site is located in the western Antelope Valley in unincorporated Los Angeles County, approximately 15 miles west of downtown Lancaster. It is at the intersection of State Route 138 and 170th Street West, approximately 1.5 miles north of the Antelope Valley California Poppy Reserve. The site is zoned A-2, a heavy agricultural designation used for commercial agricultural operations on parcels exceeding two acres in size. A solar power generating facility is an allowed use upon issuance of a Conditional Use Permit.

The proposed transmission line route follows 170th Street West in a northerly direction from the Project site to the planned Southern California Edison (SCE) Whirlwind Substation, and consists of an approximately 3.5-mile-long off-site segment and a 0.75-mile-long on-site segment. The route is located within the County road right-of-way (ROW). The northern portion of the proposed transmission line route (approximately 2 miles) is within southern Kern County.

A 20-acre strip of the Project site is located within SEA #60, an area designated as sensitive by the County for its Joshua tree woodlands. The on-site strip SEA #60 does not contain either mapped Joshua tree woodland or individual Joshua trees. However, portions of SEA #60 are adjacent to the Project site along segments of the north and east boundaries of the property, and the Fairmont-Antelope Buttes SEA (SEA #57) is approximately 0.2 miles southeast of the Project site.

ES.2 ENVIRONMENTAL SETTING

The Project site is located entirely within the floor of the Antelope Valley which is relatively flat; elevations on-site range from 2,600 to 2,720 feet. Four ephemeral drainages are located on the Project site, and storm water runoff is generally from southwest to northeast. None of these drainages are federally jurisdictional waters, and there are no jurisdictional wetlands on-site. Approximately 4.58 acres of the ephemeral drainages are under the jurisdiction of the California Department of Fish and Game (CDFG) and the Lahontan Regional Water Quality Control Board.

The only structures on the site are associated with existing ranch facilities, just south of SR-138. These facilities would be removed from the site to allow for solar field development in this area. The project vicinity is sparsely populated, and surrounding land uses consist primarily of agriculture and open space. There are two existing water wells on-site in the area of the ranch facilities that may be used by the Project for process water (e.g., solar panel cleaning, dust control).

Focused and general biological surveys were conducted on the Project site and along the proposed transmission line route between June 2008 and June 2009. The survey effort began on June 27, 2008, when a biological reconnaissance survey was conducted to assess the potential for sensitive biological resources and to recommend appropriate future surveys.

Six natural vegetation communities occur on the Project site, and/or along the proposed transmission line route. These natural vegetation communities include rabbitbrush scrub, California annual grassland, Joshua tree woodland, Joshua tree recruitment area, wildflower field, and desert saltbush scrub. In addition, four disturbed or human-converted vegetation communities occur on the Project site and/or the proposed transmission line route, including orchard, agricultural, ruderal, and ornamental vegetation.

Nineteen special-status species were detected on the Project site and/or along the proposed transmission line route during the 2008–2009 surveys. These included 18 birds (Brewer's sparrow, burrowing owl, chipping sparrow, greater roadrunner, lark sparrow, Lawrence's goldfinch, loggerhead shrike, long-eared owl, merlin, mountain bluebird, northern harrier, prairie falcon, tricolored blackbird, Vaux's swift, western meadowlark, yellow warbler, yellow-breasted chat, and vesper sparrow), and one reptile (Blainville's horned lizard).

No federally- or state-listed threatened or endangered species were observed during surveys of the Project site and proposed transmission line route.

ES.3 SUMMARY OF POTENTIALLY SIGNIFICANT IMPACTS AND MITIGATION

The proposed generating facility would occupy nearly the entire Project site with solar PV panels, buildings, and associated electrical and access-related infrastructure. In total, the proposed Project would permanently remove approximately 400 acres (0.6 square miles) of existing natural habitats within the Project site and proposed transmission line route to allow placement of solar panel footings, access roads, and buildings; these areas would not contain natural habitat in the post-Project condition. After construction of the proposed Project, up to a total of 1,676 acres (2.6 square miles) within the Project site would be subject to shading by solar PV panels. In addition, plants will typically be mowed to a height of approximately 3 to 6 inches annually at end of May after the majority of annual natives have set seed to allow for reseeding; however, selective mowing may occur at other times if necessary for equipment maintenance and operation and fuel management. The proposed shading and vegetation management is expected to substantially affect the habitat quality and species composition of the affected areas. All four jurisdictional drainages within the Project site will be avoided with setbacks from 20 to 100 feet in width and would not be impacted by the Project.

Alteration of the majority of the site's existing habitat is expected to result in adverse effects on plants and wildlife on-site. The Project site and proposed transmission line route are used by a suite of wildlife, including several special-status birds, and impacts to these species resulting from Project construction, operation, and long-term maintenance of the proposed facility would occur. Additionally, the site would be fenced for security, and the proposed chain-link perimeter fencing would have the potential to restrict wildlife movement in the area. Wildlife permeable fencing would be installed around the site perimeter in 50-feet widths (minimum) for every 200 linear feet of fencing. Non-wildlife permeable fencing would be located on either side of Highway 138 and on the east side of the substation along 170th Street West. Wildlife permeable fencing would also be located on the berms adjacent to each side of Drainage A (Figure 2-5b).

For the purposes of this Biota Report, the significance criteria assessed in the Initial Study for the proposed Project, issued by the County on April 13, 2009, have been adopted to determine impact significance. Table ES-1 identifies the significant impacts identified in this Biota Report, recommended mitigation to reduce these impacts, and the level of impact following mitigation.

ES.4 SIGNIFICANT ECOLOGICAL AREA COMPATIBILITY

The Project would be highly compatible with the biological resources present within SEA #60 because:

TABLE ES-1
SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION

Significance Criteria	Summary of Significant Impact (SI)	Summary of Mitigation Measures	Resulting Level of Significance
Impacts would be significant if Project-related grading, fire clearance, or flood-related improvements would remove substantial natural habitat areas.	SI-1: Permanent loss of 400 acres of existing natural vegetation communities, including common and sensitive habitats, and modification of an additional 1,487 acres.	BIO-1: Develop Habitat Enhancement and Vegetation Management Plan according to criteria established in Biota Report. Plan includes provision for approximately 99 acres of on-site mitigation areas. BIO-2: Off-site mitigation for the loss of common and sensitive habitats shall be conducted. The loss of common existing natural habitats, rubber rabbitbrush scrub and annual grassland, shall be mitigated at a 0.2:1 ratio (20 percent). The loss of wildflower field habitat shall be mitigated at a 1.5:1 ratio (150 percent).	*Less Than Significant*
Impacts would be significant if the proposed Project would have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFG or USFWS.	SI-2: Permanent loss of 22.5 acres consisting of: removal of wildflower fields within the Project site; modification of an additional 130.5 acres through proposed vegetation management practices and panel-related shading; and 55.8 acres of habitat modification from ground disturbance.	BIO-1: Develop Habitat Enhancement and Vegetation Management Plan according to criteria established in Biota Report. Plan includes provision for approximately 99 acres of on-site mitigation areas. BIO-2: Off-site mitigation for the loss of common and sensitive habitats shall be conducted. The loss of common existing natural habitats, rubber rabbitbrush scrub and annual grassland, shall be mitigated at a 0.2:1 ratio (20 percent). The loss of wildflower field habitat shall be mitigated at a 1.5:1 ratio (150 percent).	*Less Than Significant*
	SI-3: Fugitive dust would adversely affect the Joshua tree recruitment area within the	BIO-1: Develop Habitat Enhancement and Vegetation Management Plan according to	*Less Than Significant*

TABLE ES-1 (CONTINUED)
SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION

Significance Criteria	Summary of Significant Impact (SI)	Summary of Mitigation Measures	Resulting Level of Significance
	Project site and the mature Joshua tree and two seedlings along 170th Street.	criteria established in Biota Report BIO-3A: Within 100 feet of mapped Joshua tree woodland vegetation, chemical dust suppression shall not be utilized. Where determined necessary by a qualified biologist, a screening fence shall be installed to protect sensitive resources which may be present. BIO-3B: Develop a Fugitive Dust Emission Control Plan (FDECP) for construction work, completed prior to construction and approved by the AVAQMD.	
Impacts would be significant if the proposed Project would result in a substantial adverse effect on oaks or other unique native trees.	SI-3: Fugitive dust would adversely affect the Joshua tree recruitment area within the Project site and the mature Joshua tree and two seedlings along 170th Street.	BIO-1: Implement a Habitat Enhancement and Vegetation Management Plan according to criteria established in Biota Report BIO-3A: Within 100 feet of mapped Joshua tree woodland vegetation, chemical dust suppression shall not be utilized. Where determined necessary by a qualified biologist, a screening fence shall be installed to protect sensitive resources which may be present. BIO-3B: Develop a Fugitive Dust Emission Control Plan (FDECP) for construction work, completed prior to construction and approved by the AVAQMD.	*Less Than Significant*
Impacts would be significant if the proposed Project would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a	SI-4: Construction of the proposed Project could potentially result in fugitive dust which would adversely affect plants and wildlife in adjacent areas.	BIO-3A: Within 100 feet of mapped Joshua tree woodland vegetation, chemical dust suppression shall not be utilized. Where determined necessary by a qualified biologist,	*Less Than Significant*

TABLE ES-1 (CONTINUED)
SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION

Significance Criteria	Summary of Significant Impact (SI)	Summary of Mitigation Measures	Resulting Level of Significance
candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS.		a screening fence shall be installed to protect sensitive resources which may be present. BIO-3B: Develop a Fugitive Dust Emission Control Plan (FDECP) for construction work, completed prior to construction and approved by the AVAQMD.	
	SI-5: Mowing the vegetation within the solar arrays may result in the destruction of bird nests or eggs, mortality or injury to nestlings, or the disruption of bird nesting.	BIO-4: Annual Nesting Bird Surveys will be conducted within 30 days prior to any mowing for vegetation management purposes, should these activities occur during the nesting/breeding season of native bird species potentially nesting on the site.	*Less Than Significant*
	SI-6: Injury or mortality of Blainville's horned lizard.	BIO-5: During the nesting season, monitor the presence of special-status wildlife species that may be potentially harmed during the installation of PV panels; relocate special-status wildlife species to undisturbed areas of suitable habitat, or flag/fence the area to protect the species. BIO-6: A Worker Environmental Education Program shall be implemented for construction crews according to criteria established in Biota Report. BIO-7: Prior to the initiation of ground clearing activities, capture and relocation efforts shall be conducted for the Blainville's horned lizard according to criteria established in Biota Report.	*Less Than Significant*

TABLE ES-1 (CONTINUED)
SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION

Significance Criteria	Summary of Significant Impact (SI)	Summary of Mitigation Measures	Resulting Level of Significance
	SI-7: Loss and permanent modification of 1,887 acres of suitable foraging habitat for the Blainville's horned lizard due to construction impacts, shading, and increased likelihood of Argentine ant invasions into the site.	BIO-1: Develop Habitat Enhancement and Vegetation Management Plan according to criteria established in Biota Report. Plan includes provision for approximately 99 acres of on-site mitigation areas. BIO-2: Off-site mitigation for the loss of common and sensitive habitats shall be conducted. The loss of common existing natural habitats, rubber rabbitbrush scrub and annual grassland, shall be mitigated at a 0.2:1 ratio (20 percent). The loss of wildflower field habitat shall be mitigated at a 1.5:1 ratio (150 percent).	*Less Than Significant*
	SI-8: Project construction could result in mortality of burrowing owls.	BIO-5: During the nesting season, monitor the presence of special-status wildlife species that may be potentially harmed during the installation of PV panels; relocate special-status wildlife species to undisturbed areas of suitable habitat, or flag/fence the area to protect the species. BIO-6: A Worker Environmental Education Program shall be implemented for construction crews according to criteria established in Biota Report. BIO-9: During the nesting/breeding season conduct pre-activity surveys to determine if active nests of special-status bird species are present according to criteria established in	*Less Than Significant*

TABLE ES-1 (CONTINUED)
SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION

Significance Criteria	Summary of Significant Impact (SI)	Summary of Mitigation Measures	Resulting Level of Significance
		Biota Report. BIO-10: Conduct pre-construction wintering burrowing owl surveys according to criteria established in Biota Report.	
	SI-9: Project construction could result in mortality of special-status bird species including the lark sparrow, loggerhead shrike, and western meadowlark.	BIO-5: During the nesting season, monitor the presence of special-status wildlife species that may be potentially harmed during the installation of PV panels; relocate special-status wildlife species to undisturbed areas of suitable habitat, or flag/fence the area to protect the species. BIO-6: A Worker Environmental Education Program shall be implemented for construction crews according to criteria established in Biota Report. BIO-9: During the nesting/breeding season conduct pre-activity surveys to determine if active nests of special-status bird species are present according to criteria established in Biota Report.	*Less Than Significant*
	SI-10: Loss and permanent modification of 1,887 acres of suitable foraging habitat for the burrowing owl, a resident sensitive species within the Project site.	BIO-1: Develop Habitat Enhancement and Vegetation Management Plan according to criteria established in Biota Report. Plan includes provision for approximately 99 acres of on-site mitigation areas. BIO-2: Off-site mitigation for the loss of common and sensitive habitats shall be conducted. The loss of common existing	*Less Than Significant*

TABLE ES-1 (CONTINUED)
SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION

Significance Criteria	Summary of Significant Impact (SI)	Summary of Mitigation Measures	Resulting Level of Significance
		natural habitats, rubber rabbitbrush scrub and annual grassland, shall be mitigated at a 0.2:1 ratio (20 percent). The loss of wildflower field habitat shall be mitigated at a 1.5:1 ratio (150 percent). BIO-11: Prior to issuance of a grading permit, a habitat management plan for the burrowing owl shall be developed for portions of the site supporting suitable habitat for burrowing owl and away from Project facilities and the solar panel arrays according to criteria established in Biota Report.	
	SI-11: The proposed Project would result in the loss and permanent modification of 1,887 acres of suitable foraging habitat for sensitive bird species including the ferruginous hawk, merlin, long-eared owl, greater roadrunner, mountain bluebird, lark sparrow, loggerhead shrike, vesper sparrow, prairie falcon, and western meadowlark.	BIO-1: Develop Habitat Enhancement and Vegetation Management Plan according to criteria established in Biota Report. Plan includes provision for approximately 99 acres of on-site mitigation areas. BIO-2: Off-site mitigation for the loss of common and sensitive habitats shall be conducted. The loss of common existing natural habitats, rubber rabbitbrush scrub and annual grassland, shall be mitigated at a 0.2:1 ratio (20 percent). The loss of wildflower field habitat shall be mitigated at a 1.5:1 ratio (150 percent).	*Less Than Significant*

- Project activities would avoid impacts to Joshua tree woodlands, which would be buffered by a minimum 50-foot setback from adjacent resources, would cause only minimal operational impacts, and would preserve or revegetate a total of 99 acres of natural habitat on-site.
- The Project site and proposed transmission line route do not occupy migratory paths for wildlife species of management concern. Installation of wildlife-permeable fencing and the creation of a wildlife corridor along Drainage A would minimize impacts on local wildlife movement.
- Because of the low level of activity associated with facility operations, the proposed setbacks from the adjacent SEA would adequately buffer these adjacent resources from disturbance.
- Because of the low-level of activity, fences or walls would not be necessary to buffer the adjacent SEA from project activities. However, security fencing would be provided along the site perimeter, with a minimum 50-foot buffer between the fence and the adjacent SEA.
- Maintenance of low-lying vegetation on the site would minimize soil erosion and fugitive dust that could impact the SEA.

On-site roads and utilities would not be constructed in areas of critical resources, habitat areas or migratory paths, and therefore, such facilities would not conflict with these uses.

SECTION 1.0
INTRODUCTION AND BACKGROUND

The Applicant proposes to construct and operate a 230-megawatt (MW) renewable solar photovoltaic (PV) electrical power generating facility, AV Solar Ranch One, and an associated transmission line (Project). This Biota Report has been prepared because a portion of the Project site and transmission line route is within the Joshua Tree Woodland SEA (SEA #60).

On March 18, 2009, the Applicant submitted an application for a Conditional Use Permit (CUP) to the County, and the Los Angeles County Department of Regional Planning (LACDRP) has initiated review of the proposed Project as required under the California Environmental Quality Act (CEQA). In the CEQA Initial Study completed on April 13, 2009, the County determined that an Environmental Impact Report (EIR) would need to be prepared before the County could issue the requested CUP. A completed Initial Study Questionnaire is included in Appendix A. The purpose of this Biota Report is to provide a description of existing biological resources within the Project site and surrounding area, to identify any significant impacts that would be visited upon those resources as a result of the proposed Project, and to identify feasible mitigation measures that would avoid or substantially lessen the Project's significant impacts. It is anticipated that the baseline information, impacts analyses, and mitigation measures presented in this Biota Report will be relied upon in those sections of the County's EIR for the proposed Project that pertain to biological resources.

1.1 INFORMATION PREVIOUSLY PRESENTED TO THE COUNTY AND TO THE SEATAC

As stated previously, the Applicant submitted an application for a CUP to the County on March 18, 2009. For development projects located within areas containing significant biological resources, the LACDRP requires a community-level Biological Constraints Analysis (BCA) to be prepared as part of the Initial Study environmental review process. One of the principal purposes of the BCA is to guide preparation of a Biota Report by identifying sensitive biological resources that may potentially be present within a subject property and recommending appropriate field surveys for these resources. Once submitted to the County, BCAs are reviewed by the SEATAC, and the SEATAC either concurs with the scope of surveys proposed in the BCA or recommends that additional survey efforts be included in the Biota Report. A BCA for the proposed Project was prepared on behalf of the Applicant by URS, and was submitted to the County on March 18, 2009. The BCA presented the results of preliminary biological investigations of the Project site, which included a reconnaissance-level field survey, wintering bird surveys, and the early phases of a delineation of jurisdictional waters and streambed, burrowing owl (*Athene cunicularia*)

habitat assessment, and Joshua tree (*Yucca brevifolia*) mapping. Field survey efforts proposed in the BCA included:

- Burrowing owl habitat assessment and focused surveys
- Wintering bird surveys
- Inventory of Joshua trees within the Project area
- Delineation of waters of the U.S. and CDFG-jurisdictional streambeds on-site
- Focused floristic transect surveys, to performed during the blooming period
- Nesting bird surveys, to be performed during the nesting season
- General wildlife surveys, incorporated into the proposed floristic transect surveys and Phase II burrowing owl transect surveys

The BCA for the proposed Project was reviewed by the SEATAC on May 11, 2009. On that date the Applicant was informed that the BCA was adequate, and that URS was to begin preparation of this Biota Report. With regard to biological field investigations, the SEATAC requested that a butterfly inventory of the site be performed in addition to the surveys proposed by URS in the BCA. All of the surveys enumerated above, including those originally proposed in the BCA and the butterfly inventory added at the request of the SEATAC, have been completed, and the results are presented in Section 4.0, Biological Field Surveys and Results of this Biota Report. A completed SEATAC Biota Report Guidelines Checklist is included in Appendix B.

The initial Draft Biota Report was submitted to Los Angeles County on August 17, 2009 for review by the SEATAC Committee. The report was discussed at the SEATAC meeting on September 14, 2009. The meeting minutes were approved on October 22, 2009, and comments relating to the Draft Biota Report were submitted to URS. The SEATAC comments have been incorporated into this revised Draft Biota Report.

1.2 STUDY AREA

The study area evaluated in this Biota Report includes the Project site and an associated off-site transmission line route. The Project site is located on approximately 2,100 acres (3.3 square miles) in the western Antelope Valley in unincorporated Los Angeles County, approximately 6 miles west of the corporate boundary of the City of Lancaster (see Figure 1-1). The Project site can be accessed from Interstate 5 (I-5) or State Route (SR-) 14 via SR-138 (West Avenue D) from the west and east, respectively, and is located on portions of Township 8 North, Range 14 and 15 West (San Bernardino Base and Meridian), within the Fairmont Butte U.S. Geological Survey (USGS) 7.5 series quadrangle. The Project site occupies areas both north and south of SR-138. Elevation of the Project site ranges from 2,720 to 2,600 feet, with generally flat topography gradually sloping to the northeast. The site

is zoned A-2, a heavy agricultural designation used for commercial agricultural operations on parcels exceeding two acres in size. The majority of the Project site was used for agricultural production between the 1940s and 1990s, although the only agricultural uses on-site currently include a pistachio root stock orchard and a ranch area supporting one occupied residence. The last crop was grown on the site in 2004, on an 80-acre area south of the existing on-site ranch house and orchard. The Project site is not adjacent to existing development, and is bordered by undeveloped lands and agricultural areas in all directions. A map of the study area and vicinity is presented on Figure 1-2. Figure 1-3 shows a recent aerial photograph of the Project site, and a topographic map is presented on Figure 1-4. A full-size USGS topographic map with the boundaries of the Project site and projects in the vicinity delineated is included in Appendix C.

The proposed transmission line route follows 170th Street West in a northerly direction to the planned Southern California Edison (SCE) Whirlwind Substation, and consists of an approximately 3.5-mile-long off-site segment and a 0.75-mile-long on-site segment. The total transmission line length is approximately 4.25 miles. (Figure 1-2). The route is located within the County road right-of-way (ROW) on the west side of the road until approximately 0.5 mile south of the Whirlwind Substation. At that point, the transmission line crosses over to the east side of 170th Street West and continues 0.5 mile to Astoria Avenue, near the proposed Whirlwind Substation. The northern portion of the transmission line (approximately 2 miles) is within southern Kern County; the remaining 2.25 miles is within Los Angeles County.

An alternate transmission line route connecting the Project site to the existing 230-kilovolt (kV) Antelope-Magunden transmission line was addressed in the BCA, but has since been rejected as infeasible since no public right-of-way currently exists along this route. The alternative transmission line route is therefore not discussed further in this Biota Report.

1.2.1 Significant Ecological Areas Potentially Affected

Two County-designated Significant Ecological Areas (SEAs) occur in close proximity to the study area: the Joshua Tree Woodland SEA (SEA #60) and the Fairmont – Antelope Buttes SEA (SEA #57). The intent of SEA #60 is to protect existing Joshua tree woodland habitat, as contiguous stands of this habitat are becoming scarce, especially in the western Antelope Valley. This SEA occurs as several discrete designated areas in the Project vicinity, and one of these areas overlaps the northernmost portion of the Project site. In addition, the proposed transmission line route is within or adjacent to this SEA for a distance of approximately 0.40 miles. The total acreage of SEA #60 is 4,430 acres, of which 20 acres (0.4 percent of the total SEA) are within the Project site. The Fairmont – Antelope Buttes SEA is located approximately 0.2 mile southeast of the Project site, and the site does not overlap this SEA. The limits of SEA #57 comprise approximately 5,567 acres, and the SEA contains

wildflower fields, native grasslands, and rocky outcrops that are uncommon in the Antelope Valley.

The Los Angeles County General Plan (General Plan) is currently undergoing an update process that could affect the location and extent of SEAs within the western Antelope Valley. The Applicant understands that the SEA boundaries in the existing General Plan are applicable until any pending updates are formally adopted by the County Board of Supervisors. However, in an effort to fully disclose the impacts of the proposed Project on biological resources, this Biota Report addresses both the formally adopted SEA boundaries and the boundaries proposed in General Plan updates that are currently in development or pending approval. For more detailed descriptions of SEAs #60 and #57, including existing and proposed boundaries, please refer to Section 3.0, Environmental Setting of this Biota Report.

1.3 TAXONOMIC NOMENCLATURE AND SPECIAL STATUS

Sources of taxonomic nomenclature for plants, animals, and vegetation communities used in this Biota Report are as follows:

- Plant nomenclature follows Hickman (1993) and the Jepson Online Interchange for name changes.
- Reptile nomenclature follows Stebbins (2003) and the California Herps website for name changes.
- Bird nomenclature follows the American Ornithologists' Union (2008).
- Mammal nomenclature follows Wilson and Reeder's Mammal Species of the World (2005).
- Natural vegetation communities were identified based on Sawyer and Keeler-Wolf (1995) and Holland (1986) and follow Holland nomenclature.

The term "special-status species," as used in this Biota Report, includes:

- Those plants and wildlife listed, proposed for listing, or candidates for listing as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) under the U.S. Endangered Species Act (ESA)
- Those plants and wildlife listed or candidates for listing as threatened or endangered by the CDFG under the California Endangered Species Act (CESA)
- Those birds, mammals, reptiles and amphibians, and fishes listed as "fully protected" by the California Fish and Game Code (Sections 3511, 4700, 5050, and 5515, respectively)
- Animals identified by the CDFG as California Species of Special Concern (CSC), Special Plants, or Special Animals (SA)

- Birds designated as Sensitive Bird Species (SBS) by the Los Angeles County Sensitive Bird Species Working Group (2009)
- Plants occurring on Lists 1, 2, and 4 of the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants (CNPS 2001) and the on-line Inventory (CNPS 2008)

Common avian species identified under the Migratory Bird Treaty Act that receive protection during the nesting season but otherwise maintain no sensitivity designation are not treated as special-status species in this Biota Report.

SECTION 2.0
PROJECT DESCRIPTION

2.1 OBJECTIVES

2.1.1 Introduction

The project description is the basis for all environmental analyses required by the California Environmental Quality Act (CEQA). The purpose of the project description is to describe the project in a way that will be meaningful to the public, reviewing agencies, and decision makers. The California CEQA Guidelines (Section 15124) state that the project description need not be exhaustive and should not supply extensive detail beyond that needed for evaluation and review of potential environmental impacts. The guidelines require that a project description address the following items: 1) the precise location and boundaries of the project; 2) a statement of the project objectives; 3) a general description of the project's characteristics; and 4) a statement briefly describing the intended uses of the EIR, inclusive of the specific project approvals. The following project description serves as the basis for the technical/environmental analyses contained in this document.

2.1.2 Project Purpose and Objectives

The primary purpose of the proposed AV Solar Ranch One Project (Project) is to generate 230 megawatts (MW) of clean, renewable electrical power utilizing solar photovoltaic (PV) technology and to integrate the electrical output of the Project into the electrical grid. The electricity produced by the proposed Project will be sold via a Power Purchase Agreement that will provide a set and secure rate of financial return for the Project.

The Applicant has identified the following objectives for meeting the proposed Project's purpose:

- ***Develop a solar project designed to help meet the increasing demand for clean, renewable electrical power.*** The United States has a greater solar energy resource potential than any other industrialized nation. The multiple benefits associated with developing this resource have been recognized by both federal and state policy makers. Development of solar resources reduces reliance on foreign sources of fuel, promotes national security, diversifies energy portfolios, contributes to the reduction of greenhouse gas emissions, and generates "green" jobs. The Project will contribute on-peak power to the electrical grid in California.

- ***Develop a solar project that will help California meet its statutory and regulatory goal of increasing renewable power generation.*** California has enacted legislation mandating that certain load serving entities (LSEs) procure enough renewable power to ensure that 20 percent of their retail sales are served by renewable resources by 2010, and is

currently considering legislation (Senate Bill [SB] 14; Assembly Bill [AB] 64) would increase the goal to 33 percent renewables by 2020. The California Air Resources Board has already adopted this requirement as part of its implementation of AB 32 (which addresses reductions in Greenhouse Gases [GHG]), and the Governor has directed State agencies to implement policies requiring LSEs to achieve 33 percent renewables by 2020 (Executive Order S-14-08, November 17, 2008). The Project is an eligible renewable resource within the meaning of the California Public Resources Code, and will help the State meet its current and planned goals for increasing renewable generation.

- ***Locate the project facilities in an area that optimizes desirable solar project characteristics with minimum potential for environmental effects.*** A key objective of the Applicant was to locate the PV facility in an area with the following characteristics: 1) adequate solar radiation; 2) close proximity to a high capacity 230-kilovolt (kV) substation with adequate transmission capacity to convey the electrical output of the Project without requiring downstream upgrades to the transmission grid; 3) lack of threatened and/or endangered biological species on the site; 4) relatively flat site that has been previously disturbed to minimize disturbance to native habitat and to minimize the need for site grading; 5) existing access to accommodate construction workforce needs; 6) lack of nearby sensitive receptors or land uses to minimize potential conflicts with Project development; 7) landowner that controls and is willing to sell a large enough parcel of land at market price (approximately 2,000 acres minimum) to accommodate a 230-MW PV facility; and 8) access to nearby workforce to minimize traffic and socioeconomic impacts.

- ***Locate the transmission line in an area that optimizes connection to the electrical grid with minimum potential for environmental effect and land use conflicts.*** Another key objective of the Applicant was to locate the PV facility and the off-site 230-kV transmission line in an area such that: 1) the length of the transmission line interconnection to the electrical grid is less than 5 miles to minimize transmission line losses and costs; 2) necessary transmission line right-of-way (ROW) can be acquired; 3) lack of threatened and/or endangered biological species along the transmission line route; and 4) co-locate the transmission line route with other linear facilities such as roads and pipelines to minimize new disturbance and potential conflicts with adjacent land uses.

- ***Develop a project that utilizes a reliable and proven solar technology with minimal use of natural resources.*** The final key Project objective is to utilize a proven PV panel and equipment design in order ensure that the facility will operate as planned in a reliable manner over the life of the Project in order to meet the primary purpose of the Project (i.e., to generate 230 MW of clean, renewable electrical power and to maximize the 250-MW interconnection request with Southern California Edison). An inherent characteristic of PV-based solar generation versus typical solar thermal generation technology is the

substantially reduced water needs for PV and the lack of need for heat transfer fluids and natural gas for maintenance of fluid temperature at night.

2.2 DISCRETIONARY ACTIONS

The following discretionary actions have been requested to be approved by Los Angeles County: 1) a Tentative Tract Map for a portion of the Project site for a reversion to acreage from 147 parcels to 1 parcel; 2) Conditional Use Permit No. RCUPT200900026 for the construction and operation of a 230-MW solar photovoltaic facility in an agricultural zone, for on-site grading of approximately 103,000 to 153,000 cubic yards of soil and for development within a Los Angeles County Significant Ecological Area; and 3) any other necessary discretionary or ministerial permits or approvals as may be required for the construction of the proposed Project.

In addition, subsequent to County approval of these entitlements, the following agency approvals may be required:

- Los Angeles County Department of Public Works: Approval for placement of electrical transmission line poles in County road ROWs through a License or Franchise agreement from the County Department of Public Works or the County Chief Executive Office; Encroachment Permit(s) for accessing County roads and road utility crossings
- Kern County Planning Department: Approval for placement of electrical transmission poles in County road ROW or an otherwise approved corridor; Land Use Permit; Encroachment Permit
- California Department of Fish and Game: Potential Streambed Alteration Agreement
- California Department of Transportation: Encroachment Permit for utility crossing of SR-138 (West Avenue D); Oversized Load Permits
- Regional Water Quality Control Board – Lahontan Region: State Water Resources Control Board coverage under the General Permits for storm water discharge during construction and operation; State Water Resources Control Board 401 Water Quality Certification
- Antelope Valley Air Quality Management District: Authority to Construct and Permit to Operate for installation and operation of an emergency diesel firewater pump.

In addition to various County of Los Angeles departments and other regulatory agencies with review and approval authority for this Project, the Los Angeles County Significant Ecological Areas Technical Advisory Committee (SEATAC) has authority for reviewing the Project's potential impacts and consistency with potentially affected Significant Ecological Areas. SEATAC's authority stems from the portion of the proposed Project, including off-site transmission line route, within the Joshua Tree Woodland Significant Ecological Area.

It is noted that the California Energy Commission (CEC) and California Public Utilities Commission (CPUC) have no jurisdiction over the Project. The CEC only has jurisdiction over concentrating solar (thermal electric) facilities over 50 MW; they do not have jurisdiction over PV projects.

The majority of the required permit applications for the Project would be obtained following certification of the EIR, which will be considered by the County of Los Angeles as Lead Agency. The County of Los Angeles has the greatest responsibility for review and approval of the Project as a whole.

2.3 PROJECT LOCATION AND BOUNDARIES

2.3.1 Project Site

The proposed Project site is located in the Antelope Valley, in unincorporated Los Angeles County, approximately 15 miles northwest of downtown Lancaster. The Project site can be accessed from Interstate 5 (I-5) or State Route 14 (SR-14) via SR-138 (West Avenue D) from the west and east, respectively (refer to Figure 1-1). The property consists of approximately 2,100 acres, and is located within Sections 11, 13, 14, and 24 in Township 8 North, Range 15 West, and within Section 18 in Township 8 North, Range 14 West (San Bernardino Base and Meridian). This site occupies an area both north and south of SR-138, and is approximately bounded on the north by West Avenue B-8, on the south by West Avenue E, on the east by 155th Street West and on the west by 180th Street West (refer to Figures 1-3 and 1-4). Most of the Project site is undeveloped or has been used for agricultural production since the 1940s, and includes a residential ranch area that will be removed as part of the solar field construction. The Project site is located in an area with suitable solar radiation characteristics, flat terrain, and close proximity to existing electrical transmission facilities.

A small portion of the site (a 20-acre portion) overlaps the existing Joshua Tree Woodland Habitat Significant Ecological Area (SEA) (SEA #60), as defined by the 1986 update to the Los Angeles County General Plan (as implemented by adoption of the Area Plan, December 2, 1986); however, no portion of the site retains the characteristics of Joshua tree woodland habitat. The County is currently considering revising SEA boundaries in the site vicinity to more accurately reflect existing Joshua tree woodland habitat. This revision would remove the current SEA designation from the 20-acre portion of the Project site.

A Joshua tree recruitment area is located along the northern property boundary of the site (see Figure 2-1a) that consists of a 7.3-acre area with a relatively low density of Joshua tree seedlings (an average of 6.8 per acre). The vegetation in this area is dominated by species found within the rabbitbrush scrub habitat type; thus, it is not considered true Joshua tree woodland habitat. As shown on Figure 2-1a, this area will be avoided by the Project, and the avoidance area will include a buffer of approximately 50 feet from the nearest Joshua trees to the Project perimeter fencing.

The area surrounding the Project site is similar to the site itself and generally consists of agricultural or undeveloped land with occasional residential or farm-related structures. Fairmont Butte is near the southeast corner of the property, and the Antelope Valley Poppy Reserve (Poppy Reserve) is located approximately 1.5 miles to the southeast. Santa Monica Mountains Conservancy land is located approximately 0.5 to 1 mile to the southeast, and includes a portion of Fairmont Butte. Arthur B. Ripley Desert Woodland State Park is located approximately 2.5 miles to the southwest, and SEA #60 is adjacent to the Project on the north and east. The Fairmont-Antelope Butte SEA #57 is located approximately 700 feet to the southeast of the Project property.

2.3.2 230-kV Transmission Line

The proposed 230-kV transmission line consists of an approximately 3.5-mile-long off-site segment and a 0.75-mile-long on-site segment. The total transmission line length is approximately 4.25 miles long, and is proposed to run along the public ROW of 170th Street West to interconnect to SCE's planned Whirlwind Substation north of the Project site in southern Kern County (refer to Figure 1-3). The northern portion of the proposed transmission line route (approximately 2 miles) is located in southern Kern County and generally consists of agricultural land within the Willow Springs Specific Plan area. The portion of the proposed transmission line route in Kern County is adjacent to the Antelope Valley Water Bank Project area located immediately to the east.

The proposed transmission line route along 170th Street West traverses approximately 0.4 mile of SEA #60 immediately north of the Project site. Field surveys have confirmed that within this portion of SEA #60 there is a low density of Joshua trees, which occur only along 0.25 mile of the route. The revised SEA boundaries currently being considered by the County are consistent with the field surveys.

2.4 PROJECT CHARACTERISTICS

The proposed Project consists of a 230-MW alternating current (AC) solar PV facility located on 2,100 acres of land that was previously used for agricultural production in northern Los Angeles County along SR-138, also designated as West Avenue D (Figures 1-3 and 1-4). The Project includes an overhead 230-kV transmission line for interconnecting the electrical output of the Project to the regional transmission system. The proposed transmission line is approximately 4.25 miles long (0.75 mile on-site and 3.5 miles off-site), and will interconnect to SCE's planned Whirlwind Substation north of the Project site in southern Kern County. The Project is currently planned to begin construction in the fourth quarter of 2010 and to be completed by the fourth quarter of 2013.

2.4.1 Facility Equipment

The major Project equipment includes the following:

- PV solar panels
- Single-axis trackers (to position PV panels with the sun's movement), or fixed-tilt supports
- Inverters (to convert electricity from direct current [DC] to AC)
- Pad mounted transformers and circuit breakers

The proposed design is to arrange PV panels, tracking units, inverters, and transformers into 1- to 3-MW blocks, that combined, will achieve the full plant capacity. The Project would include approximately 78,500 to 84,500 single-axis tilted tracker units, 1,600 to 1,620 drive motors, and 180 to 185 pads and enclosures for electrical equipment, including inverters and transformers. If horizontal trackers or fixed tilt panels are used, the actual number of trackers or supports will be more for the same solar field area. Inverter and transformer sizes will be selected based on cost and market availability prior to construction; typical sizes are described in Section 2.4.1.3. The proposed facility layout for the Project, based on single-axis trackers, is provided on Figures 2-1a through 2-1d which show the locations of the solar panel arrays and Project facilities, as well as the location and details of associated site components such as infiltration basins, fencing, and fire breaks.

2.4.1.1 Photovoltaic Solar Panels

Photovoltaic panels (or modules) will produce all of the electricity generated by the Project facilities. PV panels are non-reflective and convert sunlight directly into DC electricity, therefore consuming no fossil fuels and emitting no pollutants during operations. The Project will utilize crystalline silicon, or thin-film PV technology mounted on tracker units or fixed-tilt supports as described below.

2.4.1.2 Tracker and Fixed-tilt Units

The tracker units described in this section are based on SunPower T-20 (tilted) and T-0 (horizontal) trackers; actual equipment will be similar to this technology, and will be selected based on cost and market availability. Both the T-20 and T-0 tracker units have the capability to "track" the path of the sun, as opposed to the fixed-tilt units which do not.

On T-20 trackers, the PV modules are mounted facing south and tilted at 15 degrees from horizontal. The highest point on these units (i.e., the uppermost solar panel) is about 12 to 15 feet above the ground surface. The tilted tracker units will be arranged in east-west oriented rows connected by drive shafts to drive motors that rotate the solar panels from east to west to follow the sun on a single axis throughout the day (Figure 2-2). A visual simulation of typical tilted tracker units with ballast foundations is provided on Figure 2-3.

The drive motors are located approximately every 1,200 feet along each east-west row, and each motor will drive up to 1,200 feet of trackers. The proposed Project design includes mounting the drive motors on ballast concrete foundations, approximately 7 feet by 12 feet in area and approximately 2 feet thick. However, the tracker units may be mounted on precast or cast-in-place concrete ballasts, or embedded foundations. The foundations are located at the north and south end of each tracker unit. The ballast foundations are approximately 10 feet long by 2 feet wide and 1.5 feet high. Alternatively, embedded (screw-type) foundations could be utilized; embedded foundations are approximately 4.5 to 12 inches in diameter and up to 15 feet deep. The northern end of the tracker is attached to two separate foundations, such that each tracker shares a foundation with an adjoining tracker. This shared foundation design provides the necessary support in strong wind conditions.

On T-0 trackers, the PV modules are mounted horizontal (not tilted to the south). The vertical support legs at each end of the trackers consist of foundations that may include: 1) concrete piers approximately 18 to 24 inches in diameter and 6 to 8 feet deep; 2) driven piers approximately 4 inches in diameter and 10 feet deep; or 3) screw-type foundations approximately 4.5 inches to 12 inches in diameter and up to 15 feet deep. The drive motors are typically mounted on concrete pier foundations approximately 2 to 3 feet in diameter, and 10 to 14 feet deep. The highest point for a T-0 horizontal tracker is achieved during the morning and evening hours when the trackers are tilted at their maximum angle, and is approximately 8 feet off the ground surface.

If fixed-tilt panels are used, they would be constructed in an arrangement similar to the T-0 trackers, and would likely utilize pile foundations for support. It is estimated that approximately 465,000 steel piles would need to be installed within the solar field area; the piles would be approximately 6 inches in diameter and 10 feet deep. The fixed tilt panels would be positioned to receive optimal solar energy, but the panels do not track the path of the sun. Fixed tilt panels would be approximately 6 feet off the ground surface at the highest point.

The height of the panels, whether trackers or fixed-tilt, may be slightly higher if constructed in areas of the site subject to inundation during large storm events, to avoid inundation to the solar panels or electrical equipment.

2.4.1.3 Inverters and Transformers

The Project inverters and medium voltage transformers, as well as other electrical equipment, are located within approximately 180 to 185 protective electrical equipment enclosures supported by concrete pads (Figure 2-4). Each enclosure is approximately 15 feet wide, 60 feet long, 10 to 12 feet in height, and houses 3 inverters and 1 transformer to support approximately 1.5 MW DC (for a Project total of 540 to 555 inverters and 180 to 185

transformers). Typical inverter and transformer specifics are provided below; the dimensions may vary slightly pending final Project design:

- Inverters
  - Dimensions: 3.5 feet width by 12 feet length by 8 feet height
  - Capacity: 500 kilowatts (kW)
- Transformers
  - Dimensions: 10 feet width by 10 feet length by 8 feet height
  - Capacity: 1,000 kilovolt-amperes (kVA)
  - Oil: Each medium voltage transformer contains approximately 400 gallons of dielectric oil (for insulation and heat transfer) that consists of fire resistant vegetable oil

2.4.1.4 Electrical Collection and Distribution System

The DC output of multiple rows of PV modules is collected through one or more combiner boxes, and associated electrical wiring which would deliver DC power along an underground trench (approximately 3 feet deep and 3 feet wide to an inverter in the electrical equipment enclosures described above. The inverter converts the DC electricity to AC electricity, which then flows to a medium voltage transformer where it is stepped up to collection level voltage (approximately 34.5 kV). Multiple transformers are connected in series, and deliver AC power along an underground trench (approximately 4 feet deep and 3 feet wide to electrical risers located throughout the site. From the risers, the power is delivered to the internal 34.5-kV overhead collection lines to the on-site Project substation. The on-site overhead lines would be mounted on about 90 wooden poles (18 inches in diameter) approximately 60 feet tall and spaced about 160 feet apart.

Locations of the trenching, electrical risers, and overhead distribution lines are shown on Figure 2-4. In total, the proposed Project includes approximately 25 to 30 miles of underground trenching and 2 to 3 miles of overhead 34.5-kV collection lines on the site.

2.4.2 Facilities Auxiliary Systems

The following subsections describe the various proposed on-site facilities and auxiliary systems associated with the Project.

2.4.2.1 Buildings

The Project includes a single operations and maintenance (O&M) building adjacent to the solar field (see Figures 2-1a). The design and construction of this building will be consistent with County building standards. As indicated on Figure 2-5a, the building will be approximately 100 feet wide, 200 feet long, and 27.5 feet high, and will be surrounded by a paved parking area with 36 parking spaces. The O&M building will include administrative and operational offices as well as a material storage and equipment warehouse.

The O&M building will be a pre-engineered steel building, with: 1) color compatible steel siding chosen to minimize visual impact as approved by the Los Angeles County Department of Regional Planning; 2) translucent roof panels; and 3) continuous ridge ventilation. The maintenance area of the building will be provided with roll-up doors to provide equipment access to the maintenance portion of the building as well as personal access doors. The Operations area of the building will be divided into several rooms using commercial construction materials consistent with the California Building Code (CBC) and the Los Angeles County building code.

The O&M Building is expected to be supported on structural mat foundations, which consist of reinforced concrete pads typically installed at or just below grade.

2.4.2.2 Substation

The Project substation will be located along the west side of 170th Street West as shown on Figure 2-1a, and will step up the 34.5-kV collection level voltage to 230 kV for off-site transmission to the SCE Whirlwind substation. The Project substation area will be approximately 350 feet by 350 feet with a drainage collection area of about 50 feet by 200 feet (Figure 2-5b), and will include a microwave tower, a control house, and two 50 percent high voltage transformers (each approximately 30 feet wide by 15 feet long by 15 feet high).

Each high voltage transformer contains approximately 5,000 gallons of dielectric fluid (mineral oil), and will be located on a concrete pad approximately 30 feet long by 15 feet wide, surrounded by a 6-inch earthen or concrete containment berm/curb approximately 50 feet long by 30 feet wide. The containment area will be lined with an impermeable membrane covered with gravel, and will drain to an underground storage tank. Any stormwater or fluid drained to the tank will be inspected for a sheen prior to disposal. If a sheen is observed, the tank contents will be removed by vacuum truck to an appropriate disposal site. If no sheen or contaminants are detected, the stormwater will be drained on-site. The containment, storage tank, and holding pond system will be designed to accommodate the volume of the dielectric fluid in the transformer plus an allowance for precipitation.

Grounding of the Project substation will be accomplished by a ground grid designed to meet the requirements of Institute of Electrical and Electronics Engineers (IEEE) 80, "IEEE Guide for Safety in AC Substation Grounding." Final ground grid design will be based on site-specific information such as available fault current and local soil resistivity. Typical ground grids consist of direct buried copper conductors with 8-foot-long copper-clad ground rods arranged in a grid pattern to approximately 3 feet outside of the substation area.

2.4.2.3 Roads, Fencing, and Security

Approximately 54,000 square feet of the overall site will be paved, including the site access road, parking area, and portions of the area around the O&M building (Figure 2-5a). The Project internal roadway system will include perimeter roads surrounding the facility, as well as a network of roads between solar blocks (Figure 2-1a). The majority of these roads will be oriented in a north-south direction, approximately 1,200 feet apart, to provide operations and maintenance access to solar equipment (e.g., drive motors, solar panels, inverters, transformers). These earthen or gravel roads will be approximately 30 feet in width, and will consist of compacted existing on-site materials or a blend of existing and imported materials. As necessary, water or dust palliatives will be used for road dust suppression.

The Project fencing would consist of a 7-foot chain link fence with 1-foot of 3-stand barbed wire on top; additionally, a "slack wire" would be installed on top of the upper strand of barbed wire as an anti-perch device.

Wildlife permeable fencing would be installed around the site perimeter in 50-feet lengths (minimum) every 200 feet, with the following exceptions:

- At the ingress and egress sections of the wildlife corridor (see Figure 2-1c and Section 2.4.4.1), the length of wildlife permeable fencing would equal the width of the corridor; fencing at these areas would include approximately 450 feet along 170th Street West just north of SR-138, 200 feet at the intersection of 160th Street West and West Avenue C8, and 100 feet along West Avenue C.
- Wildlife permeable fencing would not be installed adjacent to SR-138 or the substation area (Figure 2-1c).

Wildlife permeable fencing would consist of a 1-foot vertical space at ground level to allow for wildlife passage, and may also include a "slack wire."

The Project site will be staffed 24 hours per day, seven days per week. This staff will include full time security, and regular security patrols will be conducted throughout the site. A perimeter security system may also be installed as necessary. Lighting will be provided at the O&M building, and the main plant access road entrance (refer to Section 2.4.2.8 for additional information on the Project lighting system).

2.4.2.4 Water Supply and Treatment

Once the Project facilities are fully operational, approximately 12 acre-feet per year (afy) of water will be required for domestic use and process water, including solar panel washing, dust suppression, and fire protection. A 10,000 gallon process water storage tank will be included on the site. If an emergency firewater supply is required, the tank will be enlarged to satisfy both uses, and the tank will maintain a minimum level to ensure sufficient storage for firewater. The water storage tank will be located adjacent to the 20,000-square-foot O&M building as shown on Figure 2-5a. The actual tank size will be based on Los Angeles County Fire Department requirements for firewater storage.

The primary water supply for the Project will be from on-site wells (see Figure 2-4). Currently, 2 operational wells exist on the Project site: 1) a domestic well that supplies the existing ranch houses; and 2) an agricultural well formerly used for irrigation. These existing wells may be used for process water for construction and operations, but not for domestic purposes. Domestic water supply during construction will be supplied by: 1) a new well drilled adjacent to the existing irrigation well or in the vicinity of the O&M building; or 2) a water supply contractor. Domestic water during operations will be supplied by a new well drilled adjacent to the existing irrigation well or in the vicinity of the O&M building. Any new wells drilled for domestic purposes will be developed as per Los Angeles County Department of Public Health Standards.

It is estimated that approximately 150 acre-feet per year of water will be required during construction (about 190 gallons per minute [gpm] of pumping per 12-hour day, or 93 gpm of continuous pumping) and approximately 12 afy during operations (about 15 gpm of pumping per 12 hour day, or 7.5 gpm of continuous pumping). A pump/recovery test performed for the on-site irrigation well indicated that it could be pumped at these rates without adverse impacts on the aquifer, including wells on adjacent properties. Water quality testing concluded that the water is of high quality, as evidenced by: 1) its low total dissolved solids (TDS) of 226 milligrams per liter (mg/l); 2) only one detection of organic chemicals (chloromethane at 1.7 micrograms per liter [µg/l] that was well below the Lifetime Health Advisory of 30 µg/l and Drinking Water Equivalent Level Advisory of 100 µg/l; and 3) radiological levels that are below state Maximum Contaminant Levels or Action Levels (USEPA 2006). Based on the above testing, it appears that both the Project water quality and quantity needs would be met with the proposed on-site wells.

A water pipeline will be installed to tie in the existing irrigation well (and/or a newly drilled adjacent well) to the O&M building area during the early stages of construction. The water pipeline will be located along proposed Project access roads such that additional disturbance to previously undisturbed areas will be minimized. The approximate location of the water pipeline is shown on Figure 2-1a; however, this location may change depending upon the final design and arrangement of the solar array. The water line will be used to supply water to

both construction and operations activities. During construction, the water line will discharge to a temporary storage tank for use as required; during operations, the line will discharge to the process water storage tank described above. The water line will be installed underground and is expected to be approximately 6 to 8 inches in diameter and 2.2 miles in length; the trench would be approximately 3 feet wide and 3 to 6 feet deep (refer to Section 2.4.6.7.3). The line will be sized to meet Fire Department requirements, and the final dimensions will be determined during engineering design.

Domestic and process water may require on-site treatment. Chemical and/or filtration treatment may be required to provide safe water for domestic use, and water softening may be required to provide the necessary water quality for solar panel cleaning.

2.4.2.5 Domestic Waste

The wastewater collection system will collect sanitary wastewater from sinks, toilets, and other sanitary facilities, and will be discharged to an on-site septic and leach field system. The sanitary system will consist of a buried 1,000-gallon septic tank and a leach field will be approximately 60 feet wide by 500 feet long. The septic tank and leach field will be located adjacent to the O&M building. The per-capita domestic water use is estimated to be between 50 and 60 gallons per day.

2.4.2.6 Fire Protection

If it is determined that an on-site firewater supply is necessary, the Project's firewater needs will be supplied by maintaining a minimum required water level in the Project process water storage tank (see Section 2.4.2.4). In this case, the water tank will be sized appropriately to accommodate process water and firewater needs. Firewater will be delivered by an electric pump, and a diesel-fueled backup pump may be installed so that firewater is available during power outages. Fire protection pump flow rates will be based on applicable requirements. All fire protection system pumps will be designed to be shut off manually.

Fire protection measures will include sprinkler systems in the O&M building, and portable carbon dioxide (CO_2) fire extinguishers will be mounted outside inverter/electrical distribution containers on pads throughout the solar array. A FM200 fire suppression system, or equivalent, will be used in the plant control room and electrical/control rooms. Additionally, fire protection for the solar array and the off-site transmission line will be provided by vegetation management programs. Within the solar array, vegetation will be controlled to minimize fire risk by mechanical methods and/or grazing, and limited use of herbicides (refer to Section 2.4.7.2). Additionally, fire breaks will be installed and maintained within the Project site as described in Section 2.4.6.4. For the off-site transmission line, clearances for vegetation will be implemented in accordance with Public Utilities Commission General Order 95 (Rules for Overhead Electric Line Construction).

The PV panels within the solar array have been tested in accordance with Underwriters Laboratories (UL): 1) UL1703 Section 31.1 (spread of flame) and 31.2 (burning brand); as well as 2) UL790 (Standard Test Methods for Fire Tests of Roof Coverings). In accordance with these tests, the panels are rated for residential rooftop applications and have a Class C fire resistance rating (able to withstand light exposure to fire from outside sources).

The electrical equipment enclosures that house the inverters and transformers (see Section 2.4.1.3) will be either metal or concrete structures. Any fire that could potentially occur would be contained within the structures, which are designed to meet National Electric Manufacturers Association (NEMA) 1 or NEMA 3R IP44 standards for electrical enclosures (heavy duty sealed design to withstand harsh outdoor environmental conditions).

2.4.2.7 Plant Control System

The Project will have a Supervisory Control and Data Acquisition (SCADA) system located in the O&M building that will allow for remote monitoring and control of inverters and other Project components. The SCADA system will be able to monitor Project output and availability, and to run diagnostics on the equipment.

The Project will also have a local overall plant control system (PCS) that will provide monitoring of the solar field as well as control of the balance of facility systems. The microprocessor-based PCS will provide control, monitoring, alarm, and data storage functions for plant systems as well as communication with the Solar Field SCADA system. Redundant capability will be provided for critical PCS components so that no single component failure will cause a plant outage.

All field instruments and controls are expected to be hard-wired to local electrical panels. Local panels are expected to be hard-wired to the plant PCS.

2.4.2.8 Lighting System

The Project's lighting system will provide operation and maintenance personnel with illumination for both normal and emergency conditions. Lighting will be designed to provide the minimum illumination needed to achieve safety and security objectives and will be directed downward and shielded to focus illumination on the desired areas only and minimize light trespass in accordance with the Draft Exterior Lighting Standards developed for the rural unincorporated Antelope Valley (Ordinance No. 2007-0077, Sections 22.44.110 and 22.44.141 [dated July 26, 2007] and Section 22.44.500 [dated July 7, 2009]).

Project lighting will be located only at the O&M building, parking area, and the main plant access (see Figure 2-1a); there will be no lighting within the solar array. Lighting will be no brighter than required to meet safety and security requirements, and the lamp fixtures and lumens will be consistent with the recommendations of the Draft Exterior Lighting Standards

referenced above. Lights will be shielded, and lenses and bulbs will not extend below the shields. To ensure safety and security requirements are maintained, lights at the main plant access gate, doorways, and the O&M building parking area will remain in the on position, and will be light-activated to automatically come on in the evening and shut off in the morning. Other lights will be normally shut off and turned on only when worker activity requires. To avoid unnecessary activation of lighting by animals or other movement, motion sensors will not be used for exterior lighting. Once final plant design is complete, and prior to installation of exterior lighting systems, a facility lighting plan will be prepared for County approval that will identify the location and types of lighting, and light controls to be implemented.

The Project's sources of nighttime illumination will be nearly 0.5 mile from the Joshua tree woodlands within SEA #60 at the closest point. Project lighting is therefore expected to be nearly undetectable within the SEA, and light spillover onto surrounding properties will be minimal. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting will be used.

2.4.2.9 Meteorological Station

The Project will include one or more on-site Solar Meteorological Stations (SMS). Each SMS will consist of two solar energy (irradiance) meters, as well as an air temperature and a wind meter. The equipment is mounted on two tripods, 6 and 10 feet in height, that will require no permanent foundation. Power for the SMS will be provided by the plant essential power system or a dedicated PV panel with a small battery; data will be communicated directly to the PCS. The SMS will be located inside the solar array field or adjacent to the O&M building as required to quantify the solar resource for electrical generation predictions and coordination with the California Independent Systems Operator (CAISO).

2.4.3 Electrical Systems

2.4.3.1 Electrical Supply for Facility Auxiliary Systems

During daylight hours, power for plant auxiliaries will be provided by the Project's electrical generation. During non-daylight hours, the Project will require power from an external source for the O&M building, to keep transformers warm during non-daylight hours, to realign the trackers to the east at night so that they are properly oriented to catch the morning sun the following day, and for plant lighting and security. This power will be provided by either back feed from the electrical grid or from a local electricity provider. Power from the distribution service will be stepped down to an appropriate voltage to support plant auxiliaries and will be connected to the station service power switchgear.

An emergency diesel powered firewater pump may be required to provide power for fire protection in the event that power from the electrical grid is unavailable.

2.4.3.2 230-kV Electrical Transmission

Power generated by the Project will be delivered from the on-site substation to the electrical grid through interconnection to SCE's planned Whirlwind Substation to the north of the site. The proposed Project transmission line route follows 170th Street West approximately 4.25 miles (3.5 miles of which is off-site) in a northerly direction to the Whirlwind Substation location (Figure 1-3 and 1-4). The route is located along the western edge of the public road ROW until approximately 0.5 mile south of the Whirlwind Substation where it crosses over to the east side of the road. Approximately 2.25 miles of the route is located within Los Angeles County and approximately 2 miles within Kern County.

Kern County has indicated that it may require the Project to obtain a ROW adjacent to the county road ROW for the transmission line and dedicate that ROW to the County. The new ROW would then be made available for use by other projects for access to the Whirlwind Substation. In this case, the Project transmission poles would be located just outside the county ROW. Kern County has also stated that if the Project cannot reasonably obtain the ROW, the county will use it power of eminent domain to condemn the property.

The transmission line conductors (wires) will be made of non-reflective material and will be supported on approximately 36 tubular steel poles (85 to 125 feet tall) of a color (as approved by Los Angeles and Kern Counties) that will minimize the visual impact. The transmission poles will be approximately 4 feet in diameter (at the base, tapering upward) and will be located approximately every 700 feet (on average) between the on-site substation and the off-site interconnection point (i.e., SCE Whirlwind Substation). Larger poles, approximately 6 feet in diameter, will be required at angle or dead-end points on the transmission line due to greater lateral load on the poles (see Figure 2-6).

The transmission poles will be set in concrete foundations approximately 6 to 8 feet in diameter and 20 to 30 feet deep. All poles will be grounded using ground rods or other suitable means. Additionally, shield wire will be attached to the ground wire for lightning protection. To minimize corona noise, the diameter of the conductors has been optimized and corona rings will be installed at all conductor attachment points.

The calculated EMF levels and associated electronic signal interference are within established limits, as applicable.

2.4.4 Site Drainage Facilities

2.4.4.1 Wildlife Corridor

As shown on Figure 2-1a, a wildlife corridor will be provided along Drainage A that will traverse the Project site from southeast to northwest. Beginning at the intersection of 170th Street West and SR-138, the corridor will follow Drainage A along its jurisdictional length

(as per California Department of Fish & Game); within this segment it will be setback 100 feet from the top of bank on either side of the drainage, for a total width of approximately 215 to 240 feet. Continuing to the northeast, the remaining segments of the corridor will be 100 feet in width and be routed west and then north to the northern property boundary. The wildlife corridor will not be fenced along its length, but will have wildlife permeable fencing installed at the ingress/egress points (refer to Section 2.4.2.3 for a description of Project fencing).

2.4.4.2 Berms and Infiltration Basins

Areas of the facility that could potentially release contaminants, such as the paved areas surrounding the O&M building and delivery areas, will be provided with stormwater containment (i.e., berms) designed to accommodate runoff from the 25-year storm event, as appropriate, as well as the requirements of the Los Angeles County Standard Stormwater Urban Mitigation Plan (SUSMP). These paved areas will be maintained and any vehicle leaks or spills will be periodically cleaned with sorbent materials to minimize the potential for contamination.

The Project site is traversed by three primary ephemeral drainages (Drainages A, B, and C), as shown on Figure 2-1a. A fourth ephemeral drainage (Drainage D) is located at the northeastern property boundary and only a small portion of the southern bank of the drainage is on the Project site. All site drainages will be avoided and remain unmodified.

In order to meet the Los Angeles County Department of Public Works requirements for post-development runoff volume, a series of infiltration basins measuring approximately 8 feet wide by 15 feet long by 1 foot deep, and spaced about 50 feet apart will, be constructed behind every other row of solar panels; the infiltration basin alignments will be staggered from row to row (see Figure 2-1b). The cut from each basin will be placed into spoils banks located between the basins; each spoils bank will measure approximately 50 feet long by 16 feet wide by 4 inches thick (see Figure 2-1b).

The infiltration basins will function as a series of infiltration basins that will detain the excess stormwater runoff flow and volume on-site and let the detained stormwater infiltrate into the ground. It is estimated that approximately 9,600 infiltration basins and 9,600 spoils banks will be installed within the solar array.

In addition to the smaller basins located within the panel rows, two larger infiltration basins each having a capacity of about 28,300 cubic feet (1,048 cubic yards), will be constructed upstream of the proposed O&M facility (see Figure 2-5a) and substation (see Figure 2-5b) areas. These basins will mitigate the excess runoff volume due to the decreased permeability of these two areas. Additional smaller basins may be constructed within the substation and O&M area to manage stormwater quality.

In addition to balancing the runoff volume, the infiltration basins described above would also function as a mitigation method as required by the SUSMP. Stormwater runoff will be diverted into these infiltration trenches where the water infiltrates into the soil and potential pollutants are removed through a combination of filtration, adsorption, and biological processes.

2.4.4.3 Cutoff Wall

The existing incised channel in Drainage A has the potential to meander during large storm events due to bank and bed erosion. The solar panel foundations have been set back 100 feet from the edge of the existing incised channel, however the potential still exists for the channel to meander beyond these limits. As a protective measure, a cutoff wall consisting of sheet piling will be installed along each side of the existing incised channel in Drainage A (see Figure 2-1a). Approximate length of the sheet piles is 5,000 feet on each side of Drainage A for a total length of approximately 10,000 feet.

The sheet piling material will be steel or PVC. Each sheet pile will be interlocking, and measure approximately 18 inches wide by 7/16 inch thick by 15 feet long. Sheet piling requires no excavation or grading work, and will be installed at or slightly below existing grades. The depth of the sheet piling will be approximately 1.5 times the existing channel depth. Along Drainage A, the sheet pile depth is estimated to be about 15 feet. Final depths will be determined during detailed design when a detailed scour analysis will be prepared.

2.4.5 Natural Hazards

A geotechnical investigation report for the proposed site was performed in July 2009. This investigation includes a review of potential geologic hazards, seismic ground motion, and soil liquefaction. The principal natural hazard associated with the proposed Project site is potential seismic hazard. The proposed Project site is located in a seismically active area. The San Andreas Fault (a Type A Fault) is located approximately 6.1 miles south of the site and represents the most substantial hazard to the site from a design standpoint. All project structures will be designed using site specific seismic design parameters in conformance with California Building Code criteria, as applicable, to ensure safety for operating personnel and adequate protection against structural and equipment damage.

Flooding is a potential hazard of concern. Based on a review of FEMA flood maps, the site is primarily located in areas of 0.2 percent or less annual chance of flood. However, based on the hydrologic analysis for the Project, portions of the proposed Project boundaries may be subject to 100-year flooding zones and portions are within FEMA Zone B. Occupied structures, however, are located well outside (approximately 1/3 mile) flood zones.

2.4.6 Construction

2.4.6.1 Construction Plan and Schedule

Construction of the Project is scheduled to begin in the fourth quarter of 2010 and be completed in the fourth quarter of 2013 (refer to Tables E-1 in Appendix E). Initial delivery of energy produced by the facility is planned for the third quarter of 2011. Construction activities are anticipated to be sequenced as shown on Figure 2-8, and the overall construction period is expected to be approximately 39 months. Under this schedule, PV module installation is anticipated to occur at an average rate of approximately 8 MW per month, with a potential maximum of 15 MW per month for limited periods if needed to meet the completion schedule and contractual requirements.

The solar field will be constructed in six stages so that only a portion of the Project site will be worked on at any given time. It is currently expected that construction will begin north of SR-138 and transition to the south side of SR-138 later in the construction period.

Construction will generally occur between 7:00 a.m. and 3:00 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier in the morning or work later in the evening to avoid pouring concrete during hours when ambient temperatures are high. Construction working hours will be scheduled to comply with Los Angeles County noise ordinances and policies, as applicable.

The on-site construction workforce will consist of laborers, craftspeople, supervisory personnel, support personnel, and construction management personnel. The on-site assembly and construction workforce is expected to reach a peak of approximately 341 workers at the 8-MW-per-month construction rate, and approximately 668 workers during the 15-MW-per-month construction rate.

2.4.6.2 Preconstruction Activities

Preconstruction studies for the Project will include final engineering design. Additionally, meteorological and solar insolation monitoring stations may be installed, as needed, for Project operations. A surveyor will conduct a land survey of the Project site and will stake the construction area as needed.

Prior to the initiation of construction a Mitigation Monitoring and Reporting Plan (MMRP) will be prepared in accordance with CEQA requirements (California Public Resources Code, Section 21081.6) that will ensure compliance with all mitigation measures identified in this Draft EIR. Additionally pre-construction plans required by construction permits, regulation, or ordinance will also be prepared, as applicable; these may include but are not limited to: 1)

Hazardous Material Management Plan; 2) Storm Water Pollution and Prevention Plan; and 3) Recycling and Reuse Plan.

2.4.6.3 Site Mobilization

The Project construction contractor will mobilize and begin to establish temporary construction facilities during the first few months of construction. Additionally, temporary construction power and water supplies will be established. Temporary power for Project construction is expected to be provided by mobile diesel-driven generator sets and/or by temporary electrical service from the local power provider. Water for construction will be supplied by the 2 existing on-site wells, and/or the new well. Arrangements for transferring the water to the construction areas will be established as required, and may include water trucking or aboveground piping. It is anticipated that approximately 150 acre-feet per year of water will be required during construction to support concrete manufacturing, dust control, panel washing, and sanitary use. Domestic water supply during construction will either be supplied by the new well and treated as necessary to meet Los Angeles County Public Health Department standards, or will be provided by a water supply contractor.

As construction activities expand in stages and/or transitions from north to south, these temporary construction facilities will be modified or relocated as required.

2.4.6.4 Site Clearing and Grading

Prior to installation of Project facilities, all on-site vegetation will be cut to a height of approximately 3 to 6 inches above ground surface. Such vegetation cutting will be completed as necessary ahead of specific activities and/or stages of construction. Project construction will require temporary vegetation removal over portions of the site for installation of facilities such as construction staging and laydown areas, temporary access roads, electrical trenches, infiltration basins, and solar equipment fabrication areas. In other locations, such as the permanent O&M building, electrical substation, and permanent access roads, permanent vegetation removal will be required. Vegetation clearing and removal will be conducted to minimize the amount of disturbed ground surface at any one time, and will be accomplished using mowers, skip loaders, bulldozers, chippers, or dump trucks, as required.

In addition to the site clearing for the temporary and permanent Project facilities described above, vegetation will be cleared for permanent fire breaks that will be installed during Project construction. As shown on Figure 2-1d, these will include:

- A 100-foot perimeter fire break from the edge of the property boundary (or road ROW, as applicable), including both sides of SR-138 and 170th Street West. Where the property boundary is adjacent to sensitive resources, such as along the southern site boundary and the Joshua Tree Woodland Habitat to the north and east, the break will be maintained inside the perimeter fence line.

- Fire breaks 200 feet in width within the facility property, approximately every 0.5 mile, as shown on Figure 2-1d.

All fire breaks will be regularly maintained to ensure that vegetation does not become established (see Section 2.4.7.2).

Because of the flat topography at the site, minimal Project grading will be required to prepare the site for solar PV facilities installation. The foundations for both the tracker and fixed-tilt units can be adapted for installation on uneven ground and minimize the need for grading, as follows: 1) the tracker units are equipped with adjustable telescoping legs; and 2) the pile supports for the fixed-tilt units can be cut or driven to different lengths as needed.

Minor grading will be required for the O&M and substation areas, as well as the permanent access roads. However, the majority of grading will be associated with the infiltration basins and spoils banks. As shown on the site grading plan (Figure 2-7), the cut/fill for the basins and banks is estimated to be approximately 83,950 cubic yards. The total Project cut is estimated to be approximately 103,000 cubic yards, and all cut material will be used on-site as fill during construction. The total Project fill is estimated to be approximately 153,000 cubic yards; it is estimated that an additional 50,000 cubic yards of fill/road base will need to be imported for the installation of the permanent access roads. Refer to Figure 2-7 for an itemized description of the cut and fill components.

Areas disturbed due to Project construction activities will be stabilized during construction to minimize wind and water erosion and generation of fugitive dust, by watering and/or the use of dust palliatives or tackifiers. Chipped mulch created as a result of selective vegetation removal, may also be spread on-site for this purpose, as appropriate. Cleared and graded temporarily disturbed surfaces that will not be subject to future disturbance will be revegetated as practical to minimize dust and erosion. Areas of temporary disturbance will be revegetated with native grasses and wildflowers as soon as feasible, based on seasonal weather conditions, to maximize revegetation success. No woody vegetation, such as rubber rabbitbrush scrub will be seeded or maintained within the solar field. To facilitate redevelopment of on-site vegetation, topsoil generated by Project grading will be saved and spread over disturbed areas, as available.

2.4.6.5 Materials and Equipment Staging Areas

Multiple temporary staging and laydown areas will be located throughout the Project site to support final assembly and installation (Figure 2-9). The staging areas will be approximately 7 acres each and the laydown areas will be approximately 0.7 acre each. Approximately 15 staging areas and 43 laydown areas will be required throughout the Project construction period. As construction progresses across the site, equipment will be removed from each temporary staging and laydown area, solar tracker units will be installed, and the areas will be revegetated, as appropriate.

2.4.6.6 Temporary Facilities

2.4.6.6.1 Concrete Batch Plant. Depending upon the tracker unit foundation type and concrete requirements, the Project may include a temporary and portable concrete batch plant. If needed, the batch plant will operate for a total of about 39 months throughout the construction period, and will be located immediately east of the O&M facility area. Figure 2-5a shows the location of the plant and Figure 2-10 shows the general arrangement of its components. As shown on the Figure 2-10, the plant will be sloped and bermed to contain concrete make-up water as well as equipment wash water.

2.4.6.6.2 Assembly Buildings. The panel supports (tracker units or fixed-tilt supports) for the PV panels will be assembled on-site in two temporary assembly buildings approximately 260 feet long by 150 feet wide and 35 feet high; as shown on Figure 2-5a, these buildings will be located immediately south of the O&M facility. The proposed temporary structures will require no permanent foundation, and will consist of galvanized tubular steel clear-span frames, covered with skins of heavy-duty, weatherproof, reinforced fabric. The fabric will be translucent to transmit sufficient light for working inside the buildings without electric lighting, and will also be flame retardant and mildew resistant.

2.4.6.6.3 Construction Trailers and Associated Work Facilities. Temporary construction trailers and associated work facilities will be installed during site mobilization that will include:

- Full-length trailer offices or equivalent
- Portable Chemical toilets (note: construction workers will use the on-site portable toilets and will not use the operations sanitary facilities)
- Parking for construction worker vehicles
- Tool sheds/containers/dumpsters
- Construction equipment parking
- Construction material laydown area

It is expected that the majority of these temporary facilities will be located at a staging area in the O&M vicinity throughout the construction period. However, as construction progresses from north to south, some of these trailers/facilities may be moved to other staging/laydown areas, or additional trailers/facilities may be brought on-site. A general arrangement for typical temporary construction facilities is shown on Figure 2-10.

2.4.6.7 Major Facility Construction

The major Project construction components include: 1) Project substation; 2) O&M facilities; 3) infiltration and cutoff wall; 4) solar field areas one through six; and 5) on-site/off-site 230-

kV transmission line. A description of the construction of these components is summarized below.

2.4.6.7.1 Project Substation. Project substation construction is expected to occur over a period of about 8 to 10 months. Temporary construction laydown and parking areas will be provided within and/or adjacent to the substation site. The construction sequence for substation construction includes the following general steps:

- Site Preparation, including detailed construction surveys, mobilization of construction staff, grading, and preparation of drainage features. Topsoil will be preserved and stored in an adjacent area, and will either be spread on areas to be restored or saved for use on other Project areas as appropriate.
- Installation of foundations and footings for the transformers, switches, microwave tower, etc.
- Major equipment installation will commence once the foundations are complete. The substation components (e.g., transformers, control house, etc.) will be assembled on-site and installed on their foundations.
- Testing and commissioning of subsystems will be done as they are completed. Major equipment will be tested once all supporting subsystems are installed and tested.

2.4.6.7.2 Operations and Maintenance Facilities. Construction of the O&M facilities and associated auxiliary systems and civil works (as described in Section 2.4.2) are anticipated to be one of the first major construction activities to begin in the fourth quarter of 2010, and are expected to occur over a period of approximately 8 to 9 months. The general construction sequence for these facilities includes: 1) site grading and vegetation clearing as required; 2) excavation or trenching and installation of foundations/footings and utilities; and 3) building/structure and facility construction. Topsoil from excavations or trenching will be saved in adjacent areas for use in site restoration.

2.4.6.7.3 Water Supply Pipeline. Construction of the water pipeline from south of SR-138 to the O&M facility area (refer to Section 2.4.2.4) is expected to take approximately 3 months. As shown on Figure 2-1a, the line will be located along proposed Project access roads such that disturbance to previously undisturbed areas will be minimized. Construction of the water pipeline will consist of the following elements:

- Approximately 2.2 miles of buried 6- to 8-inch-diameter PVC pipe.
- The SR-138 crossing will be accomplished using either the horizontal directional drilling (HDD) or jack and bore methods. Currently, it is assumed that the jack and bore method (worst case) will be used, which will require two excavations on either side of SR-138: 1) an excavation approximately 15 feet wide by 50 feet long by 8 to 10 feet deep to the

south; and 2) an excavation approximately 8 foot wide by 10 foot long by 8 to 10 feet deep to the north. It is estimated that the pipeline would be installed at a depth of approximately 6 feet beneath SR-138, but the final depth will be determined based on consultation with Caltrans. Both excavations will be located outside of the SR-138 ROW. Refer to Figure 2-11 for preliminary construction details.

- The pipeline trench will be approximately 3 feet wide, 3 to 6 feet deep, and 2.2 miles in length. It is expected that the trench will be excavated and the pipeline installed prior to the installation of the solar array underground AC/DC conductors such that it would be located beneath these facilities.
- Topsoil from the excavations and trenching will be preserved and stockpiled immediately adjacent to these areas. Since the pipeline will be installed in a proposed Project access road, this topsoil will be saved for use in restoration of other Project areas.
- The water pipeline will be hydrotested; following completion of the test, hydrotest water will be discharged on-site in accordance with the Project Storm Water Pollution and Prevention Plan. It is estimated that up to about 30,500 gallons of water will be needed to perform the hydrotest. Management and discharge of the hydrotest water will occur in accordance with Regional Water Quality Control Board requirements.

2.4.6.7.4 Infiltration Basins and Cutoff Wall. Construction of the infiltration basins and associated spoils banks will occur during the 31-month construction period of the solar fields (see Section 2.4.6.7.5). Prior to their installation, the vegetation will be cleared from the construction area to a height of approximately 3 to 6 inches. Equipment (e.g., bulldozers, loaders, graders, etc.) will then cut and grade the infiltration basins and spread the resultant fill and vegetation mixture to form the spoils banks in the adjacent downstream area. The basins and banks will be stabilized using soil tackifiers or similar material until vegetation can be established.

Construction of the sheet pile cutoff wall is expected to occur over a period of approximately 4 months. The sheet piles will be installed using a vibratory hammer or similar installation approach. Vibratory hammers (the most common installation equipment) are typically suspended from a crane or excavator and clamped to the top of the sheet pile. The vibratory energy liquefies the soil at the toe of the sheet pile and the weight of the hammer pushes the pile into the soil.

Installation is expected to proceed with two crews, one working on each side of the existing channel in Drainage A. Each crew will generally consist of a small hydraulic crane unit or excavator with a vibratory hammer unit attached. Sheet pile installation typically requires no excavation or grading work.

2.4.6.7.5 Solar Field Areas 1 through 6. As discussed in Section 2.4.6.1, construction of solar fields will occur in 6 stages at an average rate of approximately 8 MW per month, with

a potential maximum rate of 15 MW per month for limited periods. The total solar field construction period is expected to occur over a period of approximately 31 months. For each stage, assembly of the tracker or fixed tilt units and construction of the solar array will occur concurrently. The trackers/fixed-tilt units will be assembled on-site in two temporary covered assembly buildings as described in Section 2.4.6.6.2. The proposed trackers would include the installation of approximately 157,000 to 169,000 ballast foundations that would be set in place approximately at grade level using trucks, loaders, and cranes. The fixed-tilt units would require the installation of approximately 465,000 steel piles about 6 inches in diameter and 10 feet deep. It is anticipated that these piles would be driven using equipment and techniques similar to that used for the sheet pile installation (i.e., vibratory hammer, generator, and small hydraulic crane).

Construction of the solar array will occur in a series of approximately 1- to 3-MW blocks and each block will be connected to the electrical grid as it is completed. The tilted tracker units will be constructed approximately 17 feet apart in east-west rows and connected to a drive motor that rotates the solar panels to follow the sun's east to west progression across the sky. One motor can drive approximately 1,200 feet of trackers. The rows of trackers will be located approximately 16 feet apart in a north-south direction. If horizontal trackers are used, the tracker rows will run in a north-south direction and will be approximately 15 feet apart. If fixed tilt supports are utilized, rows would be oriented east-west and the rows would be closer together. Improved (earthen or gravel) 30-foot-wide roads will be located in a generally north-south orientation to allow access within the solar array (refer to Section 2.4.2.3). Most of the remaining ground surface within the solar array will either be left vegetated or will be revegetated as necessary to minimize dust. Mowing or other methods of vegetation control may be necessary in order to avoid vegetation interfering with the solar equipment and for fire protection.

Approximately 25 to 30 miles of trenches will be excavated using ditching equipment or backhoes to install the underground wiring and conduits that collect power from the PV solar panels and deliver it to the inverters/transformers and the overhead collection lines (refer to Section 2.4.1.4). Holes for the overhead collection line poles will be augured where feasible, and will be approximately 18 inches in diameter and 20 to 30 feet deep; poles will be set in poured concrete foundations. Approximately 90 poles and 3 miles of collection lines will be installed.

2.4.6.7.6 <u>On-site/Off-site 230-kV Transmission Line</u>. Construction of the proposed 230-kV transmission line along 170th Street West is expected to take place over a period of 4 months, and will occur in time to deliver first power from the Project in the third quarter of 2011. The centerline of the transmission line route will first be surveyed, with each pole location clearly staked. The proposed transmission line is expected to require a total of approximately 36 poles. The transmission line route and pole locations will be located approximately 5 feet inside of the road ROW (refer to Figure 2-6). If Kern County requires

the acquisition of an adjacent ROW, as previously described, the poles would be located just outside the County ROW along the Kern County portion of the transmission line. Pole holes will be approximately 6 to 8 feet in diameter, 20 to 30 feet deep, and will be augured wherever feasible; poles will be set in poured concrete foundations within the holes. Structures and conductor support hardware will be assembled at each pole location to minimize damage during transport.

Construction of the transmission line will require a laydown area at each pole location for use as temporary laydown or as a staging area for equipment, poles, and hardware. If off-ROW landowner permission is obtained, it is expected that an area of approximately 100 feet by 150 feet will be required. If landowner permission is not obtainable, it will be necessary to construct the poles within the road ROW. In this case, the laydown area at each pole location is expected to be approximately 100 feet in length by 50 feet in width. This area will likely include the road shoulder and one traffic lane of 170th Street West. Erection of the poles will occur along the road ROW, and flagmen will be used as required during construction to ensure traffic safety and uninterrupted flow. During the total transmission line construction period of approximately 4 months, it is expected that traffic flow will be intermittently restricted at each pole location while that pole is being installed. Such restriction would occur for a length of approximately 500 feet adjacent to and centered on the pole, and installation of each pole would take approximately 1 to 2 days.

In general, little to no grading is expected to be required for these areas (other than the excavation of pole holes), and disturbance to sensitive vegetation will be minimized or avoided. In addition, it is likely that four conductor-stringing sites of approximately 50 feet by 200 feet will be required: one at each end of the transmission line route, and two near the midpoint. Conductor stringing will occur by stationing stringing equipment at these sites, with smaller equipment (pickup trucks and flatbed trucks) traveling along the transmission line route as the conductor is installed.

2.4.6.8 Construction Equipment, Workforce, and Disturbance

2.4.6.8.1 Construction Equipment, Deliveries, and Traffic. Construction equipment and truck deliveries are provided in Tables E-2A, E-2B and E-3A, E-3B of Appendix E for each month of the construction period. At the 8-MW-per-month construction rate during peak construction, an estimated 633 truck trips per month or 29 per day (based on a typical month of 22 working days) will be required to supply concrete, construction materials, Project components, and equipment to the site. The 15-MW scenario will require an estimated 1266 truck trips per month or 58 per day at peak construction. To provide concrete for PV module foundations and other uses, either a concrete batch plant will be located on-site or a local (Lancaster area) off-site ready mix plant will be used. In either event, a similar number of trucks would be required to supply either concrete or concrete raw materials.

2.4.6.8.2 Construction Workforce. The on-site construction workforce will consist of laborers, craftspeople, supervisory personnel, support personnel, and construction management personnel; a complete table of the estimated workforce and its breakdown is provided in Table E-4A and E4B of Appendix E. The size of the construction workforce is anticipated to range from approximately 9 to 341 workers during the 8 MW-per-month construction rate, and from approximately 52 to 668 during the 15 MW-per-month construction rate

2.4.6.8.3 Area of Disturbance. The estimated Project land disturbance (both temporary and permanent) is provided in Table 2-1. Temporary disturbance is that which is primarily due to construction, and includes equipment staging and laydown areas, temporary access roads and any graded or disturbed areas that will be restored following construction. Permanent disturbance is related to operational facilities, and includes the permanent roadways, parking areas, access roads, and buildings, structures and equipment that will remain in place for the life of the Project.

2.4.6.9 Hazardous Material Handling and Storage

The hazardous materials used for Project construction will be typical of most construction projects of this type. As summarized in Table 2-2, such materials will include gasoline, diesel fuel, oils, lubricants, solvents, detergents, degreasers, paints, ethylene glycol, and welding materials/supplies. All hazardous materials would be stored on-site in vessels/containers that are specifically designed for the characteristics of the materials to be stored; as appropriate, the storage facilities would include secondary containment. Prior to construction, a Hazardous Material Management Program (HMMP) will be developed and implemented. At a minimum the HMMP will include procedures for:

- Hazardous materials handling, use, and storage
- Emergency response
- Spill control and prevention
- Employee training
- Recordkeeping and reporting

2.4.6.10 Construction Waste Management

During construction, the primary waste generated will be solid nonhazardous waste. However, some nonhazardous liquid waste and hazardous waste (solid and liquid) will also be generated. Table 2-3 summarizes the typical construction waste streams generated, estimated quantities, and methods of disposal. The primary waste types are described further in Sections 2.4.6.10.1 through 2.4.6.10.3. Construction waste will be managed as per a

TABLE 2-1
ESTIMATED DISTURBED AREA SUMMARY

Project Component Item	Area: Construction Disturbance (Acres)	Area: Permanent Disturbance (Acres)	Proposed Length (Miles)	Comments
230-kV Transmission Line (Off-site and On-site)				
Off-site Transmission Line Construction Areas	3		3.5	29 poles (100' x 35' for each pole) 3 stringing sites (50' x 200')
Off-site Tubular Steel Poles		0.03		28 poles (4' dia.); 1 poles (6' dia.)
On-site Transmission Line Construction Areas	1		0.75	7 poles (100' x 35' for each pole) 1 stringing site (50' x 200')
On-site Tubular Steel Poles		0.01		6 poles (4' dia.) 1 pole (6' dia.)
Subtotal	4	<0.1		
Plant Development, Staging/Laydown Areas, Drainage Channel Improvements				
Construction Staging Areas	100			15 areas
Construction Laydown Areas	25			41 areas
Site Boundary Fence Line	3	10	14	Will be potentially located in disturbed fire break area
Site Paved Roads		1.5		O&M facility entrance and parking
O&M Facility		0.5		O&M building and warehouse
O&M Facility Construction Area	6			Temporary concrete batch plant, 2 temporary assembly areas, leach field, and layout area
Subtotal	134	12		
On-site Utilities				
High Voltage Substation		3		350' x 350' substation area and 50' x 200' drainage basin
34.5-kV Overhead Collection Lines	0		2	No additional disturbance; will be located in disturbed fire break area
34.5-kV Underground DC Lines	4		12.5	3' wide disturbance area inclusive of trench
34.5-kV Underground AC Lines	4		12.5	3' wide disturbance area inclusive of trench
Water Supply Line	<0.1			Trenching, construction access, and bore pits.
Subtotal	8	3		
Solar Field Development				
Unpaved Permanent Access		100	27	30' width

TABLE 2-1 (CONTINUED)
ESTIMATED DISTURBED AREA SUMMARY

Project Component Item	Area: Construction Disturbance (Acres)	Area: Permanent Disturbance (Acres)	Proposed Length (Miles)	Comments
Roads				
Tracker Ballast Foundations		68		165,552 units; 18 feet^2/unit
Tracker Drive Foundations		3		1,609 units; 84 feet^2/unit
Electrical Equipment Pads		2		182 units; 580 feet^2/unit
Infiltration Basins and Spoils Banks	253			9,600 infiltration basin and spoils banks; also 1 basin each at substation and O&M facility
East-West Temporary Construction Access Roads	185		131	12' width
Fire Breaks		213		
Subtotal	438	386		
Total Disturbed Area	584	401		

TABLE 2-2
HAZARDOUS MATERIALS USED DURING CONSTRUCTION

Material	Application	Storage Location	Estimated Quantity
Diesel fuel and gasoline	Refueling construction equipment and vehicles	Refueling truck	4,000 gallons
Lubricating oil	Vehicle and equipment maintenance	Refueling Truck	400 gallons
Various solvents, detergents, degreasers, paints, and other cleaners	Construction activities, equipment maintenance, and cleaning	Warehouse/Shop Area	132 gallons
Ethylene glycol	Vehicle and equipment engine coolant	Refueling Truck	132 gallons

Recycling and Reuse Plan in accordance with the Los Angeles County Construction and Demolition Debris Recycling and Reuse Ordinance, as applicable.

2.4.6.10.1 <u>Nonhazardous Solid Waste</u>. Solid waste generated from construction activities may include paper, wood, glass, plastics from packing material, waste lumber, insulation, scrap metal and concrete, empty nonhazardous containers, and vegetation wastes. These wastes will be segregated, where practical, for recycling. Non-recyclable wastes will be placed in covered dumpsters and removed on a regular basis by a certified waste handling

TABLE 2-3
WASTES GENERATED DURING CONSTRUCTION[1,2]

Waste	Origin	Composition	Classification	Estimated Quantity	Disposal
Scrap wood, scrap metals, glass, plastic, paper	Construction activities	Normal refuse, parts, containers	Nonhazardous	39 cubic yards per week	Recycle and/or dispose of in a Class II or III landfill
Vegetation debris	Site clearing and grubbing	Brush, grasses, and scrub	Nonhazardous	2,700,000 cubic yards[2]	Chipped/mulched and spread on-site or disposed of in appropriate landfill
Empty hazardous material containers	Construction activities	Drums, containers, totes[3]	Hazardous and nonhazardous solids	1.3 cubic yards per week	Containers <5 gallons will be disposed as normal refuse. Containers >5 gal will be returned to vendors for recycling or reconditioning
Waste oil filters	Construction equipment and vehicles	Solids	Nonhazardous	1.3 cubic yards per week	Drain and recycle at a permitted TSDF
Used and waste lube oil	Vehicle and equipment maintenance	Hydrocarbons	Hazardous	5.25 gallons per week	Recycle at a permitted TSDF
Oily rags, oil sorbent excluding lube oil flushes	Cleanup of small spills	Hydrocarbons	Hazardous	1.3 cubic yards per week	Recycle or dispose at a permitted TSDF
Solvents, paint, adhesives	Maintenance	Solids and liquids	Hazardous	1.3 cubic yards per week	Recycle at a permitted TSDF
Spent lead acid batteries	Construction machinery	Heavy metals	Hazardous	3 per year	Store no more than 10 batteries (up to 1 year) – recycle off-site
Spent alkaline batteries	Equipment	Metals	Universal waste solids	10 per month	Recycle or dispose off-site at an Universal Waste Destination Facility
Sanitary waste	Portable toilet holding tanks	Solids and liquids	Non-hazardous liquid	396 gallons per day	Remove by contracted sanitary service

1 Total amount of solid waste generated is approximately 68,952 tons per year as calculated using conversion factor from EPA 1997, Publication No. EPA530-R-97-011.

2 Total amount of one-time generation of vegetative debris is approximately 63,450 tons as calculated using conversion factor from California Integrated Waste Management Board 2009. Diversion Study Guide. Appendix I.

3 Containers include <5-gallon containers and 55-gallon drums or totes.

contractor for disposal at a Class III landfill. Vegetation wastes generated by site clearing and grubbing will be chipped/mulched and spread on-site or hauled off-site to an appropriate green waste facility.

2.4.6.10.2 Wastewater. Wastewater generated during construction will include sanitary waste, storm water runoff, and equipment washdown water. These wastewaters may be classified as hazardous or nonhazardous depending on their chemical quality, and handled and disposed of in accordance with applicable laws and regulations.

2.4.6.10.3 Hazardous Waste. Some quantities of hazardous wastes will likely be generated over the course of construction. These wastes may include waste paint, spent construction solvents, waste cleaners, waste oil, oily rags, waste batteries, and spent welding materials. Hazardous wastes generated during facility construction and operation will be handled and disposed of in accordance with applicable rules and regulations. Hazardous wastes will be either recycled or disposed of in a licensed Class I disposal facility, as appropriate.

2.4.6.11 Erosion and Sediment Control Measures

Due to the removal or disturbance of soil and vegetation during construction, appropriate water erosion and dust-control measures will be required to minimize dust and sediment load to ephemeral washes around the construction site. Vegetation will be mulched or composted on-site to assist in erosion control and limit waste disposal.

2.4.6.11.1 Water Erosion Control Measures. Soil stabilization measures will be used to prevent soil erosion caused by storm water runoff. The Project will apply for coverage under the State's Construction General Permit for storm water discharges from construction activities and will prepare a Storm Water Pollution Prevention Plan (SWPPP) that will include implementation of Best Management Practices (BMPs) erosion-control measures to control storm water runoff. Site-specific BMPs will be designed by the contractor in compliance with regulations and permit conditions. As appropriate, the Project will implement practices for temporary and final erosion control, including:

- Year-round:
  - Monitor the weather using National Weather Service reports during construction to track conditions and alert crews to the onset of rainfall events.
  - Preserve existing vegetation where feasible. Conduct clearing and grading only in areas necessary for Project activities and equipment traffic. Install temporary fencing or signage prior to construction along the boundaries of the construction zone to clearly mark this zone, preventing vehicles or personnel from straying onto adjacent off-site habitat.

- Sequence construction activities with the installation of erosion control and sediment control measures. Arrange the construction schedule as much as practicable to leave existing vegetation undisturbed until grading begins.
- Protect areas particularly susceptible to erosion by installing controls.
- Stabilize non-active areas as soon as feasible on those portions of the Project site where construction has temporarily or permanently ceased.
- Place covers over stockpiles prior to forecasted storm events and during windy conditions as necessary to prevent erosion of stockpiles. Place sediment controls (e.g., fiber rolls, straw bales, silt fencing) around the perimeter of stockpiled materials to control sediment runoff.
- Maintain sufficient erosion control materials on-site to allow implementation of erosion control measures in conformance with National Pollutant Discharge Elimination System (NPDES) storm water permit requirements and as described in the SWPPP. This includes implementation requirements for active areas and non-active areas that require deployment before the onset of rain.
- Promptly repair and reapply controls according to BMPs in areas where erosion is evident.

- During the rainy season:
  - Implement temporary erosion control measures at regular intervals throughout the defined rainy season and as needed for site-specific conditions.
  - Inspect and stabilize disturbed areas with temporary or permanent erosion control measures before rain events.

- During the non-rainy season a combination of the following erosion controls may be used at the site:
  - Scheduling
  - Preservation of existing vegetation
  - Hydromulch
  - Straw mulch
  - Geotextiles and mats
  - Earth dikes and drainage swales
  - Velocity dissipation devices
  - Slope drains
  - Streambank stabilization

BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, erosion controls will be adjusted accordingly to control storm water runoff at the down gradient perimeter.

2.4.6.11.2 Wind Erosion Control Measures. The Project will implement the following practices for wind erosion control:

- Year-round:
  - Minimize vegetation removal and grading to the extent practicable.
  - Apply water to disturbed soil areas of the Project site to control dust and maintain optimum moisture levels for compaction as needed. Apply the water using water trucks. Minimize water application rates as necessary to prevent runoff and ponding.
  - During windy conditions (forecast or actual wind conditions of approximately 25 miles per hour or greater), apply dust control to haul roads to adequately control wind erosion. Cover exposed stockpiled material areas, as necessary.
  - Suspend excavation and grading during periods of high winds when dust cannot be reasonably controlled.
  - Cover all trucks hauling soil and other loose material or maintain at least 2 feet of freeboard.

2.4.6.12 Enhancement and Revegetation

A plan for the enhancement and revegetation of disturbed areas of the Project site will be prepared prior to construction. The revegetation plan will be implemented during and immediately after construction for the areas that are temporarily disturbed. The Project facilities have an expected life of 30 years or more and a site enhancement and revegetation plan will include plans for the revegetation of the Project site assuming the cessation of operation of the facility and its eventual removal.

2.4.7 Operations and Maintenance

2.4.7.1 Facility Operations

O&M activities associated with a PV power generating facility are minimal compared to conventional power plants. The Project will operate during daylight hours only and will require approximately 16 full-time personnel for operation, maintenance, and security.

The operations workforce will be present on-site 24 hours per day. Typically, the plant operators will work 9-hour days. Plant management and administrative staff will typically work 8-hour days, Monday through Friday. However, weekend and night shifts may be required depending on maintenance requirements. Security and some maintenance staff will

be on-site on a 24-hour basis. At times when non-routine maintenance or major repairs are in progress, the maintenance force may work longer hours and contract labor may be utilized as necessary.

Daily operation of the plant will commence when there is sufficient sunlight to begin operation of the solar trackers. The panels will be facing east in the morning and rotate on a single axis to follow the sun throughout the day. In the evening, the trackers will be rotated back to the east using power from the electrical grid so that the panels are once again in position to receive the morning sun.

Water use during operations is expected to be approximately 12 afy of water for domestic, process water, and fire protection. Domestic use will include restrooms, kitchenette, showers, and other employee uses. Process water will be required for maintenance uses, the primary component of which will be the washing of solar panels (approximately 2 gallons per panel for each washing event).

Fire protection measures include sprinkler systems in the O&M building, and portable CO_2 fire extinguishers will be mounted outside inverter/electrical distribution containers or pads throughout the solar array. A FM200 fire suppression system, or equivalent, will be used in the plant control room and electrical/control rooms. A 10,000-gallon process water tank (or larger as necessary to provide water for fire control) will be located on the site in the vicinity of the O&M building (see Figure 2-5a). The actual tank size will be based on Los Angeles County Fire Department requirements for firewater storage.

2.4.7.2 Maintenance

Long-term maintenance schedules will be developed to include periodic maintenance and equipment replacement in accordance with manufacturer recommendations. No heavy equipment will be used during normal Project operation. Operation and maintenance vehicles will include trucks (pickups, flatbeds, dump trucks), forklifts, and loaders for routine and unscheduled maintenance, and water trucks for solar panel washing. Large heavy-haul transport equipment may be brought to the site infrequently for equipment repair or replacement. The primary maintenance activities that will occur during operations include the following:

- Solar panels are warranted for 20 years and are expected to have a life of 30 or more years, with a degradation rate of 0.5 percent per year. Moving parts, such as motors and tracking module drive equipment, motorized circuit breakers and disconnects, and inverter ventilation equipment, will be serviced on a regular basis, and unscheduled maintenance will be conducted as necessary.
- Water will be sprayed on the PV panels periodically to remove dust and contaminants to maintain efficient conversion of sunlight to electrical power. The cleaning interval will be

determined by the rate at which electrical output degrades between cleanings. Currently, it is expected that panel cleaning will be required about twice per year, which equates to approximately 9 afy of panel wash water.

- Project operations will include implementation of a vegetation management program. Along the transmission line, clearances for vegetation will be maintained in accordance with Public Utilities Commission General Order 95 (Rules for Overhead Electric Line Construction). Within the solar array and Project facilities, vegetation maintenance will be periodically performed by mechanical methods and limited use of herbicides, as described below; grazing may also be used to control vegetation, if appropriate:

  - Vegetation will be cut annually in the spring (near the end of May to allow for natural plant reseeding) to a height of 3 to 6 inches above the ground surface, and will be maintained approximately at this height throughout the summer and fall fire season. Grasses and wildflowers will be allowed to grow during the winter and early spring to ensure that a seed supply is maintained to perpetuate this vegetation.
  - Additional selective vegetation mowing or trimming may be performed at other times as required to: 1) minimize fire risk; 2) control vegetation to allow for equipment maintenance; and 3) keep vegetation from interfering with equipment operation.
  - Herbicides (Round-up® or equivalent, as approved by LACDRP) may be used in limited quantities to control noxious weeds primarily after the first growing season following construction) or vegetation in areas where mechanical methods are restricted due to equipment or facilities.
  - A combination of herbicides and mechanical methods will be used to keep all fire breaks free from vegetation as required by the Los Angeles County Fire Department. A description of the fire breaks and their locations may be found in Section 2.4.6.4 and Figure 2-1d.

- Infiltration basins will be maintained to allow them to continue to operate properly on a long-term basis following their construction. Such maintenance is expected to include periodic vegetation control and basin cleanout to prevent infill with sediment. Short-term stabilization and wind/water erosion protection basins and banks will be provided by soil tackifers or similar material until vegetation growth can provide root structure and cover for long-term stabilization.

2.4.7.3 Hazardous Material Handling and Storage

Limited quantities of hazardous materials will be used and stored on-site for operation and maintenance. These materials will include oils, lubricants, paints, solvents, degreasers and other cleaners, FM200 fire suppressant, and transformer vegetable or mineral oil, as shown in Table 2-4.

TABLE 2-4
HAZARDOUS MATERIALS USED DURING OPERATIONS

Chemical	Use	Storage Location	State	Storage Quantity
Various solvents, Cleaning Chemicals/Detergents, paints and other cleaners, oils, lubricants	Building maintenance and periodic cleaning	Warehouse/shop area	Liquid	Commercial 1- and 5-gallon containers
FM-200	Fire protection	Warehouse/shop area	Gaseous	15,000 pounds
Vegetable or Mineral Transformer insulating oil	Transformers/switchyard	Contained within transformers and electrical switches	Liquid	84,000 gal total

Any hazardous materials will be stored in the O&M building. Flammable materials, such as paints and solvents, will be stored in flammable material storage cabinets with built-in containment sumps. The remainder of the materials will be stored on shelves, as appropriate. Due to the quantities involved, the controlled environment, and the concrete floor of the O&M building, a spill will be able to be cleaned up without adverse environmental consequences.

A HMMP will be developed for Project operations prior to turnover of the site from construction to operations. At a minimum the HMMP will include procedures for:

- Hazardous materials handling, use, and storage
- Emergency response
- Spill control and prevention
- Employee training
- Recordkeeping and reporting

2.4.7.4 Operations Waste Management

The primary waste generated at the Project site during operations will be nonhazardous solid waste. However, varying quantities of liquid non-hazardous waste and solid and liquid hazardous waste will also be generated. The types of wastes and their estimated quantities are discussed below.

2.4.7.4.1 Nonhazardous Solid Waste. The Project will produce nonhazardous solid waste that includes typical refuse generated by workers and small office operations such as rags, scrap metal, packing materials from deliveries, empty containers, sanitary wastewater solids, and other miscellaneous solid wastes. Large metal parts will be recycled. Other nonhazardous

wastes will be recycled or disposed of in an appropriately licensed landfill. Estimated waste quantities are provided in Table 2-5.

TABLE 2-5
WASTES GENERATED DURING OPERATIONS[1]

Waste	Origin and Composition	Classification	Estimated Quantity	Disposal
Office and packaging materials from supplies deliveries	Office and warehouse paper, wood, plastic, and cardboard	Non-hazardous	Intermittent – 4 cubic yards per week	Weekly collection for recycling and/or recycling and/or approved waste disposal
Sanitary wastewater solids	Restrooms, Sanitary waste	Non-hazardous	2,000 gallons per week	Dispose to sanitary leach field
Spent batteries	Lead acid, alkaline, gel cell, nickel, and cadmium	Hazardous, recyclable	<5 units per week	Store for less than 30 days. Dispose to authorized waste recycling facility
Oily absorbent and spent oil filters	Vehicle and equipment maintenance	Hazardous	One 55-gal drum per quarter	Store for less than 90 days, dispose to authorized recycle facility
Oily rags	Vehicle and equipment maintenance	Hazardous	One 55-gal drum per quarter	Store for less than 90 days, dispose to authorized recycle facility
Used hydraulic fluid, oils, and grease	Vehicle and equipment maintenance	Hazardous, recyclable	Less than 5 gallons per month	Store for less than 90 days, dispose to authorized recycle facility

[1] Total amount of solid waste generated is approximately 31 tons per year as calculated using conversion factor from EPA 1997, Publication No. EPA530-R-97-011.

2.4.7.4.2 <u>Wastewater</u>. The wastewater collection system will collect sanitary wastewater from sinks, toilets, and other sanitary facilities, and will be discharged to an on-site septic and leach field system as discussed in Section 2.4.2.5. Approximately 4.3 afy will be used twice per year to wash dust and dirt off the solar panels (for a total of about 9 acre-feet per year). This water will be nonhazardous and will be allowed to flow onto the ground.

2.4.7.4.3 <u>Hazardous Waste</u>. When depleted or used, limited quantities of the hazardous materials described in Section 2.4.7.3 may require disposal as hazardous waste. Typical Project hazardous solid and liquid waste streams generated during operations may include empty containers, spent batteries, oil sorbent and spent oil filters, oily rags, and used hydraulic fluid, oils and grease. To the extent feasible, these wastes will be recycled; only

permitted and licensed recycling facilities will be used. If recycling is not possible, some hazardous solid wastes may be disposed of at a permitted and licensed treatment and/or disposal facility. All hazardous wastes shipped off-site for recycle or disposal will be transported by a licensed and permitted hazardous waste hauler. Estimated waste quantities are provided in Table 2-5.

2.4.7.5 Health and Safety

All employees and contractors will be required to adhere to the appropriate health and safety plans and emergency response plans. All construction and operation contractors will be trained and required to operate under a health and safety program that meets industry and OSHA standards.

2.4.7.6 Site Security

The Project site will be secured with 7-foot chain-link fencing topped with three strands of barbed wire and an anti-perch “slack wire” for a total height of about 8 feet. Lighting will be provided at the O&M building and the main plant access road only; there will be no lighting within the solar array. Lighting will be directed downward and shielded to minimize light trespass in accordance with applicable County requirements to minimize light trespass (refer to Section 2.4.2.8). The Project site will be staffed 24 hours per day, seven days per week. This staff will include full time security, and regular security patrols will be conducted throughout the site. A perimeter security system may also be installed as necessary.

SECTION 3.0
ENVIRONMENTAL SETTING

This section discusses the environmental conditions within and surrounding the Project site and proposed transmission line route, including descriptions of the site's physical and biological characteristics. The site's relationship to the biological resources in the region, including Joshua tree woodlands within SEA #60, is also addressed. Finally, this section provides estimates of the overall biological value of the Project site, and of floral and faunal populations within the site.

3.1 CHARACTERISTICS OF THE PROJECT SITE AND PROPOSED TRANSMISSION LINE ROUTE

The Project site is located on approximately 2,100 acres in the western Antelope Valley in unincorporated Los Angeles County, approximately 6 miles west of the corporate boundary of the City of Lancaster (see Figure 1-1). State Route 138 traverses the Project site, which occupies areas both north and south of SR-138. The site is zoned A-2-2, a Heavy Agricultural designation used for commercial agricultural operations on parcels exceeding two acres in size. The majority of the Project site was used for agricultural production between the 1940s and 1990s, and the vegetation on-site is in the process of recovering from this chronic disturbance. Early successional communities such as California annual grasslands have colonized the previously farmed fields, and shrub-dominated communities have developed as well. In one small area in the northern portion of the site, Joshua tree seedlings have taken root. There are currently no agricultural uses on-site, although a non-producing, non-irrigated pistachio orchard remains near a presently occupied ranch house. The last crop was cultivated on the site in 2004, on an 80-acre area south of the existing on-site ranch house and orchard. The Project site not adjacent to existing development, and is bordered by undeveloped lands and agricultural areas in all directions. A map of the study area and vicinity is presented on Figure 1-2. Figure 1-3 shows a recent aerial photograph of the Project site, and a topographic map of the area is presented on Figure 1-4. The proposed transmission line route is approximately 4.25 miles in length (3.5 miles off-site and 0.75 mile on-site), and follows 170th Street West in a northerly direction to the planned SCE Whirlwind Substation in Kern County. The proposed route is entirely contained within the County road ROW.

3.1.1 Soils

The Project site is located in the western Antelope Valley which is characterized by relatively flat-lying topography and valley fill deposits. The Soil Survey for Antelope Valley Area, California (USDA-NRCS SSURGO 2007) indicates that twelve distinct soils occur on the Project site (Figure 3-1). The twelve soils fall into five soil series: Greenfield, Hanford, Hesperia, Ramona, and Rosamond, which are described below. The following descriptions of

these soils are abridged from the USDA-NRCS Soil Series Name Search Query Facility (USDA-NRCS 2009). None of the soil series within the Project site are identified as hydric soils by the soil survey.

3.1.1.1 Greenfield

Soils in the Greenfield series exist on alluvial fans and terraces at elevations of 100 to 3,500 feet in the interior and coastal valleys of central and southern California. These soils are well drained, produce slow to medium runoff, and have moderately rapid permeability; slopes range from 0 to 30 percent. Soils in the Greenfield series tend to support annual grasses, forbs, some shrubs, and scattered oak trees. They are primarily used for the production of a wide variety of irrigated field, forage, and fruit crops and also for dryland grain farming and pasture. Greenfield soils are classified as coarse-loamy, mixed, active, thermic Typic Haploxeralfs. Within the Project site, Greenfield series soils are associated with Drainages A and B and are also found along the proposed transmission line route.

3.1.1.2 Hanford

Soils in the Hanford series are found on stream bottoms, floodplains, and alluvial fans at elevations of 150 to 3,500 feet. They are widely distributed in the San Joaquin Valley and in the valleys of central and southern California, in areas with slopes less than 15 percent. These soils are well drained, have negligible to low runoff, and have moderately rapid permeability. In uncultivated areas, soils in the Hanford series tend to support mainly annual grasses and associated herbaceous plants. The soils are used for growing a wide range of fruits, vegetables, and general farm crops, as well as for dairy farms. These soils are classified as coarse-loamy, mixed, superactive, nonacid, thermic Typic Xerorthents. Within the Project site, soils in the Hanford series are associated with Drainages A, B, and C and are found along the proposed transmission line route.

3.1.1.3 Hesperia

Soils in the Hesperia series typically occur on alluvial fans, valley plains, and stream terraces at elevations of 200 to 4,800 feet. These soils are primarily distributed in Los Angeles County, California, in areas where slopes do not exceed nine percent. Hesperia soils have negligible to low runoff potential, and are moderately permeable. Native vegetation in areas of Herperia soils generally consists of creosote bush in the high desert and sparse annual plants in valley areas. This series is primarily used for desert range, but is also used for irrigated orchards, row crops, field crops, grain, hay, pasture, and grapes. Soils in the Herperia series are classified as coarse-loamy, mixed, superactive, nonacid, thermic Xeric Torriorthents. Hesperia soils are absent from the Project site, but the proposed transmission line route traverses these soils.

3.1.1.4 Ramona

Soils in the Ramona series occur on slopes ranging from nearly level to moderately steep and are located on terraces and fans at elevations of 250 to 3,500 feet. These soils occur extensively in the interior valleys of central and the western part of southern California. They are typically well-drained, and demonstrate slow to rapid runoff and moderately slow permeability. In uncultivated areas, these soils typically exhibit a cover of annual grasses, forbs, chamise, or chaparral. These soils are frequently used for the production of grain, grain-hay, pasture, irrigated citrus, olives, truck crops, and deciduous fruits. Ramona soils are classified as fine-loamy, mixed, superactive, thermic Typic Haploxeralfs. Within the Project site, soils in the Ramona series are found south of SR-138, in the eastern half of the parcel.

3.1.1.5 Rosamond

Soils in the Rosamond series are found on the lower margins of alluvial fans between the sloping fans and the playas at elevations ranging from 2,200 to 2,900 feet. Rosamond soils are primarily located in Los Angeles County, and occur in areas with slopes less than two percent. These soils are well drained, and demonstrate medium runoff and moderate to moderately slow permeability. Where this soil series occurs, native vegetation frequently includes rabbit brush, big sagebrush, a small amount of saltbush (*Atriplex* spp.), and limited annual and perennial grasses and weeds. Large areas containing Rosamond soils are frequently used for desert range and irrigated alfalfa and row crops. Rosamond soils are classified as fine-loamy, mixed, superactive, calcareous, thermic Typic Torrifluvents. Though absent from the Project site, soils in the Rosamond series are found along the proposed transmission line route.

3.1.2 Unusual/Significant Landforms or Geologic Features

The Project site is located entirely within the floor of the Antelope Valley which is relatively flat; elevations on-site range from 2,600 to 2,720 feet. There are no unusual and/or significant landforms or geologic features associated with the Project site.

3.1.3 Watershed Boundaries and Drainage Patterns

According to the Watershed Boundary Dataset prepared by the California Interagency Watershed Mapping Committee (CalWater), which is responsible for all interagency watershed mapping and dataset creation in the state of California, the Project site is within the Antelope hydrologic unit of the South Lahontan hydrologic region. More specifically, the site is within the West Antelope Valley planning watershed in the Neenach super planning watershed (California Resources Agency 2009). The area of the West Antelope Valley planning watershed totals 157,699 acres, of which the 2,100-acre Project site accounts for approximately 1.3 percent. This watershed is not tributary to any ocean or other water body; rather, all water in this system eventually flows eastward to the valley floor where surface

flows are lost to evaporation and infiltration. The Project site is located towards the eastern (downstream) end of the watershed. Drainage patterns within the site are muted, with on-site drainages present but isolated from one another and lacking the hierarchical tributary structure found in more substantial stream systems. Watersheds in the vicinity of the Project site are depicted on Figure 3-2.

The USGS 7.5-minute quadrangle map (Fairmont Butte quad, USGS 1995) and the National Hydrography Dataset (NHD) (USGS 2007) indicate the presence of three streams that traverse portions of the Project site and one additional stream that crosses the proposed transmission line route. These four drainages are represented by dashed blue lines on the quadrangle map, indicating intermittent streams. In winter 2009, URS staff conducted a field delineation intended to confirm the location and extent of these streams within the Project site and along the proposed transmission line route. The results of this investigation indicated that, of the four drainages mapped on the USGS map and in the NHD, only two were discernible in the field (drainages A and C, see Figure 3-3). In addition, the field investigation identified the presence of two smaller, ephemeral streams within the Project site that were not mapped on the USGS maps or included in the NHD (drainages B and D, see Figure 3-3). The characteristics of the four drainages identified on-site are briefly described below. For a more detailed description of the field delineation, including methods, agency jurisdiction, and results, please refer to Section 4.3 and Appendix F of this Biota Report.

- **Drainage A:** This drainage is identified as an intermittent stream on the USGS topographic map, and extends through the portion of the Project site north of SR-138. The length of this stream within the Project site is approximately 8,000 feet, and the width varies from 20 to 50 feet. The substrate is composed mostly of sand, with gravel also present. The western portion of the stream exhibits mostly steep, cut banks, becoming more sloping and gradual towards the downstream reaches.
- **Drainage B:** This drainage was not mapped on the USGS topographic map, but was delineated in the field by URS staff. Drainage B generally parallels Drainage A, and is located between Drainage A and SR-138. This small, ephemeral drainage is wholly contained within the Project site, and has a length of approximately 2,400 feet and a width varying from three to five feet. The substrate is mostly sand, and the channel banks range from gradually sloping to distinctly cut.
- **Drainage C:** This drainage is identified as an intermittent stream on the USGS topographic map, and traverses the extreme southeastern corner of the Project site. The portion of Drainage C within the Project site has a length of 1,400 feet and width ranging from 10 to 15 feet. Substrates within this drainage are comprised mostly of sand, with gravel also present. Most of Drainage C exhibits sloping, gradual banks with shallow cuts at the low-flow channel. However, in the wider reaches of the stream, the cut banks are much deeper.

- **Drainage D:** This drainage was not mapped on the USGS topographic map, but was delineated in the field by URS staff. Drainage D follows the northern boundary of the Project site near the northeastern corner for a distance of approximately 1,500 feet, and only the southern bank of the drainage is within the Project site over most of its length. The drainage is relatively wide, with width ranging from 30 to 40 feet. The substrate is comprised mostly of sand, and the drainage exhibits steeply cut banks.

All of the drainages delineated within the Project site convey flows in a generally southwest to northeast direction, and exhibit defined beds, banks, and channels. Many of the on-site drainages also exhibit signs of geomorphic instability, such as downcutting and associated channel incision and bank failure. Anthropogenic features, such as road crossings, appear to have caused or contributed to this instability. Due to the ephemeral and intermittent flow regimes of the drainages on-site, no suitable habitat for aquatic or semi-aquatic species exists within these streams. No riparian plant communities are present within the Project site, and the stream channels on-site are vegetated with upland plant communities in most areas. Incised banks within drainages A and C (see Figure 3-3) are currently used for nesting by western burrowing owls (*Athene cunicularia*) and rock wrens (*Salpinctes obsoletus*).

3.1.4 Vegetation Communities within the Project Area

The Project site was continuously cultivated from the 1940s until 1995, but has since been largely fallow. According to the previous landowner, the last crop was grown on 80 acres of land south of the existing farmhouse in 2004. Since then, vegetation communities on-site have begun to recover from approximately five decades of chronic disturbance. Native and non-native grasses, forbs, and shrubs have colonized much of the site, although native tree species are absent with the exception of Joshua tree seedlings and one mature Joshua tree. However, the historical alteration of the natural vegetation on-site remains visibly evident, as was observed during biological field investigations of the site (see Section 4.0 of this Biota Report).

The Project site is located within the Mojave Desert geographical region, as identified by Sawyer and Keeler-Wolf (1995). Six natural vegetation communities occur on the Project site (Figure 3-4), and the proposed transmission line route (Figure 3-5). These natural vegetation communities include rabbitbrush scrub, California annual grassland, Joshua tree woodland, Joshua tree recruitment area, wildflower field, and desert saltbush scrub. In addition, four disturbed or human-converted vegetation communities occur on the Project site and/or the proposed transmission line route, including orchard, agricultural, ruderal, and ornamental vegetation. The natural and human-induced vegetation communities on-site provide breeding, foraging, and cover habitat for numerous wildlife species.

In addition to the the habitat provided by on-site vegetation communities, the drainages also provide habitat and travel routes for wildlife species. The cut banks of the drainges provide

the only significant change in topography on the relatively flat Project site. These topographical changes are important features for wildlife because they provide enhanced shade, cover, and foraging. Wildlife create burrows in the vertical substrate of the cut banks which provide shelter and also escape refugia from predators. In addition, channels within drainages are typically less vegetated than other areas due to hydrologic processes, and therefore provide for fewer obstructions for wildlife movement. Their recessed topography also limits visual detection from predators. Plants within these drainages may provide foraging habitat for wildlife species. Wildlife use of the on-site drainages was apparent during field surveys, where the presence of numerous small- to large-sized burrows (including lizard, rodent, coyote, and burrowing owl burrows) were observed within the banks, and abundant animal tracks within the channels.

The section below describes habitat type characteristics, the extent and location of the habitat, and dominant plant species observed within each community during site visits. Descriptions of habitat charateristics are based on Sawyer and Keeler-Wolf (1995) and Holland (1986). Photographs of the habitat within the Project site are included in Appendix H. A summary of the habitat types within the Project site, and proposed transmission line route are included in Table 3-1.

TABLE 3-1
SUMMARY OF ON-SITE VEGETATION COMMUNITIES

Habitat Type	Project Site (Acres)	Proposed Transmission Line Route (Linear Miles)	170th Street West	
			West Side (Linear Miles[1])	East Side (Linear Miles[1])
Rabbitbrush scrub	1,451.9	2.15	2.15	1.75
California annual grassland	367.7	0	0	0
Wildflower field	236.3	0	0	0
Joshua tree woodland	0	0.25	0.25	1.0
Joshua tree recruitment area	7.3	0	0	0
Desert saltbush scrub	0	0	0.19	0
Orchard	8.8	0	0	0.35
Agriculture	0	1.5	1.0	1.0
Ruderal	6.9	0.25	0.56	0.12
Ornamental	1.8	0	0	0
Developed	0.9	0.1	0.10	0.03
Total	2,081.7	4.25	4.25	4.25

[1] The linear miles represent total habitat along 170th Street West between the on-site terminus or the proposed transmission line route and the planned Whirlwind Substation in Kern County.

3.1.4.1 Rabbitbrush Scrub

The on-site rabbitbrush scrub habitat most closely corresponds to Sawyer and Keeler-Wolf's (1995) rubber rabbitbrush series and Holland's (1986) rabbitbrush scrub. Rabbitbrush scrub habitat is a shrub-dominated community characterized by an assortment of native shrubs dominated by rubber rabbitbrush (*Ericameria nauseosa*). Shrubs are usually less than 1.0 meter tall, and flower in late summer or fall. Shrub density can range from continuous to open with patchy California annual grassland understory. Rabbitbrush scrub is found in uplands, specifically in bajadas, pediments, and valleys on well-drained gravelly soils. Rabbitbrush scrub is a disturbance-maintained community (i.e., the result of fire, grazing, soil tilling, and other ground disturbance), and often colonizes rangeland. Among vegetation communities within the Project site, rabbitbrush scrub has the greatest coverage at approximately 1,452 acres. (Figure 3-4). Rabbitbrush scrub also occurs along the proposed transmission line route for approximately 2.15 miles (Figure 3-5). Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5. Characteristics of the rabbitbrush scrub vegetation on-site, including use by wildlife species, are discussed in greater detail in Section 4.2 of this Biota Report.

3.1.4.2 California Annual Grassland

The California annual grasslands within the Project site closely correspond to Sawyer and Keeler-Wolf's (1995) California annual grassland series and Holland's (1986) non-native grassland. California annual grassland habitat is characterized by an assortment of native and non-native annual grasses and forbs of highly variable composition. It is typically found on seasonally dry hillsides and valleys, interior valleys of the Coast Ranges, and along the coast of central and southern California. California annual grassland is among the first vegetation communities to become re-established following a disturbance, and events such as cattle grazing, ground disturbance, and wildfires can lead to expansion of this habitat. In many areas, however, California annual grassland is the final stage in community succession, and is not replaced by shrub- or tree-dominated vegetation. Although annual grasses dominate the plant species composition, often native annual forbs offer the greatest diversity in select areas. This mix of grasses and forbs is often found on gravelly to deep fine-grained soils well suited for annual plant growth.

California annual grassland is the second-most abundant vegetation type on-site, and covers approximately 367.68 acres within the Project site (Figure 3-4). The proposed transmission line route does not traverse this vegetation type. California annual grassland covers most of the northern half of the Project site south of SR-138, with a smaller area located north of SR-138. In annual grasslands within the Project site, dominant plants included native annual species such as fiddleneck (*Amsinckia menziesii*), small fescue (*Vulpia microstachys*), and non-native species such as cheatgrass (*Bromus tectorum*) and red-stem filaree (*Erodium cicutarium*). Other native species found within this habitat type include Kellogg's tarweed

(*Deinandra kelloggii*), California poppy (*Eschscholzia californica*), and goldfields (*Lasthenia californica*). Characteristics of the California annual grassland vegetation on-site, including use by wildlife species, are discussed in greater detail in Section 4.2 of this Biota Report.

3.1.4.3 Wildflower Field

This vegetation type is not defined by specific dominant plant species, but is instead characterized by a variety of herbaceous species noted for conspicuous annual wildflower displays (Holland 1986). Species composition and dominance varies from site to site, and can vary from year to year at any particular site. This habitat is found in valleys and foothills of the Californian Floristic Province except in the north coast (too wet) and desert (too dry) regions, below about 2,000 feet in the north and 4,000 to 5,000 feet in the south (Holland 1986). Wildflower fields are identified by the CDFG (2008b) as a sensitive natural community.

Wildflower field habitat occurs in the southernmost portion of the Project site, south of the existing orchard, and comprises 236.34 acres of the Project site (Figure 3-4). The species composition in this area is fairly similar to that of the California annual grasslands on-site, containing a mixture of native and non-native grasses and forbs; shrub cover is nearly absent. However, the wildflower fields on-site are distinct from the annual grassland habitat because of the relative abundance of plants that exhibit colorful floristic displays. Dominant plants in the on-site wildflower field include California poppy (*Eschscholzia californica*), goldfields (*Lasthenia californica*), fiddleneck, red-stem filaree, and several species of lupine (*Lupinus* spp.). Native and non-native grasses including cheatgrass, small fescue, and Mediterranean grass (*Schismus* spp.) are also dominant. Characteristics of the wildflower fields on-site, including use by wildlife species, are discussed in greater detail in Section 4.2 of this Biota Report.

3.1.4.4 Joshua Tree Woodland

Joshua tree woodland habitat is characterized by open woodlands of Joshua trees, with intermittently spaced shrubs less than three feet tall. Joshua trees are usually less than 30 feet tall and display a variety of life forms. The main growing season is spring, with most growth limited by cold in winter and drought in summer and fall. Many species of herbs may germinate following sufficient late fall or winter rains and flower in mid-spring. Joshua Tree Woodland is typically found on sandy, loamy, or gravelly, well-drained gentle alluvial slopes. This habitat is absent from the Project site, but occurs on approximately 0.25 mile of the proposed transmission line route within SEA #60 (Figure 3-5). Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5. The Joshua tree woodland habitat in this area most closely corresponds to Sawyer and Keeler-Wolf's (1995) Joshua tree series and Holland's (1986) Joshua tree woodland. Characteristics of the

Joshua tree woodlands along the proposed transmission line route, including use by wildlife species, are discussed in greater detail in Section 4.2 of this Biota Report.

3.1.4.5 Joshua Tree Recruitment Area

Fifty Joshua tree seedlings, scattered over an approximate 7.3 acres, are located on the northern portion of the Project site (see Figure 3-4). The presence of the Joshua tree seedlings identified within this portion of the Project site appear to indicate that this area may be in the early stages of re-establishing a Joshua tree woodland habitat; therefore, this area is has been termed a "Joshua tree recruitment area." Because cultivation of this portion of the Project site was ceased in 1995, it is likely that Joshua tree seeds dispersed into this area from the nearby Joshua tree woodland are now able to grow without regular or chronic disturbance. Although "Joshua tree recruitment area" is not a formally recognized vegetation community, the recruitment area was mapped and treated as such for the purposes of this Biota Report due to the rarity of Joshua tree recruitment within areas recovering from recent agricultural activity, and because the recruitment area represents the potential re-colonization of Joshua tree woodland habitat within its historic range. The Joshua tree recruitment area contains a relatively low density of Joshua tree seedlings (an average of 6.8 per acre) and the vegetation is dominated by species found within the rabbitbrush scrub habitat type. The Joshua tree recruitment area on-site most closely corresponds to Sawyer and Keeler-Wolf's (1995) rubber rabbitbrush series and Holland's (1986) rabbitbrush scrub, and would not be appropriately mapped as a Joshua tree woodland.

3.1.4.6 Desert Saltbush Scrub

The desert saltbush scrub in the Project vicinity most closely corresponds to Sawyer and Keeler-Wolf's (1995) allscale series and Holland's (1986) desert saltbush scrub. Desert saltbush scrub is characterized by low growing, woody, gray shrubs, one to three feet tall, strongly dominated by a single *Atriplex* species. Total cover is often low, with more bare ground between the widely spaced shrubs. The soils underlying this vegetation community are fine-textured and usually poorly drained, with high alkalinity and/or salinity, usually surrounding playas on slightly higher ground. Desert saltbush scrub occurs on widely scattered on margins of dry lake beds in the Colorado, Mojave, and Great Basin deserts.

Desert saltbush scrub habitat is absent from the Project site, but occurs along the proposed transmission line route. Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5. Desert saltbush scrub habitat occurs near the northern end of the proposed transmission line route, and is primarily located north of Astoria Avenue. This habitat is dominated by one saltbush species, allscale (*Atriplex polycarpa).* Other species present within this habitat include native shrubs such as Cooper's goldenbush (*Ericameria cooperi*), sticky matchweed (*Gutierezzia microcephala*), and non-native plants such as red brome (*Bromus madritensis* ssp. *rubens)* and red-stem filaree. Characteristics of

the desert saltbush scrub along the proposed transmission line route, including use by wildlife species, are discussed in greater detail in Section 4.2 of this Biota Report.

3.1.4.7 Orchard

An orchard is defined as an area of land devoted to the cultivation of fruit or nut trees. Approximately 8.82 acres of orchard are located on the Project site, but this community is absent from the proposed transmission line route. However, orchard does occur along 170th Street West outside the transmission line route, and the distribution is shown in Table 3-1 and on Figure 3-5. The on-site orchard is composed of non-producing and non-irrigated pistachio root stock trees located adjacent to the ranch south of SR-138 (Figure 3-4). The orchard along 170th Street West is composed of rows of stone fruit trees, and is located on the east side of 170th Street West near a rural residence (Figure 3-5). Characteristics of the orchards within the Project site and along 170th Street West, including use by wildlife species, are discussed in greater detail in Section 4.2 of this Biota Report.

3.1.4.8 Agricultural

The agricultural areas in the Project vicinity are characterized by cultivated land that is used for row-crop farming and grazing. The Project site was continuously cultivated from the 1940s until 1995, and thus would once have been considered an agricultural area, but has since been largely fallow (the last crop was grown in 2004, on an 80-acre area south of the existing on-site ranch house.) Agricultural land does not currently occur within the Project site. However, it is present on approximately 1.5 miles of the proposed transmission line route (Figure 3-5). Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5. Characteristics of the agricultural areas and along the proposed transmission line route, including use by wildlife species, are discussed in greater detail in Section 4.2 of this Biota Report.

3.1.4.9 Ruderal

Ruderal plants grow in disturbed areas as a result of activities such as road cuts and soil tilling. These activities have recently occurred along the proposed transmission line route and have resulted in areas dominated by non-native species such as Russian thistle (*Salsola tragus*), black mustard (*Brassica nigra*), and red brome. The Project site contains 6.92 acres of ruderal vegetation associated with the on-site ranch house (Figure 3-4), and the proposed transmission line route traverses approximately 0.25 mile of this community (Figure 3-5). Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5. Because of the low plant species diversity in most ruderal areas, the value of this vegetation type is generally believed to be low. Characteristics of the ruderal vegetation within the Project site and along the proposed transmission line route, including use by wildlife species, are discussed in greater detail in Section 4.2 of this Biota Report.

3.1.4.10 Ornamental Vegetation

On-site ornamental vegetation includes landscaped areas around the existing ranch house and a windbreak of planted trees and shrubs. Approximately 1.80 acres of ornamental vegetation are located on the Project site (Figure 3-4). Scattered patches of ornamental vegetation (on a scale too small to map) are also present along the proposed transmission line route in areas mapped as development. Characteristics of the ornamental vegetation within the Project site and along the proposed transmission line route, including use by wildlife species, are discussed in greater detail in Section 4.2 of this Biota Report.

3.1.4.11 Development

Developed areas are comprised of anthropogenic structures and associated human-disturbed areas, which generally do not provide habitat for native plants and wildlife. The Project site contains approximately 0.88 acres of developed areas consisting of roads, residential structures, and associated outbuildings. The proposed transmission line route traverses approximately 0.10 miles of development, consisting primarily of residences and driveways. Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5.

3.1.5 Common Plants and Wildlife within the Project Site

Each of the vegetation communities described above is comprised of a combination of dominant plants that define the community, and other associated plants that also occur depending on the physical and chemical characteristics of the location. Similarly, the various plant communities on-site provide habitat for different communities of invertebrates, reptiles, birds, and mammals. Several biological field surveys have been conducted within the Project site, including focused surveys for flowering plants, wintering and nesting birds, and burrowing owls, among others. The descriptions of flora and fauna presented in this Section are not intended to present the results of these surveys; rather, the descriptions are intended to provide an overview of the species composition present in the plant and wildlife communities on-site. For a detailed discussion of the field surveys, including the methods employed, dates and areas surveyed, and results, please refer to Section 4.0 of this Biota Report. In addition, a summary table listing all sensitive plants and wildlife observed on-site is presented in Section 4.10, and an additional listing of those sensitive species not observed but with potential to occur on-site based on known distributions and habitat requirements is presented in Section 4.11. For a complete list of plants and wildlife observed within the Project site during biological field investigations, and estimates of relative abundance of these species on-site, please refer to Appendices I and J, respectively.

3.1.5.1 Plants

Dominant plants occurring within the Project site and transmission line route include shrubs, annual grasses, and forbs. The majority of the Project site north of SR-138 contains abundant rubber rabbitbrush, with patches of Davidson buckwheat (*Eriogonum davidsonii*), Kellogg's tarweed, fiddleneck (*Amsinckia tesselata*), goldfields (*Lasthenia californica*), and slender comb seed (*Pectocarya linearis* ssp. *ferocula*), interspersed with small wirelettuce (*Stephanomeria exigua*), Lemmon's lessingia (*Lessingia lemmonii*), and annual bursage (*Ambrosia acanthicarpa*) in the more disturbed areas, particularly along road edges. Red-stem filaree (*Erodium cicutarium*) and cheatgrass (*Bromus tectorum*) were widespread throughout the site, especially between the more established grassland and scrub habitat areas.

The Project site south of SR-138 was dominated by annual native and non-native grasses and forbs consisting mostly of cheatgrass, small fescue, fiddleneck, bicolored lupine (*Lupinus bicolor*), goldfields (*Lasthenia californica*), and California poppy (*Eschschlozia californica*). Less dominant species within the southern portion of the project site included shrubs such as rubber rabbitbrush, interior goldenbush (*Ericameria linearifolia*), and Cooper's goldenbush (*Ericameria cooperi*) within scattered patches of rabbitbrush scrub. The majority of the plant species observed within the proposed transmission line route consisted of rubber rabbitbrush, ruderal species including Russian thistle (*Salsola tragus*) and mustards (*Sisymbrium* and *Brassica* spp.), and agricultural crops. Less dominant plant species observed within the proposed transmission line route included Joshua trees (*Yucca brevifolia*), and other plant species associated with Joshua tree woodlands including cheesebush (*Ambrosia salsola*), winter fat (*Krascheninnikovia lanata*), spiny hopsage (*Grayia spinosa*), Anderson's boxthorn (*Lycium andersonii*), and ephedra (*Ephedra nevadensis*). Understory species observed on the proposed transmission line route within the Joshua tree woodlands included grassland species such as cheatgrass, fiddleneck, goldfields, and red-stem filaree.

Focused floristic surveys of the Project site and transmission line route were conducted in March and April, 2009. The survey results are presented in Section 4.4 of this Biota Report, and a list of all plants observed on-site is included in Appendix I.

3.1.5.2 Invertebrates

Invertebrates observed during general wildlife surveys included harvester ant (*Pogonomyrmex barbatus*), velvet ant (*Dasymutilla occidentalis*), grasshoppers (family Acrididae), and bombardier beetles (family Carabidae). Harvester ant hills, both active and inactive, were observed scattered throughout the Project site and proposed transmission line route.

3.1.5.3 Fishes

There is no permanent or seasonal standing or flowing water on the site. All stream channels within the Project area are intermittent or ephemeral (containing water only during and shortly after precipitation events), and are not hydrologically connected to any other streams or water bodies that could serve as a source population for aquatic species. Therefore, no fishes occur on the site.

3.1.5.4 Amphibians

Due to the lack of perennial aquatic habitat, and because the soils within the Project site are sandy, well-drained, and do not hold moisture for long periods, no amphibian species are expected to occur on the Project site or proposed transmission line route. No suitable breeding habitat (vernal pools, ponds, or puddles) was noted for desert-adapted species such as the western spadefoot toad (*Spea hammondii*) and the red-spotted toad (*Anaxyrus* [*Bufo*] *punctatus*).

3.1.5.5 Reptiles

Seven common species of reptiles, comprised of 4 lizard species and 3 snake species, were observed during field surveys. In addition, one special-status lizard species, Blainville's horned lizard (*Phyrnosoma blainvillii,* CSC) was observed within the Project site. Common lizard species observed included desert horned lizard (*Phyrnosoma platyrhinos*), Great Basin whiptail (*Aspidoscelis tigris* ssp. *tigris*), side-blotched lizard (*Uta stansburiana*), and long-nosed leopard lizard (*Gambella wislizenii*). Snake species observed included Mojave rattlesnake (*Crotalus scutulatus*), gopher snake (*Pituophis catenifer*), and coachwhip (*Masticophis flagellum*). Additional common reptile species expected to occur, but not observed on the Project site or along the proposed transmission line route include the yellow-backed desert spiny lizard (*Sceloporus magister uniformis*), Great Basin collared lizard (*Crotaphytus bicinctores*), and California kingsnake (*Lampropeltis getula*).

For special status reptile species, the Project site is within the range of the California legless lizard (*Anniella pulchra)*, a California Species of Special Concern (CSC), but the site lacks suitable habitat (moist soil with leaf litter). Although the Project site and proposed transmission line route are within the historic range of the desert tortoise (*Gopherus agassizii*, ESA-threatened), current habitat suitability is very marginal and distribution data and range maps indicate that the Project site is outside the current known range for this species (Bransfield 2009; CNDDB 2009). The potential for occurrence of these special status reptile species is further discussed in Section 4.11 of this Biota Report.

3.1.5.6 Birds

Within the Project site and along the proposed transmission line route, 61 bird species (43 common species and 18 special-status species) were observed during field surveys. Of these, 48 species were observed on the Project site. The most common species found on the site during these surveys was the horned lark (*Eremophila alpestris*). Several thousand horned larks were observed foraging in the grasslands within the Project site in January and February 2009, and smaller but still significant numbers remained from February to June. The mountain bluebird (*Sialia currucoides*), sage sparrow (*Amphispiza belli*), savannah sparrow (*Passerculus sandwichensis*), and white-crowned sparrow (*Zonotrichia leucophrys*) were also common in winter. The mourning dove (*Zenaida macroura*), common raven (*Corvus corax*), sage sparrow, and house finch (*Carpodacus mexicanus*) were common at all seasons. More information regarding the common and special-status bird species occurring within the Project site and along the proposed transmission line route is presented in Section 4.0 of this Biota Report. A table listing all bird species observed is presented in Appendix J of this Biota Report.

3.1.5.7 Mammals

Common mammal species observed or detected via sign (tracks, scat, burrows) on the Project site include Botta's pocket gopher (*Thomomys bottae*) (mounds), white-tailed antelope squirrel (*Ammospermophilius leucurus*) (numerous burrows and individual sightings), California ground squirrel (*Spermophylis beecheyi*) (two individuals observed on the proposed transmission line route only), abundant sightings of black-tailed jackrabbits (*Lepus californicus*), several desert cottontails, several coyotes (*Canis latrans*) (including two dens with young, and abundant tracks and scat), and an unidentified rodent (assumed kangaroo rat [*Dipodomys* sp.] based on hind feet and tail drag tracks).

Other common mammals that have the potential to occur on the Project site and proposed transmission line route but were not observed include the desert kit fox (*Vulpes macrotis* ssp. *arsipus*), Merriam's kangaroo rat (*Dipodomys merriami*), southern grasshopper mouse (*Onychomys torridus*), and desert woodrat (*Neotoma lepida*). No native large mammal species are known to use the Project site, and no tracks or pellets of either mule deer or American antelope were noted during field surveys. The recent presence of domestic sheep (*Ovis aries*) on the Project site was confirmed by observations of scat and several sheep remains found just off the site, the majority of which were carcasses discarded within Drainage D.

No special-status mammal species were observed within the Project site or proposed transmission line route. The American badger (*Taxidea taxus*, CSC) may potentially occur, although habitat suitability for this species has diminished due to previous agricultural activities conducted on the Project site and current agricultural activities on the proposed

transmission line route; therefore, the likelihood of American badger occurrence would be expected to be low. Previous agricultural activity conducted on the Project site and surrounding vicinity has also rendered the habitat unsuitable for the Mohave ground squirrel (*Spermophilus mohavensis*), a state-listed threatened species. The most current information states that this species no longer occurs west of SR-14 in the Lancaster and Palmdale areas (Laabs 2004). The potential for occurrence of the American badger and Mohave ground squirrel is further discussed in Section 4.11 of this Biota Report.

While no focused surveys for bat species were performed on the site, several bat species have ranges which include the vicinity of the Project site and proposed transmission line route, and are known to make use of desert type habitats. These include the pallid bat (*Antrozous pallidus*, CSC), Townsend's big-eared bat (*Corynorhinus townsendii*, CSC), big brown bat (*Eptesicus fuscus*), California myotis (*Myotis californicus*), canyon bat (*Parastrellus Hesperus*), and Mexican free-tailed bat (*Tadarida brasiliensis*). The majority of the Project site and proposed transmission line route may provide foraging habitat for these species. The single residence structure and associated outbuildings and landscape trees on the Project site may provide a small amount of roosting habitat for bats. The potential for occurrence of the pallid bat and Townsend's big-eared bat is discussed further in Section 4.11 of this Biota Report.

3.2 CHARACTERISTICS OF THE SURROUNDING AREA

This section discusses the relationship of the Project site to the surrounding land uses, vegetation communities, and biotic mosaic. This relationship determines important ecological functions within and around the Project site including migration corridors and travel routes, and gene transfer between local populations and metapopulations. Also, the site's relationship to the surrounding area affects the extent to which the site may be suitable for species which rely on the site for only a portion of their biological requirements (such as raptors nesting off-site but use the site for foraging, or migrating birds using the site as stopover habitat). Lastly, the relationship between the Project site and the surrounding areas is important because the surrounding areas may serve as escape habitat for wildlife within the site during times of disturbance.

3.2.1 Existing Land Uses in the Project Vicinity

The majority of the Antelope Valley floor west of the City of Lancaster is designated Non-Urban 1 (N-1) by the Antelope Valley Area Plan (LACDRP 1994). The Area Plan characterizes the dominant uses intended for areas within each land use designation; N-1 is classified as a non-urban use with density less than 0.5 dwelling unit per acre. The parcels within the Project site are zoned A-2-2, a designation for heavy agricultural uses on parcels exceeding two acres in size. The nearest area of concentrated population is the City of Lancaster. The Lancaster City Center is located approximately 15 miles west of the Project

site. Land uses in the Project vicinity are primarily dryland agriculture, although fields with rotational irrigation systems are located to the northeast and directly south of the Project site. Large portions of the dry agriculture fields in the Project vicinity are no longer actively worked, and are currently in various seral stages of ecological succession. Rabbitbrush scrub and California annual grassland habitats (Figure 3-4) grow on most of the Project site and on most adjacent areas, with Joshua tree woodlands in SEA #60 abutting the site as well. The land uses in the portion of Kern County proximate to the Project site are similar to those described in this paragraph.

In addition to SR-138 and paved County roads, a network of dirt roads and tracks exists throughout the area, generally along the boundary lines of parcels and land sections. It is apparent that Off-Highway Vehicle (OHV) use occurs in the Project vicinity. Aerial photographs indicate that surrounding properties have well-defined OHV/motorcycle tracks. A large network of these tracks is located within SEA #57, southeast of the Project site.

Existing utility infrastructure includes local power and telephone lines, generally laid out along road grids, as well as a high voltage transmission line corridor running southeast to northwest east of the Project site. The California Aqueduct is located approximately 3 miles south of the Project site (see Figure 1-2).

3.2.2 Open Space Reserves in the Area

As shown on Figure 1-2, four open space reserves are located in the vicinity of the Project area. These reserves include: 1) the Antelope Valley California Poppy Reserve, 2) lands to the southeast of the Project site owned by the Santa Monica Mountains Conservancy, 3) the Arthur B. Ripley Desert Woodlands State Park, and 4) an unnamed strip of land along each bank of the California Aqueduct. These open space reserves are briefly described below:

1) The Antelope Valley California Poppy Reserve is a floristically diverse, 1,800-acre State Park located approximately 1.50 miles southeast of the Project site on the opposite side of Fairmont Buttes. This reserve features one of the largest remaining fields of California poppy in the state, and dozens of other flowering annual and perennial plants also occur within the reserve. The reserve has a visitor center and eight miles of hiking trails, and is a popular destination for nature lovers and tourists, particularly during the spring blooming period.
2) The 160-acre Santa Monica Mountains Conservancy property is located at the top of Fairmont Buttes, approximately 0.25 mile south of the Project site. It includes portions of the south, north, and northwest facing slopes of Fairmont Buttes, in grassland and scattered brush habitat. It appears to be undeveloped without any visible boundaries or distinguishing characteristics to separate it from the surrounding terrain. A dirt road traverses the area, following the major ridgeline of Fairmont Buttes to the top.

3) The approximately 640-acre Arthur B. Ripley Desert Woodlands State Park is located approximately three miles southwest of the Project site. Lancaster Road (paved 2-lane) and the California Aqueduct run through the middle of the park. The park features Joshua tree woodlands, the most significant stand of which occurs in the north half of the park. This area is also included within the boundaries of SEA #60. The park is largely undeveloped, and facilities are limited to a small dirt parking lot, a picnic table, and some short hiking trails.

4) The narrow strips along the California Aqueduct designated as "open space" include the access/maintenance roads located along the top of the canal bank. The banks of the canal vary in height according to the surrounding terrain, and are covered in varying amounts of grass, shrubs, and planted trees. These narrow strips range from about 50 to 140 feet in width. In many places, dirt roads parallel the canal at the base of the bank, and seem to mark the boundary of the open space. Cultivated fields or natural vegetation often begin on the other side of these roads. The aqueduct separates the floor of Antelope Valley from the hills to the south, and a variety of flume structures have been installed to direct runoff from these hills across the canal. Wildlife use these structures to cross the aqueduct. However, these structures vary in effectiveness as wildlife conduits depending on existing fencing and human infrastructure built up around them. Wildlife is less likely to use a crossing structure in close proximity to homes, occupied maintenance buildings, areas closed off by chain-link or barbed-wire fencing, areas lacking in cover, or otherwise unnatural and potentially threatening features.

3.2.3 Significant Ecological Areas

In an effort to conserve ecologically important or fragile land and water areas, which are valuable as plant and animal communities, the County has established a system of designated Significant Ecological Areas (SEAs). Although not officially designated as open space reserves, SEAs usually represent large, contiguous blocks of relatively natural habitat and are afforded protection through the County Code (Section 22.56.215), which requires that development projects proposed within SEAs be highly compatible with the biotic resources present. The SEA boundaries in the Project region were established during the 1986 update to the General Plan through adoption of the Antelope Valley Area Plan (adopted December 4, 1986). Although the General Plan is currently undergoing an update process that could potentially affect these SEA boundaries, the current boundaries are applicable until any pending updates are formally adopted.

Two SEAs, SEA #60 and SEA #57, occur in the vicinity of the Project site. The Joshua tree woodland SEA (SEA #60) is an 4,430-acre designation comprised of six discrete areas within the vicinity of the Project site, and is intended to protect the Antelope Valley's remaining stands of Joshua tree woodland habitat. The loss of this habitat is of concern to the County because: 1) accelerated agricultural and urban expansion is occurring in the County's desert regions, and 2) large, dense stands of this habitat are becoming scarce, especially in the

western Antelope Valley (LACDRP 1994). The Fairmont-Antelope Buttes SEA (SEA #57) comprises approximately 5,567 acres, and the SEA contains wildflower fields, rolling hills, and rocky outcrops that are uncommon in the Antelope Valley.

As shown on Figure 3-6a portions of the Project site and transmission line route occur within and adjacent to the current boundaries of SEA #60. The acreage of the Project site and linear extent of the proposed transmission line route that would overlap SEA #60 were calculated using GIS software. Based on the current SEA boundaries, the Project site and proposed transmission line route are located in relation to the SEAs as follows:

- An approximately 20-acre area in the northwestern portion of the Project site is located within the designated Joshua Tree Woodland SEA #60. (No Joshua trees or Joshua tree woodland habitat were observed within this overlap area during biological surveys; refer to Section 4.0, Biological Field Surveys and Results.)
- Portions of the northern and eastern site boundaries are adjacent to portions of SEA #60 that contain Joshua tree woodland habitat.
- The proposed transmission line route along 170th Street West traverses SEA #60 for approximately 0.4 mile along the west side of the roadway.
- The southeast corner of Project site is roughly 700 feet northwest of the Fairmont-Antelope Buttes SEA (SEA #57).

As stated previously, the General Plan is currently undergoing an update process that would affect the SEA boundaries within the western Antelope Valley, but the current boundaries are applicable until any pending updates are formally adopted. However, in an effort to fully disclose the extent of biological resources surrounding the Project site, a discussion of the proposed SEA boundaries is provided in this Biota Report. The proposed General Plan Update SEA boundaries are shown on Figure 6.3 of the Los Angeles County Department of Regional Planning 2008 Draft General Plan Update. If implemented, these updates would precipitate the following changes:

- The existing SEA #60 would be re-designated as Joshua Tree Woodlands SEA #11, and its boundaries would be modified as shown on Figure 3-6b.
- The Project site would not be within any SEA boundaries (i.e., the 20-acre portion of the Project site currently within SEA #60 would not be within the re-designated SEA #11).
- The portions of the northern site boundary and northwest site boundary that are currently adjacent to SEA #60 would still be adjacent to the SEA re-designated SEA #11.
- The 0.40-mile length of the proposed transmission line route along 170th Street West that traverses SEA #60 would traverse only approximately 0.25 mile of the re-designated SEA #11.

- The existing Fairmont-Antelope Buttes SEA #57 located to the southeast of the Project site would be expanded and re-designated as the San Andreas Rift Zone SEA #21. With this modification, the proposed SEA #21 would directly abut the southeastern corner of Project site (see Figure 3-6b).

3.2.4 Vegetation Communities in the Project Vicinity

The following vegetation types occur in the areas immediately surrounding the Project site and/or the proposed transmission line route: 1) rabbitbrush scrub of varying densities on the floor of Antelope Valley; 2) California annual grasslands and wildflower fields toward the slopes of Fairmont Butte; 3) scattered Joshua tree woodlands; 4) desert saltbush scrub near the terminus of the proposed transmission line route in Kern County; and 5) agriculture (both active and abandoned). Less abundant vegetation types in the immediate Project vicinity include orchards, windrows, and ornamental vegetation associated with scattered residences. These vegetation types also occur within the Project site and/or proposed transmission line route, and characteristics of these communities are described in Section 3.1.4 of this Biota Report.

Joshua tree woodland is the most diverse natural vegetation type in the immediate Project vicinity. This community covered the majority of the Antelope Valley floor prior to the area's conversion to agricultural uses, although juniper (*Juniperus* sp.) was also a major component of the community (Mojave Desert Information Center 2009). Large blocks of previously cultivated land are currently in varying stages of ecological succession following cessation of farming activities (Mojave Desert Information Center 2009). However, on the floor of the Antelope Valley, the succeeding vegetation is generally California annual grassland in the early phases of succession, followed by rabbitbrush scrub. Because of their slow growth rate, Joshua trees may take decades, if not centuries, to re-establish lost woodlands (Gossard 1992). Currently, Joshua tree woodlands in the Project vicinity are present in disjointed blocks, due to historical agricultural land uses that eliminated much of this vegetation in the area. These remaining woodlands exhibit varying Joshua tree densities and levels of disturbance. The SEA boundaries shown on Figure 3-6a reflect the fragmented nature of the Joshua tree woodlands currently found in the Project vicinity.

The area to the southeast of the Project site exhibits topography that is very different from that of the Project site, and includes hills and rock outcrops. The Fairmont and Antelope Buttes, the Antelope Valley California Poppy Reserve, and SEA #57, occur within this region. These areas support two vegetation types identified as sensitive natural communities by the CDFG (2008b): valley needlegrass grassland and wildflower fields. Wildflower fields occur within the Project site, and are described in Section 3.1.4 of this Biota Report. Valley needlegrass grassland does not occur within the Project site or in the immediate vicinity, and is described below.

3.2.4.1 Valley Needlegrass Grassland

Valley needlegrass grassland is a community of mid-height (up to 2 feet) grassland dominated by perennial, tussock-forming purple needlegrass (*Nassella pulchra*). Native and non-native annual grasses and forbs occur between the clumps of perennial grasses, often actually exceeding the bunchgrasses in cover. Soil requirements include fine-textured (often clay) soils, which can be moist or even waterlogged during winter, but very dry in summer. Valley needlegrass grassland often integrates with oak woodlands on sites with relatively high moisture and well-drained soils. Valley needlegrass grasslands were formerly extensive around the Sacramento, San Joaquin, and Salinas Valleys, as well as the Los Angeles Basin, but have been reduced by intensive cultivation and grazing, urbanization, fire suppression, and the introduction of invasive, nonnative species. Valley needlegrass grassland has been identified by the CDFG (2008b) as a sensitive natural community. Within the Project vicinity, the CNDDB identifies an occurrence of valley needlegrass grassland habitat located approximately 1.5 miles due south of the Project site, to the west of the Fairmont Buttes and SEA #57.

3.2.5 Project Site Relationship with Surrounding Biotic Mosaic

The Project site is a representative portion of the surrounding biotic mosaic, in that the dominant vegetation communities that occur within the site are also present extensively in the surrounding vicinity. Specifically, the Project site provides habitat similar to the surrounding rabbitbrush scrub, wildflower fields, and California annual grassland vegetation. Ecotones in the Project vicinity are very sharp, and clearly defined changes in vegetation are evident along section boundaries, agricultural road cuts, and other orthogonal features that once delineated changes in land use. The anthropogenic vegetation on-site, including the pistachio root stock orchard, ornamental trees, and outbuildings associated with the on-site ranch house, do not occur extensively in the project vicinity; however, these areas provide only limited habitat for native wildlife species. The Project site does not contain Joshua tree woodland habitat, although Joshua tree woodlands within SEA #60 are present to the east, north, and west of this site, and portions of the proposed transmission line route traverse this community. The Joshua tree recruitment area and wildflower fields present within the Project site represent rare habitat types/functions that are different from the overall pattern of habitats found in the vicinity.

The western Antelope Valley is shaped like an arrowhead pointing west, with the northern flank against the Tehachapi Mountains and the southern flank against the San Gabriel Mountains. The western terminus of the valley lies at the junction of five distinct ecotypes and, therefore, is in an area of high biodiversity. These ecotypes are: the western Mojave Desert, the southern San Joaquin Valley, the Tehachapi Mountains (southern tip of the Sierra Range), the Sierra Madre Range (southern tip of the Coast Ranges), and the northern tip of

the San Gabriel mountains (Transverse Ranges). The corridor of Interstate 5 transects the middle of this five-way junction.

The junction of the Tehachapi, Sierra Madre, and San Gabriel mountain range systems with the San Joaquin Valley to the north and Mojave Desert to the east represents a bottle-neck for the movement of wildlife between southern and northern California. Most wildlife favor the mountain and foothill regions for travel since they are less impacted by human development and have more topographic and vegetative cover (South Coast Wildlands 2008) (Figure 3-7). In addition, the Mojave Desert has little available surface water and experiences temperature extremes during a large part of the year, and the San Joaquin Valley is intensively cultivated and lacks cover. Thus, the primary movement of terrestrial wildlife in the region follows along the mountainous terrain of the Tehachapi Range and San Andreas Rift Zone (South Coast Wildlands 2008).

Within the Antelope Valley, the California Aqueduct represents a physical obstacle to the movement of terrestrial wildlife. However, 105 stream crossing structures (flumes) are in place along a 35-mile stretch of the aqueduct between Palmdale and the Tehachapi Afterbay (average of three per mile) that may enable these species to cross the aqueduct during dry weather. However, wildlife access to some of the structures is restricted by chain-link fencing, prohibitive gradients, and the presence of energy dissipaters. The suitability of each flume structure for use as a wildlife crossing and its actual level of use is not known. There are no known wildlife corridors in the vicinity of the aqueduct (Faulconer 2009), and no north – south oriented wildlife corridors exist in parts of the Antelope Valley north of the aqueduct (S. Harris, CDFG, personal communication, January 2009).

No regional wildlife movement corridors are known to exist on the floor of the western Antelope Valley in the vicinity of the Project site. On a smaller scale, the flat terrain and rabbitbrush cover within the site and surrounding vicinity allows small and medium-sized mammals to move about freely. This freedom can be limited in areas containing human development, roads, fences, and cultivated areas lacking in cover. Local wildlife movement is typically focused on areas of low human disturbance, high availability of cover, and ease of travel. These characteristics are best provided by drainage channels, since they provide topographic relief for cover, are usually undeveloped, and contain sparser vegetation than surrounding uplands, making them easier to travel along. Within the Project site, numerous wildlife tracks observed on the floor of the drainages during each field survey were an indication of the level of use they were receiving as local travel ways for wildlife. However, the entire site is relatively well suited for wildlife movement due to its unobtrusive, easily passable topography.

3.2.6 Overall Species Population Sizes of Flora and Fauna in the Region

The desert habitats of the western Antelope Valley have been heavily impacted for decades by agricultural development and human encroachment (Galloway *et al.* 1998). Natural vegetation communities such as Joshua tree woodlands and native grasslands have been removed and fragmented, altered by the introduction of agricultural crops and non-native plant species, and grazed by cattle and sheep. Nevertheless, a variety of plant and wildlife species are found throughout the region. Species associated with California annual grassland and rabbitbrush scrub, the most extensive habitats in the region, are the most abundant. Due to the fragmentation and scarcity of Joshua tree woodlands in the western Antelope Valley, species associated with this habitat are less abundant in the region. Species associated with the most limited habitats in the region, such as valley needlegrass grasslands, are even less abundant as this habitat type occurs only in the Fairmont-Antelope Buttes area.

Common wildlife species in the region that are associated with rabbitbrush scrub and non-native grassland habitats include the horned lark, sage sparrow, white-crowned sparrow, house finch, and common raven. Sensitive bird species, including the western meadowlark (SBS), mountain bluebird (SBS), also occur within these habitats, and raptors, including the northern harrier (CSC) and merlin (CDFG Watch List species) forage within these habitats. Burrowing owls (CSC) are known to use these habitats for foraging and nesting, and may occur commonly within these habitats in the Antelope Valley. Reptiles such as the side-blotched lizard, desert horned lizard, gopher snake, Mojave rattlesnake, and great basin whiptail are expected to be common in the rabbitbrush scrub and non-native grassland habitats. In addition, mammals such as the white-tailed antelope squirrel, black tailed jackrabbit, desert cottontail, coyote, and Botta's pocket gopher are expected regionally abundant species.

Less common bird species in the region include those associated with Joshua tree woodlands, such as the cactus wren, loggerhead shrike (CSC), and the greater roadrunner (SBS). Less common reptile species expected within the region include the Yucca night lizard (*Xanatusia vigilis vigilis*), long-nosed leopard lizard (*Gambella wislizenii*), and yellow-backed desert spiny lizard (*Sceloporus magister uniformis*).

Many wildlife species that were once common to the area are now rarely encountered due to the land use changes that have occurred in the region and impacts these populations have sustained. Such species include the pronghorn antelope (*Antilocarpa americana*) and American badger (*Taxidea taxus*). The Mohave ground squirrel (*Spermophilus mohavensis*, state-listed threatened) and desert tortoise (*Gopherus agassizii*, federally- and state-listed threatened) are not expected to occur within the western Antelope Valley, as current ranges for these species in the region have been reduced to areas east of SR-14 in the Lancaster area. Desert tortoises have been severely impacted by agriculture, development, vehicles, OHV use, feral dogs, disease, and harassment by humans (USFWS 2008). Horned lizards

(*Phrynosoma* spp.) have been negatively impacted by agriculture and displacement of native harvester ants (*Pogonomyrmex barbatus*) by introduced Argentine ants (*Linepithema humile*). Kangaroo rats (*Dipodomys* sp.) and burrowing owls have also been impacted by agricultural practices. The availability of human garbage (food waste), pet food, and road kill has increased the population of scavengers such as coyotes (*Canus latrans*) and common ravens, which in turn has been detrimental to prey species such as young desert tortoises (BLM 1999).

3.2.7 Overall Biological Value of the Area

Although some high quality natural habitats remain in limited portions of the western Antelope Valley, the overall biological value of the area is low to moderate. The main factor that has led to the decline in the biological value of the area is the conversion of native habitats to agricultural lands and other development practices which degrade or eliminate the value of these habitats for the species adapted to them. These practices also contribute to the fragmentation of natural vegetation communities, the influx of unnatural communities, and the alteration of natural drainage patterns. The lack of native habitat throughout this region has contributed to a lower level of plant and wildlife species diversity than would be expected to occur in undeveloped areas of the western Mojave Desert.

The majority of the western Antelope Valley is currently dominated by rabbitbrush scrub and California annual grasslands. Both of these habitat types represent the recovering remnants of widespread land use practices that have occurred within the western Antelope Valley, specifically agricultural production and grazing. Monotypic stands of rabbitbrush scrub occur in various stages of recovery, predominately on agricultural lands that have been allowed to remain fallow for extended periods. In terms of composition, rabbitbrush scrub lacks the structural habitat complexity of the former Joshua tree woodlands that once dominated this landscape. On the floor of the Antelope Valley, agricultural and grazing practices lead to the establishment of non-native annual grasslands, which introduced non-native species that have since altered the species composition of surrounding native plant communities.

The fragmentation of the remaining Joshua tree woodland stands in the western Antelope Valley has contributed to a mosaic of isolated blocks of native habitat surrounded by a human-altered landscape. Developed and agricultural areas, residences, roads, and the California Aqueduct currently inhibit the movement of wildlife between these isolated blocks of native habitat. These and other factors have led to a regional reduction in the diversity of species associated with this habitat, including the local extirpation of the Mohave ground squirrel and desert tortoise from the western Antelope Valley.

Although the Joshua tree woodland habitat within the western Antelope Valley has been significantly altered, it still retains some high quality habitat value and contributes to the overall biological diversity of the area. Open space reserves, including the County SEAs and

Arthur B. Ripley Desert Woodlands State Park, serve to maintain some of the original value of this important habitat within the western Antelope Valley. Other areas of high biological value in the western Antelope Valley include wildflower fields and valley needlegrass grasslands. A substantial acreage of these habitats is protected within the Antelope Valley California Poppy Reserve, located in the Fairmont-Antelope Buttes.

SECTION 4.0
BIOLOGICAL FIELD SURVEYS AND RESULTS

This section presents the results of focused and general biological surveys that were conducted on the Project site and along the proposed transmission line route between June 2008 and June 2009. The survey effort began on June 27, 2008, when a biological reconnaissance survey was conducted to assess the potential for sensitive biological resources and to recommend appropriate future surveys. Based on this initial investigation, and on SEATAC's comments on the Biological Constraints Analysis, a list of recommended surveys was prepared that included:

- A literature review, to be performed prior to conducting field investigations, intended to identify special-status species with potential to occur on the Project site and any specific survey requirements for those species (presented in Section 4.1 of this Biota Report)
- A vegetation map of the Project site and transmission line route, delineating on-site vegetation communities consistent with accepted methods (e.g., Sawyer and Keeler-Wolf 1995) (presented in Section 4.2 of this Biota Report)
- A delineation of any jurisdictional waters or streams within the Project site or crossing the proposed transmission line route (presented in Section 4.3 of this Biota Report)
- Focused floristic surveys of the entire Project site and transmission line route, including mapping of any Joshua trees present (presented in Section 4.4 of this Biota Report)
- Surveys for wintering birds within the Project site and along the transmission line route (presented in Section 4.5 of this Biota Report)
- Surveys for breeding/nesting birds within the Project site and along the transmission line route (presented in Section 4.6 of this Biota Report)
- Focused surveys for the burrowing owl (*Athene cunicularia*), to be performed consistent with the California Burrowing Owl Consortium (1993) protocol (presented in Section 4.7 of this Biota Report)
- A review of pertinent literature on sensitive butterfly taxa that may have potential to occur within the Project site or along the proposed transmission line route (presented in Section 4.8 of this Biota Report)
- General wildlife surveys, to be incorporated into the burrowing owl and floristic transect surveys (presented in Section 4.9 of this Biota Report)

Biological field investigations for the proposed Project were completed on June 10, 2009. A complete list of the survey dates and times, description of survey activities, weather conditions, personnel involved, and portions of the site surveyed for all field investigations is presented in Table 4-1. In all instances where special-status species were detected during

TABLE 4-1
BIOLOGICAL SURVEYS CONDUCTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Date	Times	Type of Survey/Activity	Site Conditions and Precipitation Level[1]	Biologists	Areas Surveyed
June 27, 2008	12:00 – 16:00	Biological Reconnaissance Survey Vehicular and pedestrian walking reconnaissance of accessible areas of the Project site	Sunny during survey with moderate SW wind. Temperatures ranged from 83.0°F to 98.0°F. No Precipitation.	John Davis IV Crissy Slaughter	Project site (Excluding the 180-acre area of the Project area located on the southwest portion of Section 11, Township 8 North, Range 15 West).
December 8, 2008	10:30 – 16:00	Burrowing Owl Habitat Assessment, Vegetation Mapping, General Wildlife Surveys, Site Perimeter Flagging Vehicular and pedestrian walking of perimeter of site.	Sunny during survey with moderate WSW wind. Temperatures during survey ranged from 50.0°F to 57.0°F. No precipitation.	Crissy Slaughter Whitney Wilkinson	Perimeter of Project site.
December 9, 2008	08:00 – 16:00	Burrowing Owl Habitat Assessment, Vegetation Mapping, General Wildlife Surveys Walking survey of main drainage north of SR-138 (Drainage A), and vehicular and pedestrian reconnaissance of Project site on accessible roads.	Sunny during survey with mild NNE winds. Temperatures during survey ranged from 43.0°F to 59.0°F. No precipitation.	Crissy Slaughter Whitney Wilkinson	Main drainage north of SR-138 (Drainage A) and Project site.
December 18, 2008	09:00 – 16:00	Jurisdictional Determination-Drainage mapping	Sunny during survey with mild WSW winds. Temperatures during survey ranged from 30.0°F to 44.0°F. Precipitation 0.32 inches.	Crissy Slaughter Whitney Wilkinson	Main drainage north of SR-138 (Drainage A).
December 18, 2008	09:00 – 16:00	Wintering Bird Surveys	Sunny during survey with mild WSW winds. Temperatures during survey ranged from 30.0°F to 44.0°F. Precipitation 0.32 inches.	David Compton Ronald Cummings	Project site.

TABLE 4-1 (CONTINUED)
BIOLOGICAL SURVEYS CONDUCTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Date	Times	Type of Survey/Activity	Site Conditions and Precipitation Level[1]	Biologists	Areas Surveyed
January 13, 2009	11:00 – 17:00	Wetland Delineation, Jurisdictional Determination	Sunny during survey with light NW winds. Temperatures during survey ranged from 62.0°F to 68.0°F. No precipitation.	John Davis IV Crissy Slaughter Julie Love Jessica Birnbaum	Drainage in southeastern corner of the Project site (Drainage C).
January 13, 2009	11:00 – 17:00	Joshua Tree Mapping	Sunny during survey with light NW winds. Temperatures during survey ranged from 62.0°F to 68.0°F. No precipitation.	David Compton Ronald Cummings	Joshua Tree Recruitment area along northern boundary of Project site.
January 14, 2009	09:00 – 16:00	Wetland Delineation, Jurisdictional Determination	Sunny during survey with light NW winds. Temperatures during survey ranged from 40.0°F to 70.0°F. No precipitation.	John Davis IV Crissy Slaughter Julie Love Jessica Birnbaum	Main drainage north of SR-138 (Drainage A) and small drainage north of SR-138 (Drainage B).
January 14, 2009	09:00 – 16:00	Wintering Bird Survey	Sunny during survey with light NW winds. Temperatures during survey ranged from 40.0°F to 70.0°F. No precipitation.	David Compton Ronald Cummings	Project site.
January 21, 2009	10:30 – 15:00	Drainage Reconnaissance Survey Main drainage (Drainage A) was surveyed in the northeastern corner of the site to find its endpoint and a possible historic connection to drainage adjacent to north boundary (Drainage D).	Sunny during surveys with calm W winds. Temperatures during survey ranged from 61.0°F to 66.0°F. No precipitation.	John Davis IV Crissy Slaughter	Project site between northeastern terminus of Drainage A and western terminus of Drainage D.

TABLE 4-1 (CONTINUED)
BIOLOGICAL SURVEYS CONDUCTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Date	Times	Type of Survey/Activity	Site Conditions and Precipitation Level[1]	Biologists	Areas Surveyed
January 28, 2009	09:00 – 13:00	Site Visit with CDFG biologists: Scott P. Harris, Kelly Schmoker, and Jamie Jackson; and Applicant representative Roy Skinner. Visited areas pertaining to potential biological constraints.	Sunny during site visit with calm W winds. Temperatures during site visit ranged from 61.0°F to 66.0°F. No precipitation.	John Davis IV Crissy Slaughter	On-site drainages, Joshua tree recruitment area in northern portion of Project site, and burrowing owl burrow locations in main drainage (Drainage A).
February 3, 2009	10:30 – 17:30	Biological Reconnaissance Survey, Vegetation Mapping, General Wildlife Survey, Reconnaissance-level Jurisdictional Determination	Sunny during surveys with mild WNW winds. Temperatures during survey ranged from 54.0°F to 70.0°F. No precipitation.	Whitney Wilkinson David Compton	Proposed[2] and alternate[3] transmission line routes.
February 3, 2009	10:30 – 17:30	Wintering Bird Survey	Sunny during surveys with mild WNW winds. Temperatures during survey ranged from 54.0°F to 70.0°F. No precipitation.	Whitney Wilkinson David Compton	Orchard within Project site.
February 4, 2009	07:00 – 16:00	Wintering Bird Survey	Sunny during surveys with mild WNW winds. Temperatures during survey ranged from 33.1°F to 68.0°F. No precipitation.	Whitney Wilkinson David Compton	Project site.
March 24, 2009	09:00 – 17:00	Focused Floristic (Botanical) Surveys	Sunny during surveys with mild ESE winds. Temperatures during survey ranged from 44.2°F to 70.6°F. No precipitation.	Julie Love Jessica Birnbaum	Project site within T 08 N, R 15 W, Section 14 and T 08 N, R 14 W, Section 18.

TABLE 4-1 (CONTINUED)
BIOLOGICAL SURVEYS CONDUCTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Date	Times	Type of Survey/Activity	Site Conditions and Precipitation Level[1]	Biologists	Areas Surveyed
March 25, 2009	09:00 – 12:00	Focused Floristic (Botanical) Surveys Visit to Antelope Valley Poppy Preserve reference site.	Sunny during surveys with mild ESE winds. Temperatures during survey ranged from 45.9°F to 79.3°F. No precipitation.	John Davis IV Crissy Slaughter Christopher Julian Julie Love Jessica Birnbaum Whitney Wilkinson	Project site within T 08 N, R 15 W, Section 24; and Proposed transmission line.[2] Visit to Antelope Valley Poppy Preserve reference site.
March 26, 2009	09:00 – 17:00	Focused Floristic (Botanical) Surveys	Sunny during surveys with 15–30 mph NW winds. Temperatures during survey ranged from 54.4°F to 66.7°F. No precipitation.	John Davis IV Julie Love Jessica Birnbaum Crissy Slaughter Christopher Julian Whitney Wilkinson	Proposed transmission line[2] and Project site within T 08 N, R 15 W, Section 11; and T 08 N, R 15 W, Section 13. Alternate transmission line route.[3]
March 27, 2009	09:00 – 17:00	Focused Floristic (Botanical) Surveys	Sunny during surveys with mild ESE winds. Temperatures during survey ranged from 54.5°F to 71.8°F. No precipitation.	Crissy Slaughter Christopher Julian Whitney Wilkinson	Project site within T 08 N, R 15 W, Section 13; T 08 N, R 15 W, Section 14; and T 08 N, R 14 W, Section 18.
April 7, 2009	12:00 – 17:00	Burrowing Owl Protocol Surveys Phase I – Burrowing Owl Habitat Assessment Phase II – Burrow Survey	Sunny during surveys with 10–22 mph WSW winds. Temperatures during survey ranged from 62.8°F to 76.6°F. No precipitation.	Crissy Slaughter Julie Love	Alternate transmission line route.[3]
April 7, 2009	12:00 – 17:00	Joshua Tree Mapping	Sunny during surveys with 10–22 mph WSW winds. Temperatures during survey ranged from 62.8°F to 76.6°F. No precipitation.	David Compton Whitney Wilkinson	Alternate transmission line route.[3]

TABLE 4-1 (CONTINUED)
BIOLOGICAL SURVEYS CONDUCTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Date	Times	Type of Survey/Activity	Site Conditions and Precipitation Level[1]	Biologists	Areas Surveyed
April 8, 2009	09:00 – 16:00	Burrowing Owl Protocol Surveys Phase I – Burrowing Owl Habitat Assessment Phase II – Burrow Survey	Sunny during surveys with 10–20 mph WSW winds. Temperatures during survey ranged from 49.7°F to 65.2°F. No precipitation.	Crissy Slaughter Julie Love	Proposed transmission line.[4]
April 8, 2009	09:00 – 16:00	Focused Floristic (Botanical) Surveys	Sunny during surveys with 10–20 mph WSW winds. Temperatures during survey ranged from 49.7°F to 65.2°F. No precipitation.	Crissy Slaughter Julie Love	Proposed transmission line (east side of 170th Street West).
April 8, 2009	09:00 – 16:00	Joshua Tree Mapping	Sunny during surveys with 10–20 mph WSW winds. Temperatures during survey ranged from 49.7°F to 65.2°F. No precipitation.	David Compton Whitney Wilkinson	Proposed transmission line.[4]
April 13, 2009	09:00 – 17:00	Burrowing Owl Protocol Surveys Phase II Burrow Survey	Sunny during surveys with 5–15 mph west winds. Temperatures during survey ranged from 56.9°F to 84.4°F. No precipitation.	Crissy Slaughter David Compton Julie Love Jessica Birnbaum Whitney Wilkinson Sofia Hamrin	Project site within T 08 N, R 15 W, Section 11.
April 14, 2009	09:00 – 17:00	Burrowing Owl Protocol Surveys Phase II Burrow Survey	Sunny during surveys with 15–25 mph WSW winds. Temperatures during survey ranged from 51.1°F to 73.9°F. No precipitation.	Crissy Slaughter David Compton Julie Love Jessica Birnbaum Whitney Wilkinson Sofia Hamrin	Project site within T 08 N, R 15 W, Section 14; and T 08 N, R 15 W, Section 13.

TABLE 4-1 (CONTINUED)
BIOLOGICAL SURVEYS CONDUCTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Date	Times	Type of Survey/Activity	Site Conditions and Precipitation Level[1]	Biologists	Areas Surveyed
April 15, 2009	09:00 – 17:00	Burrowing Owl Protocol Surveys Phase II Burrow Survey	Overcast during surveys with 17–25 mph west winds. Temperatures during survey ranged from 43.0°F to 54.0°F. No precipitation.	Crissy Slaughter David Compton Julie Love Jessica Birnbaum Whitney Wilkinson Sofia Hamrin	Project site within T 08 N, R 15 W, Section 13.
April 16, 2009	09:00 – 17:00	Burrowing Owl Protocol Surveys Phase II Burrow Survey	Sunny during surveys with 10–25 mph west winds. Temperatures during survey ranged from 52.0°F to 64.9°F. No precipitation.	Crissy Slaughter David Compton Julie Love Jessica Birnbaum Whitney Wilkinson Sofia Hamrin	Project site within T 08 N, R 15 W, Section 13; T 08 N, R 14 W, Section 18; and T 08 N, R 15 W, Section 24.
April 17, 2009	09:00 – 17:00	Burrowing Owl Protocol Surveys Phase II Burrow Survey	Sunny during surveys with mild NE winds. Temperatures during survey ranged from 48.0°F to 75.9°F. No precipitation.	Crissy Slaughter David Compton Julie Love Jessica Birnbaum Whitney Wilkinson Sofia Hamrin	Project site within T 08 N, R 15 W, Section 24.
April 21, 2009	16:30 – 18:00	Burrowing Owl Protocol Surveys Phase III – Burrowing Owl Survey, Census and Mapping 1st Visit – check mapped burrows for owl activity	Sunny during surveys with 10–15 mph SW winds. Temperatures during survey ranged from 90.0°F to 93.0°F. No precipitation.	David Compton Chris Julian	Project site.
April 22, 2009	06:30 – 17:00	Nesting Bird Surveys	Sunny during surveys with 10–20 mph SW winds. Temperatures during survey ranged from 63.0°F to 82.9°F. No precipitation.	David Compton Chris Julian	Project site, Proposed transmission line (east and west sides of 170th Street West), Fairmont Butte, and alternate transmission line route.[3]

TABLE 4-1 (CONTINUED)
BIOLOGICAL SURVEYS CONDUCTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Date	Times	Type of Survey/Activity	Site Conditions and Precipitation Level[1]	Biologists	Areas Surveyed
April 22, 2009	11:00 – 13:00	Burrowing Owl Protocol Surveys Phase III – Burrowing Owl Survey, Census and Mapping 1st Visit – check mapped burrows for activity	Sunny during surveys with 10–20 mph SW winds. Temperatures during survey ranged from 63.0°F to 82.9°F. No precipitation.	David Compton Chris Julian	Main drainage north of SR-138 (Drainage A).
April 23, 2009	7:10 – 13:00	Nesting Bird Surveys	Sunny during surveys with 5–20 mph winds. Temperatures during survey ranged from 60.0°F to 80.0°F. No precipitation.	David Compton Chris Julian	Project site, Proposed transmission line (east and west side of 170th Street West).
April 29, 2009	12:00 – 17:00	Focused Floristic (Botanical) Surveys	Sunny during surveys with 10–20 mph WSW winds. Temperatures during survey ranged from 68.2°F to 73.0°F. No precipitation.	Crissy Slaughter Michael Honer Julie Love Jessica Birnbaum David Compton Ronald Cummings	Project site within T 08 N, R 15 W, Section 24; and T 08 N, R 14 W, Section 18.
April 30, 2009	09:00 – 17:00	Focused Floristic (Botanical) Surveys	Sunny during surveys with 17–27 mph west winds. Temperatures during survey ranged from 64.0°F to 81.0°F. No precipitation.	Crissy Slaughter Michael Honer Julie Love Jessica Birnbaum David Compton Ronald Cummings	Project site within T 08 N, R 15 W, Section 24; T 08 N, R 15 W, Section 13; and Proposed transmission line (east and west side of 170th Street West).
April 30, 2009	17:30 – 20:30	Burrowing Owl Protocol Surveys Phase III – Burrowing Owl Survey, Census and Mapping 2nd Visit – observation of active burrows	Sunny during surveys with 17–27 mph west winds. Temperatures during survey ranged from 66.9°F to 77.0°F. No precipitation.	David Compton Ronald Cummings	Active owl burrow within Drainage A (Project site) and active owl burrow in Drainage C adjacent to southern Project boundary.

TABLE 4-1 (CONTINUED)
BIOLOGICAL SURVEYS CONDUCTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Date	Times	Type of Survey/Activity	Site Conditions and Precipitation Level[1]	Biologists	Areas Surveyed
May 1, 2009	09:00 – 15:30	Focused Floristic (Botanical) Surveys	Sunny during surveys with 12–18 mph WSW winds. Temperatures during survey ranged from 73.9°F to 82.9°F. No precipitation.	Crissy Slaughter Michael Honer Julie Love Jessica Birnbaum David Compton Ronald Cummings	Project site within T 08 N, R 15 W, Section 11; T 08 N, R 15 W, Section 13; T 08 N, R 14 W, Section 18; T 08 N, R 15 W, Section 14; Proposed transmission line (west and east side of 170th Street West), and Drainage A.
May 6, 2009	17:30 – 20:30	Burrowing Owl Protocol Surveys Phase III – Burrowing Owl Survey, Census and Mapping 3rd Visit – observation of active burrows	Sunny during surveys with 15–25 mph WSW winds. Temperatures during survey ranged from 72.0°F to 85.0°F. No precipitation.	David Compton Whitney Wilkinson	Active owl burrow within Drainage A (Project site) and active owl burrow in Drainage C adjacent to southern Project boundary.
May 7, 2009	06:00 – 11:00	Nesting Bird Surveys	Sunny during surveys with 20–25 mph west winds. Temperatures during survey ranged from 61.0°F to 77.0°F. No precipitation.	David Compton Whitney Wilkinson	Project site.
May 8, 2009	06:00 – 12:30	Nesting Bird Surveys	Sunny during surveys with 5–15 mph west winds. Temperatures during survey ranged from 62.1°F to 84.9°F. No precipitation.	David Compton Whitney Wilkinson	Project site and Proposed transmission line (east and west sides of 170th Street West).
June 9, 2009	18:00 – 21:00	Burrowing Owl Protocol Surveys Phase III – Burrowing Owl Survey, Census, and Mapping 4th Visit – observation of active burrows	Sunny during surveys with 5–20 mph SW winds. Temperature during survey ranged from 60°F to 65°F.	David Compton Whitney Wilkinson	Active owl burrow within Drainage A (Project site) and active owl burrow in Drainage C adjacent to southern Project boundary.

TABLE 4-1 (CONTINUED)
BIOLOGICAL SURVEYS CONDUCTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Date	Times	Type of Survey/Activity	Site Conditions and Precipitation Level[1]	Biologists	Areas Surveyed
June 9, 2009	06:00 – 11:30	Nesting Bird Surveys	Sunny during surveys with 10–20 mph SW winds. Temperatures during surveys ranged from 56°F to 75°F. No precipitation.	David Compton Whitney Wilkinson	Project site and proposed transmission line route (east and west sides of 170th Street West).
June 10, 2009	06:30 – 11:00	Nesting Bird Surveys	Sunny during surveys with 5–20 mph SW winds. Temperatures during survey ranged from 56.0°F to 68.0°F. No precipitation.	David Compton Whitney Wilkinson	Project site and proposed transmission line route (east and west sides of 170th Street West).

1 Reference for weather: http://www.wunderground.com/history/airport/KWJF/2009/4/15/DailyHistory.html?req_city=NA&req_state=NA&req_statename=NA.

2 Only west side of 170th Street West was surveyed from the Project site boundary until 1/2 mile south of Astoria Ave., the survey then continued on the east side of 170th Street West until Astoria Ave.

3 Alternate transmission line route is no longer being considered.

4 Both the east and west side of 170th Street West were surveyed from the Project boundary until 1/8 mile north of Astoria Ave.

field surveys, California Native Species Field Survey Forms were filled out and submitted to the Biogeographic Data Branch of the CDFG for inclusion in the CNDDB.

4.1 LITERATURE SEARCH

Prior to conducting field surveys, a literature review was performed which included a query of the CNDDB (CDFG 2008b) and a search of the CNPS Inventory of Rare Plants Database. In addition, a list of raptors with potential to occur within the Project vicinity during winter was provided by the CDFG (2008c). These resources were used to identify special-status plant and wildlife species occurrences, or species that could potentially occur, within or in the vicinity of the Project site.

The Project site is located within the Fairmont Butte USGS 7.5-minute quadrangle. The Fairmont Butte quadrangle was queried for records of special-status species, in addition to the eight surrounding quadrangles, which include Burnt Peak, Del Sur, Lake Hughes, Liebre Twins, Little Buttes, Neenach School, Tylerhorse Canyon, and Willow Springs. The results of the CNDDB query are included in Appendix G. The CNDDB search also provided the locations of sensitive natural communities within the nine quadrangle search. A literature review was also conducted to identify potentially occurring nesting bird species, and a list of expected species was assembled. Unpublished data from the Los Angeles County Breeding Bird Atlas Project, collected during 1995 through 1999, were obtained from Kimball Garrett of the Natural History Museum of Los Angeles County (Los Angeles County Breeding Birds Atlas [LACBBA] unpublished data). Specifically, lists of birds recorded in the vicinity of the Project site by the atlas project were obtained. These lists covered four separate atlas blocks (each approximately 3.6 x 2.9 miles) that overlapped with the Project site and noted species confirmed to breed, probably breeding, and possibly breeding within the blocks (birds expected to occur only during winter or in migration are not included on the lists). Since most of the area within each block was outside the Project area (three percent or less of three of the four blocks fell within the site), the list may contain species which are not likely to breed on the site. Therefore, only species for which there is suitable habitat on the site were included. Also, species not observed during the winter surveys and known generally to maintain year-round ranges were omitted from the list.

Additional special-status species information was obtained by reviewing previous biological reports for the area, reviewing the species list for the Antelope Valley California Poppy Reserve, informal consultations with CDFG and experts knowledgeable about the local flora and fauna, and URS expertise. Special-status species lists generated from database queries, literature review, and consultations were evaluated in conjunction with vegetation types present on the Project site to create a list of special-status plant and wildlife species with potential to occur or known to occur on the Project site. Each special-status species with potential for occurrence on or near the Project site is individually discussed. CNDDB reports will be completed and submitted to the CDFG Biogeographic Data Branch for all special-

status species identified during field surveys of the Project site and included in Technical Biological Report(s).

4.2 VEGETATION MAPPING

Vegetation mapping of the Project site and proposed transmission line route was conducted by URS biologists during winter 2008–2009 and spring 2009 field surveys to identify the dominant on-site vegetation types and to evaluate the potential of these vegetation communities and land covers to support special-status species. Vegetation types adjacent to the Project site boundary were also characterized. On a Project-wide scale, vegetation communities were classified using Sawyer and Keeler-Wolf's *A Manual of California Vegetation* (1995) and Holland's *Preliminary Description of the Terrestrial Natural Communities of California* (1986).

4.2.1 Vegetation Mapping Methods

Vegetation mapping of the Project site was initially conducted by URS biologists Crissy Slaughter and Whitney Wilkinson on December 8 and 9, 2008 during vehicular and pedestrian surveys of the Project area, and further refined on June 1, 2009 by URS biologists Crissy Slaughter and Christopher Julian to reflect an additional vegetation community, wildflower field, observed on the Project site during spring 2009 focused botanical surveys. Wildflower field habitat was not identified on the Project site during winter 2008–2009 surveys, although many wildflower species were noted to occur within grassland areas on-site. A query of the CNDDB identified a known wildflower field location in the Antelope Valley California Poppy Reserve, approximately 2.00 miles southeast of the Project site, suggesting the possibility that this vegetation type could potentially occur within the site. To address this possibility, the known location at the Poppy Reserve was used as a reference site, and was visited on March 25, 2009 by URS biologists John Davis IV, Julie Love, and Jessica Birnbaum. Botanical characteristics of the wildflower field habitat in the Poppy Reserve were compared to conditions within the Project site, to confirm whether this sensitive natural community occurred on-site.

Vegetation mapping of the proposed transmission line route was initially conducted by URS biologists David Compton and Whitney Wilkinson on February 3, 2009, during vehicular and pedestrian surveys of this area, and was further refined by URS biologists Crissy Slaughter and Julie Love on April 30 and May 1, 2009, during focused botanical surveys of the proposed transmission line route. Vegetation mapping of the proposed transmission line was conducted on the west and east side of 170th Street West within the County road ROW (50 feet from the edge of pavement) from the northern Project site boundary to approximately 1/8 mile north of Astoria Avenue (Kern County).

Vegetation mapping was determined within the Project site and proposed transmission line route based on field surveys and observations, the wetland delineation results (see Section

4.3 of this Biota Report), the Antelope Valley California Poppy Reserve reference site visit, and aerial photographs. Vegetation community boundaries were delineated in the field with the use of Trimble and Garmin GPS units.

4.2.2 Vegetation Mapping Results

The Project is located within the Mojave Desert geographical region (Sawyer and Keeler-Wolf 1995), a unique vegetation region. Six natural vegetation communities occur on the Project site (Figure 3-4), and the proposed transmission line route (Figure 3-5). These natural vegetation communities include rabbitbrush scrub, California annual grassland, Joshua tree woodland, desert saltbush scrub, wildflower field, and a Joshua tree recruitment area that was treated as a distinct vegetation community due to the presence of several juvenile Joshua trees with a grassland and rabbitbrush scrub understory. In addition to these natural habitats, five anthropogenic vegetation communities and land covers occur on the Project site and/or the proposed transmission line route. These land cover types include orchards, agricultural areas, ruderal vegetation, ornamental vegetation, and developed areas. The vegetation communities on-site provide nesting, foraging, and cover habitat for numerous wildlife species. The on-site topography and soils also contribute to wildlife use and plant diversity.

In addition to the the habitat provided by the vegetation communities discussed above, drainages within the site (see Section 4.3) also provide habitat and travel routes for wildlife species. The cut banks of the drainges provide the only significant topographic relief on the relatively flat Project site. The drainages are important features for wildlife because they provide enhanced shade, cover, and foraging habitat, and may shelter wildlife from high winds that are common in the region. Wildlife create burrows in the vertical substrate of the incised channel banks which provide shelter and also escape refugia from predators. The drainages on-site also provide wildlife movement routes, because: 1) the drainage channels are typically less densely vegetated than other areas due to hydrologic processes, and therefore present fewer obstructions to wildlife movement compared with the surrounding landscape; and 2) the recessed topography in the drainages limits visual detection by predators. Plants within these drainages may provide foraging habitat for wildlife species. Wildlife use of the on-site drainages was apparent during field surveys, where the presence of numerous small- to large-sized burrows (including lizard, rodent, coyote, and burrowing owl burrows) were observed within the banks, and abundant animal tracks within the channels. Vegetation within the on-site drainages was found to be similar to the vegetation in adjacent uplands, and the drainages were therefore not considered to constitute separate vegetation communities.

The section below describes the characteristics, extent, and location of the vegetation communities on-site, including dominant plant species observed within each community during site visits. Photographs of the habitat within the Project site are included in Appendix

H. A summary of the vegetation communities within the Project site and along the proposed transmission line route is included in Table 4-2.

TABLE 4-2
VEGETATION COMMUNITIES WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Habitat Type	Project Site (Acres)	Proposed Transmission Line Route (Linear Miles)	170th Street West	
			West Side (Linear Miles)	East Side (Linear Miles)
Rabbitbrush scrub	1,451.9	2.15	2.15	1.75
California annual grassland	367.7	0	0	0
Wildflower field	236.3	0	0	0
Joshua tree woodland	0	0.25	0.25	1.0
Joshua tree recruitment area	7.3	0	0	0
Desert saltbush scrub	0	0	0.19	0
Orchard	8.8	0	0	0.35
Agriculture	0	1.5	1.0	1.0
Ruderal	6.9	0.25	0.56	0.12
Ornamental	1.8	0	0	0
Developed	0.9	0.1	0.10	0.03
Total	2,081.7	4.25	4.25	4.25

4.2.2.1 Rabbitbrush Scrub

The on-site rabbitbrush scrub habitat most closely corresponds to Sawyer and Keeler-Wolf's (1995) rubber rabbitbrush series and Holland's (1986) rabbitbrush scrub. Rabbitbrush scrub habitat is characterized by an assortment of native shrubs less than three feet tall that flower in late summer or fall. Shrub density can range from continuous to open with patchy California annual grassland understory. It is found in uplands, specifically in bajadas, pediments, and valleys on well-drained gravelly soils. Rabbitbrush scrub is a disturbance-maintained community (i.e., the result of fire, grazing, soil tilling, and other ground disturbance activities), and often colonizes rangeland. The Project site was continuously cultivated from the 1940s until 1995 and is recovering from this past chronic disturbance, and the rabbitbrush scrub on-site likely represents a late successional phase in this recovery.

Among the vegetation communities within the Project site, rabbitbrush scrub has the greatest coverage at approximately 1,452 acres (Figure 3-4). Rabbitbrush scrub also occurs along the proposed transmission line route for approximately 2.15 miles (Figure 3-5). Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5.

This vegetation type covers most of the northern portion of the Project site, largely occurring north of SR-138, with scattered patches south of SR-138. Dominant species included native shrubs and annual plants such as rubber rabbitbrush, annual bursage, Davidson buckwheat, and non-native species such as cheatgrass and red-stem filaree.

Bird species commonly using the rabbitbrush scrub within the Project site for forage and cover include the horned lark (*Eremophila alpestris*), sage sparrow (*Amphispiza belli*), white-crowned sparrow (*Zonotrichia leucophrys*), and house finch (*Carpodacus mexicana*). Common ravens (*Corvus corax*) also use this habitat for foraging and sometimes use the larger shrubs for perching. Of these species, only the sage sparrow and horned lark are known to nest within the rabbitbrush scrub on-site (see Sections 4.5 and 4.6 of this Biota Report).

Mammal species commonly found foraging and denning in rabbitbrush scrub habitat include the white-tailed antelope squirrel (*Ammospermophilius leucurus*), black-tailed jackrabbit (*Lepus californicus*), Botta's pocket gopher (*Thomomys bottae*), and coyote (*Canis latrans*). Many small mammal burrows were observed throughout the rabbitbrush scrub on-site, as well as several gopher mounds. Numerous black-tailed jackrabbits, white-tailed antelope squirrels and several coyotes were observed during field surveys. In addition, one coyote burrow with young was found in this habitat. Special-status mammals that could potentially be found in this habitat, but were not observed during winter 2008–2009 and spring 2009 surveys include the American badger (*Taxidea taxus*, CSC), which could both hunt and burrow within the rabbitbrush scrub habitat; and the pallid bat (*Antrozous pallidus*, CSC), which would only be found gleaning insects off the ground or from brush in open areas of the rabbitbrush scrub.

Reptiles found within the rabbitbrush scrub habitat on the Project site include the desert horned lizard (*Phrynosoma platyrhinos*), great basin whiptail (*Aspidoscelis tigris tigris*), side-blotched lizard (*Uta stansburiana*), long-nosed leopard lizard (*Gambelia wislizenii*), gopher snake (*Pituophis catenifer*), red coachwhip (*Masticophis flagellum piceus*), and Mojave rattlesnake.

4.2.2.2 <u>California Annual Grassland</u>

The on-site California annual grasslands habitat most closely corresponds to Sawyer and Keeler-Wolf's (1995) California annual grassland series and Holland's (1986) non-native grassland. California annual grassland habitat is characterized by an assortment of native and non-native annual grasses and forbs of highly variable composition. It is typically found on seasonally dry hillsides and valleys, interior valleys of the Coast Ranges, and along the coast of central and southern California. California annual grassland is among the first vegetation communities to become re-established following a disturbance, and events such as cattle grazing, ground disturbance, and wildfires can lead to expansion of this habitat. Although

annual grasses dominate the plant species composition, often native annual forbs offer the greatest diversity in select areas. This mix of grasses and forbs is often found on gravelly to deep fine-grained soils well suited for annual plant growth.

As described previously, the Project site has been fallow after decades of agricultural production. California annual grassland is the second-most-abundant vegetation type at approximately 367.68 acres on the Project site (Figure 3-4), and is absent on the proposed transmission line route (Figure 3-5). This vegetation type covers most of the northern half of the Project site south of SR-138, with a smaller area located north of SR-138. Dominant species include native annual species such as fiddleneck, small fescue, and non-native species such as cheatgrass and red-stem filaree. Other native species found scattered within this habitat type include Kellogg's tarweed, California poppy, and goldfields.

The California annual grassland within the site provides forage for an abundance of horned larks in winter. Other common species observed during winter 2008–2009 surveys include the mountain bluebird, savannah sparrow (*Passerculus sandwichensis*), and house finch. Horned larks are less common in spring and summer, but are still the most common species in this habitat at this season. Western meadowlarks are present in small numbers, and common ravens regularly forage in California annual grassland vegetation.

Mammal species that may use the California annual grassland habitat on-site for foraging and denning include the white-tailed antelope squirrel, black-tailed jackrabbit, Botta's pocket gopher, and coyote. Many small burrows were observed throughout the Project site within this habitat, as well as several gopher mounds. Special-status mammals that could be found in this habitat include the American badger (CSC), which could both hunt and burrow within California annual grassland; and the pallid bat (CSC), which would only be found gleaning insects off the ground or from brush in open areas.

Reptiles found within the California annual grassland habitat on the Project site include the western whiptail (*Cnemidophorus tigris*), side-blotched lizard, and Mojave rattlesnake (*Crotalus scutulatus scutulatus*). Other reptile species which could occur in this habitat include the side-blotched lizard, gopher snake, and California kingsnake.

4.2.2.3 Wildflower Field

This vegetation type is not defined by specific dominant plant species, but is instead characterized by a variety of herbaceous species noted for conspicuous annual wildflower displays (Holland 1986). Species composition and dominance varies from site to site, and can vary from year to year at any particular site. This habitat is found in valleys and foothills of the Californian Floristic Province except in the north coast (too wet) and desert (too dry) regions, below about 2,000 feet in the north and 4,000 to 5,000 feet in the south. Wildflower fields are identified by the CDFG (2008b) as a sensitive natural community.

Wildflower field habitat occurs in the southernmost portion of the Project site, south of the existing orchard, and comprises 236.34 acres within the Project site (Figure 3-4). A visit to the wildflower field reference site within the Antelope Valley California Poppy Reserve revealed that the wildflower field habitat within the Project site contained a greater abundance of blooming flowers than was observed at the reference site.

The species composition in this area is fairly similar to that of the California annual grasslands on-site, containing a mixture of native and non-native grasses and forbs; shrub cover is nearly absent. However, the wildflower fields on-site are distinct from the annual grassland habitat because of the relative abundance (but not necessarily high diversity) of plants that exhibit colorful floristic displays. All of the habitats within the Project site and the proposed transmission line exhibited some degree of colorful wildflower display, with goldfields, followed by California poppy as the most common wildflower species observed. The wildflower field habitat on the Project site contain high concentrations of native annual wildflower species and include vegetation dominated by the following three native wildflower species: goldfields, California poppy, and bicolored lupine (*Lupinus bicolor*). Native and non-native grasses including cheatgrass, small fescue, and Mediterranean grass (*Schismus barbatus*) are also dominant.

Because the wildflower fields on-site are fairly similar to the site's California annual grasslands in terms of their plant species composition and forb-dominated nature, these two habitats are also likely to be similar in terms of their use by birds, reptiles, and mammals. However, because of the diverse and conspicuous floristic displays presented by the on-site wildflower fields, it is possible that these areas may support a higher abundance and/or diversity of insect pollinators compared to the on-site grassland habitats.

4.2.2.4 Joshua Tree Woodland

The Joshua tree woodland habitat in the Project vicinity most closely corresponds to Sawyer and Keeler-Wolf's (1995) Joshua tree series and Holland's (1986) Joshua tree woodland. Joshua tree woodland habitat is characterized by open woodlands of Joshua trees, with intermittently spaced shrubs less than three feet tall. Joshua trees are usually less than 30 feet tall, and display a variety of life forms. The main growing season is spring, with most growth limited by cold in winter and drought in summer and fall. Many species of herbs may germinate following sufficient late fall or winter rains and flower in mid-spring. Joshua tree woodland is typically found on sandy, loamy, or gravelly, well-drained gentle alluvial slopes. This habitat is absent from the Project site, but occurs on approximately 0.25 mile of the proposed transmission line route within SEA #60 (Figure 3-5). Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5.

Several bird species use Joshua trees as perches for singing or hunting and as nest sites (CDFG 2008a). Birds encountered in the Project site and vicinity that commonly use this

habitat include the common raven, cactus wren (*Campylorhynchus brunneicapillus*), western meadowlark (SBS), and house finch. Of these, only the western meadowlark, which uses the Joshua trees as singing and scanning perches, is a special-status species. Other special-status species that may nest in Joshua tree woodland in the Project region include the loggerhead shrike (CSC), which may use the spine-tipped leaves of Joshua trees for manipulating or storing prey items; the lark sparrow (SA), that may also use the Joshua trees for perching opportunities; and the greater roadrunner (*Geococcyx californianus*, SBS), which may also nest in this habitat.

Mammal species that could potentially occur in Joshua tree woodlands along the proposed transmission line and adjacent to the Project site would be mostly the same as those expected in rabbitbrush scrub and California annual grasslands, discussed above. However, Joshua tree woodland is favored by an additional special-status species, the Mohave ground squirrel (*Spermophiius mohavensis*, state-listed threatened), since Joshua tree fruits are a desirable food source for this species. However, recent data indicate that the Mohave ground squirrel no longer occupies habitat west of SR-14 (Laab 2004).

During spring 2009 surveys, Mojave rattlesnakes, side-blotched lizards, desert horned lizards, and great basin whiptails were observed within the Joshua tree woodland habitat of the proposed transmission line route. Other common reptile species which would be expected to use this habitat, but were not observed during winter 2008–2009 and spring 2009 surveys include Yucca night lizard (*Xanatusia vigilis vigilis*), yellow-backed desert spiny lizard (*Sceloporus magister*), long-nosed leopard lizard, gopher snake, and California kingsnake (*Lampropeltis getula*). Although the Project site and the proposed transmission line route are within the historic range of the desert tortoise (*Gopherus agassizii*, ESA-threatened), the current habitat suitability is marginal, and distribution data and range maps indicate that the Project site is outside the currently known range for this species (Bransfield 2009 and CNDDB 2009).

4.2.2.5 Joshua Tree Recruitment Area

Fifty Joshua tree seedlings, scattered over an approximate 7.3 acres, are located on the northern portion of the Project site (see Figure 3-4). The presence of the Joshua tree seedlings identified within this portion of the Project site appear to indicate that this area may be in the early stages of the re-establishment of Joshua tree woodland habitat; therefore, this area is considered a Joshua tree recruitment area. Although this is not a formally recognized vegetation community, the recruitment area was mapped and treated as such for the purposes of this Biota Report due to the occurrence of Joshua tree seedlings. The loss of Joshua tree woodlands due to accelerated agricultural and urban expansion in the County's desert regions is of concern to the County because large, dense stands of this habitat are becoming scarce, especially in the western Antelope Valley (LACDRP 1986), and the Joshua tree recruitment area is directly adjacent to intact Joshua tree woodland habitat located north of the Project

boundary within SEA #60. Because cultivation of this portion of the Project site was ceased in 1995, it is likely that Joshua tree seeds dispersed into this area from the nearby Joshua tree woodland are now able to grow without disturbance. The Joshua tree recruitment area contains a relatively low density of the Joshua tree seedlings (an average of 6.8 per acre) and the vegetation is dominated by species found within the rabbitbrush scrub habitat type. The Joshua tree recruitment area on-site most closely corresponds to Sawyer and Keeler-Wolf's (1995) rubber rabbitbrush series and Holland's (1986) rabbitbrush scrub, and would not be appropriately mapped as Joshua tree woodland.

Because of the low density of Joshua tree seedlings and the dominance of rabbitbrush scrub vegetation within the Joshua tree recruitment area these two habitats are also likely to be similar in terms of their use by birds, reptiles, and mammals. Therefore, the wildlife species likely to use the on-site rabbitbrush scrub, discussed in Section 4.2.2.1 above, would also be expected to utilize the Joshua tree recruitment area.

4.2.2.6 Desert Saltbush Scrub

Desert saltbush scrub habitat is characterized by low growing, woody, gray shrubs, one to three feet tall, strongly dominated by a single *Atriplex* species. Total cover is often low, with more bare ground between the widely spaced shrubs. The soils underlying this vegetation community are fine-textured and usually poorly drained, with high alkalinity and/or salinity, usually surrounding playas on slightly higher ground. Desert saltbush scrub occurs on widely scattered on margins of dry lake beds in the Colorado, Mojave, and Great Basin deserts.

Desert saltbush scrub habitat is absent from the Project site and also the proposed transmission line route. Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5. Desert saltbush scrub habitat occurs near the northern end of the proposed transmission line route, and is primarily located north of Astoria Avenue. This habitat is dominated by one saltbush species, allscale (*Atriplex polycarpa*). Other species present within this habitat include native shrubs such as Cooper's goldenbush (*Ericameria cooperi*), sticky matchweed (*Gutierezzia microcephala*), and non-native plants such as red brome (*Bromus madritensis* ssp. *rubens*) and red-stem filaree. The on-site desert saltbush scrub habitat most closely corresponds to Sawyer and Keeler-Wolf's (1995) allscale series and Holland's (1986) desert saltbush scrub.

Because the desert saltbush scrub within the proposed transmission line route is fairly similar to the Project site's rabbitbrush scrub in terms of the dominance of a single shrub species and overall shrub-dominated nature, these two habitats are also likely to be similar in terms of their use by birds, reptiles, and mammals. Therefore, the wildlife species likely to use the on-site rabbitbrush scrub, discussed in Section 4.2.2.1 above, would also be expected to utilize desert saltbush scrub.

4.2.2.7 Orchard

An orchard is defined as an area of land devoted to the cultivation of fruit or nut trees. Approximately 8.82 acres of orchard are located on the Project site, but it is absent from the proposed transmission line route. Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5. The on-site orchard is composed of pistachio root stock trees located adjacent to the ranch south of SR-138 (Figure 3-4). The orchard within the proposed transmission line route is composed of rows of stone fruit trees, and is located on the east side of 170th Street West near a rural residence (Figure 3-5).

The orchard located on the Project site provides forage and cover for several bird species, including the California quail (*Calipepla californica*), white-crowned sparrows (in winter), and house finches. Two barn owls were found roosting in the orchard in June 2009, and a pair of ravens nested in one of the taller pistachio trees in the spring. Special-status bird species observed in the on-site orchard include the loggerhead shrike (CSC), which nested in the area in the spring of 2009; the lark sparrow (SA when nesting), which was observed during winter surveys but not during spring; and the vesper sparrow (SBS when wintering). Several common bird species occur in the orchard along the proposed transmission line route, including Brewer's blackbird (*Euphagus cyanocephalus*), Bullock's oriole (*Icterus bullockii*), the house finch, and the house sparrow (*Passer domesticus*).

Due to the proximity of the orchard to the residence and the presence of domestic dogs, this habitat type is not suitable for most mammal and reptile species, although the Botta's pocket gopher would be expected to occur there. Common reptile species which may occur in this habitat include the side-blotched lizard and gopher snake.

4.2.2.8 Agricultural

Agricultural areas are characterized by cultivated land that is used for farming or grazing. The Project site was continuously cultivated from the 1940s until 1995, and thus would once have been considered an agricultural area, but has since been largely fallow (the last crop was grown in 2004, on an 80-acre area south of the existing on-site ranch house.) Agricultural land does not currently occur within the Project site. However, it is present on approximately 1.5 miles of the proposed transmission line route (Figure 3-5). Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5.

Bird species encountered in this habitat included horned larks and western meadowlarks. White-crowned sparrows and savannah sparrows are among the species likely to forage in agricultural habitat in winter in the region. Some birds of prey attracted to these species, including the northern harrier (CSC when nesting), ferruginous hawk, merlin (CDFG Watch List species), and prairie falcon, may forage here in winter as well.

Active agricultural habitats are not conducive to use by the common and special-status reptile and mammal species occurring or potentially occurring within the Project site. Agricultural practices (such as tilling) and equipment destroy burrows, and herbicide, insecticide, and rodenticide applications greatly reduce forage and prey species, while the flat landscape and low-growing crops provide little hiding cover.

4.2.2.9 Ruderal

Ruderal plants grow in disturbed areas as a result of activities such as road cuts and soil tilling. These activities have recently occurred on the proposed transmission line route and have resulted in areas dominated by non-native species such as Russian thistle (*Salsola tragus*), black mustard (*Brassica nigra*), and red brome. The Project site contains 6.92 acres of ruderal vegetation associated with the on-site ranch house (Figure 3-4), and the proposed transmission line route traverses approximately 0.25 mile of this community (Figure 3-5). Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5. Because of the low plant species diversity in most ruderal areas, the value of this vegetation type is generally believed to be low.

Locally common bird species that may be found in this habitat include the white-crowned sparrow, the western meadowlark, and the house finch. The western meadowlark (an SBS) is the only special-status species among these three. However; several special-status birds of prey, including the ferruginous hawk, merlin, and prairie falcon (all CDFG Watch List species), may use these areas for foraging. The northern harrier, a CSC during the nesting season, may also forage in this habitat.

Gophers and ground squirrels may be attracted to ruderal habitats due to the soil disturbance, which facilitates burrowing. Gopher snakes and side-blotched lizards may also be present within this habitat type. Numerous small mammal burrows, and two California ground squirrels (*Spermophylis beecheyi*) were observed within ruderal habitat along the proposed transmission line route during spring 2009 surveys.

4.2.2.10 Ornamental

On-site ornamental vegetation includes landscaped areas around the existing ranch house and a windbreak of planted trees and shrubs. Approximately 1.80 acres of ornamental vegetation are located on the Project site (Figure 3-4). Scattered patches of ornamental vegetation (on a scale too small to accurately map) are also present along the proposed transmission line route in areas mapped as development.

Although several of the larger ornamental trees on the Project site have the potential to host nesting birds of prey, most trees at this location were too small for roosting hawks and too small or sparsely vegetated for any roosting or nesting owls to utilize the area. No roosting or nesting owls or hawks were detected here during visits in February and June 2009. Common

bird species using these trees for nesting, foraging, or cover were the western kingbird (*Tyrannus verticalis*), European starling (*Sturnus vulgaris*), Brewer's blackbird, house finch, and house sparrow. No special-status species were detected in this habitat on-site. However, potential impacts to special-status species from the removal on ornamental vegetation is addressed in Section 5.5.2.

Bird species detected in the ornamental vegetation along the proposed transmission line route were similar to those utilizing this habitat within the Project site. Several special-status species were detected in this area in the winter season, including the yellow warbler (*Dendroica petechia*, CSC), yellow-breasted chat (*Icteria virens*, CSC), and chipping sparrow (*Spizella passerina*, SA).

Local mammal species, with the exception of gophers, likely avoid this habitat type due to the proximity of the residence and the presence of domestic dogs. Potential reptile species which may occur within this habitat include the side-blotched lizard and the gopher snake.

4.2.2.11 Development

Developed areas are comprised of anthropogenic structures and associated disturbed areas, which generally do not provide habitat for native plants and wildlife. The Project site contains approximately 0.88 acre of developed areas consisting of roads, residential structures and associated outbuildings. The proposed transmission line route traverses approximately 0.10 miles of development, consisting primarily of residences and driveways. Its distribution along the west and east sides of 170th Street West is shown in Table 3-1 and on Figure 3-5.

4.3 DELINEATION OF JURISDICTIONAL WATERS AND STREAMBEDS

A formal delineation of waters of the U.S. (including wetlands) and CDFG-jurisdictional streambeds was performed on the Project site on January 13 and 14, 2009. This section summarizes the methods and results of the delineation; a stand-alone report was also prepared and is included in Appendix F. The delineation was conducted by URS biologists Julie Love, Crissy Slaughter, and Jessica Birnbaum, with guidance by senior biologists John Davis IV and Chris Julian.

4.3.1 Summary of Agency Jurisdictions

Streams and waterways, including ephemeral drainages, dry streambeds, and wetlands, can possess unique ecological functions and values, and are protected from human-induced destruction or degradation by a number of federal and state statutes. The federal and state agencies charged with administering these statutes and their responsibilities are described briefly below. For a more complete description of the Project's regulatory setting with regard

to waters and streams, please refer to the Wetland Delineation and Jurisdictional Determination Report for the Project, included in Appendix F.

4.3.1.1 U.S. Army Corps of Engineers Responsibility and Jurisdiction

Pursuant to Section 404 of the Clean Water Act (CWA), the U.S. Army Corps of Engineers (Corps) regulates the discharge of dredged and/or fill material into waters of the U.S. Section 404 requires that any person proposing such a discharge first obtain a permit from the Corps. Generally speaking, waters of the U.S. are defined to include navigable waterways and their tributaries and adjacent wetlands. Intrastate waters that are not tributary to navigable waterways are generally not waters of the U.S. The lateral limits of waters of the U.S., in the absence of adjacent wetlands, are defined by the ordinary high-water mark on the stream bank. Wetlands are defined using a three-parameter approach under the CWA, which requires a site to possess a predominance of hydrophytic vegetation, wetland hydrology, and hydric soils to qualify as a wetland.

4.3.1.2 Lahontan Regional Water Quality Control Board Responsibility and Jurisdiction

Under Section 401 of the CWA, every applicant for a federal permit or license for any activity which may result in a discharge of dredge or fill material to a water body must obtain a State-issued Water Quality Certification that the proposed activity will comply with state water quality standards (i.e., beneficial uses, water quality objectives, and anti-degradation policy). In California, the State Water Resources Control Board (SWRCB) has delegated the responsibility for issuing Section 401 Certifications to nine Regional Water Quality Control Boards (RWQCB) throughout the state. The Lahontan RWQCB issues Section 401 Certifications for projects in northeastern Los Angeles County. Because a Section 404 Permit is a federal permit subject to the terms of Section 401 as described above, the Corps cannot issue Section 404 permits in the Project region unless the permit applicant also receives a Section 401 Certification from the Lahontan RWQCB.

Because Section 401 of the CWA is restricted to activities requiring a federal license or permit, this section does not apply to activities affecting waters outside federal jurisdiction, such as isolated, intrastate waters. However, the SWRCB has jurisdiction over all “waters of the State,” defined as any surface water or groundwater, including saline waters, within the boundaries of the state, under the Porter-Cologne Water Quality Control Act (a state statute). To ensure that California’s isolated waters are protected and that the permitting process is as efficient as possible, the SWRCB has issued general Waste Discharge Requirements (WDRs) regulating discharges to “isolated” waters of the State that are not under Federal CWA jurisdiction (SWRCB 2004). If the waters on the Project site are determined to be outside federal CWA jurisdiction, a Water Quality Certification under Section 401 will not be required and these WDRs will apply.

4.3.1.3 California Department of Fish and Game Responsibility and Jurisdiction

Pursuant to Sections 1600-1616 of the California Fish and Game Code, any entity proposing to divert, obstruct, or substantially alter the bed, bank, or channel of a stream or lake must first obtain a Streambed Alteration Agreement from the CDFG. Regulations promulgated by the CDFG define streams to include bodies of water that flow at least periodically or intermittently through a bed or channel having banks and supporting aquatic life, including watercourses having surface or subsurface flow that supports or has supported riparian vegetation. Jurisdiction under this statute encompasses all portions of the bed, banks, and channel of any stream, extending laterally to the upland edge of riparian vegetation. The upstream limit of CDFG jurisdiction is the point upstream of which there is no evidence of a defined bed and bank, and riparian vegetation is not present.

4.3.2 Jurisdiction Delineation Methods

Prior to the formal wetland delineation, the United States Geologic Society (USGS) Fairmont Butte, CA 7.5 minute quadrangle map (USGS 1995), the Antelope Valley Soil Survey (USDA-NRCS 1970, USDA-NRCS SSURGO 2007), the National Hydrography Dataset (USGS 2007), and a high quality aerial photograph of the Project site and the surrounding area (NAIP 2005) were reviewed. On June 27, 2008, an initial reconnaissance-level survey was performed by URS biologists John Davis IV and Crissy Slaughter to identify potentially jurisdictional streams and wetland areas on-site. This survey consisted of vehicular and pedestrian walking reconnaissance of accessible areas of the Project site, and identified two drainages within the Project site (later identified as Drainage A and Drainage C). Because potentially jurisdictional features were discovered, a formal delineation was conducted during winter 2008–2009 surveys.

4.3.2.1 Delineation of Jurisdictional Streambeds

The USGS 7.5 minute quadrangle map (USGS 1995) and the National Hydrography Dataset (USGS 2007) indicated the presence of three potentially jurisdictional drainages on the Project site and one potentially jurisdictional drainage crossing the proposed transmission line route. Also, aerial photographs of the site suggested that two portions of the site may contain additional drainages that were not identified on the topographic map and in the NHD. On January 13, 14, and 21, 2009, URS biologists Julie Love, Crissy Slaughter, and Jessica Birnbaum visited five potentially jurisdictional drainage locations within the Project site, including the three drainages mapped by the USGS and NHD and the two additional locations identified by URS staff from aerial photography. At each location, pedestrian surveys were conducted to locate the drainage feature. Once located, the boundaries of CDFG jurisdiction at each drainage were identified and mapped using a sub-meter accurate Trimble GeoXT GPS unit. The GPS unit was configured to collect data in a “streaming” mode, enabling the operator to walk along the stream banks and continuously record

positional data points at a rate of one point per second. Because the on-site drainages lack riparian vegetation, the jurisdictional boundaries were mapped along the top of the physical banks. At one location where pedestrian surveys indicated that a drainage shown on the USGS map or NHD was not actually present in the field, no GPS mapping was conducted.

During the January 21, 2009 field investigation, specific attention was given to a portion of the site where one of the larger drainages appeared to lose bed and bank characteristics and become a swale. This area was surveyed to ascertain whether the larger drainage indeed terminated at that point, or whether surface flows regularly passed through the swale and eventually entered one of the smaller drainages to the north. It was concluded that the swale did not exhibit evidence of flow and lacked the requisite characteristics to constitute a jurisdictional stream, and the drainage was therefore mapped to include two jurisdictional reaches without a surface connection. On January 28, 2009 URS biologists John Davis IV and Crissy Slaughter met with representatives from CDFG and a representative of the Applicant to discuss issues related to the on-site drainages. During this meeting, a CDFG representative confirmed that the swale in Drainage A did not possess the requisite bed and bank characteristics to qualify as a CDFG-jurisdictional stream (Jackson 2009).

The potentially jurisdictional drainage shown on the USGS map and NHD crossing the proposed transmission line route was investigated on February 3, 2009 by URS biologists Dave Compton and Whitney Wilkinson. This drainage was not present in the field, as no defined channel or other hydrology indicators were found at the location; therefore, no GPS mapping was conducted. This area was re-visited during the focused botanical surveys conducted in March and April/May of 2009, and again no stream was present.

A small side channel on the south side of Drainage A was mapped on June 1, 2009 during a follow-up field survey, using the same mapping techniques employed in the January field effort.

When field data collection was complete, jurisdictional boundaries were downloaded from the GPS unit and converted into a GIS shape file using ArcGIS software. In instances where individual “outlier” points were present in the data set (the GPS unit occasionally recorded erroneous points extremely remote from the polygon being mapped), these points were removed using ArcGIS and points on either side of the outlier were connected to restore the integrity of the polygon. The four jurisdictional drainages on-site were identified as Drainage A, Drainage B, Drainage C, and Drainage D, and properties such as length, width, and jurisdictional acreage of each drainage were calculated through ArcGIS.

These assessment methods are presented more fully in the Wetland Delineation and Jurisdictional Determination Report for the Project, included in Appendix F.

4.3.2.2 Delineation of Jurisdictional Wetlands

During the delineation of jurisdictional streams within the Project site, URS staff also performed formal wetland delineations to determine whether any of the areas on-site exhibited the three required wetland parameters: predominance of hydrophytic vegetation, wetland hydrology, and hydric soils. Because wetlands are areas where water tends to accumulate, they are usually located at low points in the landscape, such as depressions and drainage channels. Within each drainage channel on-site, one or more locations were selected that appeared most likely to pond or retain water, and these sampling points were evaluated for wetland characteristics.

A total of six sampling points were assessed, including two within Drainage A, one within the non-jurisdictional swale area to the east of Drainage A, one within Drainage B, and two within Drainage C. No wetland sampling point was assessed in Drainage D, along the northern border of the site, because the majority of the channel bottom was actually located outside the Project site. All sampling point locations were mapped in the field using a sub-meter accurate Trimble GeoXT GPS unit.

At each sampling point, examination for wetland indicators was conducted in accordance with the procedures of the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), Department of the Army (DOA) *Clarification and Interpretation of the 1987 USACE Wetland Delineation Manual* (DOA 1992), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Corps 2008). Each location was analyzed for hydrophytic vegetation, hydric soils, and wetland hydrology. Data were recorded on Routine Wetland Determination Data Forms – Arid West Regional Supplement (Corps 2008). Three photographs were taken at each sampling point, one facing upstream, one facing downstream, and one close-up of the area. Selected photographs are included in the Wetland Delineation and Jurisdictional Determination Report for the Project, included in Appendix F.

4.3.2.2.1 Vegetation. Vegetation was analyzed at each sampling point, with the analysis boundaries being defined by the top of the drainage banks. In accordance with the Arid West Regional Supplement (Corps 2008), the vegetative sampling area only included a single vegetative unit or community. At each sampling point, the dominant plant species within each stratum (tree, shrub, herb, woody vine) were determined using the "50/20 rule" and were identified to the species level. The wetland status of plant species within the study area was determined using the *National List of Species That Occur in Wetlands: California (Region 0)* (Reed 1988). This list assigns each plant species an indicator status of obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), or upland (UPL), based on the species' probability of occurring in wetlands. Where more than 50 percent of the dominant plants consisted of species rated OBL, FACW, or FAC (excluding FAC-), the vegetation at the sampling location was classified as "hydrophytic

vegetation" in accordance with the Wetland Delineation Manual and Arid West Regional Supplement. Additionally, as required by the Routine Wetland Delineation Data Forms, a Prevalence Index was calculated at sites where the dominance test did not indicate dominance by hydrophytic vegetation.

4.3.2.2.2 Soils. At each sample point, a delineation shovel was used to dig a pit at least 18 inches in depth, and an intact soil sample allowing inspection of the soil profile was extracted where possible. The characteristics of on-site soils were compared to the literature results obtained from the Soil Survey of Antelope Valley Area, California (USDA-NRCS 1970, USDA-NRCS SSURGO 2007) for the Project site. The soil profiles were examined for indicators of hydric soils and to determine if the on-site soils were consistent with the USDA soils map of the area. Soil characteristics assessed were soil color, texture, and the presence of mottles, organic matter, and other indicators of hydric soils as listed on the Corps' Wetland Determination Data Forms for the Arid West region. A Munsell® Soil Color Chart (Munsell Color 2000) was used in the field to identify the color of soil and to assist in soil type verification and the color of mottles, where present.

4.3.2.2.3 Hydrology. Each sample point was examined for positive field indicators of wetland hydrology. The soil pit was examined for standing water or saturation, and the surrounding area was investigated for hydrologic indicators as specified on the Wetland Delineation Data Forms, including water marks, sediment deposits, drift lines, and other primary and secondary indicators of wetland hydrology. The dominant vegetation was evaluated per the "FAC-Neutral test," a potential secondary indicator of wetland hydrology. The analysis of hydrology at each point was also informed by site hydrology data (USGS 1995, 2007).

4.3.2.2.4 Determination. Once each sample location had been evaluated for a predominance of hydrophytic vegetation, wetland hydrology, and hydric soils, a final determination of wetland status was made. Any points exhibiting all three of these characteristics were determined to be within a wetland, and any points lacking one or more characteristics were determined not to meet the Corps' wetland definition. In areas where one parameter was naturally problematic and difficult to assess ("Problem Areas," sandy soils are an example), extra diligence and weight was given to the other two parameters, per the Wetland Delineation Manual. Because the delineation of jurisdictional streams did not indicate any potential wetlands along the proposed transmission line route, and no wetland sampling points were assessed along the transmission line route. These assessment methods are presented more fully in the Wetland Delineation and Jurisdictional Determination Report for the Project, included in Appendix F.

4.3.3 Jurisdiction Delineation Results

This section summarizes the results of the jurisdiction delineation that was conducted within the Project site and along the proposed transmission line route. These results are presented more fully in the Wetland Delineation and Jurisdictional Determination Report for the Project, included in Appendix F.

4.3.3.1 Jurisdictional Streams within the Project Site

The results of this investigation indicated that, of the four unnamed drainages mapped on the USGS map and in the NHD, only two were discernible in the field (drainages A and C, see Figure 3-3). However, the field investigation also identified the presence of two smaller, ephemeral streams within the Project site that were not mapped on the USGS maps or included in the NHD (drainages B and D, see Figure 3-3). The characteristics of the four drainages identified on-site are briefly described below.

- **Drainage A:** This drainage is identified as an intermittent stream on the USGS topographic map, and transects through the portion of the Project site north of SR-138. This stream appears to terminate towards the northeastern corner of the Project site, where bed and bank characteristics become indiscernible and the drainage becomes a vegetated swale. A CDFG representative (2009) indicated during the January 28, 2009 site visit that the swale did not possess the requisite bed and bank characteristics to qualify as a CDFG-jurisdictional stream. The jurisdictional length of the main channel of Drainage A within the Project site is approximately 8,000 feet, and the width varies from 20 to 50 feet. The drainage also supports an on-site side-channel, with a length of 315 feet and width of 6 to 15 feet. Sinuosity is mild, as the channel is relatively straight. The stream channel is not evident upstream of the Project site (west of 170th Street West), but develops immediately downstream of the road at the site boundary. The substrate within the channel is composed mostly of sand, with gravel also present. The western portion of the stream exhibits mostly steep, cut banks, becoming more sloping and gradual towards the downstream reaches. Signs of geomorphic instability, including channel incision and bank failure, are present and are likely associated with accelerated flows from the impervious road surface. The stream channel is sparsely vegetated with upland plant species, and the drainage does not support any riparian vegetation.
- **Drainage B:** This drainage was not mapped on the USGS topographic map, but was delineated in the field by URS staff. Drainage B generally parallels Drainage A and is located to the south, between Drainage A and SR-138. This small, ephemeral drainage is wholly contained within the Project site, and has a length of approximately 2,400 feet and a width varying from three to five feet. Drainage B is not connected to any other drainage on-site, and appears to be the result of sheet flows carving a channel at low point within a low-gradient, grassland area. Bed and bank characteristics originate at the western end of the channel, and then disappear at the eastern end without apparent cause. The substrate

in this drainage is mostly sandy, which may partly explain this irregularity. The channel banks range from gradually sloping to distinctly cut.

- **Drainage C:** This drainage is identified as an intermittent stream on the USGS topographic map, and traverses the extreme southeastern corner of the Project site. The drainage is substantial in size, with width ranging from 10 to 15 feet, and the USGS map and NHD indicate that this stream flows into another drainage to the east of the Project site. Because this stream only overlaps a corner of the Project site, the portion of Drainage C within the site boundary is limited with a length of only 1,400 feet. Substrates within this drainage are comprised mostly of sand, with gravel also present. Most of Drainage C exhibits sloping, gradual banks with shallow cuts at the low-flow channel. However, in the wider reaches of the stream channel, the cut banks are much deeper.
- **Drainage D:** This drainage was not mapped on the USGS topographic map, but was delineated in the field by URS staff. Drainage D follows the northern boundary of the Project site near the northeastern corner for a distance of approximately 1,500 feet. The drainage is relatively wide, with width ranging from 30 to 40 feet. Because the Project site boundary runs along this drainage lengthwise, there are reaches where only the southern bank of this channel is with the Project site. The substrate is comprised mostly of sand, and the drainage exhibits steeply cut banks.

As stated previously, the Project site is located in the eastern (downstream) end of the West Antelope Valley planning watershed. This watershed is not tributary to any ocean or other water body; rather, all water in this system eventually flows eastward to the valley floor where surface flows are lost to evaporation and infiltration. Thus, the drainages on-site are not tributaries of navigable waters. Drainage patterns within the site are poorly developed, as the on-site drainages are isolated from one another and lacking the hierarchical tributary structure found in more substantial stream systems.

The drainages on-site exhibit ephemeral flow regimes, and the extent to which these areas perform traditional stream functions is limited. The streams have well-defined channels, and serve to direct storm runoff downstream and off of the site, but do not retain flows for any substantial period of time. No suitable habitat for aquatic or semi-aquatic wildlife is present in the channels, and the moisture regime is not sufficient to support riparian vegetation. The channels are vegetated with the same plant species that occur in adjacent upland areas, with the exception of incised reaches, where the banks are nearly vertical and unvegetated. From a habitat perspective, the channels do provide function; the functions provided are simply not those generally associated with streams. The vertical banks in drainages A and C provide nesting habitat for ground-nesting birds, including the burrowing owl and rock wren, and the channels are used by wildlife as travel routes and to escape high winds. The most valuable habitat function performed by the drainages is providing topographic relief in a relatively homogeneous, upland landscape.

Because they are not tributary to navigable waters, the four streams within the Project site are not waters of the U.S., and therefore are not subject to the authority of the Corps and the Lahontan RWQCB under sections 404 and 401, respectively, of the CWA. However, all four of these drainages exhibit defined beds, banks, and channels, and the drainages are therefore subject to the authority of the CDFG under Section 1600 et seq. of the California Fish and Game Code. These streams are also waters of the State, and any impacts to these waters would be subject to the WDRs established for discharges into waters outside federal jurisdiction (SWRCB 2004). Within the Project site, the extents of waters of the State and CDFG-jurisdictional streambeds were determined to be coterminous. The characteristics of the four jurisdictional drainages on-site are summarized in Table 4-3 below.

TABLE 4-3
JURISDICTIONAL STREAMS WITHIN THE PROJECT SITE

	On-site Length	Width (Range)	Flow Regime	Jurisdictional Acreage (Corps)	Jurisdictional Acreage (CDFG/RWQCB)
Drainage A	8,315 Feet	20 to 50 Feet	Intermittent	0 Acres	2.68 Acres
Drainage B	2,400 Feet	3 to 5 Feet	Ephemeral	0 Acres	0.61 Acres
Drainage C	1,400 Feet	20 to 30 Feet	Intermittent	0 Acres	1.02 Acres
Drainage D	1,500 Feet	30 to 40 Feet	Ephemeral	0 Acres	0.27 Acres
Total	13,300 Feet	N/A	N/A	0 Acres	4.58 Acres

In summary, the Project site contains a total of four jurisdictional drainages, none of which are subject to federal jurisdiction under the CWA. The four drainages are subject to the authority of the CDFG and the Lahontan RWQCB pursuant to Section 1600 et seq. of the California Fish and Game Code and the Porter-Cologne Water Quality Control Act, respectively, and the total jurisdictional area of these streams totals 4.58 acres. No jurisdictional waters or streambeds occur along the proposed transmission line route. These results are presented more fully in the Wetland Delineation and Jurisdictional Determination Report for the Project, included in Appendix F.

4.3.3.2 Jurisdictional Wetlands within the Project Site and Transmission Line Route

As previously described, URS staff assessed a total of six sample points for evidence of the three wetland parameters: hydrophytic vegetation, wetland hydrology, and hydric soils. All of the sampling points assessed were naturally problematic due to sandy soils, which do not typically exhibit hydric indicators due to low organic matter content (Corps 2008). As specified in the Wetland Delineation Manual, the assessment relied more heavily on vegetation and hydrology to compensate for the problematic soils.

As shown in Table 4-4 below, the hydrophytic vegetation and hydric soil parameters were not met at any of the sample points, and the wetland hydrology parameter was met at three sample points (points A1, A2, and C1, located within jurisdictional drainages A and C). Because the three requisite parameters were not met at any of the points assessed, no wetlands were identified within the Project site. These results are presented more fully in the Wetland Delineation and Jurisdictional Determination Report for the Project, included in Appendix F. The locations of all sampling points assessed are shown on Figure 3-3.

TABLE 4-4
WETLAND DELINEATION RESULTS

Sampling Point	Location	Hydrophytic Vegetation Present?	Hydric Soils Present?	Wetland Hydrology Present?	Corps Wetland Present?
A1	Within Drainage A	No	No	Yes	No
A2	Within Drainage A	No	No	Yes	No
A3	Swale East of Drainage A	No	No	No	No
B1	Within Drainage B	No	No	No	No
C1	Within Drainage C	No	No	Yes	No
C2	Within Drainage C	No	No	No	No

Although none of the sample points on-site met the Corps' three-parameter wetland definition, it is also important to note that, because waters within the Project site are intrastate, isolated, and not tributary to navigable waterways, any wetlands present would not be subject to CWA jurisdiction.

4.4 FOCUSED BOTANICAL SURVEYS

To establish a baseline against which to evaluate the proposed Project's effects on the flora on-site, including any special-status species, URS biologists conducted full-coverage floristic surveys of the site. The surveys were conducted in accordance with USFWS, CDFG, and California Native Plant Society (CNPS) guidelines (USFWS 2000; CDFG 1983, revised 2001; CNPS 1983, revised 2001).

4.4.1 Botanical Survey Methods

As a first step in the botanical survey process, URS biologists developed a preliminary target list of special-status plant species with potential to occur in the vicinity of the Project site based on review of the CNDDB, the CNPS Inventory of Rare and Endangered Plants (CNPS 2001) and the on-line Inventory (CNPS 2009), and professional knowledge of the Antelope Valley area. This list was included in the Biological Constraints Analysis (BCA) prepared by URS submitted to SEATAC in March 2009. Additional special-status plant species

information used to develop the special-status plant species list was obtained by reviewing previous biological reports for the area, reviewing the plant species list for the Antelope Valley California Poppy Reserve, and informal consultations with CDFG and experts knowledgeable about the local flora. The special-status plant species list generated from database queries, literature review, and consultations was cross-referenced with habitat types present on the Project site to create a refined list of special-status plant species with potential to occur or known to occur on the Project site. The refined list also included ecological requirements for special-status plant species obtained from the CNDDB and the CNPS Inventory of Rare and Endangered Plants and the on-line Inventory. In March 2009, prior to conducting focused botanical surveys, updated queries of the CNPS Inventory of Rare Plants Database and CNDDB were performed, and the list of potentially occurring special-status plants was updated as necessary.

The USFWS, CDFG, and CNPS botanical survey protocols direct that surveys be conducted during time(s) that plants are in identifiable condition; often flowers and/or fruits are necessary for correct identification. The list of potentially occurring special-status plant species was used to ensure that surveys were conducted during the appropriate blooming season for each species. Focused floristic (botanical) surveys were conducted on the Project site and along the proposed transmission line route on the following dates: March 24-27 (early spring survey of entire site), April 8 (transmission line route only), and April 29-May 1, 2009 (late spring survey of entire site). Surveys were conducted in accordance with USFWS, CDFG, and CNPS guidelines by URS biologists and Michael Honer, a subcontracting botanist, all of whom are familiar with plant species that occur in the Western Mojave Desert/Antelope Valley region of Los Angeles County. On March 25, 2009, URS biologists also visited a reference site within the Antelope Valley California Poppy Reserve to compare blooming conditions between the Project site and the Reserve, which contains a known high-quality wildflower field.

In total, the botanical survey effort involved eight days of field time for a staff of six biologists, and included pedestrian transect surveys within every quarter section of the Project site, in the on-site drainages, and along the proposed transmission line route. Within the Project site, each section (as shown on Township/Range maps) was divided longitudinally into four quarter-section strips. Two pedestrian transect surveys were conducted within each quarter section, by at least three biologists walking approximately 20 meters (approximately 60 feet) apart. Surveys within the on-site drainages were conducted by biologists walking within the channels and on the banks of the drainages. This method was used during both the early spring and late spring surveys of the Project site.

Along the transmission route, the survey effort consisted of two biologists walking approximately 10 meters (approximately 30 feet) apart within the County road ROW (50 feet from the edge of pavement) on the west and east side of 170th Street West from the Project site boundary until approximately 0.25 mile north of Astoria Avenue in Kern County. The

distance surveyed on the west side of 170th Street West was 3.75 miles, and the distance surveyed on the east side of 170th Street West was 4.25 miles.

All plant species observed or detected during biological surveys conducted from March 2009 through May 2009 were documented and compiled into a plant species list. Voucher specimens were collected for selected taxa, to be deposited at Rancho Santa Ana Botanic Garden by Michael Honer. Plant nomenclature follows Hickman (1993) and the Jepson Online Interchange for name changes. All plant species within similar taxonomic grouping with a special-status plant species were identified to species or subspecies level to conclusively determine its identity as per protocol guidelines.

4.4.1.1 Joshua Tree Inventory Methods

Portions of the Project site and the proposed transmission line route are within and abutting the Joshua Tree Woodland SEA #60. The loss of Joshua tree woodlands due to accelerated agricultural and urban expansion in the County's desert regions is of concern to the County because large, dense stands of this habitat are becoming scarce, especially in the western Antelope Valley (LACDRP 1986). Due to this concern, URS biologists undertook an effort to map all Joshua trees occurring within the Project site and along the proposed transmission line route. In addition, an effort was made to assess the Joshua tree woodland habitat values present within the Project site and how this habitat relates to the Joshua tree woodlands in SEA #60.

Because of the large, conspicuous nature of this species, the general locations of Joshua trees within the Project site were known prior to conducting the field inventory. Generally, Joshua trees were known to occur in a 7.3-acre area near the northern Project boundary identified as a recruitment ground for the species (see Figure 3-4), at one location near the east edge of 170th Street West, and at various locations within SEA #60 along the proposed transmission line route.

4.4.1.1.1 Project Site. On January 13, 2009, URS biologists David Compton and Ronald Cummings conducted an inventory of individual Joshua trees within the Project site boundary. Each Joshua tree or seedling was identified and approached, and its location was recorded using a Garmin GPS unit. Height and "crown" diameter measurements to the nearest inch were taken using 5.0 foot tall x 0.5 inch diameter PVC pipes marked in 1.0 inch increments. Height was taken to the top of the main mass of leaves/spines on the main trunk. "Crown" diameter was defined as the maximum width of living material just below the crown for all seedlings, and was measured by laying the PVC measuring rod across the crown of the main branch. For both crown diameter and height, the measurements were estimated by the general mass of the leaves/spines, and exceptionally long spines were not included. For each seedling, the number of branches was also measured. If several branches/seedlings broke the surface in close proximity, all stems emerging at an angle from

the same subsurface location were regarded as branches of the same seedling. Any stems in close proximity but not appearing to originate from the same subsurface location were regarded as separate seedlings. The primary trunk was not counted as a branch. On the mature Joshua tree, a traditional measurement, "diameter at breast height" (dbh) was taken on the primary trunk using a standard dbh tape. Where numerous seedlings occurred within a roughly 3.0-meter (10-foot) radius, they were plotted as one GPS location due to the accuracy limitations of the GPS unit; however, physical measurements were recorded for each individual seedling.

After all Joshua tree individuals had been recorded, the GPS location data was downloaded into a computer and displayed using the Garmin Map Source program. The boundaries of the Joshua tree recruitment area were estimated by drawing a least-area convex polygon around the seedling locations, and Garmin Map Source software was used to calculate the polygon area. The results of the Joshua tree inventory of the Project site are presented in Section 4.4.2.1 of this Biota Report.

4.4.1.1.2 <u>Proposed Transmission Line Route</u>. Along the proposed transmission line route, Joshua tree mapping was conducted by URS biologists David Compton, Crissy Slaughter, Julie Love, and Whitney Wilkinson on April 8, 2009. This survey differed somewhat from the inventory conducted within the Project site, and was intended to identify the locations, densities, and relative maturity of Joshua tree individuals and clusters along the portion of the transmission line route within SEA #60. The field survey included 0.25 linear miles of the west side of 170th Street West and 1.0 linear miles of the east side of 170th Street West, and censused Joshua trees located within approximately 80 feet of the edge of the pavement on both sides of the 170th Street West within SEA #60.

As with the inventory of the Project site, the location of each Joshua tree was recorded using a Garmin GPS unit, and Joshua trees within a roughly 3.0-meter (10-foot) radius were plotted as one GPS location due to accuracy limitations. In cases where many Joshua trees were growing adjacent to each other in clusters larger than 3.0-meter (10-foot) radius, the perimeter of each cluster was marked with the GPS. These perimeter GPS points were used to form polygons indicating the location of the clusters of Joshua trees.

The number of trees and height class information for each tree (including individual Joshua trees within clusters) was recorded. Trunks that appeared to be completely separate at the bottom were counted as two separate trees, while those that appeared to originate from the same place at or slightly below the surface were counted as one tree. Height of the Joshua trees was estimated by using 5.0-foot-tall-by-0.5-inch-diameter PVC pipes marked in 1.0-inch increments. For trees greater than 10 feet tall, height was visually estimated to the top of the main mass of leaves/spines on the main trunk by holding the measuring stick to demonstrate the 10-foot mark while another biologist stood at a distance that allowed them to see the top of the tree to estimate tree height. Each Joshua tree censused was categorized into

one of five height classes: 0 to 5 feet, 5 to 10 feet, 10 to 15 feet, 15 to 20 feet, and 20 to 25 feet. The results of the Joshua tree inventory of the transmission line route, along with height class data, are presented in Section 4.4.2.1 of this Biota Report.

4.4.2 Botanical Survey Results

No special-status plant species were observed on the Project site or proposed transmission line route during the seasonally-timed focused botanical surveys. A total of 135 plant species were recorded within the Project site and along the proposed transmission line route, including 102 native and 33 non-native species. Many early-blooming species were observed in flower and identified during the initial botanical survey conducted from March 24 to 27, 2009, and later-flowering species such as Kellogg's tarweed (*Deinandra* [*Hemizonia*] *kelloggii*), Davidson buckwheat (*Eriogonum davidsonii*), sapphire woolystar (*Eriastrum sapphirinum*) and desert milkweed (*Asclepias californica*) were observed in flower during the final botanical visit from April 29 to May 1, 2009. Appendix I provides the family, scientific name, common name, wetland indicator status, and estimated abundance of each plant species observed on the Project site. Although no special-status plant species were observed during the botanical field investigations, a discussion of sensitive plants and their potential for occurrence within the Project site and proposed transmission line route is presented in Section 4.11 of this Biota Report.

Dominant plants observed on the Project site and the proposed transmission line route included shrubs, annual grasses, and forbs. The majority of the Project site north of SR-138 consisted of abundant rubber rabbitbrush, with patches of Davidson buckwheat, Kellogg's tarweed, fiddleneck (*Amsinckia tesselata*), goldfields (*Lasthenia californica*), and slender comb seed (*Pectocarya linearis* ssp. *ferocula*), interspersed with small wirelettuce (*Stephanomeria exigua*), Lemmon's lessingia (*Lessingia lemmonii*), and annual bursage (*Ambrosia acanthicarpa*) in the more disturbed areas, particularly along road edges. Red-stem filaree (*Erodium cicutarium*) and cheatgrass (*Bromus tectorum*) were widespread throughout the site, especially between the more established grassland and scrub habitat areas.

The Project site south of SR-138 was dominated by annual native and non-native grasses and forbs consisting mostly of cheatgrass, small fescue (*Vulpia microstachys*), fiddleneck, bicolored lupine (*Lupinus bicolor*), goldfields (*Lasthenia californica*), and California poppy (*Eschschlozia californica*). Less dominant species within the southern portion of the project site included shrubs such as rubber rabbitbrush, interior goldenbush (*Ericameria linearifolia*), and Cooper's goldenbush (*Ericameria cooperi*) within scattered patches of rabbitbrush scrub. The majority of the plant species observed within the proposed transmission line route consisted of rubber rabbitbrush, ruderal species including Russian thistle (*Salsola tragus*) and mustards (*Sisymbrium spp.*), and agricultural crops. Less dominant plant species observed within the proposed transmission line route included Joshua

trees (*Yucca brevifolia*), and other plant species associated with Joshua tree woodlands including cheesebush (*Ambrosia salsola*), winter fat (*Krascheninnikovia lanata*), spiny hopsage (*Grayia spinosa*), Anderson's boxthorn (*Lycium andersonii*), and ephedra (*Ephedra nevadensis*). Understory species observed on the proposed transmission line route within the Joshua tree woodlands included grassland species such as cheatgrass, fiddleneck, goldfields, and red-stem filaree.

The greatest floristic diversity was found within the six natural vegetation communities mapped within the Project site and along the transmission line route (California annual grassland, rabbitbrush scrub, wildflower fields, Joshua tree woodland, Joshua tree recruitment area, and desert saltbush scrub, described in Section 4.2 of this Biota Report). The Joshua tree woodland within the proposed transmission line route exhibited the highest native shrub and annual plant diversity of all of these communities. The Project site contained a relatively less diverse assemblage of plants due to recent cultivation of the site which has contributed to the dominance of rabbitbrush scrub and to a lesser extent California annual grasslands within the site. Although rubber rabbitbrush was the dominant native shrub within the Project site, a variety of native and non-native annual plant species were found within rabbitbrush scrub habitat during focused botanical surveys. The California annual grassland habitat south of the ranch house and SR-138, which includes the most recently cultivated portion of the Project site, exhibited the lowest amount of plant diversity of all the natural communities.

Non-native species such as cheatgrass (*Bromus tectorum*), red brome (*Bromus madritensis* ssp. *Rubens*), common Mediterranean grass (*Schismus barbatus*) and red-stem filaree (*Erodium cicutarium*) were ubiquitous to some degree throughout all of the habitats of the Project site and proposed transmission line route. The highest concentration of non-native plants was observed within the agricultural or ruderal areas, representing disturbed or human converted habitats along the proposed transmission line route.

The visit to the reference site within the Antelope Valley California Poppy Reserve on March 25, 2009 revealed that the first botanical survey conducted on March 24-27, 2009 coincided with the peak of the wildflower season. All of the habitats within the Project site and the proposed transmission line exhibited some degree of wildflower display, with goldfields, followed by California poppy, as the most common wildflower species observed. The highest concentration of native annual wildflower species was found within the wildflower field community identified on the southern portion of the Project site, which exhibited dense concentrations of goldfields, California poppy, and bicolored lupine. The reference site visit also revealed that the wildflower field habitat within the Project site produced an even more showy display of wildflowers compared to that observed at the reference site.

4.4.2.1 Joshua Tree Inventory Results

The Joshua tree (*Yucca brevifolia*) has no formal state or federal sensitivity designation. However, the loss of Joshua tree woodlands due to accelerated agricultural and urban expansion in the County's desert regions is of concern to the County because large, dense stands of this habitat are becoming scarce, especially in the western Antelope Valley (LACDRP 1986). The County has designated the Joshua Tree Woodland SEA (SEA #60) to protect this habitat. Portions of the Project site and the proposed transmission line route are within and abutting this SEA. Due to the County's concern with the loss of Joshua tree woodland habitat in the region, URS biologists undertook an effort to map all Joshua trees occurring within the Project site and along the proposed transmission line route. In addition, an effort was made to assess the Joshua tree woodland habitat values present within the Project site and how this habitat relates to the Joshua tree woodlands in SEA #60.

The Joshua tree is an evergreen monocot endemic to the Mojave Desert, and generally occurs from 2,000 to 6,000 feet elevation. The species prefers well-drained soils, and Joshua tree woodland is often outcompeted by other plant communities in soils where water retention is greater (Royo 1997). Studies conducted in Joshua Tree National Park have indicated that the growth rate for Joshua trees is approximately two feet for every ten years, and that trees can remain in a "juvenile" state (having not produced a flower) for many years (Gossard 1992). Joshua trees have a "deep and expansive" root system that can reach up to 36 feet away from the main stem (Gucker 2006). Some, but not all, Joshua trees can also send up shoots from rhizomes up to 10 feet out (Ibid.).

Reproduction in this species is achieved through a symbiotic relationship with the yucca moth (in the western U.S., *Tegeticula synthetica*). In this mutualistic partnership, the fruit of the Joshua tree provides the developing seeds that serve as the sole source of food for the moth's larvae (Godsoe et al. 2008). Conversely, the female yucca moth uses specialized mouth parts to pollinate the Joshua tree's flowers, enabling the consequent production of fruit and seeds. The adult moth travels among blooming Joshua trees collecting pollen, then selects a bloom and lays eggs within the ovary. Several days later, the larval yucca moths hatch and take up residence within the Joshua tree's fruit, where they feed on the plant's seeds. Eventually, the larval moths leave the fruit of the Joshua tree and drop to the ground. The larvae burrow into the desert soil, where each larva creates a cocoon and continues to develop before emerging as an adult moth to repeat the cycle (Sharp 2009). The presence of very young Joshua tree seedlings in the recruitment area on-site, adjacent to the Joshua tree woodland in SEA #60, provides evidence that yucca moths are present in the area and that pollination of mature Joshua trees within the SEA is occurring.

The Joshua tree inventory of the Project site and proposed transmission line route described in Section 4.4.1.1 of this Biota Report identified the presence of Joshua tree individuals in three general locations: the 7.3-acre area recruitment area near the northern Project boundary;

near the east edge of 170th Street West; and along to the proposed transmission line route within SEA #60. No Joshua trees, seedlings, or other indicators of Joshua tree woodland were detected within the 20-acre northwestern portion of the Project site that overlaps SEA #60; the habitat in this area consisted of rabbitbrush scrub consistent with the surrounding habitat within this portion of the Project site (Figure 3-4).

The January 13, 2009 Joshua tree inventory identified 50 Joshua tree seedlings within the 7.3-acre recruitment area in the northern portion of the site adjacent to SEA #60. The polygon encompassing the Joshua tree recruitment area measures approximately 0.4 mile long by a maximum of 270 feet wide. It is oriented with the long axis east-west, and is parallel with the northern boundary of the Project site and SEA #60. The distribution of seedlings within the recruitment area is clumped, and the overall tree density in this area is approximately 6.8 seedlings per acre. Among the 50 seedlings inventoried within the recruitment area, the average height was 25.5 inches (range 4 to 70 inches) and the average crown diameter was 12.7 inches (range 4 to 24 inches). The majority of the seedlings (39 of the 50 seedlings, or 78 percent) had no branches, although the remaining 11 seedlings exhibited from one to four branches in addition to the main stem. The majority of these branches appeared to originate from a common root just below the ground surface, since the seedlings were too young to have formed a distinct trunk. Two small seedlings had been grazed down to stubs.

The presence of the Joshua tree seedlings identified within the recruitment area appears to indicate that this area may be in the early stages of re-establishing a Joshua tree woodland habitat. The recruitment area assessed is directly adjacent to intact Joshua tree woodland habitat located north of the Project boundary within SEA #60. Because agricultural cultivation of this area ceased in 1995, it is likely that Joshua tree seeds dispersed into this area from the nearby Joshua tree woodland are now able to grow without disturbance.

In addition to seedlings within the recruitment area, the Joshua tree inventory also detected one mature Joshua tree and two seedlings located along 170th Street West within the Project site (Figure 4-1). The mature individual was the only mature Joshua tree detected within the Project site, and had a height of 11 feet and a diameter of 7.8 inches at breast height. The two seedlings at this location measured 7 and 15 inches in height, and did not support branches other than the main trunk. Given the young age of these seedlings, and their proximity to the mature Joshua tree, it is likely that they originated from the seeds of the mature tree. A table presenting all of the data collected, including height, crown diameter, number of branches, and dbh of each individual Joshua tree, is included in Appendix K.

Within the proposed transmission line route, the April 8, 2009 Joshua tree mapping effort identified a total of 385 Joshua trees in SEA #60 within 80 feet of the edges of 170th Street West. Thirty Joshua trees were located within the 0.25 mile section of SEA #60 on the west side of 170th Street West, and 355 Joshua trees were located within the one mile section of

SEA #60 on the east side of 170th Street West. The east side of the street had a higher density of Joshua trees than the west side, with 34.5 trees per acre compared to 12.4 trees per acre. Figure 4-2 shows the locations of the Joshua tree individuals and clusters along the proposed transmission line route. The majority of Joshua trees located along the proposed route were categorized in the 0- to 5-foot height class, which comprised 83 percent of the Joshua trees on the west side of 170th Street West and 40 percent of the Joshua trees on the east side of the street.

In total, the Joshua tree inventory effort identified 438 Joshua tree individuals within the Project site and along the proposed transmission line route. These observations are presented by height class and location in Table 4-5 below.

TABLE 4-5
JOSHUA TREES OBSERVED BY LOCATION AND HEIGHT CLASS

	Project Site		Transmission Line Route	
Height Class	Joshua Tree Recruitment Area	Adjacent to 170th Street West	West Side of 170th Street West	East Side of 170th Street West
0 to 5 feet	49	2	25	141
5 to 10 feet	1	0	2	113
10 to 15 feet	0	1	2	90
15 to 20 feet	0	0	1	10
20 to 25 feet	0	0	0	1
Total	50	3	30	355

4.5 WINTERING BIRD SURVEYS

Wintering bird surveys were conducted to identify any potential bird use of the Project site for wintering by special-status bird species. The wintering bird survey methodology for the Project site was developed by URS biologist David Compton, who has an extensive background in bird survey techniques.

4.5.1 Wintering Bird Survey Methods

Prior to conducting field surveys, the CNDDB was queried for special-status bird species known to use the Project site and surrounding area. Two such species were detected in this query: the burrowing owl (*Athene cunicularia*, CSC) and the mountain plover (*Charadrius montanus*, CSC). Additionally, a list of raptors that are known to use the Antelope Valley area was obtained from a CDFG representative (Harris 2009).

Based on the site vegetation map (Figure 3-4) and the lists of sensitive species with potential to occur on-site, 12 point count stations were designated in various locations within the

Project site. Each point count station was at the center of a circular survey plot 250 meters (approximately 800 feet) in diameter; point count stations were marked with a Garmin GPS unit so the station could be relocated readily on subsequent visits (see Figure 4-3). The stations were located so that survey plots would encompass the three most abundant natural habitat types on the Project site (rabbitbrush scrub, wildflower fields, and California annual grassland). In addition, three of the point count stations were located along the site's largest drainage (Drainage A). An effort was made to distribute the stations as evenly as possible around the site, and to place each station in a location with maximum visibility.

A series of three one-day site visits to each point count station was conducted in December 2008, January 2009, and February, 2009. Surveys were conducted within this three-month window to optimize the chance of observing special-status bird species that use the Project site for wintering habitat. Visits were made to each station on January 14 and February 4, 2009, under normal winter conditions and during morning hours when birds are more likely to be active. The visits conducted on December 17 and 18, 2008, were limited by weather conditions on-site (heavy snow on December 17), and only stations 10 through 13 were counted during that visit.

Each time a point count station was visited, a primary observer and an assisting biologist visited the point count station for a five minute period. During this time, the primary observer listened for vocalizing birds and scanned the surrounding area alternately with 10 x 42 Swarovski binoculars and the naked eye. The assisting biologist recorded notes, as instructed by the primary observer. All birds heard or seen within 250 meters (approximately 800 feet) of the point count station were recorded, and birds recorded within 50 meters (approximately 160 feet) of the station were recorded in a separate column. In the case of species that travel in large flocks, especially the horned lark, observers estimated flock sizes rather than making precise counts. Species detected while surveyors were en route between point count stations, but not at any single station, were recorded separately so that a complete list of bird species observed could be compiled. General weather conditions were recorded. URS biologist Dave Compton served as the primary observer during all three visits; he was assisted by URS biologists Ronald Cummings, on December 18 and January 14, and Whitney Wilkinson, on February 4. During the December 18 visit, point counts were conducted between 11:20 a.m. and 1:30 p.m. During the January 14 visit, all point counts were conducted between 7:45 a.m. and 11:30 a.m. During the February 4 visit, all point counts were conducted between 7:50 a.m. and 11:15 a.m.

To address portions of the Project site that were not sampled by the point counts described above, straight-line transects were established in two areas (Figure 4-3). One transect, 0.6 miles long, covered rabbitbrush scrub, and the other, 1.1 miles long, covered California annual grassland and wildflower field habitats. Along each transect, a series of points were marked with a Garmin GPS, dividing the transects into segments of approximately 1,500 feet each. Biologists walked a straight line between points, stopping to scan for birds with 8 x 42

Swarovski binoculars every 150 to 250 feet. All birds detected were identified and recorded. Transects surveys were conducted in the afternoon, on the same dates and by the same personnel as the point counts described above.

Because the proposed transmission line route had not yet been established at the time of the wintering bird surveys, this area was not surveyed during winter 2008–2009 surveys. The proposed transmission line route was surveyed for breeding birds during the spring of 2009, and the results of breeding bird surveys within this area are discussed in Section 4.6 of this Biota Report.

In addition to observations made during wintering bird surveys, biologists recorded significant bird observations made during other winter field visits. Such observations included occurrences of any special-status species or any bird not observed, or uncommonly observed, during wintering bird surveys. A separate visit was made to the area surrounding the ranch house on the Project site, south of SR-138, on February 3, 2009 by URS biologists Dave Compton and Whitney Wilkinson. During this visit, URS biologists checked all the trees in the vicinity of the ranch house for evidence of roosting owls or other birds of prey, and also walked the orchard to assess the suitability of the area for nesting birds of prey. At sunset, URS biologists stationed themselves approximately 500 feet west of the ranch house to watch for birds of prey coming to roost in the trees in the area.

4.5.2 Wintering Bird Survey Results

During the wintering bird surveys, 20 species were identified on the Project site. An additional seven species of birds were identified on the Project site during other non-bird related winter biological surveys. The most common species found on the site during the wintering bird surveys was the horned lark. During walking transects south of SR-138, 2,727 were counted on December 18, 2008, and 1,763 were tallied on January 14, 2009. Fewer were present on February 14, when 511 were counted in the same areas south of SR-138, and 841 were recorded overall on the Project site. However, the horned lark was still the most common species observed during the 2008–2009 winter survey season by far. Other common species included the mourning dove (*Zenaida macroura*) (6 recorded on December 18, 45 on January 14, and 0 on February 4), common raven (5, 20, and 44 recorded during the three surveys), house finch (235, 489, and 36), mountain bluebird (1, 51, and 0), savannah sparrow (26, 41, and 37), and white-crowned sparrow (2, 49, and 18). The house sparrow was present near the ranch house, where they were observed in small numbers (2 to 3 per survey) from point count station 4 on January 14 and February 4, respectively. The sage sparrow was the only desert species recorded during wintering bird surveys, when 6 were recorded on January 14 and 5 were recorded on February 4. Several Brewer's sparrows were recorded on other biological surveys, including 4 near the northern boundary of the Project site on January 13, 2009. Five bird of prey species were found on the site during winter surveys: the northern harrier, red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), merlin,

and prairie falcon. Only the harrier, merlin, and prairie falcon were observed during the wintering bird surveys. Northern harriers were recorded once during each wintering bird survey, in addition to regular sightings during other 2008–2009 winter biological surveys. Single merlins were observed twice, and one prairie falcon was seen during these surveys. The only red-tailed hawk and American kestrel sightings occurred during other biological surveys. All bird species observed during wintering bird surveys of the Project site and transmission line route are reported in Table 4-6.

During the February 3 visit to the area surrounding the ranch house on the south side of SR-138, no large nest structures were observed in any of the trees. The trees nearest the house were mostly bare and did not at that season provide ideal habitat for roosting birds of prey. The pistachio trees in the orchard were mostly too small for nesting or roosting by birds of prey, although some of the larger trees may have been marginally suitable for these purposes.

4.5.2.1 Special-status Species Detected

Special-status species found on the Project site during wintering bird surveys included the Brewer's sparrow, burrowing owl, lark sparrow, loggerhead shrike, merlin, mountain bluebird, northern harrier, prairie falcon, vesper sparrow, and western meadowlark. One species observed during the winter 2008–2009 but not during the wintering bird surveys was the greater roadrunner, observed on the northern boundary of the Project site when biologists were marking the perimeter of the site. Although mountain plovers were recorded in the general vicinity of the Project site by the CNDDB, none were found on the site, which lacks the short vegetation and bare ground necessary for this species in winter. However, suitable habitat for this species is present in agricultural fields in the proposed transmission line route in Kern County. Not all of the special-status species found on the site were recorded during the season for which they have been designated as having special status. Special-status species observed within the Project site and along the proposed transmission line route are discussed in additional detail in Section 4.10 of this Biota Report. No federally- or state-listed threatened or endangered species were observed during wintering bird surveys of the Project site.

4.6 BREEDING BIRD SURVEYS

Breeding bird surveys were conducted to identify any potential bird use of the Project site and proposed transmission line route for breeding by special-status bird species. The breeding bird survey methodologies were developed by URS biologist David Compton, who has an extensive background in bird survey techniques.

4.6.1 Breeding Bird Survey Methods

The Project site and proposed transmission line route differ greatly in their spatial configuration, as the Project site occupies a large area while the transmission line route

TABLE 4-6
BIRDS DETECTED WITHIN THE PROJECT SITE DURING WINTERING BIRD SURVEYS

		Point Counts			Transect 1			Transect 2		
Common name	Scientific name	Dec. 18, 2008	Jan. 14, 2009	Feb. 4, 2009	Dec. 18, 2008	Jan. 14, 2009	Feb. 4, 2009	Dec. 18, 2008	Jan. 14, 2009	Feb. 4, 2009
Northern harrier	*Circus cyaneus*	1	0	0	1	0	0	-	0	1
Merlin	*Falco columbarius*	0	0	1	0	1	0	-	0	0
Prairie falcon	*Falco mexicanus*	0	0	0	0	1	0	-	0	0
Rock pigeon	*Columba livia*	0	2	0	0	0	0	-	0	0
Mourning dove	*Zenaida macroura*	1	0	0	5	45	0	-	0	0
Burrowing owl	*Athene cunicularia*	0	1	0	0	0	0	-	0	0
Loggerhead shrike	*Lanius ludovicianus*	0	3	0	0	0	0	-	0	0
Common raven	*Corvus corax*	2	10	13	3	7	30	-	3	1
Horned lark	*Eremophila alpestris*	556	3,492	321	2,727	1,763	511	-	40	9
Mountain bluebird	*Sialia currucoides*	1	0	0	0	51	0	-	0	0
European starling	*Sternus vulgaris*	0	5	2	0	0	0	-	0	0
Yellow-rumped warbler	*Dendroica coronata*	3	2	0	0	0	0	-	0	0
Vesper sparrow	*Pooecetes gramineus*	0	0	0	2	1	0	-	0	0
Sage sparrow	*Amphispiza belli*	0	5	4	0	0	0	-	1	1
Savannah sparrow	*Passerculus sandwichensis*	2	23	11	24	18	26	-	0	0
White-crowned sparrow	*Zonotrichia leucophrys*	2	35	14	0	4	1	-	10	3
Sparrow sp.		0	14	10	0	0	0	-	3	1
Western meadowlark	*Sturnella neglecta*	6	2	9	1	0	0	-	2	0
House finch	*Carpodacus mexicanus*	229	186	35	6	303	1	-	0	0
House sparrow	*Passer domesticus*	0	2	3	0	0	0	-	0	0
Totals species observed		10	15	11	8	10	5	-	6	6
Total individuals observed		803	3,783	423	2,769	2,194	569	-	59	16

constitutes a narrow linear feature. Owing to this difference, two surveys methods for breeding birds were used, one for the Project site and one for the proposed transmission line route.

4.6.1.1 Survey Methods for the Project Site

Within the Project site, 16 point count stations were established. Many of the point count stations were those used during the wintering bird surveys, but some new stations were established in spring to ensure that the site was sampled adequately. The point count stations sampled all natural habitat types occurring within the project site (Figure 4-4), including rabbitbrush scrub, California annual grassland, and wildflower fields, as well as the on-site orchard and ornamental vegetation. Either rabbitbrush scrub, wildflower fields, or California annual grassland was the dominant habitat surrounding each point count station, although some stations were located in areas where at least two of these habitats were present. The plots sampled by these stations also included parts of the two largest drainages within the Project site, which provide topographic relief on an otherwise relatively homogeneous site. Finally, point count stations were established with the intention of evenly distributing them across the site geographically. Thus the point count stations were located in areas that encompassed the variety of habitats, topography, and locations around the Project site.

Each point count station was located at the center of a circular survey area 250 meters (approximately 800 feet) in diameter; the center of each station was marked with a Garmin GPSmap 60CSx GPS unit so the station could be relocated readily on subsequent visits (see Figure 4-4). Each station was visited by URS biologists three times between April 22 and June 10, 2009. On each visit, a primary observer and an assistant visited each point count station for a five minute period. During this time, the primary observer listened for vocalizing birds and scanned the surrounding area alternately with 10 x 42 Swarovski binoculars and the naked eye. The assisting biologist recorded notes, as instructed by the primary observer. All birds heard or seen within 800 feet of the point count station were recorded, and birds recorded within 50 meters (approximately 160 feet) of the station were recorded in a separate column. URS biologist Dave Compton served as the primary observer during all three visits; he was assisted by URS biologists Chris Julian, on April 22–23, and Whitney Wilkinson on May 7–8 and June 9–10. During the April 22–23 visit, all point counts were conducted between 6:30 a.m. and 10:00 a.m. During the May 7–8 visit, all point counts were conducted between 6:30 a.m. and 9:30 a.m. During the June 9–10 visit, all point counts were conducted between 6:15 a.m. and 8:45 a.m.

The 250-meter- (800-foot-) radius plot surveyed during the point counts is larger than is often used in this survey method. The use of a large plot size was deemed feasible on the Project site, because the open habitats and flat terrain on-site enable observers to see and hear birds over a great distance. In all, the 16 locations surveyed an area of 760 acres, or about 36.2 percent of the approximate 2,100-acre Project site. Since the plots were large, birds at the

edges of the plot were harder to detect than birds closer to the observer. However, 84.8 percent of the birds detected during the surveys were detected at a distance between 50 and 250 meters from the center point (compared to the 96 percent of the area of each plot that fell between 50 and 250 meters of the center). Thus, while birds were recorded at a greater rate within 50 meters of the point count station, the surveys detected a significant number of birds more than 50 meters from the station.

4.6.1.2 Survey Methods for the Transmission Line Route

Because of the narrow (100 foot), linear nature of the proposed transmission line route, the use of large, circular plots would be an inefficient survey method for this feature. Thus, biologists instead surveyed the route using a straight-line transect method. Two biologists walked each side of 170th Street West from the project site to the end of the proposed transmission line route. Observers walked at a moderate pace, listening and watching for birds, and stopping periodically to scan the route ahead for birds with 10 x 42 Swarovski EL binoculars. Birds seen or heard within 50 meters (approximately 160 feet) of the center line of 170th Street West were recorded. Each side of 170th Street West was divided into five to six survey transects based on the vegetation present (Figure 4-5). Transects varied in length from 0.2 miles to 1.13 miles. Breeding bird surveys of the proposed transmission line route were conducted on April 23, May 8, and June 9–10, 2009.

4.6.2 Breeding Bird Survey Results

During the breeding bird surveys, 42 species were observed on the Project site and proposed transmission line route (see Table 4-7). Of these, 10 species were observed exclusively within the Project site, 17 species were observed both within the Project site and along the proposed transmission line route, and 15 species were observed exclusively along the proposed transmission line route. These totals included all birds observed using or flying over the Project site and the proposed transmission line route, and included species that were likely not nesting on the site because the observed individuals were either spring transients or wintering birds lingering into spring.

Several of the species detected within the Project site and proposed transmission line route are presumed not to nest in these areas, either due to lack of suitable nesting habitat, and/or because the Project vicinity is outside the known breeding range for the species. Eight species observed on-site are not believed to nest there because the Project site is outside the known breeding ranges: the whimbrel (*Numenius phaeopus*), Vaux's swift (*Chaetura vauxi*), American pipit (*Anthus rubescens*), Brewer's sparrow, savannah sparrow, white-crowned sparrow, lazuli bunting (*Passerina amoena*), and American goldfinch (*Carduelis tristis*). Three other species detected on the Project site, the northern harrier (*Circus cyaneus*, CSC), cliff swallow (*Petrochelidon pyrrhonota*), and tricolored blackbird (*Agelaius tricolor*, CSC), breed in the Antelope Valley but are not believed to nest on-site due to lack of suitable

TABLE 4-7
BIRDS DETECTED DURING BREEDING BIRD SURVEYS OF THE PROJECT SITE AND PROPOSED TRANSMISSION LINE ROUTE

		Project Site (Point Counts)			Transmission Line Route (Straight-line Transects)		
Common Name	Scientific Name	April 22–23, 2009	May 7–8, 2009	June 9–10, 2009	April 23, 2009	May 8, 2009	June 9–10, 2009
California quail	*Callipepla californica*	1	0	9	2	0	21
Northern harrier[1]	*Circus cyaneus*	1	0	0	0	0	0
Red-tailed hawk	*Buteo jamaicensis*	0	0	0	0	1	0
Killdeer	*Charadrius vociferus*	0	0	1	0	0	1
Whimbrel[1]	*Numenius phaeopus*	0	47	0	0	0	0
Eurasian collared-dove	*Streptopelia decaocto*	1	0	0	0	0	3
Mourning dove	*Zenaida macroura*	1	1	0	2	8	9
Burrowing owl	*Athene cunicularia*	1	0	0	0	0	0
Vaux's swift[1]	*Chaetura vauxi*	0	2	0	0	0	0
White-throated swift[1]	*Hirundapus caudacutus*	0	0	0	1	0	0
Flycatcher[1]	*Empidonax* sp.	0	0	0	0	1	0
Ash-throated flycatcher	*Myiarchus cinerascens*	0	0	0	0	1	0
Western kingbird	*Tyrannus verticalis*	1	2	0	6	5	3
Kingbird sp.	*Tyrannus* sp.	0	1	0	0	0	0
Loggerhead shrike	*Lanius ludovicianus*	2	2	2	1	1	3
Common raven	*Corvus corax*	9	18	18	9	7	7
Horned lark	*Eremophila alpestris*	35	37	172	1	1	48
Tree swallow[1]	*Tachycineta bicolor*	0	0	0	1	0	0
Cliff swallow	*Petrochelidon pyrrhonota*	2	0	0	0	0	6
Cactus wren	*Campylorhynchus brunneicapillus*	0	0	0	0	0	1

TABLE 4-7 (CONTINUED)
BIRDS DETECTED DURING BREEDING BIRD SURVEYS OF THE PROJECT SITE AND PROPOSED TRANSMISSION LINE ROUTE

		Project Site (Point Counts)			Transmission Line Route (Straight-line Transects)		
Common Name	Scientific Name	April 22–23, 2009	May 7–8, 2009	June 9–10, 2009	April 23, 2009	May 8, 2009	June 9–10, 2009
Northern mockingbird	*Mimus polyglottos*	0	0	0	0	2	0
European starling	*Sturnus vulgaris*	3	19	41	0	4	2
American pipit[1]	*Anthus rubescens*	10	0	0	8	0	0
Yellow warbler[1]	*Dendroica petechia*	0	0	0	0	1	0
Yellow-breasted chat[1]	*Icteria virens*	0	0	0	0	1	0
Western tanager[1]	*Piranga ludoviciana*	0	0	0	0	1	0
Chipping sparrow	*Spizella passerina*	0	0	0	0	1	0
Brewer's sparrow[1]	*Spizella breweri*	5	2	0	0	0	0
Lark sparrow	*Chondestes grammacus*	2	0	1	0	0	1
Sage sparrow	*Amphispiza belli*	12	14	11	0	0	0
Savannah sparrow[1]	*Passerculus sandwichensis*	8	0	0	0	0	0
White-crowned sparrow[1]	*Zonotrichia leucophrys*	1	0	0	0	0	0
Sparrow sp.		4	1	1	0	0	0
Blue grosbeak[1]	*Guiraca caerulea*	0	0	0	1	0	0
Lazuli bunting[1]	*Passerina amoena*	4	0	0	0	0	0
Tricolored blackbird[1]	*Agelaius tricolor*	18	0	0	0	0	1
Western meadowlark	*Sturnella neglecta*	11	3	9	6	1	3
Brewer's blackbird	*Euphagus cyanocephalus*	2	4	4	18	7	35
Bullock's oriole	*Icterus bullockii*	0	0	0	1	6	3
House finch	*Carpodacus mexicanus*	3	5	6	16	23	27

TABLE 4-7 (CONTINUED)
BIRDS DETECTED DURING BREEDING BIRD SURVEYS OF THE PROJECT SITE AND PROPOSED TRANSMISSION LINE ROUTE

		Project Site (Point Counts)			Transmission Line Route (Straight-line Transects)		
Common Name	Scientific Name	April 22–23, 2009	May 7–8, 2009	June 9–10, 2009	April 23, 2009	May 8, 2009	June 9–10, 2009
Lesser goldfinch	*Carduelis psaltria*	0	0	0	0	4	0
Lawrence's goldfinch	*Carduelis lawrencei*	0	0	0	0	4	0
American goldfinch[1]	*Carduelis tristis*	1	0	0	0	0	0
House sparrow	*Passer domesticus*	10	4	5	10	16	19
Total species observed		25	16	13	15	21	18
Total individuals per survey		148	162	279	83	97	193

[1] Species unlikely to breed on or near the project site, because of lack of suitable nesting habitat, because the site is outside the known nesting range, or both.

nesting habitat. The tricolored blackbird, detected once on the Project site (18 individuals observed at station 5 on April 22) is a CSC protected for its nesting colonies. The species has been known to nest at three different locations within seven miles of the Project site, but there is no suitable nesting habitat within the site. Northern harriers are known to breed near the City of Lancaster, but the lack of observations of this species on-site after April 30 suggests that no harriers nested on or near the site in 2009. Also, the relative lack of dense ground cover and the lack of any wetlands within the Project site render the site suboptimal as a nesting habitat for this species. All of the 11 species detected within the Project site but presumed not to breed there were observed in the early spring when transients or lingering wintering birds could be expected, and were not detected in May and June surveys. The remaining 16 species detected within the Project site are presumed to have been breeding there or nearby.

The most widespread species on the project site was the horned lark, which was detected at every point count station. Common ravens occurred at 11 of the 16 stations, sage sparrows at 9, and western meadowlarks at 8. The horned lark was also the most abundant species, with 35, 37, and 172 recorded on the April 23, May 8, and June 9–10 surveys, respectively. Other common species were the European starling (3 on April 23, 19 on May 8, and 41 on June 9–10), the common raven (9, 18, and 18), and the sage sparrow (12, 14, and 11). Although it was recorded only once, at point count station 2 on May 7, 2009, the whimbrel was overall one of the most numerous species, with a migrating flock of 47 individuals recorded in a single survey.

Of the 32 species observed along the proposed transmission line route, nine species are not expected to breed in the area due to lack of suitable nesting habitat; these species included the white-throated swift (*Hirundapus caudacutus*), tree swallow (*Tachycineta bicolor*), American pipit, yellow warbler, yellow-breasted chat, western tanager (*Piranga ludoviciana*), blue grosbeak (*Guiraca caerulea*), tricolored blackbird, and an unidentified species of flycatcher of the genus *Empidonax*. The tricolored blackbird was seen only once, along the proposed transmission line route, when a single male was recorded on June 10 east of 170th Street West near Gaskell Road, in Kern County. In addition to these nine species, a chipping sparrow that was seen adjacent to a residence on 170th Street West in Kern County was observed within the migratory window for this species and was probably a migrant. The other 22 species observed along the proposed transmission line route were likely breeding in the area.

The most widespread species found in or flying above the proposed transmission line route was the common raven, which was recorded in 7 of the 11 survey transects. Other frequently encountered species were the mourning dove and the house finch, recorded in 6 transects each, and the western meadowlark and Brewer's blackbird, recorded in 5 each. The most abundant species in the proposed transmission line route were the house finch (16 on April 23, 23 on May 8, and 27 on June 9–10), the house sparrow (10, 16, 19), and Brewer's

blackbird (18, 7, 35). Only one horned lark was observed during each of the first two surveys, but 48 were recorded on June 9–10. The dramatic increase on the latter date occurred as this species began gathering in flocks as the breeding season drew to an end. Also, numbers for the house finch, house sparrow, and Brewer's blackbird were skewed upward throughout the surveys because of large concentrations around an area just north of Gaskell Road, Kern County, where birds congregated around an orchard and in large trees surrounding several structures on either side of 170th Street West. Discounting birds found in this area, as well as the large flocks of horned larks that gathered late in the season, the common raven (9, 7, and 7 during the three surveys) was the most common species along the proposed transmission line route.

4.6.2.1 Special-status Bird Species Detected During the Breeding Season

Twelve special-status species were detected during the spring 2009 breeding bird surveys: the Brewer's sparrow, burrowing owl, chipping sparrow, lark sparrow, Lawrence's goldfinch, loggerhead shrike, northern harrier, tricolored blackbird, Vaux's swift, western meadowlark, yellow warbler, and yellow-breasted chat. In addition, two species were observed during other spring biological surveys: the prairie falcon and the vesper sparrow (the latter designated as having special status only for winter). Finally, the long-eared owl was confirmed as occurring on-site from a wing feather found during breeding bird surveys, although no long-eared owls were observed on-site. Of the 15 special-status species detected during all spring biological surveys (including the long-eared owl), seven were detected on the Project site only, four were detected in the proposed transmission line route only, and four were detected in both areas. No federally- or state-listed threatened or endangered species were observed during breeding bird surveys of the Project site and transmission line route. Special-status species observed within the Project site and along the proposed transmission line route are discussed in additional detail in Section 4.10 of this Biota Report.

4.7 BURROWING OWL SURVEYS

Due to the Project site's proximity to documented burrowing owl occurrences and available suitable habitat, burrowing owl surveys were conducted on the Project site and along the proposed transmission line route during winter and spring 2009. These surveys followed the California Burrowing Owl Consortium (CBOC) protocol guidelines (CBOC 1993), which have been adopted by the CDFG. Scott P. Harris, a CDFG biologist, provided further guidance on the appropriate burrowing owl survey windows and methodology. The CBOC guidelines include a four-step survey protocol (Phases I though IV) for documenting the presence of burrowing owl habitat and evaluating burrowing owl use of the Project site as well as a 500-foot buffer zone around the site boundary. Phases I through III consist of varying levels of field surveys; Phase IV consists of a written report documenting results of the Phase I though III surveys. The Phase I surveys were conducted during the 2008–2009 winter season, prior to the submittal of the BCA to the SEATAC. Based on the results of the

Phase I survey included in the BCA, Phases II and III were included among the spring survey efforts of the Project site conducted in 2009. Along the proposed transmission line route, Phases I and II were conducted during spring 2009 surveys. Because the Applicant does not own or have access rights to lands surrounding the Project site, all phases of the burrowing owl surveys were confined to the Project site; the 500-foot buffer zone described in the protocol was not assessed.

The burrowing owl is a CSC which occurs in open, dry grasslands, agricultural lands, and desert habitats often associated with burrowing animals. Burrowing owls nest underground in abandoned burrows dug by mammals or, if soil conditions allow, will dig their own burrows. In the western Mojave region, they are often associated with the presence of California ground squirrels (*Spermophilus beecheyi*), which provide burrows that are suitable for their use (Personal communication, Scott P. Harris, January 22, 2009). California ground squirrels were not observed on the Project site. However, two California ground squirrels were observed in ruderal habitat within the proposed transmission line route. Several large mammal burrows, likely dug by coyotes or desert kit foxes, as well as numerous small mammal burrows were observed on the Project site and proposed transmission line route. Burrowing owls in the Imperial Valley are known to dig out burrows of mammals as small as the round-tailed ground squirrel (*Citellus tereticaudus*) and Botta's pocket gopher (*Thomomys bottae*) (Gervais et al. 2008). Therefore, burrowing owls may have the potential to use the burrows of the white-tailed antelope squirrel, a small mammal species frequently observed on the Project site. Burrowing owls have been known to nest colonially and forage over great distances (Gervais et al. 2008; Rosenberg and Haley 2004). The drainages on-site, particularly Drainage A, where most of the suitable burrows were found, may be suitable locations for colonially nesting burrowing owls. A description of all of the survey Phases, methodology, and results of the protocol burrowing owl surveys is provided below.

4.7.1 CBOC Protocol Phase I: Burrowing Owl Habitat Assessment

Phase I of the CBOC survey protocol consists of an assessment for the presence of burrowing owl habitat on the Project site, including a 150-meter (approximately 500-foot) buffer zone around the site boundary. The *Burrowing Owl Survey Protocol and Mitigation Guidelines* (CBOC 1993) states that, "Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat: both natural and artificial burrows provide protection, shelter, and nests for burrowing owls. Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures, such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement."

4.7.1.1 Phase I Methods

A Phase I burrowing owl habitat assessment was conducted on the Project site during winter 2008–2009 and along the proposed transmission line route during spring 2009. Within the Project site, the habitat assessment was conducted by biologists traversing the site and identifying constituent elements of burrowing owl habitat. These elements include the presence of small mammal burrows and suitable foraging areas within the burrowing owl's preferred habitat; open, dry grasslands, agricultural lands, and desert habitats. Areas within the Project site that contained these elements were identified as burrowing owl habitat. Where burrowing owl sign was detected (i.e., burrows, whitewash, pellets), coordinates were recorded using Garmin™ GPS Map 60CSx GPS units capable of accuracy within 3 meters (approximately 10 feet). The Phase I burrowing owl habitat assessment of the Project site was conducted in conjunction with all winter 2008–2009 biological survey efforts, and incorporated observations of burrowing owl sign recorded from the entire Project site, including the on-site drainages.

The Phase I burrowing owl habitat assessment of the proposed transmission line route was conducted on April 8, 2009. Along the transmission route, the survey effort consisted of two biologists walking approximately 10 meters (30 feet) apart within the County road ROW (50 feet from the edge of pavement) on the west and east side of 170th Street West from the Project site boundary until approximately 1/8 mile north of Astoria Avenue in Kern County. The distance surveyed on the west side of 170th Street West was approximately 3.63 miles, and the distance surveyed on the east side of 170th Street West was approximately 4.13 miles. As with the Phase I burrowing owl habitat assessment of the Project site described previously, areas along the proposed transmission line route that contained the constituent elements of burrowing owl habitat were identified as burrowing owl habitat.

4.7.1.2 Phase I Results

The results of the Phase I burrowing owl habitat assessment for the Project site indicate that the entire approximate 2,100 acre Project site contains suitable burrowing and foraging habitat for burrowing owls. The Project site is comprised of the burrowing owl's preferred habitat components, including open, dry grasslands, and desert habitats. In addition, small mammal burrows were observed in abundance within the Project site, especially within the drainages and at the interface between the Project site and the adjacent, off-site Joshua tree woodlands.

The results of the Phase I burrowing owl habitat assessment for the proposed transmission line route indicate that the entire proposed transmission line route contains suitable burrowing and foraging habitat for burrowing owls. Similar to the Project site, the proposed transmission line route is comprised of the burrowing owl's preferred habitat components, including open, dry grasslands, agricultural lands, and desert habitats. Numerous small

mammal burrows were also observed within the proposed transmission line route indicating that this area contains suitable burrowing habitat for burrowing owls, although burrowing habitat may be limited within the agricultural habitats along the proposed transmission line route during periods of active tilling.

During the process of mapping suitable burrowing owl habitat as directed by Phase I of the CBOC protocol, biologists also identified seven burrowing owl burrows (with whitewash and/or pellets) and four sightings of burrowing owls. Six of these burrows were located within Drainage A, and the remaining one was in Drainage C. An additional burrow with owl sign and an owl sighting was identified off-site approximately 150 feet south of the southern Project boundary in Drainage C. These observations were included with additional observations gathered during Phase II and Phase III surveys to more thoroughly assess burrowing owl usage of the Project site.

4.7.2 CBOC Protocol Phase II: Burrowing Owl Burrow Surveys

Phase II of the CBOC burrowing owl survey protocol consists of pedestrian transect surveys covering all suitable burrowing owl habitat on-site to identify potential burrows, sign, and presence of burrowing owls. All potential owl burrows and burrowing owl sign identified during these walkover surveys are mapped, and used to conduct the next step (Phase III) in the burrowing owl survey protocol.

4.7.2.1 Phase II Methods

Phase II burrow mapping surveys of the Project site and the proposed transmission line route were conducted during spring 2009. Within the Project site, Phase II surveys occurred from April 13–17, 2009. Surveys were conducted by six URS biologists walking parallel transects over the entire Project site, spaced to allow 100 percent visual coverage of the ground surface. Due to differing vegetation densities across the Project site, the distance between pedestrian transects was adjusted as needed to maintain 100 percent visual coverage of the ground surface under all conditions. Transects were spaced approximately 30 meters (approximately 100 feet) on the Project site south of SR-138, because of the dominance of grassland and low-growing annual plants, even terrain, and low shrub density. Transect spacing was reduced to approximately 20 meters (approximately 60 feet) apart in the portion of the Project site north of SR-138 to maintain 100 percent visual coverage in the portion of the site with higher vegetation density. Because of the high density of burrows and burrowing owl activity observed within Drainage A during winter 2008–2009 biological surveys, burrow mapping of Drainage A was conducted separately from the Project site transects. This survey was accomplished by four biologists walking in the bottom of the channel and one biologist on top of either bank of the drainage to identify and map burrow locations.

The Phase II survey of the proposed transmission line was conducted on April 8, 2009 in conjunction with the Phase I survey. The survey effort consisted of two biologists walking approximately 10 meters (approximately 30 feet) apart within the County road ROW (50 feet from the edge of pavement) on the west and east side of 170th Street West from the Project site boundary until approximately 1/8 mile north of Astoria Avenue in Kern County. The distance surveyed on the west side of 170th Street West was approximately 3.63 miles, and the distance surveyed on the east side of 170th Street West was approximately 4.13 miles.

For both the Project site and the proposed transmission line Phase II surveys, the locations of all suitable burrowing owl burrows (natural and artificial), and owls observed were mapped using a Garmin™ GPS Map 60CSx unit. Any artificial or natural burrows larger than 3 inches in diameter were mapped. In addition, observations noted the presence of burrowing owl sign at the locations of the burrows to aid in determining which burrows may potentially be in active use by burrowing owls.

4.7.2.2 Phase II Results

The Phase II surveys identified 59 burrows on the Project site and 52 burrows on the proposed transmission line route over three inches in diameter. Of the burrows identified, only 16 burrows on the Project site had visible burrowing owl sign (i.e., pellets, whitewash, and/or feathers) and were considered to have potential to be occupied by burrowing owls. In addition, the burrow located off-site in Drainage C, where owl sign and an owl were observed during the Phase I habitat assessment, was considered to have potential to be occupied. None of the artificial or natural burrows identified along the proposed transmission line route showed any evidence of use by burrowing owls. The majority of the potentially active burrows identified within the Project site were located in Drainage A, and most were identified during previous surveys. However, five new potential burrows within Drainage A were mapped during Phase II surveys, and four potential burrows were located within other areas of the Project site. Table 4-8 includes observations of burrowing owl individuals and sign from Phase I surveys conducted during winter 2008–2009, observations from spring 2009 Phase II burrow surveys, as well as any additional observations recorded during other 2008–2009 biological surveys. The locations of the potential burrowing owl burrows identified during Phase II surveys are depicted graphically on Figure 4-6.

4.7.3 CBOC Protocol Phase III: Burrowing Owl Surveys, Census, and Mapping

Phase III burrowing owl surveys, census, and mapping are required to describe if, when, and how the site is used by burrowing owls. According to the *Burrowing Owl Survey Protocol and Mitigation Guidelines*, "if the project contains burrows that could be used by burrowing owls, then survey efforts should be directed towards determining owl presence on the site" (CBOC 1993). The protocol requires Phase III surveys during the breeding season (February 1 to August 31, with the peak from April 15 to July 15); winter surveys are required if owls

TABLE 4-8
BURROWING OWL SIGN OBSERVED DURING BIOLOGICAL FIELD INVESTIGATIONS

Burrowing Owl Sign	Identifier on Figure 4-6	Date/Time Initially Observed	Survey Activity in Which Sign Was First Observed	Location	Observation Notes
Burrow	B 1	Jan. 13 2009/ 3:00 p.m.	Wetland Delineation/ Jurisdictional Determination	Drainage C in southeastern corner of Project site (Section 24)	*January 13, 2009*: The burrow (approximately 6 inches in diameter) was located on top of the southeastern bank of the drainage. No whitewash observed, only one old pellet near the burrow entrance. No individual owls observed. PHASE II. *April 17, 2009*: The burrow is overgrown with new vegetation. No owls or new owl sign. PHASE III. *April 21, 2009*: No owls or new owl sign.
Burrow	B 2	Dec. 9, 2008/ 10:15 a.m.	Phase I Burrowing Owl Habitat Assessment	Drainage A – main drainage north of SR-138 (Section 13)	*December 9, 2008*: The western-most burrow in the main drainage was located near the top of the vertical wall of the north bank (south-facing) of the drainage, approximately 7 feet above the channel bottom. Whitewash was observed surrounding the burrow and a small patch of annual vegetation consisting of fiddleneck was growing at the mouth of the burrow entrance. No owl pellets or individual owls were observed. PHASE II. *April 15, 2009*: No owls or new owl sign. PHASE III. *April 22, 2009*: No owls or new owl sign.
Burrow	B 3	Dec. 9, 2008/ 10:30 a.m.	Phase I Burrowing Owl Habitat Assessment	Drainage A – main drainage north of SR-138 (Section 13)	*December 9, 2008*: Burrow located approximately 400 feet east of burrow 2 (B 2) surrounded by whitewash at the base of the north bank of the drainage. No owl pellets or individual owls were observed. PHASE II. *April 15*: No owls or new owl sign. PHASE III. *April 22, 2009*: No owls or new owl sign.
Burrow	B 4	Dec. 9, 2008/ 10:40 a.m.	Phase I Burrowing Owl Habitat Assessment	Drainage A – main drainage north of SR-138 (Section 13)	*December 9, 2008*: Burrow surrounded by whitewash, located on top of the south bank, approximately 100 feet east of burrow 3 (B 3). No owl pellets or individual owls were observed. PHASE II. *April 15*: On bank top above a second burrow entrance. Lots of whitewash was observed. PHASE III. *April 22, 2009*: No owls or new owl sign.

TABLE 4-8 (CONTINUED)
BURROWING OWL SIGN OBSERVED DURING BIOLOGICAL FIELD INVESTIGATIONS

Burrowing Owl Sign	Identifier on Figure 4-6	Date/Time Initially Observed	Survey Activity in Which Sign Was First Observed	Location	Observation Notes
Burrow	B 5	Dec. 9, 2008/ 10:55 a.m.	Phase I Burrowing Owl Habitat Assessment	Drainage A – main drainage north of SR-138 (Section 13)	*December 9, 2008*: Burrow located approximately 0.1 mile east of burrow 4 (B 4) in the vertical portion of the north bank of the drainage, surrounded by whitewash. No owl pellets or individual owls were observed. Owl observations 3 and 4 were recorded in the vicinity of this burrow (see Owl 3 and Owl 4 observation notes). PHASE II. *April 15, 2009*: One old pellet was observed, as well as fresh digging. PHASE III. *April 22, 2009*: No owls or new owl sign.
Burrow	B 6	Jan. 14 2009/ 2:00 p.m.	Wetland Delineation/ Jurisdictional Determination	Drainage A – main drainage north of SR-138 (Section 13)	*January 14, 2009*: The burrow was located midway up the cut bank. Height was 10 inches, width was 7 inches, and the depth was greater than 4 feet. An abundance of whitewash was observed inside the burrow, with a small amount observed outside the burrow. Three pellets were found near the burrow entrance. Owl observations 3 and 4 were recorded in the vicinity of this burrow (see Owl 3 and Owl 4 observation notes). No individual owls observed. PHASE II. *April 15, 2009*: No owls or new owl sign. PHASE III. *April 22*: No owls or new owl sign.
Burrow	B 7	Dec. 9, 2008/ 11:30 a.m.	Phase I Burrowing Owl Habitat Assessment	Drainage A – main drainage north of SR-138 (Section 13)	*December 9, 2008*: The eastern-most owl burrow identified within the main drainage (Drainage A), approximately 0.2 miles east of burrow 6 (B 6). This burrow was located at the base of the north bank of the drainage and was surrounded by whitewash. No owl pellets or individual owls were observed. PHASE II. *April 15, 2009*: Lots of whitewash and one pellet were observed. PHASE III. *April 22, 2009*: Lots of whitewash and two new pellets were observed on the bank top. A burrowing owl (Owl 6) was observed 50 feet east of the burrow on the bank top, during breeding bird surveys on the same day. An owl was also observed here on April 29 and May 7, 2009 (see Section 4.7.3.2 for details).

TABLE 4-8 (CONTINUED)
BURROWING OWL SIGN OBSERVED DURING BIOLOGICAL FIELD INVESTIGATIONS

Burrowing Owl Sign	Identifier on Figure 4-6	Date/Time Initially Observed	Survey Activity in Which Sign Was First Observed	Location	Observation Notes
	B8		Phase II Burrow Search	Approximately 800 feet west of 170th Street West, in the northwestern part of the Project site (Section 11)	PHASE II. *April 13, 2009*: Burrow that probably was also used by a coyote, in a clearing in rabbitbrush scrub. Fifteen inches by 8 inches at entrance. Whitewash and half of an old pellet were observed near the burrow entrance, which was blocked by cobwebs. PHASE III. *April 21, 2009*: No owls or new owl sign. Cobwebs hung across the burrow entrance.
	B9		Phase II Burrow Search	Approximately 900 feet east of 170th Street West, north of Drainage A (Section 13)	PHASE II. *April 15, 2009*: Burrow under shrub. Dimensions are 16 inches by 10 inches. Unclear whether burrow went deep into the ground. This is probably a jackrabbit den, but whitewash and one pellet were observed. PHASE III. *April 21, 2009*: No owls or new owl sign. There may be a hole that continues deeper into the ground, but it is too small for a burrowing owl (less than 3 inches in diameter).
	B10		Phase II Burrow Search	Drainage A – main drainage north of SR-138 (Section 13)	PHASE II. *April 15, 2009*: The burrow was in the south-facing bank, approximately 4 inches up from the bottom of the drainage. It is well-hidden under shrubs. PHASE III. *April 22, 2009*: Minimal whitewash was observed. No owls or new owl sign.
	B11		Phase II Burrow Search	Drainage A – main drainage north of SR-138 (Section 13)	PHASE II. *April 15, 2009*: The burrow was in the vertical, south-facing bank of the drainage, 12 inches from the bank top. Whitewash was observed. PHASE III. *April 22, 2009*: No owls or new owl sign.
	B12		Phase II Burrow Search	Drainage A – main drainage north of SR-138 (Section 13)	PHASE II. *April 15, 2009*: Near the bottom of the north-facing bank, below B4. The burrow is 5 inches by 4 inches. Whitewash and one broken, older pellet were observed. PHASE III. *April 22, 2009*: Whitewash, burrowing owl feather, possible bat skeleton were all observed. *May 6*: No new owl sign or owls observed.

TABLE 4-8 (CONTINUED)
BURROWING OWL SIGN OBSERVED DURING BIOLOGICAL FIELD INVESTIGATIONS

Burrowing Owl Sign	Identifier on Figure 4-6	Date/Time Initially Observed	Survey Activity in Which Sign Was First Observed	Location	Observation Notes
	B13		Phase II Burrow Search	Drainage A – main drainage north of SR-138 (Section 13)	PHASE II. *April 15, 2009*: The burrow was on the top of the vertical, north-facing bank and appears to connect to a burrow at the bottom of the bank. Whitewash was observed at the top of the bank. PHASE III. *April 22, 2009*: No owls or new owl sign.
	B14		Phase II Burrow Search	Drainage A – main drainage north of SR-138 (Section 13)	PHASE II. *April 15, 2009*: Burrow on top of bank of side drainage to Drainage A. A small amount of white wash was observed. PHASE III. *April 22, 2009*: No owls or owl sign observed.
	B15		Phase II Burrow Search	Near the east end of Drainage B, north of SR-138 (Section 13)	PHASE II. *April 15, 2009*: Burrow located in grassy area with *Amsinckia tessellata*. It was 4 inches by 6 inches. Lots of whitewash and at least one pellet were observed. PHASE III. *April 21, 2009*: Old whitewash and two old pellets. No owls or new owl sign.
	B16		Phase II Burrow Search	On the bank of a dry farm retention pond southwest of the ranch house, south of SR-138 (Section 24)	PHASE II. *April 17, 2009*: Multiple burrow entrances under branches on side of berm. Some whitewash and some horned lark feathers are observed. PHASE III. *April 22, 2009*: The small amount of whitewash present may be from a songbird. No owls or obvious owl sign. *May 7, 2009*: No owls or obvious owl sign. As biologists approached the burrow, a cottontail flushed into one of the burrow entrances.

TABLE 4-8 (CONTINUED)
BURROWING OWL SIGN OBSERVED DURING BIOLOGICAL FIELD INVESTIGATIONS

Burrowing Owl Sign	Identifier on Figure 4-6	Date/Time Initially Observed	Survey Activity in Which Sign Was First Observed	Location	Observation Notes
	B17		Phase I Burrowing Owl Habitat Assessment	North-facing bank of Drainage C, approximately 150 feet south of the project's southern boundary (Section 25)	*December 8, 2008*: The burrow was located in the vertical portion of the bank, near the top, approximately 4 feet above the channel bottom and appeared to be in good condition (approximately 12 inches tall). The burrow entrance was free of debris, and whitewash and owl pellets were documented outside the entrance. *January 13, 2009*: Three fresh pellets were found near the entrance of the burrow. *January 28, 2009*: An individual owl was observed at this burrow location (see observation notes for Owl 4). PHASE II. *April 17, 2009:* An owl was flushed from the burrow entrance. No detailed observations were made of the burrow. PHASE III. *April 21, 2009*: An owl was in the entrance of the burrow. One to two adults were seen here on subsequent visits, and six juvenile owls were seen on June 9, 2009 (see Section 4.7.3.2 for details).
Individual	Owl 1	Jan. 14, 2009/ 10:30 a.m.	Wintering Bird Survey	In Section 18, northeastern corner of the Project site	Owl observed on the ground in an opening in rabbitbrush scrub in northwestern quarter of Section 18, approximately 750 feet south of the northern boundary of the site.
Individual	Owl 2	Jan. 21, 2009/ 11:45 a.m.	Drainage Reconnaissance Survey	In Section 18, northeastern corner of the Project site	Owl observed on the ground in an opening in rabbitbrush scrub, in northwestern quarter of Section 18, approximately 750 feet south of the northern boundary of the site.
Individual	Owl 3	Jan 28, 2009/ 10:15 a.m.	Site Visit with CDFG	Drainage A – main drainage north of SR-138 (Section 13)	Owl observed on top of northern bank under rabbitbrush, approximately 100 feet east of B 5 and B 6. In highly incised channel with 5 to 6 foot tall banks. Owl was flushed and flew east over drainage.

TABLE 4-8 (CONTINUED)
BURROWING OWL SIGN OBSERVED DURING BIOLOGICAL FIELD INVESTIGATIONS

Burrowing Owl Sign	Identifier on Figure 4-6	Date/Time Initially Observed	Survey Activity in Which Sign Was First Observed	Location	Observation Notes
Individual	Owl 4	Jan. 28, 2009/ 11:40 a.m.	Vegetation Mapping	North-facing bank of the drainage which skirts the southern boundary of the project site, approximately 150 feet south of the project's southern boundary (Section 25)	Owl observed on the top of bank above burrow (B17) in open California annual grassland habitat, then moved into mouth of burrow within the cut bank of the drainage. *April 17, 2009*: Owl flushed from the burrow entrance (B17) and flew up to 300 feet east of the burrow, within the drainage, remaining off-site the entire time.
Individual	Owl 5	Feb. 4, 2009/ 2:00 p.m.	Wintering Bird Survey	Drainage A – main drainage north of SR-138 (Section 13)	Owl flushed from rabbitbrush scrub habitat on top of bank, above a burrow at the bottom of the bank. No pellets or whitewash were found, and freshly dug dirt was observed at the entrance to the burrow. The location was near B 6.
Individual	Owl 6	April 22, 2009/ 8:32 a.m.	Breeding Bird Survey	Drainage A main drainage north of SR-138 (Section 13)	An owl was observed 50 feet east of the burrow (B 7) on the bank top (Owl 6). A burrowing owl was observed here subsequently, on April 29 and May 7, 2009 (see Section 4.7.3.2 for details).

are not found during the breeding season. Phase III methodology consists of four site visits, in which biologists count and map all burrowing owl sightings, occupied burrows, and burrows with owl sign. Numbers of pairs and juveniles, and behavior such as courtship and copulation, are recorded during Phase III, and the approximate territory boundaries and foraging areas (if known) are mapped.

4.7.3.1 Phase III Methods

During the initial Phase III survey, on April 21–22, 2009, biologists Dave Compton and Chris Julian visited the 16 burrows on the Project site where owl sign (including white wash, pellets, and individual owls) was observed during the Phase II transect surveys to determine whether or not these burrows were occupied by burrowing owls at the time of assessment (Figure 4-6). In addition, the burrow with owl sign located off-site within 150 feet of the southern Project boundary in Drainage C was visited, because of the proximity of this burrow to the Project site and the potential use of the Project site by owls inhabiting this burrow. The biologists examined the areas around these burrows for the presence and freshness of pellets and white wash, the presence of owls near the burrows, and any other signs of recent burrowing owl activity. Based on these features, only one of the 16 burrows within the Project site identified as likely occupied. In addition, the burrow located close to the Project site boundary in Drainage C was also found to be occupied. Although the other 15 burrows within the Project site were judged to be inactive during the initial visit, the majority were visited at least once subsequently before the end of Phase III surveys to ensure that there was no new evidence that the burrows were occupied by owls.

The final three Phase III visits focused on the areas surrounding the two active burrows. During each of the three visits, two biologists were stationed on the site, one in the vicinity of each active burrow. Observation points were chosen with the intention of maximizing the opportunity to view the owls both in the vicinity of the burrow and over a large portion of the Project site. Each observer spent more than an hour and thirty minutes at a single observation point that fit these criteria but was not nearer than 100 meters (approximately 300 feet) from the burrow. However, observers also spent part of the time observing from alternate vantage points to view parts of the Project site not visible from their primary vantage points. During each survey, biologists noted the movements of owls near the active burrows and around the site, breeding-related behaviors, and the numbers of owls, pairs, and juveniles observed. To avoid disturbing the owls, observers did not record locations where owls were observed by GPS. Instead, they used aerial photographs while in the field to plot locations where owls were observed, whether stationary or flying. These observations were later used to construct and digitize polygons showing the extent of owl movements observed. To construct the polygons, all locations were an owl was observed were plotted on an aerial photo. A line was then drawn around the perimeter of these points so that all points were included in the polygon.

All three surveys were conducted over a three hour period in the evening, beginning approximately two hours before sunset and ending approximately one hour after sunset. Since it was dark by the end of the surveys, observers had the option of walking in areas away from the burrows to watch and listen for evidence of owl movements in those areas. Observers used both binoculars (Swarovski EL 10 x 42 and Barska 8 x 30 binoculars) and spotting scopes (a Kowa TSN-1 with 20 x 60 zoom eyepiece and a Kowa TSN661 with a 30x wide-angle eyepiece) during the final three Phase III surveys. Dave Compton and Ronald Cummings conducted the second Phase III survey, on April 30, 2009. Dave Compton and Whitney Wilkinson conducted the final two Phase III surveys, on May 6 and June 9, 2009.

4.7.3.2 Phase III Results

During the initial Phase III survey, on April 21-22, two of the 17 burrows previously designated as having the potential to be active were judged to be occupied by burrowing owls (Figure 4-6). One of these burrows was located on-site in Drainage A, while the other was 150 feet south of the Project site, in the off-site portion of Drainage C. Owls were seen near the entrances of both of these burrows before the Phase III surveys, or during the initial Phase III survey. Near a third burrow, also in Drainage A, an old pellet and whitewash were found during the Phase II surveys. During the initial Phase III survey, on April 23, 2009, a single burrowing owl feather and a possible bat skeleton were observed near this burrow. However, no owl was observed here, and no new pellets or whitewash were found. On May 6, a visit to this burrow again revealed no new owl sign, and it was assumed that this burrow was unoccupied. This burrow was approximately 0.25 miles east of the active burrow in Drainage A. Thus activity around both burrows could be monitored from a single area.

No owls were seen in the vicinity of any of the other burrows previously identified as having owl sign. In addition, no new white wash or pellets were found near these burrows. Burrowing owl sign found in the vicinity of these burrows was determined not to be recent, given the fact that white wash observed was generally faded and any pellets found were desiccated and often crumbling.

The occupied burrow in Drainage A was initially located during the Phase II burrow search on April 15 and visited again on April 22, during the initial Phase III survey. This burrow was approximately one foot above the floor of the drainage, in the vertical portion of the north bank. On April 15, extensive whitewash had been observed on the top of the bank, and a single pellet was found below the entrance. On April 22, during the initial Phase III visit, a burrowing owl was observed perched on a shrub approximately 15 meters (approximately 45 feet) from the burrow, on the top of the bank. Two new pellets were also found on the top of the bank on that date. An individual owl was observed in this same location during subsequent Phase III visits on April 30 and May 6, and was also incidentally observed during the focused botanical survey on May 1. A single burrowing owl was also observed at this

location during a breeding bird survey on May 7. During the final Phase III visit on June 9, 2009, no owls were detected at this location.

On each occasion when an owl was seen at the Drainage A location, it was perched on a shrub atop the bank where the burrow was located. During Phase III visits on April 30 and May 6, the owl remained on a single perch near the burrow for long periods, but also occupied one to two other perches during the survey. During both visits, the owl was observed to take short flights from these perches, sometimes dropping out of sight, below the top of the bank. The owl was never seen more than 100 feet from the burrow. On both April 30 and May 6, the primary song of a burrowing owl was heard well after sunset, but the owl was not seen while it was singing. On April 30, the singing owl was judged to be approximately 160 feet east of the burrow. Figure 4-6 shows the location of the burrow and the area in which the owl was seen or heard, based on these observations.

In Drainage C, approximately 150 feet south of the Project site, a single burrowing owl was first observed in the entrance of a burrow in a low, north-facing vertical bank, on January 28, 2009. This owl was observed on the top of the bank above the burrow in open California annual grassland habitat, then moved into the mouth of the burrow within the cut bank of the drainage. An owl was seen again on top of the bank above this burrow on March 25, 2009, during focused botanical surveys of the Project site. On April 17, during Phase II burrowing owl surveys of the Project site, an owl was flushed from the burrow entrance and was observed flying up to 350 feet east of the burrow. It was not seen flying over the Project site. An owl was observed again during the initial Phase III visit to this location, on April 21. During the second Phase III visit, on April 30, two burrowing owls were observed repeatedly entering and leaving the burrow, beginning at approximately 25 minutes before sunset and continuing until approximately 30 minutes after sunset. Two owls were again seen entering and leaving the burrow repeatedly after sunset on May 6, during the third Phase III visit. However, because the owls flew primarily below the top of the drainage bank, their movements could not be tracked far from the burrow; no owl was seen more than about 60 feet north of the bank top, and no owl was seen on the Project site. During the final Phase III visit to this location, on June 9, two owls were again observed in and around the burrow entrance. In addition, six fledgling owls were observed near the burrow entrance. None of the owls were observed more than 160 feet meters (approximately 480 feet) from the burrow. While one owl was observed flying to the north side of the drainage, no owl was observed on the Project site.

A pair was clearly observed on three occasions at the burrow adjacent to the Project site in Drainage C. Both owls made frequent trips outside the burrow, suggesting they were hunting to feed young in the nest. Owls standing near the entrance of the burrow were observed retreating into the burrow when common ravens flew overhead. On June 9, one owl was observed dropping down from a perch on a shrub to capture prey, which it then carried to the burrow. This pair hatched at least six young, as indicated by the presence of six mobile but

unfledged young on this date. Figure 4-6 shows the location of the burrow and the area in which the owls were observed.

Only one burrowing owl (the individual observed in Drainage A) was confirmed to be present on the Project site during the breeding season, and the final Phase III survey (on June 9, 2009) recorded no evidence that this owl was still present. One pair and six fledglings were confirmed at a burrow just south of the site in Drainage C, although none of these owls were observed within the Project site during any of the surveys. However, given the wide-ranging habits of this species, which may range more than two miles from its nest, and the proximity of the burrow to Project site, it is likely these owls foraged on the site. Despite a thorough search for burrows on the site a week prior to the initiation of the Phase III surveys, and despite multiple checks of potentially occupied burrows during the period when Phase III was conducted, no evidence was found that other owls were present on or near the Project site. Also, no evidence was found that owls nested colonially on-site.

In general, the home ranges of owls detected on the Project site were difficult to define during the Phase III burrowing owl surveys. Topography, habitat, and the owls' propensity for moving about in the drainages, presumably to avoid detection, made following owl movements difficult. Around Drainage A, there was no high point that provided a good vantage point for viewing the burrow entrance. Several vantage points provided views of a large part of the Project site, but owls could move about unseen by flying low in the drainage. In Drainage C, observers were able to follow the movements of owls in and out of the burrow from the hillside north of the burrow. However, this location did not provide expansive views of the Project site, and it did not allow the observer to see the owls as they traveled below the rim of the drainage. The polygons mapped in the field and displayed on Figure 4-6 therefore under-represent the actual foraging ranges of the owls on-site.

4.8 BUTTERFLY LITERATURE REVIEW

As stated previously, the SEATAC requested that a butterfly inventory of the Project site be performed in addition to the survey efforts originally proposed by URS in the BCA for the Project. Due to the late season during which this request was received, the scheduling needs of the Project, and the relatively low precipitation in 2008–2009, butterflies potentially occurring within the Project site were identified based on a literature review rather than through field investigations.

4.8.1 Butterfly Literature Review Methods

The intended purpose of the butterfly literature review was to disclose and evaluate biological conditions within the Project site to determine the potential for occurrence of special-status butterflies or other invertebrate species. Available information was reviewed from resource management plans and other relevant documents to determine the locations

and types of invertebrate species that have the potential to exist within and adjacent to the study area. Primary information reviewed included the following:

- A query of the CNDDB for special-status invertebrates in the Project vicinity
- Emmel, TC. and JF. Emmel. 1973. *The Butterflies of Southern California*. The Natural History Museum of Los Angeles County, Science Series 2
- Hogue CL. 1993. Insects of the Los Angeles Basin. Natural History Museum of Los Angeles, Los Angeles, California
- Scott JA. 1986. The Butterflies of North America. Stanford University Press, Stanford, California
- Heath F. 2004. Southern California Butterflies. Mountain Press Publishing Company, Missoula, Montana
- Bruyea, 2003. Butterfly Survey Update for Antelope Valley Raceway Projects, Los Angeles County, California. Bruyea Biological Consulting
- California Gap Analysis. 1998. Land-cover for California Geospatial Data Presentation Form: map
- The vegetation map and plant list compiled from field investigations of the Project site (see sections 4.2 and 4.4 of this Biota Report, and also Appendix I)

The CNDDB query referenced above was limited to the Fairmont Butte USGS 7.5-minute topographic quadrangle map. A list of butterfly species with potential for occurrence in the Project vicinity was created, and the list was augmented and refined through review of the materials listed above and discussions with specialists (personal communication with B. Helm, 2009). For each potentially occurring butterfly species identified, the probability of occurrence on-site was characterized as either absent, low, moderate, or high. These designations were based on the Project site's potential to support the species, based on comparisons of on-site habitat and nectar resources with reported occupied habitats in the region, and are defined as follows:

- **Absent:** Species distribution is restricted by substantive habitat requirements, such as a specific geographic/elevation range or nectar resource, and one or more required habitat elements is not present within the Project site or along the proposed transmission line route. Consequently, no Project-related effects to the species would be expected to occur from Project implementation.
- **Low:** Species distribution is restricted by substantive habitat requirements, such as a specific geographic/elevation range or nectar resource, and one or more habitat requirements is only marginally satisfied by the Project site. Consequently, no Project-related effects to the species would be expected to occur from Project implementation.

- **Moderate:** Species distribution is somewhat restricted by substantive habitat requirements, and it is possible that habitats within the Project site and along the proposed transmission line route contain appropriate characteristics to support the species. Therefore, an assessment of Project-related effects to this species is warranted prior to Project implementation.
- **High:** The Project site and proposed transmission line route are located within the appropriate geographic and elevation range for the species, and suitable nectar resources are known to occur on-site. Therefore, an assessment of Project-related effects to the species is warranted prior to Project implementation.

The probability for occurrence of special-status butterflies was utilized to determine the need for any subsequent surveys for invertebrates within the study area and to assess the potential need to determine Project-related effects to special-status invertebrate species. For a more detailed description of the methods employed during the literature review, please refer to Appendix L.

4.8.2 Butterfly Literature Review Results

Based on the list of plants observed within the Project site and along the proposed transmission line route (see Appendix L), the site likely supports some flowering plants that could functionally serve as nectar resources for butterflies and other wildlife in the region as well. Known nectar resources identified within the Project site and/or along the proposed transmission line route included, but were not limited to fiddleneck (*Amsinckia tesselata*), forget-me-not (*Cryptantha* sp.), lupine (*Lupinus bicolor*), and Camissonia (*Camissonia* sp.).

The literature review indicated that approximately 135 recorded butterfly species occur in Los Angeles County, of which roughly 120 are considered resident species. Several butterfly species found in the County have been afforded special recognition by federal, state or local resources agencies (e.g., USFWS and CDFG) and/or other resource conservation organizations. The literature review identified 13 special-status butterfly species with the potential to occur within the region. However, the potential for these species to occur within the Project site was determined to be "absent," as defined above, due to habitat limitations within the site. Therefore, no special-status butterflies are anticipated to occur within the Project site or along the proposed transmission line route.

For a list of common and special-status butterfly species and their potential to occur within the Project site, refer to the Biological Technical Report in Appendix L.

4.9 GENERAL WILDLIFE SURVEYS

General wildlife surveys were incorporated into all surveys conducted within the Project site and along the proposed transmission line route. Given the amount of ground covered during

winter 2008–2009 and spring 2009 biological surveys, in particular the full-coverage floristic and burrowing owl transect surveys, the extent of general wildlife surveys was relatively robust. General wildlife surveys included recording all field observations of wildlife species and an assessment of habitat suitability for special-status wildlife species for which there are no formal survey protocols, such as the Blainville's horned lizard (*Phrynosoma* [=*Anota*] *blainvillii* [=*coronatum*]; CSC) and the American badger (*Taxidea taxus*, CSC).

4.9.1 General Wildlife Survey Methods

General wildlife surveys took place concurrently with all biological surveys conducted on the Project site and proposed transmission line route. All wildlife species observed were visually identified; however, some bird species were identified by auditory recognition. The presence of wildlife was also noted through the observation of scat, tracks, diggings, trails, and burrows. All wildlife observed or detected were documented and compiled into a wildlife species list. In addition, the relative abundance of wildlife species observed on the Project site and proposed transmission line route was estimated based on species counts during bird surveys, and the general amount of wildlife species and sign observed (tracks, scat, burrows, and diggings). Relative abundance estimate categories for observed wildlife include scarce, uncommon, common, and abundant. With the exception of birds, no quantitative data were gathered by URS field biologists on common wildlife species observed during general wildlife surveys to determine population sizes present on-site.

4.9.2 General Wildlife Survey Results

A total of 80 wildlife species were observed on the Project site and along the proposed transmission line route, including 4 invertebrates, 8 reptiles, 61 birds, and 7 mammal species. A list of all wildlife observed on the Project site and proposed transmission line route during field surveys and their relative estimated abundance (i.e., rare, uncommon, common, and abundant) is provided in Appendix J. Bird species were the most common wildlife observed on the Project site and proposed transmission line route. Specific reptile surveys were not conducted, although 4 different common species of lizards and 3 common species of snakes were observed during field visits. In addition, one special-status reptile species the Blainville's horned lizard (CSC) was observed within Drainage C in the southeastern corner of the Project site. Specific mammal and invertebrate surveys were also not conducted, however several common mammal and invertebrate species were observed during field visits. No federally- or state-listed threatened or endangered species were observed during general wildlife surveys of the Project site and proposed transmission line route. The wildlife species observed within the Project site and along the transmission line route are described below.

4.9.2.1 <u>Invertebrates</u>

Invertebrates observed during general wildlife surveys included harvester ant (*Pogonomyrmex barbatus*), velvet ant (*Dasymutilla occidentalis*), grasshoppers (family

Acrididae), and bombardier beetles (family *Carabidae*). Harvester ant hills, both active and inactive, were observed scattered throughout the Project site and proposed transmission line route.

4.9.2.2 Fishes

There is no permanent or seasonal standing or flowing water on the Project site or proposed transmission line route. All hydrologic channels are intermittent or ephemeral (containing water only during and shortly after precipitation events). Therefore, no fish species occur on the Project site or along the proposed transmission line route.

4.9.2.3 Amphibians

For the reasons stated in Section 4.9.2.2 above, and because the soils in the Project vicinity are sandy, well-drained, and do not hold moisture for long periods, no amphibian species were observed or are expected to occur on the Project site or along the proposed transmission line route. No suitable breeding habitat was noted for desert-adapted species such as the western spadefoot toad (*Spea hammondii*) and the red-spotted toad (*Bufo punctatus*).

4.9.2.4 Reptiles

Seven common species of reptiles, including four lizard species and three snake species, were observed during field surveys. In addition, one special-status reptile species, the Blainville's horned lizard (CSC) was observed on the Project site. The majority of reptile species were not observed on the Project site or proposed transmission line route until spring 2009 surveys. Common lizard species observed included the desert horned lizard, Great Basin whiptail, side-blotched lizard, and long-nosed leopard lizard. Common snake species observed included the Mojave rattlesnake, gopher snake, and coachwhip. Additional common reptile species expected to occur, but not observed on the Project site or proposed transmission line route include the yellow-backed desert spiny lizard (*Sceloporus magister uniformis*), Great Basin collared lizard (*Crotaphytus bicinctores*), and California kingsnake (*Lampropeltis getula*).

For special status reptile species, the Project site is within the range of the California legless lizard (*Anniella pulchra)*, a California Species of Special Concern (CSC), but the site lacks suitable habitat (moist soil with leaf litter). Although the Project site and proposed transmission line route are within the historic range of the desert tortoise, current distribution data and range maps indicate that the Project site is outside the known range for this species (Bransfiled 2009; CNDDB 2009). The potential for occurrence of these special status reptile species is further discussed in Section 4.11 of this Biota Report.

4.9.2.5 Birds

On the Project site and proposed transmission line route, 61 bird species were observed during field surveys. Of these, 48 were observed on the Project site. The most common species found on the site during these surveys was the horned lark. Several thousand horned larks were observed foraging in the grasslands within the Project site in January and February 2009, and smaller but still significant numbers remained from February to June. The mountain bluebird, sage sparrow, savannah sparrow, and white-crowned sparrow were also common in winter. The mourning dove, common raven, sage sparrow, and house finch were common during all seasons. House sparrows were common near the ranch house. The site was lacking in migratory species that were only present during the breeding season. However, European starling numbers were higher in spring, when they nested and foraged near the ranch house. Species that were common in spring migration were the American pipit and Brewer's sparrow. A variety of other species were found in migration, including the whimbrel, two large flocks of which were seen during field surveys. Eighteen special-status species were found on the Project site and proposed transmission line route. Of these, 11 were present during the season for which they are assigned special status. These were the burrowing owl, greater roadrunner, lark sparrow, Lawrence's goldfinch, loggerhead shrike, long-eared owl, merlin, mountain bluebird, prairie falcon, vesper sparrow, and western meadowlark. All but Lawrence's goldfinch were detected within the Project site. Besides Lawrence's goldfinch, the lark sparrow, loggerhead shrike, and western meadowlark were also recorded along the proposed transmission line route. All bird species observed are listed in Appendix J.

4.9.2.6 Mammals

Common mammal species observed or detected via sign (tracks, scat, burrows) on the Project site include Botta's pocket gopher (*Thomomys bottae*) (mounds), white-tailed antelope squirrel (*Ammospermophilius leucurus*) (numerous burrows and individual sightings), two California ground squirrels (*Spermophylis beecheyi*) (observed on the proposed transmission line route only), abundant sightings of black-tailed jackrabbits (*Lepus californicus*), several desert cottontails, several coyotes (*Canis latrans*) (including two dens with young, and abundant tracks and scat), and an unidentified rodent (assumed kangaroo rat based on hind feet and tail drag tracks).

Other common mammals that have the potential to occur on the Project site and proposed transmission line route but were not observed include the desert kit fox (*Vulpes macrotis* ssp. *arsipus*), Merriam's kangaroo rat (*Dipodomys merriami*), southern grasshopper mouse (*Onychomys torridus*), and desert woodrat (*Neotoma lepida*). No native large mammal species are known to use the Project site, and no tracks or pellets of either mule deer or American antelope were noted during field surveys. The recent presence of domestic sheep (*Ovis aries*) on the Project site was confirmed by observations of scat and several sheep

remains found just off the site, the majority of which were carcasses discarded within Drainage D.

No special-status mammal species were observed within the Project site or proposed transmission line route. The American badger (*Taxidea taxus*, CSC) may potentially occur, although habitat suitability for this species has diminished due to previous agricultural activities conducted on the Project site and current agricultural activities on the proposed transmission line route; therefore, the likelihood of American badger occurrence would be expected to be low. Previous agricultural activity conducted on the Project site and surrounding vicinity has also rendered the habitat unsuitable for the Mojave ground squirrel (*Spermophilus mohavensis*), a state threatened species. The most current information states that this species no longer occurs west of SR-14 in the Lancaster and Palmdale areas (Laabs 2004). The potential for occurrence of the American badger and Mojave ground squirrel is further discussed in Section 4.11 of this Biota Report.

While no bat species surveys were performed on the site, several bat species have ranges which include the vicinity of the Project site and proposed transmission line route, and are known to make use of desert type habitats. These include the pallid bat (*Antrozous pallidus*, CSC), Townsend's big-eared bat (*Corynorhinus townsendii*, CSC), big brown bat (*Eptesicus fuscus*), California myotis (*Myotis californicus*), canyon bat (*Parastrellus Hesperus*), and Mexican free-tailed bat (*Tadarida brasiliensis*). The majority of the Project site and proposed transmission line route may provide foraging habitat for these species. The single residence structure and associated outbuildings and landscape trees on the Project site may provide a small amount of roosting habitat for bats. The potential for occurrence of the pallid bat and Townsend's big-eared bat is discussed further in Section 4.11 of this Biota Report.

4.10 SPECIAL-STATUS SPECIES AND SENSITIVE NATURAL COMMUNITIES OBSERVED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

The biological field investigations described in sections 4.1 through 4.9 of this Biota Report characterized the vegetation and wildlife communities present within the Project site and along the proposed transmission line route, and included inventories of the plants, wildlife, and natural communities detected. The surveys identified a total of 19 special-status species and three sensitive natural communities, discussed below.

4.10.1 Special-status Species Detected

The biological field investigations described in sections 4.1 through 4.9 of this Biota Report detected a total of 16 special-status wildlife species on the Project site, and an additional three species along the proposed transmission line route (see Table 4-9). The surveys did not detect the presence of any special-status plants. Special-status wildlife species detected included one reptile and 18 bird species. Of the 18 special-status birds, six were detected

TABLE 4-9
SPECIAL-STATUS SPECIES OBSERVED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Common Name	Scientific Name	Regulatory Status	Nesting/ Breeding Period	Habitat Requirements	Site Suitability/Survey Results
Reptiles and Amphibians					
Coast horned lizard	*Phrynosoma blainvillii*	CSC	May – June (variable)	Habitats include scrubland, grassland, coniferous forests, and broadleaf woodland. Species requires open areas for sunning, bushes for cover, patches of loose soil for burial, and an abundant supply of native ants and other insects.	Annual grassland and sandy washes are present in Project area. One individual was observed on sandy substrate within Drainage C in the southeastern corner of the Project site. CNDDB documented sighting 2 miles south in habitat similar to Project area.
Birds					
Brewer's sparrow	*Spizella breweri*	SA (nesting)	May – August	Treeless shrub habitats, especially in sagebrush (*Artemisia tridentata*), with canopy cover usually less than five feet high. Nests are typically placed in sagebrush or other shrubs, rarely on the ground.	Not known to nest in the lower-lying areas of the valley. Present on the Project site in small numbers during winter surveys, and in larger numbers in April; absent after early May. Winter or migrant, no t-line.
Burrowing owl	*Athene cunicularia*	CSC (breeding)	March – August (peak April – May)	Open, dry grasslands, brushlands, and deserts. Needs burrows (such as dug by ground squirrels) and friable soils. Prefers low perches such as fence posts.	Seen in winter in Drainages A and C and in the northeastern part of the site. Nesting was confirmed off-site in Drainage C and likely occurred on-site in Drainage A, where 11 burrows with owl sign were found. Suitable foraging habitat throughout the Project site and the proposed transmission line route, but no burrows with owl sign were found in the latter.
Chipping sparrow	*Spizella passerina*	SA (nesting)	May – August	Open woodlands with sparse or low herbaceous cover and a low density of shrubs. Nests in conifers, but also in deciduous trees and shrubs.	No suitable woodland habitat on-site or along proposed transmission line route. One was detected during breeding bird surveys of the proposed transmission line route was judged to be a migrant.

TABLE 4-9 (CONTINUED)
SPECIAL-STATUS SPECIES OBSERVED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Common Name	Scientific Name	Regulatory Status	Nesting/ Breeding Period	Habitat Requirements	Site Suitability/Survey Results
Greater roadrunner	*Geococcyx californianus*	SBS	Late February – August	Nests in isolated thickets of small trees and shrubs in steep foothill canyons, desert woodland, and coastal sage scrub.	No suitable nesting habitat on the site, although suitable foraging habitat exists north of SR-138. May nest in Joshua tree woodland near the site and along the proposed transmission line route. One was at the northern boundary of the site in winter.
Lark sparrow	*Chondestes grammacus*	SA (nesting)	March – July	Sparse woodlands, open brushy habitats, and grasslands with scattered trees and shrubs. Nests usually built on ground in herbage shaded by a tussock or small shrub.	Suitable nesting habitat occurs near the best perching opportunities, such as Joshua trees or other isolated trees. Spring sightings were in these areas in 2009. Likely nests in small numbers on-site.
Lawrence's goldfinch	*Carduelis lawrencei*	SA (nesting)	Late March – July	Breeds in valley foothill woodland, desert riparian, palm oasis, pinyon-juniper, and lower montane habitats. Nests in oaks and a variety of other trees. Most often nests near water in open, arid woodland.	No nesting habitat on-site, but potentially some suitable habitat present along the proposed transmission line route. Several individuals observed in spring were in this area.
Loggerhead shrike	*Lanius ludovicianus*	CSC (nesting)	March – August	Requires tall shrubs or trees for perching and nest placement; open grassy or brushy areas for hunting; and impaling sites, including thorny plants and barbed wired fences, for manipulating and storing prey.	Nested at several locations on-site in 2009. Nesting also likely occurs in Joshua tree woodland just north of the Project site and in the transmission line route. Nested in the transmission line route in 2009, and habitat is present along much of the route.
Long-eared owl	*Asio otus*	CSC (nesting)	February – June	Usually hunts in open areas, occasionally in woodland and forested habitats. Requires riparian or other thickets with relatively small, densely canopied trees for roosting and nesting.	Abundant suitable open areas for hunting on-site, where some trees are probably suitable for nesting; however, no owls were found there in 2009. A wing feather found on-site indicates foraging and probable nesting nearby. Potential to nest near the transmission line route, near Gaskell Road.

TABLE 4-9 (CONTINUED)
SPECIAL-STATUS SPECIES OBSERVED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Common Name	Scientific Name	Regulatory Status	Nesting/ Breeding Period	Habitat Requirements	Site Suitability/Survey Results
Merlin	*Falco columbarius*	WL (wintering)	Wintering only in California	Present in a variety of habitats, including grasslands, agriculture, open brushlands, and open forest. Requires dense stands of trees for roosting and feeds primarily on small birds.	Suitable foraging habitat on the Project site and proposed transmission line route. Potentially suitable roost sites on-site near the ranch house and near the proposed transmission line route. Individuals were observed twice in the winter 2008–2009.
Mountain bluebird	*Sialia currucoides*	SBS (wintering)	Mainly wintering in Los Angeles County	Prefers relatively flat grasslands with few trees, as well as irrigated pastures.	Suitable wintering habitat over most of the Project site, mostly in California annual grassland and wildflower fields. Individuals or flocks were seen on several occasions in the winter of 2008–2009. Portions of the proposed transmission line route are suitable.
Northern harrier	*Circus cyaneus*	CSC (nesting)	March – August	Found mostly in flat, or hummocky, open areas that contain tall, dense grasses, moist or dry shrubs, and edges. Uses tall grasses and forbs in wetlands, or at wetland/field borders, for cover. Roosts on the ground.	The site lacks the necessary dense ground cover for roosting or nesting. Suitable winter foraging habitat present on the Project site and the proposed transmission line route. Regularly observed from December 2008 to April 2009.
Prairie falcon	*Falco mexicanus*	WL (nesting)	March – July	Inhabits dry, open terrain, either level or hilly, and requires breeding sites located on cliffs. May travel more than 20 km from nest.	Suitable foraging habitat on-site and in the southern portions of the proposed transmission line route. No nesting habitat on-site, but nesting may be possible in the Fairmont Butte area or the Sierra Pelona. Individuals were seen on January 14 and April 17, 2009.
Tricolored blackbird	*Agelaius tricolor*	CSC (nesting)	April – July (breeds in colonies)	Breeds near fresh water, often in emergent vegetation, but also in thickets of willow, blackberry, wild rose, and tall herbs. Feeds in grasslands, agricultural lands, flooded fields, and pond edges. May travel more than six miles to forage.	No suitable nesting habitat on-site or in the proposed transmission line route. Several known nesting sites within seven miles of the Project site. Single observations on-site and along the proposed transmission line route during breeding bird surveys may have involved birds nesting in the general vicinity of the Project site.

TABLE 4-9 (CONTINUED)
SPECIAL-STATUS SPECIES OBSERVED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Common Name	Scientific Name	Regulatory Status	Nesting/ Breeding Period	Habitat Requirements	Site Suitability/Survey Results
Vaux's swift	*Chaetura vauxi*	CSC (nesting)	May – mid-August	Redwood and Douglas fir habitats with nesting sites in large hollow trees and snags, especially tall, burned-out stubs. Feeds on flying arthropods.	No suitable nesting or foraging habitat on-site or in the proposed transmission line route. Two flying above the site, May 8, 2009, were migrants.
Vesper sparrow	*Pooecetes gramineus*	SBS (wintering); CSC (Oregon vesper sparrow only)	Wintering only in region	Occupies grasslands, agricultural lands, and open brushlands in winter. Uses scattered shrubs and patches of tall herbs for cover.	Suitable foraging habitat on the Project site for both the Oregon vesper sparrow (*P. g. affinis*) and the Great Basin vesper sparrow (*P. g. confinis*). Species observed from December 2008 to mid-April 2009.
Western meadowlark	*Sturnella neglecta*	SBS	March – July	Prefers grasslands, agricultural lands, and other open habitats. Nests on the ground in small depressions in fairly dense vegetation.	At least marginally suitable for breeding over much of the site and the proposed transmission line route. Seen widely on the Project site from December 2008 to June 2009, as well as in the proposed transmission line route from April to June 2009.
Yellow warbler	*Dendroica petechia*	CSC (nesting)	April – early July	Primarily found in deciduous riparian woodlands. Places nest in the upright fork of a shrub, sapling, or tree and feeds on insects and spiders.	No suitable riparian or other woodland habitat on-site or in the proposed transmission line route. An individual at a residence in the transmission line route was a migrant.
Yellow-breasted chat	*Icteria virens*	CSC (nesting)	May – early August	Riparian thickets of willow and other brushy tangles near watercourses. Normally places nest in dense shrubs near streams or rivers. Feeds mainly on small insects and spiders.	Project site and proposed transmission line route lack suitable riparian thickets. Individual at a residence in the proposed transmission line route was a migrant.

Status Definitions:
CSC = California Species of Special Concern
WL = CDFG Watch List Species
SA = Special Animal
SBS = Los Angeles County Sensitive Bird Species

during a season other than which they are assigned special status, or were judged to be migrants. The special-status species identified within the Project site and along the proposed transmission line route are described below.

4.10.1.1 Reptiles and Amphibians

One sensitive reptile species was observed within the Project site, and is described below.

4.10.1.1.1 Blainville's Horned Lizard (*Phrynosoma Blainvillii*, CSC). The coast horned lizard ranges throughout the southern South Coast Peninsular and Transverse Ranges, the foothills of the Sierra Nevada and the Tehachapi Mountains. However, the California Wildlife Habitat Relationship system (CWHR) range map indicates that this species does not range out onto the floor of the Antelope Valley (Zeiner, et al. 1988–1990, revised 1997, accessed online). The species occupies a variety of open habitats including coastal scrub, oak savanna, coniferous woodland, and grasslands. It is most commonly found in lowlands, along sandy washes with scattered low bushes and along dirt roads, and frequently found near ant hills. The species requires open areas for sunning, bushes for cover, patches of loose soil for burial, and an abundant supply of native ants and other insects for forage. Agricultural practices, such as plowing, and the introduction of non-native Argentine ants (*ridomyrmex humilis*) are very harmful to this species (BLM 1999).

One Blainville's horned lizard was observed on the Project site on March 24, 2009. This individual was found on sandy substrate within Drainage C located in the southeastern corner of the Project site within the wildflower field habitat. The location of this sighting is the portion of the Project site closest to the Fairmont Buttes area. A sighting was recorded in CNDDB (unknown date) approximately 2 miles south of the Project site in habitat similar to that found on the site. Considering the species known range and the past agricultural use of the Project site, the observation is most likely an individual dispersing from suitable habitat to the south of the Project site. The species may be colonizing portions of the Project site nearest the foothills as it recovers from the past chronic disturbances related to dry farming. Given these considerations, it is presumed that the coast horned lizard would be very uncommon throughout the Project site, particularly north of SR-138.

4.10.1.2 Birds

Eighteen sensitive bird species were detected within the Project site and/or along the proposed transmission line route, and are described below.

4.10.1.2.1 Brewer's Sparrow (*Spizella Breweri*, SA When Nesting). This species breeds east of the Cascade-Sierra Nevada crest, in mountains and higher valleys of the Mojave Desert, and in those bounding the southern end of the San Joaquin Valley. It winters from central Mexico north to southern New Mexico and Arizona and the southeastern California deserts, including the Antelope Valley. Peak northward passage in the Project region is from

mid-April to early May; southward passage occurs principally from late August to October (Heindel 2000; Garrett and Dunn 1981). This species is not currently known to breed in the low-lying portions of the western Antelope Valley, with breeding confined to the southern slopes of the mountain ranges bordering the valley (K. Garrett, personal communication). Also, it was not found in the area surrounding the project site during the Los Angeles County Breeding Bird Atlas surveys in 1995–1999 (LACBBA unpublished data). Brewer's sparrows prefer treeless shrub habitats, especially in sagebrush (*Artemisia* spp.), with canopy cover usually of less than five feet high. They typically place their nests in sagebrush or other shrubs, rarely on the ground. They feed on small insects gleaned from the foliage and bark of shrubs, as well as on seeds taken from the ground (Rotenberry et al. 1999).

Brewer's sparrows were recorded in small numbers on the Project site in rabbitbrush scrub habitat during winter biological surveys, but not during the wintering bird surveys. Four were encountered near the northern boundary of the site on January 13, 2009. A total of five Brewer's sparrows were detected during breeding season point counts on April 22–23, 2009, at stations B14, B15, and B16. Only two were detected during point counts on May 7–8, both at station B16. None were detected subsequently. Brewer's sparrows were detected singing during other biological surveys in April, including large numbers in areas north of SR-138 on April 13–16, 2009. No Brewer's sparrows were detected in the proposed transmission line route during biological surveys. This species' decline in numbers on the Project site in spring, and its eventual disappearance from the site, show a pattern consistent with the presence of lingering wintering birds and migrants in April and early May.

4.10.1.2.2 Burrowing Owl (*Athene Cunicularia*, CSC). This species is a year-round resident in the Central Valley, San Francisco Bay region, Carrizo Plain, Imperial Valley, and scattered areas in the southern deserts of California (Miller et al. 2003). Outside the state, the species breeds in northern Mexico, throughout the Great Basin and the U.S. Southwest, in much of the Rocky Mountain region, and in the Great Plains north to southern Canada. Numbers in California are likely augmented by birds from elsewhere in western North America in winter (Gervais et al. 2008). Migrants enter California from the north in September and October and generally leave the state in March and April (Haug et al. 1993). Burrowing owls prefer open, dry, annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. They usually nest in the old burrow of a ground squirrel, badger, or other small mammal, although they may dig their own burrow in soft soil. In the nesting season, they frequently forage hundreds of yards from their burrow, and some have been recorded foraging nearly two miles from their nests (Gervais et al. 2003; Rosenberg and Haley 2004). This species may also nest in loose colonies. Prey consists mostly of insects, small mammals, reptiles, birds, and carrion.

During the wintering bird surveys, one burrowing owl was recorded, at point count station W12, in the northeastern corner of the site, on January 14, 2009. Three additional observations of burrowing owls were recorded during other biological surveys in December

2008–February 2009. During the breeding bird surveys, a single burrowing owl was observed near a burrow entrance at point count station B6 on April 22 and May 7, but was not seen during the breeding bird survey on June 9. This individual was also observed at length during Phase III protocol burrowing surveys (CBOC 1993) on April 21, April 30, and May 6, but not on June 9. It is unclear whether this bird was paired. During other biological surveys, a single burrowing owl was first observed at a burrow 150 feet south of the Project site, in Drainage C, on January 18, 2009. It was seen again during the initial Phase III protocol burrowing owl survey, on April 21. A pair of burrowing owls was observed repeatedly leaving and entering the burrow at this location during Phase III protocol burrowing owl surveys on April 30, May 6, and June 9, 2009. On the latter date, six juvenile owls were seen near the burrow as well. However, none of the owls observed in Drainage C were observed on the Project site itself.

In addition to the owl sightings, seven burrows with owl sign (pellets and whitewash) were found on the Project site during Phase I burrowing owl habitat assessment, six within Drainage A and one within Drainage C. An additional 10 burrows with owl sign were found during the Phase II burrow search, but only the two burrows mentioned in the previous paragraph (one in Drainage A and one just south of the Project site, Drainage C) appeared to be active. Therefore, the Project site is not the site of a burrowing owl nesting colony, but provides nesting and foraging habitat for up to two pairs. Further details on the occurrence of this species within the Project site are presented in Section 4.7 of this Biota Report. No burrowing owls or burrows with owl sign were detected in the proposed transmission line route.

4.10.1.2.3 Chipping Sparrow (*Spizella Passerina*, SA When Nesting). The chipping sparrow is a common migrant and summer visitor throughout most of California, excluding the Central Valley, the southern deserts, and parts of the southern and central coast. It does not breed in the Mojave Desert (Grinnell and Miller 1944; Garrett and Dunn 1981). The species winters in Mexico and Central America and across North America in the southern tier of states, where its breeding range overlaps with its wintering range; it breeds northward through the subarctic. Most migrants pass through southern California in April and May and from late July through September (Heindel 2000; Middleton 1998). Chipping sparrows nest in conifers, but also in deciduous trees and shrubs, and frequent open woodlands with sparse or low herbaceous cover and a low density of shrubs. They feed on seeds of grasses and annuals and supplement their diet with insects and other invertebrates during the breeding season (Middleton 1998).

One chipping sparrow was observed near a residence along the proposed transmission line route, on the west side of 170th Street West, on May 8, 2009, during the migratory period for this species. The Project site and surrounding area are considered to be outside the geographic breeding range for this species, and the Project site lacks the woodland habitat required for nesting.

4.10.1.2.4 Greater Roadrunner (*Geococcyx Californianus*, SBS). This species is a year-round resident in the California deserts, the Central Valley and adjacent foothills, and the southern and central coasts, except for heavily urbanized areas. It lives in "steep foothill canyons, desert woodland, and coastal sage scrub" in Los Angeles County (Los Angeles County Sensitive Bird Species Working Group [LACSBSWG] 2009). It is found most readily in the county in the Antelope Valley, at the base of the San Gabriel Mountains, and in the Puente Hills. It nests in isolated thickets of small trees and shrubs. Nests are approximately one foot in diameter and are usually placed three to ten feet above the ground, although one case has been documented in which the species placed its nest on the ground (Hughes 1996). One greater roadrunner was observed at the northern boundary of the Project site on December 8, 2008, near Joshua tree woodland. This species may nest in the Joshua tree woodland near the Project site and use the Project site for foraging, but the shrubs on-site are smaller than those typically used for nesting by greater roadrunner. No roadrunners were detected in the proposed transmission line route.

4.10.1.2.5 Lark Sparrow (*Chondestes Grammacus*, SA When Nesting). The lark sparrow is a resident species in lowlands and foothills throughout coastal California except for the extreme north and portions of the central coast, and is also year-round in the Central Valley, the Sierra foothills, the Imperial Valley, the Blythe area, and the Antelope Valley. It breeds in northeastern California and the Owens Valley, but is absent there in the winter; it also winters in the Colorado River Valley but is absent in most of that region in summer. Outside California, it breeds in British Columbia and the southern Prairie Provinces south to north-central Mexico and winters from the extreme southern United States south through much of Mexico (Martin and Parrish 2000). Most spring migrants pass through southern California by late May; most fall migrants pass through from late July to late September (Garrett and Dunn 1981). Lark sparrows occupy sparse valley foothill hardwood, valley foothill hardwood-conifer, open mixed chaparral and similar brushy habitats, and grasslands with scattered trees or shrubs. Shrub habitats favored by lark sparrows are generally two to six feet high. Lark sparrows prefer habitats where trees or shrubs provide lookouts and song perches. They feed mostly on seeds and grains in winter, but also feed their young on insects, especially grasshoppers. They nest on the ground and low in shrubs and trees.

No lark sparrows were detected during the wintering bird surveys. However, two singing individuals were found in the pistachio orchard south of the ranch house on February 3, 2009. The only lark sparrow detected during breeding bird surveys was an individual detected during the final visit to point count station B9, on June 9, 2009. However, several individuals were found during other biological surveys. One was just east of 170th Street West, at the north edge of the Project site, on April 8; two were at the northwestern extreme of the site on April 13; and one was in the northeastern part of the site on April 21. Efforts to relocate the individual at the latter location were unsuccessful on May 7. During surveys for the Los Angeles County Breeding Bird Atlas in 1995–1999, this species was recorded as either "confirmed" or "possible" as a breeder in all four atlas blocks covering the Project site

(LACBBA unpublished data). The rabbitbrush scrub widespread on the Project site may provide suitable habitat for this species, especially where nearby Joshua tree woodlands provide perching opportunities. Thus it may nest on-site, at least in some years.

One lark sparrow was detected during surveys of the proposed transmission line route: an individual observed on June 10, 2009, on the east side of 170th Street West, in Kern County, near the northern terminus of the route.

4.10.1.2.6 Lawrence's Goldfinch (*Carduelis Lawrencei*, SA When Nesting). The Lawrence's goldfinch is erratic and localized in occurrence. The species is fairly common but sporadic in Santa Clara County and on the coastal slope from Monterey County south, and uncommon in foothills surrounding the Central Valley. It ranges from "uncommon to common" as a breeder in the eastern Kern County desert and is a "common but local summer resident" in the Antelope Valley, where it is present from March to September (Heindel 2000; Garrett and Dunn 1981). It was confirmed as a breeder in one of four atlas blocks overlapping the Project site during surveys for the Los Angeles County Breeding Bird Atlas in 1995–1999 (LACBBA unpublished data). Lawrence's goldfinches breed in valley foothill woodland and, in southern California, in desert riparian, palm oasis, pinyon-juniper, and lower montane habitats. They prefer to nest in oaks, but also use cypress or plantings of deodar cedar, riparian thicket, and other species. They most often nest near water in open, arid woodland. They feed mainly on seeds of annual plants, particularly fiddleneck (*Amsinckia* spp.), during the breeding season, and eat the fruits of chamise (*Adenostoma fasciculatum*) in winter, along with lesser amounts of annual seeds and berries (Davis 1999).

Four Lawrence's goldfinches were detected along the proposed transmission line route, on the west side of 170th Street West and north of Gaskell Road, on May 8, 2009. Over most of the Project site, there is no woodland habitat suitable for nesting, although it is possible that Lawrence's goldfinches could nest in the orchard and in other planted trees near the ranch house on the south side of SR-138. Also, puddling water from irrigation and the planted trees around structures on either side of 170th Street West north of Gaskell Road, along the proposed transmission line route, may provide habitat for nesting Lawrence's goldfinches. The birds detected on May 8 may have been nesting here.

4.10.1.2.7 Loggerhead Shrike (*Lanius Ludovicianus*, CSC When Nesting). This species can be found in lowlands and foothills throughout California. It is absent or rare in the state in the highest mountain ranges and the north coast. Breeding populations in the north are migratory. The species is a year-round resident in the southern deserts, parts of the south and central coasts, and the Central Valley, where numbers are augmented by migrants from November to February (Heindel 2000; Yosef 1996). It was widely recorded in the Antelope Valley during surveys for the Los Angeles County Breeding Bird Atlas in 1995–1999 (Humple 2008; LACBBA unpublished data). Loggerhead shrikes prefer open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches, and require impaling sites,

such as thorns, sharp twigs, or barbed wire, for skewering and manipulating their prey. The species nests in densely foliated trees or shrubs and feeds on "arthropods, amphibians, small to medium-sized reptiles, small mammals and birds" (Yosef 1996).

During wintering bird surveys, two individuals were recorded in the orchard on the Project site on January 14, 2009, and one was recorded here on February 3–4, 2009. By April 22, during the breeding bird surveys, this pair had raised two young to the fledgling stage. During other winter biological surveys, an individual was sighted in Joshua tree woodland adjacent to the northern boundary of the central portion of the Project site on January 13, 2009. Possibly the same bird was seen at this location and south to point count station B15 during breeding bird surveys on June 10, 2009. Another was recorded in winter at the edge of the Project site on February 4, 2009, along 170th Street West and north of West Avenue C. Other breeding season sightings included a pair observed within the Project site just north of SR-138, along 160th Street West near the Project boundary, on May 7, 2009. One of these individuals was observed carrying a food item, presumably to feed nestlings or fledglings; however, the nest may have been off-site, east of 160th Street West. Other sightings included an individual observed in the northeastern part of the site on April 16 and 22, 2009 (but not during a subsequent visit to refind this bird, on May 7), and an individual near point count station B3 on June 9, 2009. Loggerhead shrikes nest relatively early in the season, usually laying eggs before June (Kiff and Irwin 1987). Thus, observations during the month of June may not involve breeding activity.

During breeding bird surveys of the proposed transmission line route, a single shrike was observed on the east side of 170th Street West, near West Avenue A-8, on both April 23 and June 9, 2009. On May 8, 2009, another individual was observed on the east side of 170th Street West, in Kern County, north of West Avenue A, when it was flushed from a nest with four eggs in a planted tree. Possibly the same bird was observed near here on June 10. Two other sightings, in the Joshua tree woodland south of Avenue B on the west side of 170th Street West, on June 10, and on the east side of 170th Street West on April 8, may have involved a single bird.

4.10.1.2.8 <u>Long-eared Owl (*Asio Otus*, CSC When Nesting)</u>. This species occurs widely, but uncommonly, throughout California. In western North America, the species breeds from the Southwestern states north to southern Canada and winters from northern Mexico north to Washington State, Idaho, and Montana. The species does not breed in most of the Central Valley, most of the Imperial and Coachella Valleys, and parts of the immediate coast. "Irregular wanderings" occur in California (Grinnell and Miller 1944), although it is unclear to what extent these are movements of birds within the state or influxes from elsewhere. Breeding occurs in the state from February through July (Hunting 2008). Long-eared owls forage over open spaces, feeding mostly on mice and kangaroo rats, but occasionally on small birds and rabbits. Long-eared owls roost and nest in riparian and other dense woodlands where suitable nest platforms are present. They do not build their own nests,

instead using old nests of magpies (*Pica* spp.), American crows (*Corvus brachyrhynchos*), common ravens, hawks, squirrels, and woodrats. The species also nest occasionally in mistletoe brooms and tree cavities and on natural platforms and cliffs (Hunting 2008).

No long-eared owls were observed during any biological surveys on the Project site. However, on June 10, 2009, a primary wing feather of a long-eared owl was found near point count station B13, indicating that this species uses the Project site for foraging. On February 3, 2009, URS biologists Dave Compton and Whitney Wilkinson searched the trees around the ranch house on SR-138 for roosting owls, and to assess the potential of the area for roosting and nesting by owls and hawks. The biologists searched this area again on June 10, and also walked the nearby pistachio orchard for evidence of nesting long-eared owls. No long-eared owls or sign were found during either of these visits. The only suitable nest structure observed was an active common raven nest in the orchard. However, some trees in the orchard and in the immediate vicinity of the house may have the potential to host nesting by this species, if nest structures become available.

4.10.1.2.9 Merlin (*Falco Columbarius*, SA When Wintering). The merlin is an uncommon winter visitor throughout California, except at very high elevations. It is present in southern California from September into April, with most fall migrants arriving by early November and birds beginning to leave their wintering grounds in February (Heindel 2000). Merlins occupy a variety of habitats, including grasslands, agricultural fields, open scrublands, and open forest. They may forage over an area of more than eight square miles in winter, and they require dense stands of trees for roosting. They feed primarily on small birds.

Individual Merlins were observed on the Project site, on January 14, 2009, over the California annual grassland habitat, and on February 4, 2009, along 170th Street West between SR-138 and West Avenue C. The abundance of horned larks on the Project site in winter (a Merlin prey species) provides ample foraging opportunity for Merlins. This species may also use the site during migration.

4.10.1.2.10 Mountain Bluebird (*Sialia Currucoides*, SBS When Wintering). In Los Angeles County, the mountain bluebird is nearly confined to grassland and irrigated pastures on the floor of the Antelope Valley and the adjacent lower slope of the Sierra Pelona (LACSBSWG 2009). It is present from November to March in the San Joaquin Valley and nearby valleys, and locally in the southeastern deserts coastal southern California. Mountain bluebirds forage for insects on the wing and by stooping from a low perch. In winter, they may also feed on berries and other small fruits.

Mountain bluebird observations on the Project site during the wintering bird surveys included 2 near SR-138 and Avenue C on December 18, 2008; 10 near Drainage A on January 14, 2009; and 51 in the southern portion of the Project site on January 14, 2009.

4.10.1.2.11 Northern Harrier (*Circus Cyaneus*, CSC When Nesting). The northern harrier breeds in widely scattered locations over much of California, but is absent from most desert areas, the high Sierra, and most of the Coast Ranges. Most migrants and winter visitors are present in the Project region from September into March, but some may occur as early as mid-August or as late as April. Migrants in California may breed as far north as the Arctic or winter as far south as Central America and northern South America. Northern harriers are found mostly in flat, or hummocky, open areas of tall, dense grasses and moist or dry shrubs. They use tall grasses and forbs in wetlands, or at wetland/field borders, for cover, and roost and nest on the ground. Northern harriers feed on voles and other small mammals, as well as birds, small reptiles, crustaceans, and, rarely, fish. The species is known to nest in the Antelope Valley near Lancaster, but during the field effort for the Los Angeles County Breeding Bird Atlas, none were recorded nesting in atlas blocks in the immediate vicinity of the Project site (Davis and Niemela 2008; LACBBA unpublished data). However, one individual was observed in the vicinity of the northwestern part of the Project site on May 22, 1999, well outside the date range during which migrating individuals would be expected in the region.

This species was seen regularly and throughout the project site during wintering bird surveys and other biological surveys from December 2008 to February 2009, with as many as three individuals seen in a day (3 males on February 3, 2009). During breeding bird surveys, a single northern harrier was observed at point count station B4 on April 22, 2009. During other spring biological surveys, single harriers were observed south of SR-138 on April 17 and north of Drainage A on April 30. All sightings were of a subadult, and the same individual may have been involved in all three sightings. No harriers were detected during bird surveys in May and June, and the April sightings may have involved one or more migrants or lingering wintering birds. Because of the lack of suitable wetlands and dense ground vegetation on-site, it is highly unlikely that this species nests within the Project site. However, given the May 1999 observation and confirmed breeding near Lancaster, this species may sometimes breed near the Project site and forage on-site.

4.10.1.2.12 Prairie Falcon (*Falco Mexicanus*, CDFG Watch List Species When Nesting). The prairie falcon is a permanent resident in the Project region. The species ranges from California's southeastern deserts northwest throughout the Central Valley and along the inner Coast Ranges and Sierra Nevada. Prairie falcons are mostly absent from the coast and the higher elevations of the Sierra Nevada. The species is mostly non-migratory, but numbers increase in the Project region from September to February. Prairie falcons inhabit dry, open terrain, either level or hilly, and require breeding sites located on cliffs. They forage over large, undefended areas during the breeding season (Steenhof 1998) and feed on small mammals, small birds, and reptiles.

One individual was recorded on the Project site south of SR-138 on January 14, 2009, during wintering bird surveys, and none were recorded during breeding bird surveys. However, one

individual was observed south of SR-138 on April 17, 2009, during burrowing owl Phase II surveys. The species may nest in the rocky outcroppings of the Fairmont Butte area approximately 0.5 miles southeast of the Project site, as well as in the Sierra Pelona, less than 5 miles to the south. Considering the large foraging range of this species, prairie falcons nesting off-site may visit the site regularly during the breeding season. The Project site does not provide suitable nesting habitat for this species.

4.10.1.2.13 Tricolored Blackbird (*Agelaius Tricolor*, CSC When Nesting in Colonies). This species breeds from the central California coast inland through the Central Valley, in coastal southern California from Ventura County southward, in the western Mojave Desert, and locally in northeastern California. Aside from scattered small breeding colonies in Oregon, Washington, and Nevada, this species is restricted to California and Baja California, where it occurs year-round. Tricolored blackbirds nest in colonies that sometimes exceed 10,000 birds, and will nest as early as mid-March (Hamilton 1998). However, flocks of birds not attached to any breeding colony, and non-breeding birds attached to breeding colonies, may be encountered during the early breeding season. Some birds may arrive at colonies to begin nesting in May or even later, and birds nesting at one location may move to other locations to breed later in the season (Hamilton 1998). Some tricolored blackbirds in the Central Valley have been known to nest in the fall, from September to November (Beedy 2008). Tricolored blackbirds place their nests near fresh water, preferably in emergent wetlands with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. They forage on the ground in croplands, in grassy fields, in flooded land, and along pond edges, where they feed on insects and spiders, especially during the nesting season, and on seeds and cultivated grains. Most individuals forage within three miles of their nesting colony, but some may range to nearly ten miles away (Beedy and Hamilton 1999). Three sites in the Antelope Valley hosted nesting colonies within seven miles of the Project site in 2008: Fairmont Reservoir, 3.2 miles south of the site (30 individuals); the Munz Ranch Aqueduct, 4.6 miles south southeast of the site (100 individuals); and Holiday Lake, 7.0 miles west of the site (550 individuals).

The lack of wetlands with emergent vegetation and other thickets makes the Project site unsuitable for nesting by colonies of tricolored blackbirds. However, known colonies may be near enough to the site that birds from those colonies may occasionally forage on-site. Tricolored blackbirds were detected once on the Project site, when 18 were observed flying over point count station B5 on April 22, 2009, before landing on the site south of SR-138. A single bird was detected during surveys of the proposed transmission line route, on June 10, 2009, on the east side of 170th Street West south of Gaskell Road in Kern County. These birds may have been traveling from a nesting site to forage, or they may have been non-breeding birds.

4.10.1.2.14 Vaux's Swift (*Chaetura Vauxi*, CSC When Nesting). This species breeds in the Coast Ranges fairly commonly from Sonoma County north, and very locally south to

Monterey County; it also breeds in the Sierra Nevada and possibly in the Cascade Range. Most migrants pass through southern California from mid-April to mid-May and from September to mid-October, on the way to and from breeding sites in California and northward. Vaux's swifts prefer redwood and Douglas fir habitats with nesting sites in large hollow trees and snags, especially tall, burned-out stubs. They feed primarily on flying arthropods during the breeding season. Two Vaux's swifts were recorded on May 8, 2009, flying overhead near point count station B12. This sighting occurred during the migratory window for this species, which is "fairly common" as a migrant in the region (Heindel 2000). The Project site is well outside of the geographic breeding range for Vaux's swift and lacks suitable woodland breeding habitat.

4.10.1.2.15 Vesper Sparrow (*Pooecetes Gramineus*, SBS When Wintering). In Los Angeles County, this species is found in grasslands, agricultural lands, and open brushlands in valleys, and desert regions (LACSBSWG 2009). It breeds east of the Cascade-Sierra Nevada crest, south to the White and Inyo Mountains. It winters in the Owens Valley, in the Central Valley and adjacent foothills, and locally in the southern deserts and coastal southern California. It occurs on the breeding grounds from April through September. Birds arrive on their wintering grounds in September and leave in April or March. The Vesper sparrow uses scattered shrubs and patches of tall herbs for cover. It feeds mainly on grass and forb seeds in the winter, and on insects and spiders during the breeding season. A subspecies of the vesper sparrow, the Oregon vesper sparrow (*P. g. affinis*), is a CSC that winters from the central California valleys south to Baja California (Erickson 2008). Its range overlaps extensively with the more common Great Basin vesper sparrow (*P. g. confinis*).

During the wintering bird surveys, two vesper sparrows were seen in the southern part of the Project site on December 18, 2008, and one was seen in this area on January 14, 2009. During other 2008–2009 winter biological surveys, two were observed at the edge of the pistachio orchard on the Project site on February 3, 2009. A total of eight were recorded on the Project site, including six in the northeastern corner of the site, on April 15-16, 2009, during the migratory period for this species. It is not possible to determine in the field whether any of these observations involved the Oregon vesper sparrow or the Great Basin vesper sparrow.

4.10.1.2.16 Western Meadowlark (*Sturnella Neglecta*, SBS). This species occurs year-round in California, except in the higher mountains. It breeds from north-central Mexico north to British Columbia and the Prairie Provinces of Canada. It is mostly absent from Canada and the northern tier of states in winter, when it ranges south to central Mexico. The species breeds in California from March to August. Numbers are higher in southern California from October to March (Heindel 2000), due to influxes of birds from further north. Western meadowlarks breed in herbaceous and cropland habitats with sufficient ground cover for concealment, and may also use open, wooded habitats that include these features. They use trees, shrubs, fences, and mounds for lookouts and song perches.

This species was found in small numbers on the Project site in the winter of 2008–2009. Western meadowlarks were detected during each breeding bird survey on the Project site, at seven different point count locations, mostly south of SR-138. The extreme northwestern portion of the site also held relatively high numbers in mid-April, as recorded during other biological surveys. Breeding was confirmed on April 29, 2009, when an adult was seen carrying food in the northeastern portion of the Project site. Along the proposed transmission line route, western meadowlarks were seen during each breeding bird survey. On April 23, western meadowlarks were scattered along the proposed transmission line route from the Project site north to Gaskell Road in Kern County. On May 8, only one meadowlark was detected along the proposed transmission line route, between West Avenue A and West Avenue B on the west side of 170th Street West. During the final breeding bird survey, on June 9–10, three were detected east of 170th Street West: one between West Avenue A and West Avenue B on June 9, and two in Kern County, between West Avenue A and Kingbird Avenue on June 10.

4.10.1.2.17 Yellow Warbler (*Dendroica Petechia*, CSC When Nesting). This species breeds widely across California, but is absent from the high Sierras, most of the southern deserts, and most of the Central Valley. It breeds only very locally in the southern deserts, was not recorded in atlas blocks covering the Project site during the Los Angeles County Breeding Bird Atlas surveys of 1995–1999, and is absent as a breeder in the Antelope Valley (LACBBA unpublished data; Heath 2008). The species is largely absent from the state in winter. Spring migrants pass through from April through early June, and fall migrants occur from late July to mid-October (Heindel 2000). Yellow warblers breed primarily in deciduous riparian woodlands, including those dominated by cottonwoods, willows, and alders, up to 8000 feet; they also breed in montane chaparral and open conifer forests. They place their nests in the upright fork of a shrub, sapling, or tree and feed on a variety of insects and spiders (Lowther et al. 1999; Heath 2008).

One yellow warbler was detected in trees at a residence on the west side of 170th Street West, near Gaskell Road, on May 8, 2009, during the migratory period for this species. No suitable nesting habitat for this species exists on the Project site or the proposed transmission line route. The nearest breeding populations of yellow warblers are in the Sierra Pelona to the south and the Tehachapi Mountains to the north.

4.10.1.2.18 Yellow-breasted Chat (*Icteria Virens*, CSC When Nesting). The yellow-breasted chat is an uncommon summer resident species occurring in coastal California, the foothills of the Sierra Nevada, in northern California inland to the Cascades, and in scattered, isolated riparian areas in the southern deserts. The Los Angeles County Breeding Bird Atlas surveys of 1995–1999 found no chats in atlas blocks overlapping the Project site, and the species is not known to breed in the Los Angeles and Kern County portions of the Mojave Desert (LACBBA unpublished data; Comrack 2008; Garrett and Dunn 1981). Spring migrants from Mexico and Central America pass through southern California from mid-April

through May; fall passage is mainly from late August to late September (Dunn and Garrett 1997; Heindel 2000). Yellow-breasted chats require riparian thickets of willow and other brushy tangles near watercourses for cover. They normally place their nests in dense shrubs near streams or rivers. The species feeds mainly on small insects and spiders.

One yellow-breasted chat was detected in trees near a residence along the proposed transmission line route, on the west side of 170th Street West on May 8, 2009, during the migratory period for this species. The dense woodland habitat required for this species is lacking on the Project site and along the proposed transmission line route. This species breeds fairly commonly along the Santa Clara River east of Interstate 5, in Los Angeles County, approximately 25 miles south southwest of the site, but is absent from the western Mojave Desert except for scattered locations in San Bernardino County (Comrack 2008; Myers 1998).

4.10.2 Sensitive Natural Communities

The Project site and proposed transmission line route contain three distinct sensitive natural communities: wildflower fields, Joshua tree woodland, and Joshua tree recruitment area. Wildflower fields are designated as a sensitive natural community by the CDFG. Joshua tree woodland and Joshua tree recruitment area have no formal sensitivity designations, but are considered to be sensitive natural communities for purposes of this analysis because of the County's expressed concern regarding the continuing loss and degradation of Joshua tree woodlands in the Antelope Valley.

4.10.2.1 Wildflower Field

The defining habitat characteristics of wildflower field vegetation, including observed and expected use by common and special-status wildlife, are discussed in Section 4.2.2.3 of this Biota Report. Wildflower fields are identified by the CDFG (2008b) as a sensitive natural community. In the original vegetation mapping efforts conducted to support the Biological Constraints Analysis for the proposed Project (URS 2009), no wildflower fields were mapped within the Project site. However, refinements to the vegetation mapping, conducted during preparation of this Biota Report, led to reclassification of one portion of the site previously mapped as California annual grassland to wildflower field vegetation. This reclassification was based on a reference visit to a known wildflower located approximately 1 mile southeast of the Project site in the Antelope Valley California Poppy Reserve. The reclassified area is in the southernmost portion of the Project site (Figure 3-4), and totals approximately 236 acres. Wildflower field vegetation is absent from the transmission line route.

4.10.2.2 Joshua Tree Woodland

The defining habitat characteristics of Joshua tree woodlands, including observed and expected use by common and special-status wildlife, are discussed in Section 4.2.2.4 of this Biota Report. This vegetation type is absent from the Project site, but occurs along approximately 1.25 miles of the proposed transmission line route (0.25 mile along the west side of 170th Street West and 1.0 mile along the east side of 170th Street West) within SEA #60 (Figure 3-5).

4.10.2.3 Joshua Tree Recruitment Area

The defining habitat characteristics of Joshua tree woodlands, including observed and expected use by common and special-status wildlife, are discussed in Section 4.2.2.5 of this Biota Report. Fifty Joshua tree seedlings, scattered over an approximate 7.3 acres, are located on the northern portion of the Project site (see Figure 3-4). The presence of the Joshua tree seedlings identified within this portion of the Project site appear to indicate that this area may be in the early stages of the re-establishment of Joshua tree woodland habitat. No Joshua tree recruitment areas occur along the proposed transmission line route.

4.11 SENSITIVE SPECIES AND NATURAL COMMUNITIES NOT OBSERVED BUT WITH POTENTIAL TO OCCUR WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Figure 4-7 provides the results of the CNDDB records search for special-status plant, wildlife, and sensitive native plant community occurrences within the Project site quadrangle (Fairmont Butte) and the surrounding eight quadrangles. This nine-quadrangle CNDDB query, supplemented by additional literature review for special-status plant and wildlife species with potential to occur within the Project vicinity, indicated that there is potential for special-status plants and wildlife that were not observed during field surveys to occur within the Project site and along the proposed transmission line route. These 26 plant and wildlife species were selected based on considerations of the reported occurrences in the site vicinity, habitat suitability and availability on the site, habitat connectivity, and presumed extant status of species with known and/or historic ranges that include the site. A discussion of each special-status species with potential for occurrence on or near the Project site and the proposed transmission line route is included below. Other special-status species that were not identified in the CNDDB query, but which require analysis due to their potential of occurrence, are also discussed in this section.

Certain special-status species that were identified in the CNDDB 9-USGS quadrangle query, but that have no likelihood to occur on the Project site are not addressed in this section. These species were excluded based on range restrictions and/or the lack of key habitat requirements found within the Project site and proposed transmission lines route, and include the following species: the southwestern pond turtle (*Actinemys marmorata pallida*, CSC)

requires appropriate aquatic or semi aquatic habitat that is not present on the Project site; the lodgepole chipmunk (*Neotamias speciosus speciosus*, SA) requires lodgepole forest habitat that does not occur on the Project site; and the hoary bat (*Lasiurus cinereus*, SA) requires access to trees and water that are not located on-site. These species are not discussed further in this analysis.

4.11.1 Plants

Twelve special-status plant species that were not observed during biological surveys, including one species listed by the State as threatened, have the potential to occur on the Project site and proposed transmission line route based on the literature review and the presence of suitable habitat. Descriptions of these species, including known occurrence, habitat, and range restrictions, are provided below. (See Table 4-10 for site suitability/survey results and likelihood to occur).

4.11.1.1 Chaparral Sand-verbena (*Abronia Villosa* var. *Aurita*, CNPS List 1B)

This annual herb is found in Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. The chaparral sand-verbena grows in chaparral, coastal scrub, and desert habitats in sandy soil, blooming from January to September. The nearest occurrence to the Project site was reported in 1971, when the subspecies was recorded in the West Mojave Desert region, approximately 15 miles east of Palmdale on the southern slope of Lovejoy Buttes in the Mojave Desert.

4.11.1.2 Kusche's Sandwort (*Arenaria Macradenia* var. *Kuschei*, CNPS List 1B)

Populations of this perennial herb are found in very limited distribution in Los Angeles County. It prefers decomposed granitic sunny openings in oak woodlands, chaparral or low scrub, and its blooming period is from June to July. The nearest occurrence was reported in 1997, approximately 8 miles southwest of the Project site. Five observations were made in Burnt Peak and Liebre Mountain quadrangles, which are in northwestern Los Angeles County.

4.11.1.3 Horn's Milk-vetch (*Astragalus Hornii* var. *Hornii*, CNPS List 1B)

This annual herb subspecies occurs in Inyo, Kern, San Bernardino, and Tulare counties. Horn's milk-vetch habitat consists of meadows, seeps, alkaline playas and lake margins. The species blooms from May through October. The nearest occurrence to the Project site was recorded approximately 8 miles northeast of the site in 1931.

TABLE 4-10
SPECIAL-STATUS PLANTS NOT OBSERVED BUT WITH POTENTIAL TO OCCUR WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Scientific Name	Common Name	Regulatory Status	Blooming Period	Habitat Requirements	Site Suitability/Survey Results	Potential to Occur
Abronia villosa var. *aurita*	Chaparral sand-verbena	CNPS 1B.1	January – September	Chaparral, coastal scrub, and desert habitats in sandy soil from 80 to 1,600 meters (approximately 262 to 5,249 feet) elevation.	May be present in areas where soil conditions are appropriate. Recorded in Los Angeles County, West Mojave Desert region 15 miles east of Palmdale on southern slope of Lovejoy Buttes in Mojave Desert in 1971.	Unlikely
Arenaria macradenia var. *kuschei*	Kusche's sandwort	CNPS 1B.1	June – July	Decomposed granitic sunny openings in oak woodlands, chaparral or low scrub from 1,220 to 1,700 meters (4,003 to 5,577 feet) elevation.	No suitable habitat is present. Known from approximately 5 observations in 1997 in Burnt Peak and Liebre Mountain quadrangles, in NW Los Angeles County, approximately 8 miles southwest of the Project site.	Unlikely
Astragalus hornii var. *hornii*	Horn's milk-vetch	CNPS 1B.1	May – October	Meadows, seeps, alkaline playas and lake margins from 60 to 850 meters (approximately 200 to 2,750 feet) elevation.	Marginal habitat is present. One collection in 1931 from an unknown location approximately 8 miles northeast of the Project site.	Unlikely
California macrophylla	Round-leaved filaree	CNPS 1B.1	March – May	Cismontane woodland and valley and foothill grassland from 15 to 1,200 meters (approximately 50 to 3,900 feet) elevation, where it grows in clay soils.	No suitable habitat exists on the site. Known from Elizabeth Lake, approximately 8 miles to the south, in 1888.	Unlikely
Calochortus striatus	Alkali mariposa lily	CNPS 1B.2	April – June	Chaparral, chenopod scrub, Mojavean desert scrub, meadows and seeps in alkaline, mesic soils from 70 to 1,595 (approximately 230 to 5,233 feet) elevation.	Suitable habitat present on-site. The species usually occurs in wetlands, but occasionally found in non wetlands. The nearest occurrence was recorded in 1998, approximately 11 miles west of the Project site.	Unlikely

TABLE 4-10 (CONTINUED)
SPECIAL-STATUS PLANTS NOT OBSERVED BUT WITH POTENTIAL TO OCCUR WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Scientific Name	Common Name	Regulatory Status	Blooming Period	Habitat Requirements	Site Suitability/Survey Results	Potential to Occur
Calystegia peirsonii	Peirson's morning-glory	CNPS 4.2	April – June	Chaparral, chenopod scrub, cismontane woodland, coastal scrub, lower montane coniferous forest, and valley and foothill grassland from 30 to 1,500 meters (approximately 100 to 4,900 feet) elevation. Often found in disturbed areas, along roadsides, or in grassy open areas.	Suitable habitat found on-site. Known from the Elizabeth Lake and Lake Hughes areas. Also known from 1982 on valley floor approximately 8 miles southeast of the Project site.	Likely
Canbya candida	White pygmy-poppy	CNPS 4.2	March – June	Joshua tree "woodland," Mojavean desert scrub, pinyon and juniper woodland in gravelly, sandy, and granitic soils from 600 to 1,460 meters (approximately 1,969 to 4,790 feet) elevation.	Suitable habitat found on-site. One or more known populations in Los Angeles County, quadrangle-level data pending.	Likely
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	SE, CNPS 1B.1	April – July	Sandy soils in coastal scrub and valley and foothill grassland from 150 to 1,220 meters (approximately 500 to 4,000 feet) elevation.	Suitable habitat found on-site. Three plants collected approximately 8 miles west of the Project site from Elizabeth Lake, Lake Hughes quadrangle, in 1929, but possibly extirpated.	Unlikely
Harpagonella palmeri	Palmer's grapplinghook	CNPS 4.2	March – May	Chaparral, coastal scrub, valley and foothill grassland in clay soil from 20 to 955 meters (approximately 66 to 3,133 feet) elevation.	Appropriate soil is rare on the Project site. One or more populations known in Los Angeles County, pending additional quadrangle-level data.	Unlikely

TABLE 4-10 (CONTINUED)
SPECIAL-STATUS PLANTS NOT OBSERVED BUT WITH POTENTIAL TO OCCUR WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Scientific Name	Common Name	Regulatory Status	Blooming Period	Habitat Requirements	Site Suitability/Survey Results	Potential to Occur
Layia heterotricha	Pale-yellow layia	CNPS 1B.1	March – June	Valley grassland, foothill woodland, pinyon-juniper woodland, and wetland-riparian habitats in alkaline or clay soils from 300 to 1,705 meters (approximately 984 to 5,594 feet) elevation.	Suitable habitat may be present on-site. Closest recorded occurrence in the Liebre Mountains region, north of San Franscisquito Canyon, on road to Palmdale in 1969, approximately 20 miles southwest of the Project site.	Unlikely
Opuntia basilaris var. *brachyclada*	Short-joint beavertail	CNPS 1B.2	April – June	Chaparral, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland from 425 to 1,800 meters (approximately 1,400 to 5,850 feet) elevation.	May occur in Joshua tree woodland along the proposed and alternate transmission line routes. Occurs approximately 6 miles south of the Project site, north of Lake Hughes.	Likely
Symphyotrichum greatae	Greata's aster	CNPS 1B.3	June – October	Broadleafed upland forests, chaparral, cismontane woodland, lower montane coniferous forest, and mesic riparian woodland from 300 to 2,100 meters (approximately 975 to 6,800 feet) elevation.	No suitable habitat exists on the site. Occurs in the Liebre Mountains, approximately 10 miles west southwest of the site.	Unlikely

Status Definitions:
FE = Federally Endangered
SE = State Endangered
CNPS = California Native Plant Society
1A = Presumed extinct/extirpated in California
1B = Plants that are rare, threatened, or endangered in California and elsewhere
2 = Rare, threatened, and endangered in California but more common elsewhere
3 = Plants about which more information is needed
4 = A watch list of plants of limited distribution
.1 = Seriously endangered in California
.2 = Fairly endangered in California
.3 = Not very endangered in California

4.11.1.4 Round-leaved Filaree (*California Macrophylla*, CNPS List 1B)

This annual herb can be found in many counties in California, but occurs mainly in the southern part of the state. The species grows in cismontane woodland and valley and foothill grassland. Round-leaved filaree blooms from March through May. The nearest occurrence to the Project site was recorded in 1888 at Elizabeth Lake, approximately 8 miles to the south.

4.11.1.5 Alkali Mariposa Lily (*Calochortus Striatus*, CNPS List 1B)

This bulbiferous herb occurs in Kern, Los Angeles, San Bernardino, Tulare counties. The species' habitat consists of chaparral, chenopod scrub, Mojavean desert scrub, meadows, and seeps in alkaline, mesic soils. Its blooming period is from April to June. The recorded occurrence nearest to the Project site was in the Mojave Desert near Lancaster in 1998, approximately 11 miles west of the site.

4.11.1.6 Peirson's Morning-glory (*Calystegia Peirsonii*, CNPS List 4)

This rhizomatous herb has been found only in Los Angeles County, and prefers to inhabit chaparral, chenopod scrub, cismontane woodland, coastal scrub, lower montane coniferous forest, and valley and foothill grasslands. Peirson's morning-glory's blooming period is from April to June. The occurrence nearest to the Project site was recorded in 1982, on the floor of the Antelope Valley approximately 8 miles southeast of the site.

4.11.1.7 White Pygmy-poppy (*Canbya Candida*, CNPS List 4)

This annual herb is found in Imperial, Inyo, Kern, Los Angeles, and San Bernardino counties. It grows in Joshua tree woodlands, Mojavean desert scrub, and pinyon and juniper woodland in gravelly, sandy, and granitic soils. The species blooms from March through June. There are one or more known populations in Los Angeles County, but the exact location is unknown as the quadrangle-level data is pending.

4.11.1.8 San Fernando Valley Spineflower (*Chorizanthe Parryi* var. *Fernandina*, CESA-Endangered, CNPS List 1B)

This annual herb is found in sandy soils in coastal scrub and valley and foothill grassland. This subspecies had been presumed extinct, but was rediscovered in 1999 and is now known from only three occurrences in Los Angeles and Ventura counties. The species blooms from April to July. The closest recorded occurrence to the Project site was in 1929, when three plants were collected from Elizabeth Lake, in the Lake Hughes quadrangle, approximately eight miles from the site. This subspecies is also a candidate (level 6) for listing under the federal ESA.

4.11.1.9 Palmer's Grapplinghook (*Harpagonella Palmeri*, CNPS List 4)

This annual herb inhabits Los Angeles, Orange, Riverside, and San Diego counties. The species prefers Chaparral, coastal scrub, valley and foothill grassland in clay soil. Its blooming period is from March to May. The closest occurrence of Palmer's grapplinghook to the Project site is unknown, but one or more populations are known to occur in Los Angeles County.

4.11.1.10 Pale-yellow Layia (*Layia Heterotricha*, CNPS List 1B)

This annual herb occurs in Fresno, Los Angeles, Monterey, Santa Barbara, and Ventura counties, and may occur in Kern, Kings, San Benito, and San Luis Obispo counties. Its habitat consists of valley grassland, foothill woodland, pinyon-juniper woodland, and wetland-riparian habitats in alkaline or clay soils. The species blooms from March through June. A pale-yellow layia collection was attributed to a site in the Liebre Mountains region, north of San Franscisquito Canyon, on the road to Palmdale in 1969, approximately 20 miles southwest of the Project site.

4.11.1.11 Short-joint Beavertail (*Opuntia Basilaris* var. *Brachyclada*, CNPS List 1B)

This stem succulent occurs in Los Angeles and San Bernardino counties. Its preferred habitat consists of chaparral, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland. Short-joint beavertail's blooming period is from April through June. The nearest recorded occurrence to the Project site is approximately six miles south of the site, north of Lake Hughes.

4.11.1.12 Greata's Aster (*Symphyotrichum Greatae*, CNPS List 1B)

This rhizomatous herb is known to occur in Los Angeles, San Bernardino, and Ventura counties. It occurs in broad-leafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and mesic riparian woodland. Its blooming period is from June to October. The nearest occurrence to the Project site was recorded in the Liebre Mountains, approximately 10 miles west-southwest of the site.

4.11.2 Wildlife

Fourteen special-status wildlife species that were not observed during biological surveys were identified as having a potential to occur on the Project site and proposed transmission line route due to the availability of suitable habitat (Table 4-11). These include one species federally and State listed as endangered, one federally and State listed as threatened, and one State listed as threatened. Descriptions of these species including known occurrences, habitat, range restrictions, and field survey observations during biological surveys are provided below.

TABLE 4-11
SPECIAL-STATUS WILDLIFE NOT OBSERVED BUT WITH POTENTIAL TO OCCUR WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Common Name	Scientific Name	Regulatory Status	Nesting/ Breeding Period	Habitat Requirements	Site Suitability/Survey Results	Potential to Occur
Reptiles and Amphibians						
California legless lizard	*Anniella pulchra*	CSC	Breeds early Spring to July, Bears young between Sept and Nov.	Sparsely vegetated areas with loose, moist soil, leaf litter layer, insects for prey. Rests and hides under surface objects such as rocks, logs, boards, and under leaf litter around the base of shrubs.	Project site lacks moist soils and leaf litter. Past cultivation was very detrimental to habitat suitability. Nearest sighting is 11 miles away and 20 years old.	Very low
Desert tortoise	*Gopherus agassizii*	FT, ST	March – October	Firm ground for burrows, sandy or gravelly desert habitats, washes, oasis, canyons, alluvial fans. Desert plants for food: grass, cactus, herbs, flowers, legumes. Agriculture renders habitat unsuitable (USFWS 2008).	Area was suitable habitat in past. Cultivation since late 1940s in the western Antelope Valley has made habitat in the vicinity unsuitable. No sightings in vicinity. Project site is 13 miles outside of current range maps.	Very low
Birds						
California condor	*Gymnogyps californianus*	FE, SE	February – May egg laying; courtship as early as October	Nests in caves, crevices, and ledges on cliffs. Roosts in large trees and snags. Forages for carrion over large areas of open savanna, grassland, and foothill chaparral. Prefers large carrion (deer, cattle, sheep).	The Project area and proposed transmission line route are within range of the known population, but only possibly suitable for opportunistic foraging. Low likelihood of suitable carrion: the Project site and proposed transmission line route are not currently grazed by livestock and no evidence of use by deer.	Unlikely, over – flights only

TABLE 4-11 (CONTINUED)
SPECIAL-STATUS WILDLIFE NOT OBSERVED BUT WITH POTENTIAL TO OCCUR WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Common Name	Scientific Name	Regulatory Status	Nesting/ Breeding Period	Habitat Requirements	Site Suitability/Survey Results	Potential to Occur
Ferruginous hawk	*Buteo regalis*	SA (wintering)	Wintering only in California	Open grasslands, sagebrush flats, desert scrub, low foothills surrounding valleys. Perches on power poles and on ground. Avoids urban areas.	Habitat within the Project site and much of the proposed transmission line route is suitable for foraging. Occurs regularly in the Antelope Valley in winter.	Likely
Golden eagle	*Aquila chrysaetos*	FP (nesting and wintering)	Late January – August	Nests on cliffs of all heights and in large trees in open areas. Needs open terrain for hunting; occurs in grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats.	Habitat suitable for foraging on the Project site and in much of the proposed transmission line route, but no nesting habitat is near the site. Eagles are not known to nest nearby.	May forage; unlikely to nest
Le Conte's thrasher	*Toxostoma lecontei*	SA	January – June peak March – April	Open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats; also occurs in Joshua tree habitat with scattered shrubs. Known in recent years (2005) from sites 9 or more miles northeast and north of the Project site.	Project site likely not suitable as it lacks dense, spiny shrubs for nest sites. Some potential exists for this species to occur in Joshua tree woodland in the proposed transmission line route. However, despite regular biological surveys from December to June, none were detected singing in Joshua tree woodlands near the site or the proposed transmission line route.	Unlikely
Mountain plover	*Charadrius montanus*	CSC (wintering)	Wintering only in California	Uses open grasslands and plowed or burned fields with little or no vegetation. Avoids areas with cover. Twenty-four were observed approximately 3.5 miles east of the Project site on March 13, 1999 (CNDDB).	The site lacks suitable areas of short to no vegetation necessary for this species to winter. Some potential exists for this species to winter in agricultural fields in the proposed transmission line route.	Unlikely

TABLE 4-11 (CONTINUED)
SPECIAL-STATUS WILDLIFE NOT OBSERVED BUT WITH POTENTIAL TO OCCUR WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Common Name	Scientific Name	Regulatory Status	Nesting/ Breeding Period	Habitat Requirements	Site Suitability/Survey Results	Potential to Occur
Short-eared owl	*Asio flammeus*	CSC (nesting)	March – July	Open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh water wetlands with emergents. Requires dense, low-growing vegetation; uses tall grasses, brush, ditches, and wetlands for resting and roosting; and nests on dry ground in a depression concealed in vegetation.	The site lacks suitable dense ground cover for roosting and nesting. Although this species may have bred east of Lancaster in 1995 (Garrett and Molina 1998), breeding has not been confirmed in the Antelope Valley.	Unlikely
Swainson's hawk	*Buteo swainsoni*	SE (nesting)	Late March – August	Open stands of trees in juniper-sage flats, riparian areas, and oak savanna. Forages in adjacent grasslands or suitable grain or alfalfa fields, or livestock pastures. Feeds on a variety of vertebrates during the breeding season.	Suitable foraging habitat if found over much of the site, and suitable trees for nesting are near the ranch house south of SR-138. The nearest known nesting by this species was 5 miles to the east northeast, in 2009 and previously.	Possible
White-tailed kite	*Elanus leucurus*	FP (nesting)	February – August	Forages for small rodents in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands. Roosts in trees with dense canopies. Nests near top of dense oak, willow, or other tree. May forage miles from roost site, but has relatively small home range during breeding season.	Suitable foraging habitat on the Project site. The orchard south of SR-138 is marginal habitat for roosting and unsuitable for nesting.	Unlikely

TABLE 4-11 (CONTINUED)
SPECIAL-STATUS WILDLIFE NOT OBSERVED BUT WITH POTENTIAL TO OCCUR WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Common Name	Scientific Name	Regulatory Status	Nesting/ Breeding Period	Habitat Requirements	Site Suitability/Survey Results	Potential to Occur
Mammals						
American badger	*Taxidea taxus*	CSC	February – May	Open, dry, shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, uncultivated ground, preys on burrowing rodents.	Nearest sighting was 2 miles south of Project site in similar habitat (1904). Nearly all of Project site was cultivated in the past, but is recovering. Burrowing rodents do occur on Project site. Ground appears to be suitable for denning. Field surveys to date did not locate any badger burrows on Project site or proposed transmission line route.	Possible
Mojave ground squirrel	*Spermophilus mohavensis*	ST	March – May	Optimum habitats are open desert scrub, alkali desert scrub, and Joshua tree woodlands. Can feed in annual grasslands. Very rare throughout its range. Negatively affected by agriculture.	Cultivation of Project site since late 1940s made habitat unsuitable. Development and agriculture throughout western Antelope Valley have extirpated local populations west of Lancaster (Laabs 2004).	Very low
Pallid bat	*Antrozous pallidus*	CSC	Mating: October – February; birth and rearing of young: April – August	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temps, very sensitive to disturbance of roost sites.	Suitable breeding habitat and roost sites do not occur in the Project area or proposed transmission line route, but suitable foraging habitat does occur. No recorded sightings near Project area in CNDDB. May roost in abandoned buildings.	Unlikely, foraging only

TABLE 4-11 (CONTINUED)
SPECIAL-STATUS WILDLIFE NOT OBSERVED BUT WITH POTENTIAL TO OCCUR WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

Common Name	Scientific Name	Regulatory Status	Nesting/ Breeding Period	Habitat Requirements	Site Suitability/Survey Results	Potential to Occur
Tehachapi pocket mouse	*Perognathus alticolus inexpectatus*	CSC	Unknown (Best 1994)	Known from a few scattered localities from Tehachapi Pass to the area of Mt. Pinos, and around Elizabeth, Hughes, and Quail Lakes. Known localities are between about 3,500 and 6,000 feet in elevation. Habitat requirements "not well defined."	Project area below known elevation limit for this species. Sighting is 7 miles south of Project site near Elizabeth Lake in foothill habitat very dissimilar to that found on the Project site or proposed transmission line route.	Very low
Townsend's big-eared bat	*Corynorhinus townsendii*	CSC	Mating: November – February; birth and rearing of young: May – August	Wide variety of habitats including desert scrub. Most common in mesic habitats. Roost in mines, caves, or abandoned buildings. Extremely sensitive to roost disturbance.	Possible foraging habitat on the Project site and proposed transmission line route, but no mesic conditions exist. No roosting habitat exists on the Project site or proposed transmission line route.	Unlikely, foraging only

Status Definitions:
CSC = California Species of Concern.
FE = Federally Endangered.
FT = Federally Threatened.
FP = State Fully Protected.
SE = State Endangered.
ST = State Threatened.
SR = State Rare.
SA = Special Animal.
SBS = Los Angeles County Sensitive Bird Species.

4.11.2.1 Reptiles and Amphibians

Two sensitive reptile species have potential to occur within the Project site and/or the proposed transmission line route but were not detected during biological field investigations, and are described below.

4.11.2.1.1 Desert Tortoise (*Gopherus Agassizii*, ESA-threatened, CESA-threatened). The desert tortoise occurs in the Mojave and Sonoran deserts of southeastern California and southern Nevada, and south through Arizona into Mexico. Within the known range, the desert tortoise is most commonly found in desert washes, canyon bottoms, and rocky hillsides below 3,530 feet elevation. The dominant shrub commonly associated with desert tortoise habitat is creosote bush (*Larrea tridentata*). Other shrubs including white bursage, cheese bush (*Hymenoclea salsola*), Desert senna (*Cassia armata*), and Mojave prickly-pear (*Opuntia mojavensis*) provide suitable habitat for the desert tortoise. Desert tortoise spend 95 percent of their lives underground; therefore, suitable soil is a requirement for burrow construction. Throughout most of the Mojave Desert, desert tortoises occur most commonly on gently sloping terrain with soils ranging from sand to sandy-gravel and with scattered shrubs, and where there is abundant inter-shrub space for growth of herbaceous plants. Desert tortoises can also be found in steeper, rockier areas throughout their range. Although the Project site and proposed transmission line route are within the historic range of the desert tortoise, land use practices within the western Antelope Valley have altered the native desert habitats (i.e., Joshua tree woodland) required by the desert tortoise. The most recent range maps show this species occurring predominately east of SR-14 in the Lancaster area, over 13 miles from the Project site. There are no recent sightings within the vicinity of the Project site. Since the 1950s, losses of tortoise populations in the Antelope Valley and other areas of the western Mojave Desert have been attributed to urbanization and agriculture (USFWS 2008). Once converted to agricultural fields, the habitat becomes unsuitable for tortoises for foraging or burrowing (USFWS 2008). Agricultural activities may also result in the invasion of non-native plant species that may reduce the abundance and diversity of the native species that provide shelter and food for desert tortoises (USFWS 2008). Agricultural fields can also support common ravens, which prey on juvenile tortoises. Agricultural cultivation from the late 1940s to 1995 has eliminated the habitat quality for this species on the Project site; further reducing the suitability of the site for this species. Additionally, desert tortoises are unlikely to be present in the small stretches of Joshua tree woodland that the proposed transmission line route would cross, because of its proximity to a busy road, and the relatively small patches of native habitat (Bransfield 2009). The USFWS concurred with this assessment in an e-mail from Ray Bransfield dated July 9, 2009. This letter stated that "…desert tortoises are highly unlikely to be present" and that the FWS did not recommend protocol tortoise surveys (See Appendix O). They did, however, recommend an avoidance strategy that includes pre-construction surveys and worker education in the unlikely case a desert tortoise should be found on the site (USFWS 2009).

4.11.2.1.2 California legless lizard (*Anniella pulchra, CSC*). The California legless lizard, *Anniella pulchra*, is a fossorial reptile that is easily mistaken for a small snake. They can rapidly tunnel through loose, sandy soil or under leaf litter where they hunt for small insects around the bases of shrubs (Californiaherps.com). Loose, moist soil and leaf litter are important habitat components (Stebbins 2003; Californiaherps.com; CDFG 2008). They can be found in areas of sparse vegetative cover in various habitats including beaches, chaparral, pine-oak woodlands, and riparian areas. They can occasionally be found in desert scrub habitats (Stebbins 2003). Agricultural activities, housing developments, and uses which trample the soil such as OHVs and cattle grazing are detrimental to this species.

The range in which California legless lizards are commonly found includes the coastal ranges from Contra Costa County south to the Mexican border. Throughout the rest of their range there are only scattered, isolated occurrences of the lizard. This includes the floor of the San Joaquin Valley from San Joaquin County south, the west slope of the southern Sierra, the Tehachapi Mountains west of the Mojave Desert, and the mountains of southern California (CDFG 2008). The closest occurrence is approximately 11 miles to the south-east of the Project site, near the city of Lancaster, in 1988 (CNDDB 2008). The CNDDB database refers to it the silvery legless lizard, but it is the same species *Anniella pulchra*.

In general, the Project site lacks moist soils and leaf litter cover. The tilling associated with dry farming in the recent past would have been very detrimental to the habitat for this species both on-site and throughout adjacent properties. Therefore, it is very unlikely that the California legless lizard would occur within the Project site.

4.11.2.2 Birds

Eight sensitive bird species have potential to occur within the Project site and/or along the proposed transmission line route but were not detected during biological field investigations, and are described below.

4.11.2.2.1 California Condor (*Gymnogyps Californianus*, ESA-endangered, CESA-endangered, Fully Protected). Within California, the California Condor is restricted to a small population in the south-central portion of the state. Condors prefer mountains, gorges, and hillsides, which create updrafts, thus providing favorable soaring conditions. They nest in caves, in crevices, behind rock slabs, or on large ledges on high sandstone cliffs. The California Condor's diet consists of medium and large-sized dead mammals such as cattle, sheep, deer, and horses in various states of decay. A 9-quadrangle query of CNDDB produced one record of in the Tehachapi Mountains, approximately 13 miles northwest of the Project site, in 1976. The Biological Constraints Analysis (URS 2009) erroneously stated that URS biologists observed a condor over the Project site; this species was not observed during biological surveys. Condors may travel several hundred miles in search of food, and could potentially fly over the Project site or the proposed transmission line route; however, the lack

of large mammals in the area, as well as the flat landscape and lack of suitable updrafts, make the Project site unsuitable foraging habitat for this species.

4.11.2.2.2 Ferruginous Hawk (*Buteo Regalis*, CDFG Watch List Species). The ferruginous hawk is an uncommon winter resident and migrant at lower elevations and open grasslands in the Modoc Plateau, Central Valley, and Coast Ranges. It is also a fairly common winter resident of grasslands and agricultural areas in southwestern California, including in the Antelope Valley, but is not known to breed in the state. Ferruginous Hawks breed in the Great Basin, Rocky Mountains, and Great Plains, generally arriving in California beginning in September and departing by mid-April. They roost in open areas, usually in a lone tree or utility pole. The species feeds on rabbits, ground squirrels, and mice, and also on birds, reptiles, and amphibians. The California annual grasslands and wildflower fields within the Project site and proposed transmission line route include an ample supply of prey, including black-tailed jackrabbits, and ferruginous hawks are expected to forage there.

4.11.2.2.3 Golden Eagle (*Aquila Chrysaetos*, Fully Protected). The golden eagle is an uncommon permanent resident and migrant throughout California, excepting the center of the Central Valley. The species ranges from sea level up to 11,500 feet, and typically prefers to inhabit rolling foothills, mountain areas, sage-juniper flats, and desert. Secluded cliffs with overhanging ledges and large trees are used for cover. Golden eagles nest on cliffs of all heights and in large trees in open areas. They may occasionally forage on the Project site or proposed transmission line route, but suitable nesting habitat is not present in either location, and this species is not known to nest in the area (S. Harris, CDFG, personal communication, January 2009).

4.11.2.2.4 Le Conte's Thrasher (*Toxostoma Lecontei*, CSC). This species is an uncommon to rare, year-round resident in southern California deserts from southern Mono County south to the Mexican border, and in the western and southern San Joaquin Valley. Le Conte's Thrashers commonly place their nests in dense, spiny shrubs or in densely branched cactus in desert wash habitat, 1.5 to 3.5 feet above the ground. The species occurs primarily in open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats. Le Conte's Thrashers feed mainly on insects and spiders, but occasionally feed on plant seeds, bird eggs, and small lizards (Sheppard 1996). This species was recorded approximately seven miles north of the Project site in 1968 (CNDDB). However, the lack of larger, spiny shrubs suitable for nesting makes it unlikely that the species occurs on-site. The Joshua tree woodland near the Project site, and along a portion of the proposed transmission line route, may be suitable habitat for this species. However, the species was not detected despite frequent biological surveys near the Joshua tree woodland.

4.11.2.2.5 Mountain Plover (*Charadrius Montanus*, CSC When Wintering). This species winters in California from September through March. During this season, it is generally present in the Central Valley from Sutter and Yuba Counties southward, in foothill valleys

west of the San Joaquin Valley, in the Imperial Valley, in the western Mojave Desert, and along the central Colorado River valley. Mountain Plovers are primarily insectivorous, and in winter in California they prefer fallow, grazed, or burned sites with mean vegetative heights less than 2.5 inches (Hunting and Edson 2008). A CNDDB query yielded one mountain plover sighting 3.5 miles east of the Project site in 1999. However, this species is unlikely to occur at the Project site due to absence of the short-grass habitat it prefers. Some potential does exist for this species to occur in agricultural fields along the proposed transmission line route, when conditions are suitable.

4.11.2.2.6 Short-eared Owl (*Asio Flammeus*, CSC When Nesting). This species winters uncommonly over much of California and breeds in northeastern California, the San Joaquin Valley and parts of the Sacramento Valley, in most of Mono County, and in isolated locations in coastal central and southern California. This species is a year-round resident in many of these areas, where the population increases with influxes of birds from the north from September to March (Roberson 2008). It is usually found in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh water wetlands with emergents. This owl requires dense, low-growing vegetation; uses tall grasses, brush, ditches, and wetlands for resting and roosting; and nests on dry ground in depressions concealed by vegetation. This species has not been confirmed to breed in the region, although it may have bred east of Lancaster in 1992 (Garrett and Molina 1998). The lack of dense ground cover within the Project site and along the proposed transmission line route makes this species' occurrence on-site in winter and in the breeding season unlikely.

4.11.2.2.7 Swainson's Hawk (*Buteo Swainsoni*, CESA-threatened). This raptor nests uncommonly in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert. Most Swainson's hawks winter in Argentina (England, Bechard, and Houston 1997). The species is generally present in California from March to October. Swainson's hawks breed in open stands of trees in juniper-sage flats, riparian areas, and oak savanna, and forage in adjacent grasslands or suitable grain or alfalfa fields, or livestock pastures. They feed on a variety of vertebrates during the breeding season. A pair of Swainson's hawks nested approximately 5 miles east northeast of the Project site in 2009. Four other pairs were known in the Antelope Valley that year (J. Feenstra, personal communication). The Project site contains suitable foraging habitat for this species. On the Project site, the trees near the ranch house south of SR-138 may be suitable for nesting, and this species may potentially use Joshua trees and utility poles in the proposed transmission line route for nesting. However, this species was not detected within the Project site during biological field investigations conducted in 2009.

4.11.2.2.8 White-tailed Kite (*Elanus Leucurus*, Fully Protected). The white-tailed kite is an uncommon, yearlong resident in coastal and valley lowlands of the Pacific Slope. White-tailed kites are rarely found away from agricultural areas. The species nests in tree tops with

dense foliage, including orchards and riparian areas, and forage in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands. In winter, they often roost communally in trees with dense canopy cover. While habitats within the Project site and along the proposed transmission line route may be suitable for foraging by this species, and some trees of suitable height for nesting (10 to 150 feet) are located near the ranch house on-site and near 170th Street West and Gaskell Road in the proposed transmission line route, none of these trees have the dense crown structure required for nesting by white-tailed kites.

4.11.2.3 Mammals

Five sensitive mammal species have potential to occur within the Project site and/or the proposed transmission line route but were not detected during biological field investigations, and are described below.

4.11.2.3.1 American Badger (*Taxidea Taxus*, CSC). The badger is an uncommon, permanent resident found throughout most of the state. It is most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Badgers are generally associated with treeless regions, prairies, park lands, and cold desert areas. They need sufficient food, uncultivated ground, and burrowing rodents for their prey base. The closest occurrence to the Project site recorded in the CNDDB was an observation in 1904, roughly two miles south of the site. Although the majority of the Project site has been cultivated as recently as 1995, burrowing rodents (white-tailed antelope squirrel) occupy the Project site, suggesting that habitat suitability the American badger is recovering. Therefore, badgers may potentially occur on-site, although no badger burrows were observed during field visits in 2008 and 2009. Badgers may also potentially occur within the natural habitats found along the proposed transmission line route, although no individuals were observed during 2008–2009 surveys.

4.11.2.3.2 Mohave Ground Squirrel (*Spermophilius Mohavensis*, CESA-threatened). This rare, burrowing rodent occurs exclusively in the Mojave Desert. Optimal habitats include open desert scrub, alkali desert scrub, and Joshua tree woodlands. Joshua tree fruits are a favored food source, but Mohave ground squirrels eat a wide variety of green vegetation, seeds, and fruits, and can also forage in annual grasslands (CDFG 2008a). The species has the ability to forgo reproduction and aestivate for long periods when rainfall is insufficient to provide forage. Prolonged drought periods can lead to the extirpation of local populations, and these areas are re-colonized from remaining populations during years of good forage production (BLM 1999). However, agriculture and urban development have fragmented the habitat and prevented the re-colonization of some areas, greatly reducing the population and range of the Mohave ground squirrel over the past several decades. Current range maps and occurrence data indicate that the species is no longer found west of SR-14 (Laabs 2004). Given the Project site's location and history of agricultural use, the Mohave

ground squirrel is not expected to occur on the Project site or along the proposed transmission line route.

4.11.2.3.3 Pallid Bat (*Antrozous Pallidus*, CSC). This species occurs throughout California, but is most common in open, dry habitats with rocky areas for roosting. Pallid bats forage primarily on the ground or by gleaning insects from low vegetation, rarely taking aerial prey. They roost mainly in rocky areas, but can use caves, mines, bridges, and abandoned buildings as well. The species is very susceptible to roost disturbance and intolerant of high temperatures. Since pallid bats require very specific roost site characteristics, they are very vulnerable to displacement. They generally forage within three miles of their day roost (CDFG 2008a). The Project site and proposed transmission line route do not contain suitable roosting habitat for this species; however, an area of rock outcrops on Fairmont Buttes may provide suitable roosting habitat, in which case the Project site and the proposed transmission line route would provide suitable adjacent foraging habitat.

4.11.2.3.4 Tehachapi Pocket Mouse (*Perognathus Alticolus Inexpectatus*, CSC). The Tehachapi pocket mouse occupies a variety of habitats from 3,500 feet to 6,000 feet elevation, preferring grasslands, Joshua tree and pinyon-juniper woodlands, oak savannah, chaparral, coastal sage, and open pine forests. The known range of this species extends along the mountainous western fringe of the Mojave Desert from Tehachapi Pass southwest toward Gorman, and back to the east along the Transverse Ranges to Elizabeth Lake, within the County's proposed San Andreas Rift Zone SEA (SEA #21) (BLM 1999). Pocket mice are primarily nocturnal granivores, but little is known about their natural history. Their small, widely scattered populations are very vulnerable to localized extirpation from natural events and human activities. The Project site and proposed transmission line route are below the known elevation range of this species. The closest sighting to the Project site recorded in the CNDDB database dates from 1981, near Elizabeth Lake approximately 7 miles south of the site, and occurred in terrain and vegetation types very different from those found at the Project site. The Tehachapi pocket mouse is not expected to occur on the Project site or along the proposed transmission line route.

4.11.2.3.5 Townsend's Big-eared Bat (*Corynorhinus Townsendii*, CSC). This avian mammal occurs throughout California in nearly all habitats except subalpine and alpine. It is most abundant in mesic (moist) habitats and requires open water for drinking. The species forages aerially, primarily for moths. They can roost in caves, mines, tunnels, and buildings, but hibernate only in caves and abandoned mines. Big-eared bats are extremely sensitive to roost site disturbance and have been known to abandon a roost after only one disturbance (CDFG 2008a). The Townsend's big-eared bat was once common, but populations have declined drastically in recent decades. Roost site disturbance has been the biggest factor in this decline. The Project site and proposed transmission line route do not contain suitable roosting habitat for this species, although limited foraging opportunities may be available.

Due to the lack of suitable roosts and mesic conditions, the habitat within the Project site and along the proposed transmission line route are of low quality for this species.

4.11.3 Sensitive Natural Communities

The CNDDB search identified three sensitive natural communities within the nine-quadrangle search of the Project site and vicinity: wildflower field, valley needlegrass grassland, and southern willow scrub (Figure 4-7). Wildflower field habitat was identified on the Project site during spring 2009 surveys and is discussed in Section 4.10.2.1 above. Southern willow scrub is not described below, as there is no potential for this riparian community to occur on-site.

4.11.3.1 Valley Needlegrass Grassland

Valley needlegrass grassland habitat is located east of the Fairmont Butte, in the northeast corner of the Lake Hughes quadrangle, approximately one mile southeast of the Project boundary. This mid-height (to 2 feet) grassland community is characterized by the perennial, tussock-forming purple needlegrass (*Nassella pulchra*). Native and introduced annual plants occur between the perennial species, often actually exceeding the bunchgrasses in cover. Soil requirements include fine-textured (often clay) soils, which become moist or even waterlogged during winter, but very dry in summer. Valley needlegrass grassland often integrates with oak woodlands on moist, well-drained sites. These habitats were formerly extensive around the Sacramento, San Joaquin, and Salinas Valleys, as well as the Los Angeles Basin, but are now much reduced. Only a few isolated needlegrass plants were observed during botanical surveys of the Project site, and none were detected on the proposed transmission line route; therefore this sensitive habitat is not expected to occur.

4.12 WILDLIFE MOVEMENT LITERATURE REVIEW

Wildlife movement/migration routes link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization tends to create isolated “islands” of wildlife habitat. Wildlife movement activities usually fall into one of three movement categories: dispersal (e.g., juvenile animals from natal areas or individuals extending range distribution), seasonal migration, and movements related to home range activities (e.g., foraging for food or water, defending territories, or searching for mates, breeding areas, or cover).

A number of terms such as “travel route,” “wildlife corridor,” and “wildlife crossing” have been used in various wildlife movement studies to refer to areas in which wildlife move from one area to another. To clarify the meaning of these terms and to facilitate the discussion on wildlife movement in this analysis, these terms are briefly defined as follows:

- Travel Route – A landscape feature such as a ridgeline, drainage, canyon, or riparian strip within a larger natural habitat area that is used frequently by animals to facilitate movement and provide access to necessary resources (e.g., water, food, cover, den sites).
- Wildlife Corridor – A piece of habitat, usually linear in nature, that connects two or more habitat patches that would otherwise be fragmented or isolated from one another.
- Wildlife Crossing – A small, narrow area, relatively short in length and generally constricted in nature, which allows wildlife to pass under or through an obstacle or barrier that otherwise hinders or prevents movement.

The South Coast Wildlands website (2008) was consulted to determine the presence of wildlife corridors within the region of the Project site. The South Coast Wildlands Missing Linkages Project aims to maintain and restore connections between wildlands in the South Coast Ecoregion and addresses fragmentation on a landscape scale by identifying and prioritizing linkages that conserve essential biological and ecological processes. Linkage designs are based on state-of-the-art GIS analyses informed by experts on numerous focal species, which cover a broad range of habitat and movement requirements such that planning adequate linkages for their needs is expected to cover connectivity needs for the ecosystems they represent. The focal species used for the wildlife linkage analysis include large mammals such as mountain lion and mule deer which may utilize the entire linkage pathway in one generation as well as smaller species such as rodents and lizards which would use the linkage over many generations.

Figure 3-7 shows the linkages in the region surrounding the Antelope Valley as identified by the South Coast Wildlands Missing Linkages Project. These linkages include: the Tehachapi Linkage, which connects the Sierra Madre and Castaic Ranges with the Sierra Nevada Ranges; the Sierra Madre-Castaic Linkage, which connects these two ranges; and the San Gabriel Mountains-Castaic Range Linkage, which connects these mountain ranges. The South Coast Wildlands linkage map indicates that wildlife utilize the mountain ranges surrounding the Antelope Valley to connect fragmented habitats and that these wildlife corridors exclude the majority of the Mojave desert habitat located within the Antelope Valley. Most wildlife favor the mountain and foothill regions for travel since they are less impacted by human development and provide greater topographic and vegetative cover compared to the homogeneous and exposed valley floor. In addition, the Mojave Desert has little available surface water and experiences temperature extremes during a large part of the year, and the San Joaquin Valley is intensively cultivated and lacks cover. Thus, the primary movement of terrestrial wildlife in the region follows along the mountainous terrain of the Tehachapi Range and San Andreas Rift Zone (South Coast Wildlands 2008).

The CNDDB website (CDFG 2008b) was also consulted to determine the presence of wildlife corridors within the region of the Project site. This website provides information on range maps and life histories of many wildlife species in the state. The website indicated that

the Project location is not likely to be used by large mammals (deer, elk, antelope, cougar, and bear) for habitat or movement corridors. The closest occurrence of antelope documented in the CNDDB is 18 miles to the northwest of the Project site; however, the SEATAC notes from a July 7, 2008 meeting state that antelope "have been recorded straying as far south as the [Antelope Valley California] Poppy Reserve." Historically, antelope were common in Antelope Valley, but for the most part have been eliminated. Tule elk occur about 30 miles north of the Project site. The Antelope Valley does not provide suitable habitat for elk. The mule deer range map from the California Wildlife-Habitat Relationships program (CDFG 1996 with updates 2008, Version 8.2) indicates that deer do not use the Mojave Desert area, although they are known to occur within the mountain ranges to the north and south. CDFG biologist Scott P. Harris reported that deer do make incidental use of the area, but there are no migration routes or movement corridors in the Project area. Field visits in 2008 and early 2009 did not note any mule deer sign (tracks or scat).

No regional wildlife movement corridors are known to exist on the floor of the western Antelope Valley in the vicinity of the Project site. On a smaller scale, the flat terrain and rabbitbrush cover within the site and surrounding vicinity allows small and medium-sized mammals to move about freely. This freedom can be limited in areas containing human development, roads, fences, and cultivated areas lacking in cover. Local wildlife movement is typically focused on areas of low human disturbance, high availability of cover, and ease of travel. These characteristics are best provided by drainage channels, since they provide topographic relief for cover, are usually undeveloped, and contain sparser vegetation than surrounding uplands, making them easier to move along. Within the Project site, numerous wildlife tracks observed on the floor of the drainages during each field survey were an indication of the level of use they were receiving as local travel ways for wildlife.

The Project site is bounded by similar habitat types found within the Project site to the south, west, and the majority of the eastern boundary (Figure 3-4). The Fairmont-Antelope Buttes southeast of the site represent more of a topographic change rather than a habitat type change. Joshua tree woodlands adjacent to the northern boundary and a small portion of the eastern boundary provide a habitat type not found on the Project site. The proposed transmission line route is also bounded by similar habitats found within the route. Natural habitats within the proposed transmission line are disjointed due to the existence of developed and agricultural areas along the route (Figure 3-5). The habitat surrounding the proposed transmission line routes was not characterized, but given the narrow linear nature of the proposed transmission line route, the habitats represented along the route reflect the greater land use that surrounds them, in some cases for miles. Joshua tree woodlands are present within a small portion of the proposed transmission line route.

Within the Project site, the on-site drainages provide local travel routes for wildlife. These drainages are natural conduits of movement for wildlife due to reduced obstacles (less vegetation within the channel bottoms) and increased topographic cover. Although large

mammals are not likely to utilize the Project site for wildlife movement, the site itself may represent the entire range of smaller wildlife species including lizards and rodents. The ranges of more mobile, medium-sized wildlife such as coyotes would not be expected to be limited to the Project site. The tracks of coyote, fox, jackrabbit, lizards, and rodents were noted in the sandy bottoms of these drainages during all field visits. Numerous small- to large-sized burrows were also observed within these drainages. In addition, burrowing owl roosting and nesting burrows and individuals were identified within Drainages A and C.

Although the on-site drainages allow for local wildlife movement within the Project site, there was no evidence that these features constitute wildlife corridors connecting isolated blocks of habitat (i.e., Joshua tree woodland habitat). The on-site drainages consist of disjointed sections of defined bed and bank separated by stretches of level terrain without any defined bed and bank features. Additionally, Drainages A, B, and D all terminate within the Project site, and only a small portion of Drainage C is located within the Project site. The on-site drainages are shown on Figure 3-3.

Joshua tree woodland habitat exists only along the northern boundary of the Project site, and a small portion of the proposed transmission line route. With the exception of Drainage D, which ends along the northern boundary, Drainage A is the closest drainage feature on the Project site to any Joshua tree woodland habitat. However, the defined bed and bank portion of Drainage A ends approximately 700 feet south of the northern Project boundary. The terrain is level at the northern terminus of this drainage and characterized by rabbitbrush scrub until the northern Project boundary. The southern terminus of Drainage A is located at the junction of 170th Street West and SR-138 and there is no culvert structure under these roads that would provide for safe wildlife crossing. The presence of these roads themselves also represents an impediment to wildlife movement.

SECTION 5.0
IMPACTS OF THE PROPOSED PROJECT ON BIOLOGICAL RESOURCES

This section describes the direct, indirect, and cumulative impacts of the proposed Project on biological resources, and identifies those effects determined to be significant. Any significant direct, indirect, and cumulative impacts will require mitigation, and definitions used in the CEQA statute and the State CEQA Guidelines have been adopted to clearly define and differentiate between these three types of impacts.

For purposes of this analysis, direct or primary impacts of the proposed Project would include those effects that are caused by the Project and occur at the same time and place. Examples of direct impacts could include permanent and temporary habitat removal during site preparation, injury or mortality of plants or wildlife by construction equipment, diversion or modification of stream channels, and disruption of wildlife movement routes due to site perimeter fencing.

Secondary or indirect impacts, by contrast, are defined to include impacts that are reasonably foreseeable and caused by a project, but occur at a different time or place. Thus, those Project-related impacts that would occur off-site or later in time are considered indirect impacts. Examples of indirect impacts could include effects on wildlife behavior in adjacent areas due to noise or nighttime lighting at the site and long-term changes in the species composition on-site due to the creation of conditions that may favor particular species, usually those adapted to disturbance or urbanization.

The term "cumulative impacts," as defined at Section 15355 of the State CEQA Guidelines, refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. Thus, in instances where other past, proposed, or reasonably foreseeable future projects in the region would impact the same resource as the proposed Project (such as wildflower field habitat, for example), the cumulative impact on this resource would include the incremental impacts from all of these projects, including the proposed Project.

For the purposes of this Biota Report, the significance criteria assessed in the Initial Study for the proposed Project, issued by the County on April 13, 2009, have been adopted to determine impact significance. The Project's impacts on biological resources would be considered significant if:

- Project-related grading, fire clearance, or flood-related improvements would remove substantial natural habitat areas

- The proposed Project would have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS
- The proposed Project would divert, obstruct, or substantially alter a drainage course depicted on USGS quad sheets as a dashed blue line or that may contain a bed, channel, or bank of any perennial, intermittent or ephemeral river, stream, or lake
- The proposed Project would result in a substantial adverse effect on oak or other unique native trees
- The proposed Project would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS
- The proposed project would interfere substantially with any wildlife corridor, adjacent open space linkage, and any identified resources nearby and on the site
- The proposed Project would adversely affect SEA resources, including linkages to other SEAs, or undisturbed habitats

Impacts of the proposed Project on biological resources are assessed per the criteria listed above in Section 5.1 through Section 5.7, below. The Project's cumulative impacts are addressed in Section 5.8 of this Biota Report.

5.1 IMPACTS TO EXISTING VEGETATION COMMUNITIES AND LAND COVERS

Criterion: Impacts would be significant if Project-related grading, fire clearance, or flood-related improvements would remove substantial natural habitat areas.

The Project site and proposed transmission line route are located in the western Antelope Valley, an area that has been heavily impacted for decades by agricultural development and human encroachment. Natural vegetation communities such as Joshua tree woodlands and native grasslands have been removed and fragmented, altered by the introduction of agricultural crops and non-native plant species, and grazed by cattle and sheep. Nevertheless, six natural vegetations communities, along with four human-induced land cover types, can be found within the Project site and along the proposed transmission line route. These communities provide habitat for a variety of plant and wildlife species that are found throughout the region.

As discussed in Section 4.2 above, the Project site occupies approximately 2,100 acres, of which approximately 2,063 acres contain natural vegetation. The proposed transmission line route traverses approximately 4.25 miles along 170th Street West, north of the Project site, and would be constructed within the existing road ROW. The area of the road ROW (both

east and west sides) along the proposed transmission line route totals 49.9 acres, of which 13.4 acres contain natural vegetation. Impacts from the implementation of the proposed Project would result in permanent loss of habitat and habitat modification resulting from Project-related shading of vegetation, excavation of infiltration basins and the spreading of the associated spoils and the vegetation management program. Impacts of the proposed Project on existing vegetation are discussed in this Section. Impacts specific to sensitive natural communities are addressed in Section 5.2 of this Biota Report.

5.1.1 Impact Analysis Methods

As stated in Section 4.2 of this Biota Report the biological field investigations conducted in spring 2009 included vegetation mapping within the Project site and along the proposed transmission line route. Within the Project site, the mapped vegetation was digitized into GIS shape files, and a layer was created that provided mutually exclusive, mutually exhaustive coverage of the site. In other words, every point on-site was assigned a mapped vegetation or land cover type, and no point was assigned more than one type. The resulting coverage is presented on Figure 3-4. Along the proposed transmission line route, vegetation was initially mapped as two transect lines, one on either side of 170th Street West, with varying vegetation types mapped in a single dimension (see Figure 3-5). To facilitate impacts analysis, a two-dimensional coverage was extrapolated from the linear transect data by extending the vegetation laterally to create polygons. Because all transmission line-related ground disturbance would be restricted to areas within the 170th Street West ROW, the outer limits of the ROW were used as the outer limits of the vegetation polygons. Finally, the boundaries of the roadbed itself were digitized and mapped as developed area, separating the polygons on the east and west sides of the road.

After the vegetation maps were completed as described above, the proposed Project site plan (Figure 2-1) was transferred from AutoCAD to a georeferenced GIS format, and the various Project components were assessed for impacts. Primarily, each proposed facility was assigned an attribute describing the type of ground disturbance that would occur within the polygon: permanent disturbance, habitat modification, or no ground disturbance. This coverage was mutually exclusive and mutually exhaustive, ensuring that every part of the Project site was ascribed one, and only one, ground disturbance classification. Next, the impacts of the habitat modification was further broken down into three categories, including facility-related shade (footprint of the proposed solar PV panels), excavation of infiltration basins and the spreading of the associated spoils and vegetation management practices. This layer was independent of the ground disturbance coverage, indicating that areas could potentially be subject to both ground disturbance and shading/vegetation management.

Finally, the ground disturbance and habitat modification coverages were overlain onto the vegetation maps described above using GIS software, and the acreages of each vegetation

type to be permanently disturbed or subject to a particular habitat modification, were calculated.

5.1.2 General Descriptions of Impacts

As described above, impacts of the proposed Project on existing vegetation were classified in terms of permanent disturbance and habitat modification. To facilitate a greater understanding of the changes to existing conditions that would occur in areas proposed for permanent disturbance or habitat modification, these impacts are described generally below.

5.1.2.1 Permanent Impacts from Ground Disturbance

Areas subject to permanent impacts from ground disturbance are those locations that would be directly occupied by Project facilities and the fire breaks around the perimeter and transecting the Project site. Examples of the Project facilities include the footprints of buildings, PV panel foundations, and access roads to name a few; the site plan depicted in Figure 2-1a includes all facilities proposed. See Figure 2-1d for locations of the fire breaks. Existing vegetation in these areas would be cleared to facilitate construction of the proposed facilities and the fire breaks. The ground surface would be occupied by these facilities after construction or in the case of the fire breaks, the ground surface would be will be regularly maintained to ensure that vegetation does not become established. In areas subject to permanent impacts from ground disturbance, existing habitats would be permanently lost, as the post-Project condition would no longer support vegetation. The locations within the Project site and along the proposed transmission line route where permanent impacts from ground disturbance would occur are depicted graphically on Figures 5-1 and 5-2.

5.1.2.2 Habitat Modification from Ground Disturbance

In addition to the permanently impacted areas described above, the proposed Project would also require vegetation removal in some areas outside the immediate footprint of proposed facilities. These areas would include temporary access roads, construction zones around the footprints of Project components such as buildings, transformer/inverter boxes, cutoff walls, and transmission line poles, and areas where earthwork would be required for site preparation, such as trenching for underground wiring. In areas where the site grading plan (Figure 2-7) proposes the excavation and placement of fill, such as the construction of infiltration basins habitat modification impacts from ground disturbance would occur. As with permanently impacted areas, the currently existing vegetation would be removed during site preparation or construction activities. However, whereas permanently impacted areas would be occupied by Project facilities or fire breaks and would lose their long-term habitat value, habitat modification areas would be revegetated following construction according to the County and CDFG approved Habitat Enhancement and Vegetation Management Plan (HEVMP), in an effort to maintain habitat value within the Project site to the extent feasible. The locations within the Project site and along the proposed transmission line route where

habitat modification from ground disturbance would occur are depicted graphically on Figures 5-1 and 5-2.

Although clearly not as destructive as permanent impacts, habitat modification impacts from ground disturbance can nevertheless result in long-term effects on natural habitats. Even when the original grade and topography are restored, the initial vegetation removal and ground disturbance render the impact areas more susceptible to invasion by non-native plant species. In addition, due to the time lag between the time these impact areas are first disturbed and the time replacement vegetation matures, a temporal loss of habitat function occurs. The extent of this temporal loss depends on the type of vegetation removed, but in this case it should be less than a year for habitats dominated by herbaceous annual species. The primary modification taking place in these areas is the conversion of brush-dominated habitats to a predominately grass and forb-dominated habitat.

Currently, the portion of the proposed Project Description dealing with revegetation of habitat modification impact areas, presented in Section 2.5.6.12 of this Biota Report, directs that a plan for the revegetation of disturbed areas will be prepared prior to Project construction. However, a substantial portion of the area on-site to be impacted by temporary roads would also be subject to shading and vegetation management practices, and it is uncertain whether revegetation efforts would be successful in those locations. As the proposed revegetation plan is identified in the Project Description without details, the plan as described in the Project Description alone cannot be relied upon to reduce impacts of the proposed Project.

5.1.2.3 Alteration of Habitat through Shading and Vegetation Management Program

As described in Section 2.0 of this Biota Report and illustrated on Figure 2-1, the proposed Project would include a total of 706,500 PV solar panels, and proposed solar arrays would occupy an area of approximately 1,676 acres. In addition, as part of the vegetation management program, vegetation will be periodically mowed, treated with limited use of herbicide, or grazed if appropriate. Vegetation will typically be mowed to a height of approximately 3 to 6 inches annually at end of May after the majority of annual natives have set seed to allow for reseeding; however, selective mowing may occur at other times if necessary for equipment maintenance and operation and fuel management for fire protection. Although the area below the panels would not necessarily be graded or cleared during construction, the panel shading and proposed vegetation management would result in long-term alterations to the vegetation communities within the solar array.

5.1.2.3.1 Impacts of Shading from Solar PV Panels. Because the primary intent of the PV panels is to capture the maximum possible amount of sunlight, and because the facilities would rotate to track the sun's movement throughout the day, the panels necessarily obstruct the majority of the irradiance that would otherwise contact the ground surface under the

panels. Data on the environmental effects of such installations are limited. However, two previous studies evaluating the effects of solar thermal generating collectors (mirrors) have documented physical effects including substantially reduced irradiance, decreased maximum ground surface temperatures, increased nighttime ground surface temperatures, and decreased precipitation (Smith 1980; Smith et al. 1987). These physical changes were manifested on the plants underneath the panels, which exhibited phenologic effects including larger individual plant size, a later biomass peak, and delayed senescence.

These previous studies have also indicated that in addition to causing plants to undergo adaptations on an individual level, the presence of solar panels can also affect plant community structure. Studies in the Mojave (Smith 1980) and Sonoran (Smith et al. 1987) deserts have shown that the overall plant biomass is substantially lower in sites that are shaded by panels, presumably due to insufficient light. This finding suggests that, although the distributions of desert plant communities are generally dictated by the availability of water rather than light, the shade created by the panels blocks sufficient light to cause an exception to this rule and change the limiting resource in the affected areas. In addition to decreased biomass, solar panels have been shown to increase plant diversity in areas where a single grass species was dominant prior to installation of the panels and the increase in the abundance of non-native species. It is expected that the proposed fuel management practices would lead to an increase in the density of annual grasses and forbs on-site, as the areas currently dominated by shrubs would likely be colonized by these species following mowing of the shrubs.

Maintenance of the solar facilities, primarily washing of the panels and/or mirrors, has also been shown to affect the distribution and abundance of vegetation. A study by Smith (1980) showed that heliostat arrays in the Mojave Desert created “drip lines” at the locations where wash water fell to the ground during cleaning, and that vegetation was visibly denser along these lines compared to adjacent areas. In addition, the study found that the added moisture from washing runoff may have made the sites beneath the heliostats more susceptible to invasion by non-native species, such as the tumbleweed (*Salsola tragus*). This ruderal species is also abundant in the Antelope Valley region, and occurs within the Project site.

Like the proposed Project, the systems evaluated in the Smith (1980) and Smith et al. (1987) studies featured arrays of solar generating facilities with spaces in between the arrays for maintenance and other access. Smith et al. (1987) evaluated the effects of solar panels on the adjacent “gaps” between the arrays, and found that the physical effects in those areas were generally similar to those that occurred beneath the panels (i.e., decreased daytime ground surface and soil temperatures, decreased precipitation), but that these effects occurred to a lesser degree.

Because the proposed Project has physical similarities to the facilities evaluated in the studies discussed above, it is reasonable to assume that the effects of the proposed solar arrays on

vegetation beneath and adjacent to the arrays would have similarities to those observed in the aforementioned studies. However, some key differences between the scenarios exist which could potentially affect the extent to which these impacts could be expected. First, the facility evaluated at Barstow was a solar thermal generating facility, utilizing mirrors to reflect sunlight onto a collector, whereas the proposed Project would use PV panels that absorb light. Because PV facilities require far less frequent washing than do concentrated solar thermal technologies (the proposed Project would only require washing an estimated two times per year, compared to once every two weeks for thermal technologies (Kearney 1989), effects from washing runoff, such as irregular vegetation patterns and invasion by non-native plant species into the arrays would likely be less severe than observed by Smith (1980) at the Barstow facility. Second, the entire heliostat array at the Barstow facility had been cleared of vegetation prior to construction, which may have increased the site's susceptibility to invasion by ruderal plants. The Project site would not need to be cleared of all vegetation to allow installation of the proposed Project; rather, only areas within the permanent facility footprints and temporary construction zones, or within the fire breaks (a total of approximately 980 acres, or 47 percent of the site area), would be cleared. Approximately 400 acres (19 percent) of the site would remain permanently cleared of vegetation (O&M area, substation, roads, and fire breaks).

Nevertheless, the effects of shading identified above would likely contribute to changes the in the structure and composition of the on-site vegetation communities. Smith (1980) states that for plants, the effects would likely include changes in community structure favoring shade-tolerant species, although Smith suggests that increased diversity may also occur. These changes could potentially alter the suitability of these habitats for plants and wildlife. Although the natural vegetation communities within the Project site would be altered as a result of shading from solar arrays and fuel modification impacts from the proposed Project, these vegetation communities have wide geographic distribution and are present throughout the Project region, and would persist in adjacent, undisturbed areas. Impacts of habitat modifications, such as shading, on plants and wildlife species within these natural communities are addressed in Sections 5.5 of this Biota Report.

5.1.2.3.2 <u>Impacts of Vegetation Management Activities</u>. To reduce the risk of fire within the Project site, vegetation management practices would be implemented in portions of the site beneath and surrounding the proposed solar arrays. On-site vegetation would be mowed to a height of approximately 3 to 6 inches annually at end of May after the majority of annual natives have set seed to allow for reseeding; however, selective vegetation removal may occur at other times if necessary for equipment maintenance and operation and fuel management, using mechanical means and limited application of herbicides. Fuel management practices would be implemented year-round, and would affect all vegetation occurring within and surrounding the solar arrays. Vegetation would also be trimmed or cleared on an as-needed basis to avoid entanglement with the solar tracking machinery and to eliminate worker hazards. Portions of the site that are not proposed for solar development,

such as the southernmost portion of the site adjacent to West Avenue E and the portion surrounding the channels of Drainage A and B, would not be subject to vegetation controls. In addition, along the proposed transmission line route, clearances for vegetation will be maintained in accordance with Public Utilities Commission General Order 95 (Rules for Overhead Electric Line Construction).

The cutting of on-site vegetation to a height of 3 to 6 inches would have a substantial effect on the composition of the existing vegetation communities within the Project site, particularly where shrubs are currently dominant. The elimination of shrub-dominated habitats within the Project site would precipitate a change in the wildlife community composition on-site. In herbaceous plant communities, such as California annual grassland and wildflower fields, a large portion of the plants that make up those communities are annuals that bloom and set seed before the end of May when the majority of vegetation would be mowed to the proposed 3 to 6 inch height, so the impact of the mowing during this time would be minimal. Mowing and plant removal that occurs during other times of year would have an impact to these plant communities, particularly if implemented prior to native species setting seed. A few native species that make up these plant communities bloom and set seed in later summer.

It is expected that the proposed vegetation management practices would lead to a habitat conversion of the areas currently dominated by shrubs. These areas would likely be colonized by annual grasses and forbs on-site following mowing of the shrubs. Although the shrub communities within the Project site would be altered as a result vegetation management impacts from the proposed Project, these shrub communities have a wide geographic distribution, are present throughout the Project region, and would persist in adjacent, undisturbed areas. Impacts of habitat modifications, such as vegetation management, on plants and wildlife species within these natural communities are addressed in Section 5.5 of this Biota Report.

5.1.3 Acreages of Vegetation Impacted

This section describes the specific impacts to each vegetation community found within the Project site and along the proposed transmission line route, including permanent impacts, and impacts associated with habitat modifications. Impact acreages for the natural and human-influenced vegetation communities and land covers found on the Project site and proposed transmission line route are presented in Table 5-1 and Table 5-2.

5.1.3.1 <u>Rabbitbrush Scrub</u>

Rabbitbrush scrub is the most extensive natural community present within the Project site, at 1,461 acres. As shown in Tables 5-1 and 5-2, the proposed Project would impact this vegetation type on-site and along the proposed transmission line route by permanently removing all vegetation within 294 acres and temporarily removing all vegetation within 417

TABLE 5-1
PROPOSED REMOVAL OF EXISTING VEGETATION COMMUNITIES WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

	Existing Vegetation (Acres)			Vegetation Removed through Permanent Disturbance (Acres)			Vegetation Altered through Habitat Modification (Acres)		
Vegetation Community	Project Site	Transmission Line Route[1]	Total	Project Site	Transmission Line Route[1]	Total	Project Site	Transmission Line Route[1]	Total
Rabbitbrush scrub	1,451.9	9.5	1,461.3	294.4	<0.1	294.4	415.8	0.8	416.6
California annual grassland	367.7	0.0	367.7	83.2	0	83.2	102.8	0	102.8
Wildflower field	236.3	0.0	236.3	22.5	0	22.5	55.8	0	55.8
Joshua tree woodland	0.0	3.6	3.6	0.0	<0.1	<0.1	0.0	0.1	0.1
Joshua tree recruitment area	7.3	0.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0
Desert saltbush scrub	0.0	0.3	0.3	0.0	<0.1	<0.1	0.0	0.1	0.1
Subtotal natural communities	2,063.3	13.4	2,076.7	400.1	<0.1	400.1	574.4	0.9	575.3
Agriculture[2]	0	3.9	3.9	0	<0.1	<0.1	0	0.5	0.5
Orchard[2]	8.8	0	8.8	0.3	<0.1	0.3	1.9	0	1.9
Ornamental[2]	1.8	0	1.8	0.2	<0.1	0.2	0.6	0	0.6
Ruderal	6.9	1.3	8.2	0.6	<0.1	0.6	1.4	0.1	1.5
Developed[2]	0.9	31.3	32.2	0.2	<0.1	0.2	0.2	3.6	3.8
Total	2,081.7	49.9	2,131.6	401.4	<0.1	401.4	578.5	5.1	583.6

1 Acreage includes all vegetation within the 170th Street West ROW along the proposed transmission line route (both east and west sides).

2 Within the Project site, these human-induced land cover types would be completely removed.

TABLE 5-2
SHADING AND VEGETATION MANAGEMENT WITHIN THE PROJECT SITE

		Areas Subject to Temporary Ground Disturbance[1]		Areas Not Subject to Ground Disturbance[1]	
Vegetation Community	Total Acreage within Project Site	Acreage Subject to Shading and Vegetation Management	Acreage Not Subject to Shading and Vegetation Management	Acreage Subject to Shading and Vegetation Management	Acreage Not Subject to Shading and Vegetation Management
Rabbitbrush scrub	1,451.9	400.4	15.4	612.2	129.5
California annual grassland	367.7	101.6	1.2	169.8	11.9
Wildflower field	236.3	55.5	0.3	130.5	27.5
Joshua tree woodland	0.0	0.0	0.0	0.0	0.0
Joshua tree recruitment area	7.3	0.0	0.0	0.0	7.3
Desert saltbush scrub	0.0	0.0	0.0	0.0	0.0
Subtotal natural communities	2,063.3	557.5	16.9	912.5	176.1
Agriculture[2]	0.0	0.0	0.0	0.0	0.0
Orchard[2]	8.8	1.9	0.0	6.7	0.0
Ornamental[2]	1.8	0.6	<0.1	1.0	0.2
Ruderal	6.9	1.4	<0.1	4.7	0.2
Developed[2]	0.9	0.2	0.0	0.5	0.0
Total	2,081.7	561.6	16.9	925.4	176.5

1 Calculated areas presented do not include permanent disturbance areas for the Project facility structures (i.e., O&M building, substation, PV array system, etc.), fire breaks, or internal roads used during operation.

2 Within the Project site, these human-induced land cover types would be completely removed, and would be replaced with vegetation reflecting natural habitats in the region.

acres of rabbitbrush scrub habitat. The remaining 750 acres of this habitat within the Project site and along the proposed transmission line route would not be cleared.

However, as described in Section 5.1.2.3.2, vegetation management practices within the solar arrays would involve annually cutting vegetation within the solar arrays to a height of 3 to 6 inches, which would result in the conversion of scrub habitat to habitat dominated by annual grasses and forbs. Except for those areas where project activities would result in permanent removal of all vegetation all rabbitbrush scrub habitat within the proposed solar arrays would be converted to annual grassland. Weedy or ruderal species could also become established. Thus, only 139 of the 1,461 acres of rabbitbrush scrub habitat within the Project site and the transmission line corridor would remain after development of the Project.

5.1.3.2 California Annual Grassland

California annual grassland is a major vegetation community within the Project site, encompassing a total of 368 acres, but does not occur along the proposed transmission line route. As shown in Tables 5-1 and 5-2, the proposed Project would impact this vegetation type on-site by permanently removing 83 acres and 103 acres would be impacted by habitat modification. The remaining 182 acres of California annual grassland habitat within the Project site would not be cleared; however, all but 11.9 acres of this total would be affected by shading and vegetation management activities.

The effects of shading and vegetation management described in Section 5.1.2.3 above would likely contribute to changes in the structure and composition of the on-site California annual grassland communities. Shading may cause plants within this community to become stunted, and the fact that the species present are generally not shade-tolerant suggests that long-term persistence and reproductive success of individual species within this community in the shaded areas is uncertain. Because of the herbaceous nature of the California annual grassland habitat, impacts due to vegetation management practices would not be as severe as those expected for taller, shrub-dominated communities such as rabbitbrush scrub. A large portion of the plants that make up the California annual grassland habitat are annuals that bloom and set seed before the end of May when the majority of vegetation would be mowed to the proposed 3 to 6 inch height, so the impact of the mowing during this time would be minimal. Mowing and plant removal that occurs during other times of year would have an impact to these plants, particularly if implemented prior to native species setting seed. A few native species that make up this plant community bloom and set seed in later summer.

5.1.3.3 Wildflower Field

Wildflower fields are the third most extensive natural community present within the Project site, encompassing 236 acres sitewide, but are absent along the proposed transmission line route. As shown in Tables 5-1 and 5-2, the proposed Project would impact this vegetation type on-site by permanently removing 22.5 acres and 55.8 acres would be impacted by habitat modification. The remaining 158 acres of wildflower field habitat within the Project site would not be cleared; however, all but 27.5 acres of this total would be affected by shading and vegetation management activities. Wildflower field is considered a sensitive natural community by the CDFG, and impacts to this habitat are discussed more fully in Section 5.2 of this Biota Report.

5.1.3.4 Joshua Tree Recruitment Area

The Joshua tree recruitment area consists of a 7.3-acre area located along the northern boundary of the Project site which is similar to on-site rabbitbrush scrub except for the occurrence of a moderate density of immature Joshua trees. As shown in Tables 5-1 and 5-2, the proposed Project would not impact this vegetation type with project-related effects. The

perimeter fence and access road will be constructed around the area with a minimum 50 foot buffer between the closest Joshua tree seedling and the fence. Due to expressed concern by the County, the on-site Joshua tree recruitment area is considered to be a sensitive natural community for purposes of this analysis, and impacts to this habitat are discussed more fully in Section 5.2 of this Biota Report.

5.1.3.5 Joshua Tree Woodland

This vegetation community is absent from the Project site, but 3.6 acres of Joshua tree woodland occur within the ROW of 170th Street West along the proposed transmission line route. As shown in Tables 5-1 and 5-2, the proposed Project would impact this vegetation type along the proposed transmission line route by 0.1 acre being impacted by habitat modification, but would not permanently remove any Joshua tree woodland vegetation. The remaining 3.55 acres of Joshua tree woodland habitat along the proposed transmission line route would not be cleared, and no shading or vegetation management activities are proposed in this area. Due to expressed concern by the County, Joshua tree woodland is considered a sensitive natural community for purposes of this analysis; impacts to this habitat are discussed more fully in Section 5.2.3 of this Biota Report. Impacts specific to the removal of trees from the Project site are presented in Section 5.4 of this Biota Report.

5.1.3.6 Desert Saltbush Scrub

Desert saltbush scrub is not present within the Project site but encompasses 0.3 acre within the 170th Street West ROW along the proposed transmission line route. As shown in Tables 5-1 and 5-2, no permanent removal of desert saltbush scrub is proposed. However, the proposed Project would impact this vegetation type along the proposed transmission line route through habitat modification of 0.05 acre. The remaining 0.25 acre of desert saltbush scrub habitat along the proposed transmission line route would remain in its present state, and would not be affected by shading or vegetation management activities.

5.1.3.7 Orchard

A total of 8.8 acres of abandoned orchard, a human-induced vegetation community, are present within the Project site. No orchards occur within the 170th Street West ROW along the proposed transmission line route. As shown in Tables 5-1 and 5-2, the proposed Project would impact this vegetation type on-site by permanently removing 0.3 acre and habitat modification of 1.9 acres for placement of Project facilities. However, this tree-dominated vegetation community is not compatible with build out of the proposed Project because installing solar PV panels in an orchard would be infeasible. Therefore, the entire on-site orchard would be removed during site preparation. Portions of the cleared orchard area that would not be subject to permanent disturbance (8.5 acres) would be revegetated, but would tend to support native and non-native grasses and forbs, rather than trees, after Project build out. All of these areas would be affected by panel-related shading, and would be subject to

vegetation management. (For a discussion of impacts related specifically to the removal of trees from the Project site, please refer to Section 5.4 of this Biota Report).

5.1.3.8 Agricultural Lands

Agricultural lands are absent within the Project site, but 3.9 acres of this human-induced vegetation type are present within the 170th Street West ROW along the proposed transmission line route. As shown in Tables 5-1 and 5-2, the proposed Project would result in permanent ground disturbance to less than 0.1 acre of agricultural lands along the off-site transmission line route at pole locations, but would also impact this vegetation type through habitat modification of approximately 0.5 acre. It is expected that agricultural lands that were temporarily disturbed during construction would be replanted with the applicable crop types and return to agricultural use following transmission line construction. The remaining 3.4 acres of agricultural land habitat along the proposed transmission line route would not be cleared, and no panel-related shading and or modification activities are proposed in this area.

5.1.3.9 Ruderal

A total of 8.2 acres of ruderal vegetation, a non-natural vegetation community indicative of past ground disturbance, are present within the Project site and along the proposed transmission line route. As shown in Tables 5-1 and 5-2, the proposed Project would impact this vegetation type on-site and along the proposed transmission line route by permanently removing 0.6 acre and 1.4 acres removed through habitat modification. The remaining 6.2 acres of ruderal vegetation within the Project site and along the proposed transmission line route would not be cleared; however, all but 0.2 acre of this total would be affected by shading and vegetation management activities. Because of the non-native, and generally undesirable nature of this vegetation type, ruderal vegetation that is temporarily impacted would be replaced by appropriate species reflecting natural habitats in the region, rather than by non-native, ruderal species.

5.1.3.10 Ornamental

A total of 1.8 acres of ornamental vegetation, a human-induced vegetation community typically consisting of plants used for landscaping, are present within the Project site. As shown in Tables 5-1 and 5-2, the proposed Project would completely remove the existing ornamental vegetation from the Project site, by permanently removing 0.2 acre and 0.6 acre removed through habitat modification. Due to the non-native and human-induced nature of this plant community, the 0.6 acre of ornamental vegetation impacted by habitat modification would be revegetated with plant species reflective of natural vegetation in the region, rather than with ornamental species. Of this 0.6 acre, 0.4 acre would be affected by vegetation management practices and shading associated with the proposed solar arrays.

5.1.3.11 Development

Although the Project site is largely undeveloped, a total of 32.2 acres of development occur on the Project site and within the ROW of 170th Street West along the proposed transmission line route. The vast majority of this total reflects the roadbed of 170th Street West itself, and 0.9 acre represents the existing ranch house and associated structures within the Project site. Implementation of the proposed Project would require complete removal of the existing structures within the Project site, as these uses are incompatible with the proposed solar PV arrays. Existing developed areas to be impacted by habitat modification (3.8 acres) would be revegetated with species reflective of natural habitats in the region.

5.1.3.12 Project-wide Impacts to Existing Vegetation

In total, the Project site and proposed transmission line route (bounded by the 170th Street West ROW) encompass 2,132 acres, of which 2,077 acres are comprised of relatively natural vegetation (see Table 5-1). Of this total, the proposed Project would permanently remove 400 acres to allow placement of solar panel footings, access roads, buildings, substation and the fire breaks; these areas would not contain natural habitat in the post-Project condition. In addition, the Project would require the habitat modification of 575 acres of natural habitats during site preparation and in construction zones surrounding proposed facilities. These areas would be enhanced and revegetated after construction, and would therefore not represent a complete loss of habitat. However, as discussed in Section 5.1.2.2 above, the habitat type will shift from a brush-dominated type (within the current rubber rabbitbrush scrub areas) to a grass- and forb- dominated type. Also, the habitat quality in enhanced and revegetated areas may be less than currently exists on-site.

After construction of the proposed Project, a total of 1,487 acres within the Project site would be altered through habitat modification, including areas shaded by solar PV panels and areas subject to vegetation management standards, as well as areas subject to construction disturbance. This acreage would include areas undisturbed by Project construction as well as areas of habitat modification and subsequent revegetation (see Table 5-2). As described in Section 5.1.2.3 above, the proposed shading and vegetation management would substantially affect the quality and species composition of the affected areas.

Because of the substantial acreage of habitat to be removed by the proposed Project, and because the majority of remaining habitat on-site would be substantially altered by habitat modification, impacts of the proposed Project on existing vegetation and associated habitat values would be ***significant, absent mitigation***. Impacts specific to sensitive vegetation communities are presented in Section 5.2 of this Biota Report.

5.2 IMPACTS TO SENSITIVE NATURAL COMMUNITIES

Criterion: Impacts would be significant if the proposed Project would have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFG or USFWS.

As described in Section 4.2 and illustrated on Figures 3-4 and 3-5, three sensitive natural vegetation communities are present within the Project site and along the proposed transmission line route: Joshua tree recruitment area and wildflower field, which occur within the Project site but not along the proposed transmission line route, and Joshua tree woodland, which occurs along the proposed transmission line route but not within the Project site. Of these three communities, only the wildflower field is recognized as a sensitive natural community by the CDFG. However, the Joshua tree woodland and Joshua tree recruitment area communities affected by the Project are treated as sensitive for purposes of this analysis to reflect the County's concern over the continuing loss and degradation of Joshua tree woodland habitats within the County. Impacts of the proposed Project on these sensitive vegetation communities are described below.

5.2.1 Wildflower Field

Wildflower field is identified as a sensitive natural community by the CDFG and is the third most extensive natural community present within the Project site encompassing approximately 236 acres. As shown in Tables 5-1 and 5-2, the proposed Project would impact this vegetation type on-site by permanently removing 22.5 acres and altering 55.8 acres through habitat modification. Permanent impacts would include the removal of wildflower field habitat and replacement of this habitat with Project facilities including structures, roads, transmission line poles, solar panels, and solar panel footings. Habitat modification impacts would occur in areas such as construction disturbance zones, temporary access roads, and temporary construction staging and lay down yards on the Project site. It is possible that the wildflower field habitat could be impacted by edge effects from construction of the proposed Project such as contact with construction runoff, windblown dust, inadvertent crushing or root damage caused by construction vehicles, and vandalism. These potential impacts would mostly be limited to the construction phase of the Project, and would no longer have potential to occur once the Project entered the operational phase, except for ground disturbance that would be associated with maintenance of the fire breaks.

The remaining 158 acres of wildflower field habitat within the Project site would not be cleared; however, all but 27.5 acres of this total would be impacted by shading and vegetation management activities. The effects of shading from solar panels identified in Section 5.1.2.3 above would likely contribute to changes in the structure and composition of the on-site wildflower field communities. Shading may cause plants within this community to become stunted, and the relative abundance of species with lower radiation requirements

would be expected to increase. Washing of the proposed panel arrays, estimated to occur twice per year, is unlikely to affect the on-site wildflower fields due to the infrequency of this event. Because of the herbaceous nature of the wildflower field habitat, impacts to this community from vegetation management practices would not be as severe as those expected for taller, shrub-dominated communities like rabbitbrush scrub. A large portion of the plants that make up the wildflower fields habitat are annuals that bloom and set seed before the end of May when the majority of vegetation would be mowed to the proposed 3 to 6 inch height, so the impact of the mowing during this time would be minimal. Mowing and plant removal that occurs during other times of year would have an impact to these plant communities, particularly if implemented prior to native species setting seed. A few native species that make up this plant community bloom and set seed in later summer.

Because the wildflower fields on-site are fairly similar to the region's California annual grasslands in terms of their plant species composition, containing a mix of native and non-native common grasses and forbs, the removal and alteration of wildflower fields on-site described above would not have the potential to extirpate any plant species from the Project vicinity. All of the forbs and grasses present in the wildflower field habitat on-site, including California poppy, goldfields, lupines, fiddleneck, and red-stem filaree, are abundant in the Project vicinity, and most areas surrounding the Project site exhibit colorful floristic displays to some extent. Nonetheless, the proposed removal and habitat modification of approximately 208.8 acres of wildflower fields within the Project site would constitute a substantial adverse effect on this community, and these impacts would be ***significant, absent mitigation***.

This vegetation community does not occur along the proposed transmission line route, and construction of the proposed transmission line would not impact wildflower field habitat.

5.2.2 Joshua Tree Recruitment Area

Although not a formally-recognized vegetation community, the Joshua tree recruitment area on-site is treated as a distinct vegetation type for purposes of this analysis, and is considered to be a sensitive natural community due to expressed concern by the County regarding the ongoing loss and degradation of Joshua tree woodland habitats. The Joshua tree recruitment area consists of a 7.3-acre area located along the northern boundary of the Project site which is similar to on-site rabbitbrush scrub except for the occurrence of a moderate density of immature Joshua trees. As shown in Tables 5-1 and 5-2, the proposed Project will have no permanent impact on, or result in modification of, this vegetation type. The recruitment area will be protected with a minimum 50-foot wide buffer, as measured from the most outlying Joshua tree seedlings. A 50-foot wide buffer is adequate to protect the root system of the Joshua trees from soil compaction caused by construction equipment because the roots of a mature Joshua tree can extend out approximately 36 feet at the most (Gucker 2006). The perimeter fence and 30-foot wide access road will be constructed outside of this buffer. Also,

the nearest solar panels will be at least 80-90 feet from the Joshua tree seedlings, since they will be on the far side of the buffer, perimeter fence, and access road. Therefore, they will not contribute to any significant shading of the Joshua tree recruitment area.

As an indirect effect, road construction, fire breaks, the construction/installation phase of the solar panel arrays, and the associated excavation of the infiltration basins would create fugitive dust in this area. Fugitive dust can carry heavy metals and other toxins, and excessive dust could adversely affect the entire suite of plants and wildlife that inhabit this sensitive area.

Because of indirect impacts from fugitive dust, the overall impact from development of the Project on the Joshua tree recruitment area would be ***significant, absent mitigation***.

This vegetation community does not occur along the proposed transmission line route, and construction of the proposed transmission line would not impact Joshua tree recruitment areas.

5.2.3 Joshua Tree Woodland

This vegetation community is absent from the Project site, but 3.6 acres of Joshua tree woodland occur within the ROW of 170th Street West along the proposed transmission line route. Although Joshua tree woodlands do not occur within the Project site, a 20-acre portion of the site overlaps the existing Joshua Tree Woodland Habitat Significant Ecological Area (SEA) #60 (Figure 3-6a), as defined by the 1986 update to the Los Angeles County General Plan (as implemented by adoption of the Area Plan, December 2, 1986). However, no portion of the site retains the characteristics of Joshua tree woodland habitat. The County is currently considering revising SEA boundaries in the site vicinity to more accurately reflect existing Joshua tree woodland habitat. This revision would remove the current SEA designation from the 20-acre portion of the Project site. The mature Joshua tree and two seedlings along 170th Street West would not be removed during Project construction, and the nearest Project facility to these resources would be an access road located approximately 78 feet to the east. However, it is possible that these trees could be impacted by edge effects from construction of the proposed Project such as contact with construction runoff, windblown dust, inadvertent trunk or root damage caused by construction vehicles, and vandalism. These potential impacts would mostly be limited to the construction phase of the Project, and would no longer have potential to occur once the Project entered the operational phase. However, maintenance of the fire breaks would continue to be an impact once the Project has been constructed, as the maintenance would produce windblown dust. Because of the substantial separation between these trees and the construction impact zones, the potential for construction-related impacts on the mature Joshua tree and two seedlings along 170th Street West would be minimal.

The Joshua tree woodlands adjacent to the Project site within SEA #60 are comprised of several, disjointed blocks of Joshua tree woodland separated by other vegetation. Currently, the rabbitbrush scrub and California annual grasslands within the Project site represent breaks in the continuity of the Joshua tree woodland vegetation in the vicinity. As described in Section 4.4.2.1 of this Biota Report, Joshua trees are dependent on a specific insect pollinator, the yucca moth (*Tegeticula synthetica*), for reproductive success. Through their ecological roles as Joshua tree pollinators, these moths are responsible for transferring genetic material between individual Joshua trees and, on a larger scale, between Joshua tree populations. Because the Project site is abutted on three sides by patches of Joshua tree woodland, the yucca moth may be found on portions of the site when travelling between the disjunct habitat patches. If the proposed Project were to render the site impassable by this moth, the patches of Joshua tree woodland within SEA #60 could potentially become genetically isolated from one another.

Traversing the Project is not the only possible route for yucca moths to travel between the existing patches of Joshua tree woodland within SEA #60. The existing habitat patches to the west, north, and east of the Project site form a partial ring around the site (refer to Figure 3-6a), and moths travelling among these habitat patches could follow an arc around the northern boundary of the site and gain access to all of the Joshua tree woodland patches within SEA #60. In fact, such a route might be preferable for the moth, because the insects would be travelling within Joshua tree woodland habitat for the majority of the route, rather than crossing substantial expanses of California annual grassland and rabbitbrush scrub found within the Project site. Information regarding the flight habits of yucca moths is limited; however, studies of one species of yucca moth, *T. yuccasella*, indicated that the moths do not generally spread pollen over long distances. In this study, conducted on 18 nights of observation across five separate sites in Tennessee and Ohio, the pollen transfer distance recorded ranged from 0 to 50.6 meters (Marr et al. 2000). If the behavior patterns of *T. synthetica* within the Project vicinity are even remotely similar to those observed in *T. yuccasella*, it would be highly unlikely that this species utilizes the Project site as a travel route between Joshua tree woodland habitat patches. Even the shortest distance across the Project site connecting two habitat patches exceeds 0.5 mile in length, approximately 16 times the length of the longest movement documented in the study of *T. yuccasella*.

Most moth species are attracted to sources of nighttime illumination, and the potential exists for the proposed security lighting at the site to lure yucca moths away from adjacent Joshua tree woodlands and into unsuitable habitat within the solar arrays of the Project site. This potential would be minimal, however, due to the location and nature of the proposed lighting. All nighttime security lighting could consist of shielded, downcast luminaries, and would be no brighter than required to meet safety requirements. Further, Project lighting will be located only at the O&M building, parking area, the main plant access, and potentially the substation area; no lighting is proposed within the solar arrays or along the site perimeter fences. The Project's sources of nighttime illumination would therefore be nearly 0.5 mile

from the Joshua tree woodlands within SEA #60 at the closest point, and would be nearly undetectable from within the SEA.

As stated previously, no Joshua tree woodlands occur within the Project site, and the proposed Project would therefore not remove any of this habitat on-site. Taking into consideration that the proposed lighting system is located and designed to prevent nighttime illumination of adjacent habitats, that a viable travel route between the several patches of Joshua tree woodland within SEA #60 exists which does not traverse the Project site, and that the yucca moth is unlikely to attempt long-distance flights over the Project site even under existing conditions, the Project is unlikely to have a substantial adverse effect on this vegetation community. Impacts of the proposed Project on Joshua tree woodlands adjacent to the Project site would therefore be ***less than significant.***

Along the proposed transmission line route, the proposed Project would temporarily impact 0.05 acres of ground within Joshua tree woodland within temporary construction zones and proposed stringing sites, as shown in Tables 5-1 and 5-2, but would not remove any Joshua tree woodland vegetation. Of the 36 proposed transmission pole locations, two are located within SEA #60. The installation of these two poles would result in the removal of approximately 40 square feet of habitat along the County road right-of-way. No Joshua trees would be removed during construction of the proposed transmission line. The remaining 3.55 acres of Joshua tree woodland habitat along the proposed transmission line route would not be cleared, and no shading or vegetation management practices are proposed in this area. Due to the very small acreage of Joshua tree woodland to be disturbed, combined with the fact that no Joshua trees would be removed during construction, the proposed transmission line would not cause a substantial adverse effect on Joshua tree woodlands. Impacts to this vegetation type along the proposed transmission line route would therefore be ***less than significant.***

5.3 IMPACTS TO JURISDICTIONAL WATERS AND STREAMS

Criterion: Impacts would be significant if the proposed Project would divert, obstruct, or substantially alter a drainage course depicted on USGS quad sheets as a dashed blue line or that may contain a bed, channel, or bank of any perennial, intermittent or ephemeral river, stream, or lake.

Streams and water bodies are protected by several federal and state statutes, and are generally considered to be valuable habitat features. Streams can vary considerably in their characteristics, and different classes of streams provide different hydrologic, biogeochemical, and habitat-related functions. As described in Section 4.3 of this Biota Report and illustrated on Figure 3-3, the Project site contains portions of four unnamed intermittent and ephemeral streams, which occupy a total of 4.58 acres. For ease of reference, the on-site drainages are identified as Drainage A, Drainage B, Drainage C, and Drainage D in this Biota Report.

Because they are not hydrologically connected to any navigable waters, the streams on-site are not subject to the permitting authority of the U.S. Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act. However, the streams on-site are regulated by the California Fish and Game Code.

As noted by the County (LACDPW 2006), the Antelope valley lacks defined drainage channels outside of the foothills, and is subject to unpredictable drainage patterns. The Project site generally trends to the northeast but has a very low overall gradient, with only 120 feet elevation difference between the lowest and highest points on-site. In addition, the site is located on the floor of the Antelope Valley, an arid region with mean annual rainfall of only 5.12 inches (NWS 2009). Soils within the Project site are relatively permeable and exhibit low runoff potential (RBF 2009). Conditions such as these are not conducive to the formation of robust stream systems exhibiting hierarchical tributary structure exists. Rather, the presence of flat topography, low rainfall, and permeable soil tend to create a drainage scenario in which water tends to pond on the landscape rather than flow into defined drainage channels, and evaporation and infiltration replace surface flow as the dominant mechanisms by which flows leave the site. As a result, the drainage patterns within the Project site are poorly developed, with several streams draining a relatively flat area and having no clearly distinct watershed boundaries.

There are no jurisdictional drainages present along the proposed transmission line route, and construction of the transmission line is not anticipated to have any effects on waters or streams.

5.3.1 Impacts to Drainage A

Drainage A is the largest drainage within the Project site, and flows generally southwest to northeast through the central portion of the site north of SR-138 and east of 170th Street West (Figure 3-3). The main portion of the drainage has an on-site length of 8,315 feet, including both the mainstem and a smaller, 315-foot side channel. In addition, there is an isolated portion of the drainage located to the northeast that is approximately 550 feet long. The width of Drainage A ranges from 20 to 50 feet from bank to bank, and the stream has a total on-site area of 2.68 acres. Drainage A is mapped on USGS topographic maps (USGS 2005) as an intermittent stream, suggesting that the channel supports surface flows only during the wet season. The channel is vegetated with upland plant species, and does not support any riparian vegetation or habitat for aquatic or semi-aquatic wildlife. The channel banks are incised, indicating that the on-site reach of this drainage is in a state of sediment disequilibrium. In the northeastern, downstream portion of the site, Drainage A ceases to exhibit defined bed and banks, and overland flows presumably occur in this area during large storm events. Drainage A is also known to contain active burrowing owl burrows in the main portion of the drainage; impacts to this species are discussed in Section 5.5.2.1 of this Biota Report. No improvements or modifications to these drainages are proposed, and no Project facilities

would be sited within 100 feet of the main part of the drainage. The isolated segment of Drainage A is located within the middle of a 100-foot wide wildlife corridor, thus it is protected by a 50-foot buffer. However, a dirt access road will be located adjacent to the northern terminus of this isolated segment. The proposed Project would not divert, obstruct, or substantially alter Drainage A, and impacts to this channel would be ***less than significant.***

5.3.2 Impacts to Drainage B

Drainage B is the smallest ephemeral drainage within the Project site, and its entire 0.61-acre jurisdictional area is contained within the Project site. The defined bed and banks of the drainage occur and vanish within a level grassland between Drainage A and SR-138. The entire length of this drainage will be protected by a 20-foot wide buffer. No project infrastructure will be located closer than 20 feet to the drainage. Thus, the proposed Project would not divert, obstruct, or substantially alter Drainage B, and impacts to this channel would be ***less than significant.***

5.3.3 Impacts to Drainages C and D

In contrast with the configurations of Drainages A and B, which traverse the central portion of the Project site, Drainages C and D are located near the periphery of the site (see Figure 3-3), and the on-site acreages of these streams are minor (1.02 acres of Drainage C and 0.27 acres of Drainage D are within the Project site). No improvements or modifications to these drainages are proposed, and no Project facilities would be sited within 50 feet of either drainage. Drainage C is protected by a minimum 100-foot setback measured from the FEMA Zone-A floodplain boundary. Thus, the proposed Project would not divert, obstruct, or substantially alter Drainages C and D, and impacts to these channels would be ***less than significant.***

5.3.4 Impacts of the Proposed Transmission Line

No streams or other water bodies occur along the proposed transmission line route, and the transmission line would not affect this resource.

5.4 IMPACTS TO NATIVE TREES

Criterion: Impacts would be significant if the proposed Project would result in a substantial adverse effect on oaks or other unique native trees.

The Project site is characterized primarily by grasslands and shrub-dominated vegetation communities, and trees are absent from the majority of the site. However, focused botanical investigations have indicated the presence of trees at the following locations:

- One mature Joshua tree and two seedlings are located immediately east of 170th Street West north of SR-138.
- The 7.3-acre Joshua tree recruitment area along the northern site boundary contains 50 juvenile Joshua trees.
- An 8.8-acre orchard containing approximately 525 non-producing mature pistachio trees occurs south of the existing ranch house.
- The landscaping immediately surrounding the ranch house contains approximately 12 mature ornamental trees.
- The proposed transmission line route would pass along the edge of parcels containing mature Joshua trees, ornamental trees, and orchards.

Some of these trees are located in areas that would be subjected to Project-related ground disturbance, and others could potentially experience indirect effects from construction and operation of the proposed generating facility.

5.4.1 Impacts to Mature Joshua Trees and Seedlings

The loss of Joshua tree woodland habitat is of concern to the County due to accelerated agricultural and urban expansion in the County's desert region; and because large, dense stands of this habitat are becoming scarce, especially in the western Antelope Valley (LACDRP 1986). Because of this concern, Joshua trees are considered to be "unique native trees" for purposes of this analysis, and substantial adverse impacts to Joshua trees would therefore be considered significant.

5.4.1.1 Mature Joshua Tree and Two Seedlings near 170th Street West

The only mature Joshua tree within the Project site is located immediately east of the 170th Street West ROW, north of SR-138. The tree stands 11 feet tall, and has a diameter of 7 feet 8 inches at breast height. The fact that the tree is fully mature suggests that this individual is a survivor that was not eliminated from the site when agricultural operations commenced in the mid-1940s, probably due to the tree's proximity to the roadway and the edge of the parcel. Two Joshua tree seedlings, both in the 0- to 5-foot height class, are also present in the immediate vicinity of this mature tree. The mature Joshua tree and two seedlings near 170th Street West would not be removed by Project activities. These trees are located within the proposed road setback from 170th Street West, approximately 56 feet outside the proposed fence line. Aside from the fence, the closest Project facility to these Joshua trees would be an unpaved perimeter access road, located approximately 78 feet east of the trees.

Although the mature Joshua tree and two seedlings along 170th Street West would not be removed during Project construction, it is foreseeable that these trees could be impacted by edge effects from construction of the proposed Project and during maintenance of the fire

breaks. During construction, these trees could potentially be impacted through trunk damage or root compaction caused by inadvertent contact with construction equipment; exposure to construction runoff; exposure to fugitive dust; and vandalism. All of these potential impacts would be limited to the construction phase of the Project, and would no longer have potential to occur once the Project enters the operational phase. Also, the substantial separation between these trees and the construction impact zones makes the potential construction-related impacts on the mature Joshua tree and two seedlings along 170th Street West ***less than significant***. However, because the fire breaks would be regularly maintained, potential impacts on the mature Joshua tree and two seedlings along 170th Street West would be ***significant, absent mitigation***.

5.4.1.2 Joshua Tree Seedlings in the Recruitment Area

The 7.3 acre Joshua tree recruitment area at the northern edge of the Project site contains a total of 50 relatively young Joshua tree seedlings, most of which are in the 0-5 foot height class (see Figure 4-1 and Table 4-5). Because of indirect impacts from fugitive dust, the overall impact from development of the Project on the Joshua tree recruitment area would be ***significant, absent mitigation***. See Section 5.2.2 for an analysis of impacts to Joshua tree seedlings.

5.4.1.3 Joshua Trees along the Transmission Line Route

The Project site is bordered by Joshua tree woodland habitat on portions of three sides, and approximately 0.4 linear miles of the proposed transmission line route would traverse or abut the mapped Joshua tree woodland within SEA #60 (Figure 3-6a). This woodland contains many mature Joshua trees, distributed along both sides of 170th Street West. Although the proposed transmission line route traverses approximately 4.25 miles from the Project site to the northern terminus in Kern County, the majority of the habitat traversed by the transmission line would not be impacted by this feature. Ground disturbance associated with the proposed transmission line would be limited to the 36 locations where power poles and temporary stringing sites are proposed, including a 100-foot by 50-foot construction zone surrounding each pole. Of the pole locations proposed, only two are located within areas mapped as Joshua tree woodland, and all poles have been sited to ensure that no Joshua tree individuals are present in the disturbance zones. Thus, installation of the proposed transmission line would not result in the removal of any Joshua trees.

Although no Joshua trees would be removed during construction along the transmission corridor, it is foreseeable that Joshua trees located adjacent to the construction zones could potentially be impacted by edge effects from construction activities. The distance from the edge of the construction zone to the nearest Joshua tree varies, but exceeds 30 feet in all cases. Since the longest known Joshua tree roots were about 36 feet long (Gucker 2006), this separation is sufficient to minimize the potential for root compaction or trunk damage caused

by inadvertent contact with construction equipment. Such impacts would be limited to the construction phase of the transmission line, and would no longer have potential to occur once the Project enters the operational phase. Potential construction-related impacts on Joshua trees adjacent to pole locations along the transmission line route would be ***less than significant***.

5.4.2 Impacts to the Existing Pistachio Orchard and Ornamental Trees

The Project site contains an existing ranch house and associated pistachio orchard, located adjacent to the south side of SR-138 east of 170th Street West. Both of these areas contain mature trees, installed as a component of ornamental landscaping near the ranch house and for pistachio production in the orchard. The ornamental vegetation surrounding the ranch house contains 12 mature pine trees, and the orchard contains approximately 525 non-producing pistachio trees. Although these trees are mature, and provide nesting and roosting habitat for wildlife within the Project site, the tree species present are not native to the region.

Installation of the proposed Project would entail removal of the existing ranch house and associated landscaped areas, and clearing of the pistachio orchard. Thus, all approximately 525 pistachio trees and 12 pine trees would be permanently removed from the site. Because the ornamental and orchard trees to be removed are not "unique, native trees," this impact would be ***less than significant***. Removal of mature trees from the Project site would also result in effects on wildlife species that may depend on these areas for nesting, roosting, sheltering, or other essential behaviors; these effects are addressed in Section 5.5 of this Biota Report.

5.5 IMPACTS TO PLANTS AND WILDLIFE

Criterion: Impacts would be significant if the proposed Project would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS.

This section addresses the impacts of the proposed Project on plants and wildlife, including both a discussion of Project-related impacts to plants and wildlife in general, and separate analyses of impacts to special-status species. Impacts are evaluated for significance according to the criterion stated above; however, Section 15065(a)(1) of the State CEQA Guidelines mandates additional circumstances under which impacts to wildlife species must be considered significant. These circumstances include:

- **Mandatory Finding of Significance:** Impacts would be significant if the proposed Project would substantially reduce the habitat of a fish or wildlife species.

- **Mandatory Finding of Significance:** Impacts would be significant if the proposed Project would cause a fish or wildlife population to drop below self-sustaining levels.
- **Mandatory Finding of Significance:** Impacts would be significant if the proposed Project would substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

To ensure the greatest possible level of consistency between the impacts analysis in this Biota Report and the analysis prepared for the County in the EIR for the proposed Project, the analysis presented below relies on both the Mandatory Findings of Significance required by CEQA and the County's significance criteria when assessing impacts for significance.

5.5.1 Impacts to Common Plants and Wildlife

The Project site is located in the western Antelope Valley, an area that has been heavily impacted for decades by agricultural development and human encroachment. Natural vegetation communities such as Joshua tree woodlands and native grasslands have been removed and fragmented, altered by the introduction of agricultural crops and non-native plant species, and grazed by cattle and sheep. Nevertheless, a variety of plant and wildlife species are found throughout the region. Species associated with California annual grassland and rabbitbrush scrub, the most extensive habitats in the region, are the most abundant. Due to the fragmentation and scarcity of Joshua tree woodlands in the western Antelope Valley, species associated with this habitat are less abundant in the region.

As described more fully in Section 3.0 of this Biota Report, the Project site is a fairly representative sample of the western Antelope Valley from a biological perspective. The most common vegetation communities within the Project site, including California annual grassland and rabbitbrush scrub, are also the most extensive in the region. By extension, the plants that define these communities are also dominant, both in the region and on the Project site. Regionally common wildlife species that are associated with these communities, such as the horned lark, sage sparrow, white-crowned sparrow, house finch, and common raven, are also among the most abundant within the Project site. Regionally common reptiles such as the side-blotched lizard, Mojave rattlesnake, gopher snake, and great basin whiptail were commonly observed on-site in the rabbitbrush scrub, California annual grasslands, and wildflower fields. In addition, mammals such as the white-tailed antelope squirrel, black tailed jackrabbit, desert cottontail, coyote, and Botta's pocket gopher are regionally abundant species.

Common wildlife species that currently utilize the Project site could be impacted by construction and operation of the proposed Project. Generally speaking, impacts could potentially include injury or mortality during construction, destruction of suitable habitat, habitat modification caused by vegetation management and shading, and construction and operational edge effects. These sorts of impacts would potentially affect all species

occupying the site, including common and special-status species, and the analysis below is not intended to focus on any particular species. Impacts to special-status species are discussed individually in section 5.5.2 of this Biota Report. Impacts associated with wildlife movement are addressed in Section 5.6 of this Biota Report.

5.5.1.1 Injury/Mortality of Common Plants and Wildlife

Within the Project site and along the proposed transmission line route, approximately 975 acres of existing natural habitat would be disturbed (including permanent removal within the footprint of proposed facilities and habitat modification in surrounding construction zones). Of the vegetation communities on-site, rabbitbrush scrub, California annual grassland, and wildflower fields would be the most extensively impacted, with total disturbance acreages of 711, 186, and 78, respectively. For the plants and wildlife that inhabit these areas, ground disturbance would lead to injury and mortality of individuals. The extent to which species would be impacted would be dependent on several factors, the most important of which is mobility.

All existing plants within proposed disturbance zones (permanent and temporary) would be eliminated, as these species are completely immobile. As no special-status plants occur within the Project site, removal of plants would be limited to common species. Specifically, substantial numbers of native and non-native grasses and forbs and rubber rabbitbrush shrubs would be removed. After the completion of construction, the 584 acres of habitat undergoing modification (including 575 acres of current natural habitat areas on-site) will be suitable for native plants to become re-established; however, such re-establishment may be hindered by competition from ruderal plant species adapted to colonizing recently disturbed areas. Also, shrubs habitats on-site will be unable to establish themselves, due to fuel management practices that would require that all areas in the solar arrays be mowed to a height of 3 to 6 inches annually. All of the plant species that would be removed during construction are relatively widespread in the Project region.

For wildlife species of relatively low mobility, such as reptiles and small, fossorial mammals, construction-related ground disturbance would result in injury and mortality due to collapsed burrows and collisions with construction equipment. In addition, installing the proposed grid of temporary construction access roads would exacerbate this effect by fragmenting the existing on-site habitat and necessitating that these species cross the construction roads to fulfill their basic needs, including feeding and sheltering. For individuals able to escape from the disturbance areas into adjacent, undisturbed portions of the Project site, competition for space and resources could potentially lead to harm or mortality as well. These species may also be exposed to injury and mortality due to annual mowing associated with vegetation management practices. Reptiles in particular are likely to be active during the daytime in spring and thus vulnerable during mowing. These types of impacts would be expected to affect all low-mobility, ground dwelling species within the Project site. They would affect

common species that are regionally abundant; and the Blainville's horned lizard (CSC) would be affect by the construction-related impacts mentioned. Impacts specific to this special-status reptile are addressed in Section 5.5.2.1.1 of this Biota Report.

For wildlife species of higher mobility, such as medium-sized mammals and birds, the risk of injury or mortality during Project construction would be lower. Medium and large-sized mammals generally have home ranges that exceed the size of the Project site, and encounters with construction or mowing equipment would not necessarily occur. Birds would almost certainly be able to escape collisions by flying away, and so the potential for construction or mowing equipment to injure or kill adult birds is minimal. Destruction of active bird nests containing eggs or young is prohibited by the federal Migratory Bird Treaty Act, and would be avoided. It is unlikely that Project construction activities would directly injure high-mobility species, although flushed individuals would be at higher risk of injury or mortality from equipment collisions. However, species that nest or den within the Project site, such as the coyote and a variety of birds, could potentially be forced to abandon their young, exposing them to mortality. These types of impacts would be expected to affect all higher-mobility mammals and birds that utilize the Project site, including common mammal species and a suite of common and special-status birds. The common wildlife on-site have wide geographic ranges and are abundant in the Project region, and would persist in adjacent, undisturbed habitat, as well as within portions of the Project site not proposed for development. The Project's impact on common plants and wildlife due to construction-related injury or mortality would be ***less than significant***. Impacts to special-status bird species are addressed specifically in Section 5.5.2 of this Biota Report.

5.5.1.2 Loss of Existing Habitats for Common Plants and Wildlife

As stated in Section 5.1 of this Biota Report, implementation of the proposed Project would result in substantial removal of existing natural habitat within the Project site. Project-wide, of the 2,077 acres that are currently in a relatively natural state (i.e., not occupied by structures, ornamental landscaping, or orchards) 400 acres, or 19 percent, would be replaced by the footprint of Project facilities and permanently eliminated. An additional 575 acres, or 28 percent, would not be within the ground footprint of Project facilities once constructed, but are located adjacent to these proposed facilities and would be disturbed during construction. These temporarily impacted areas could potentially remain suitable for at least some use by plants and wildlife following construction, although the habitats would be altered by the presence of Project facilities and by vegetative fuel management practices. Absent active revegetation practices, abundance of non-native and ruderal species would be expected to increase in these areas.

The overall loss of 400 acres of natural habitats within the Project site would necessarily lead to a concomitant decrease in the site's biological value. Population sizes of plants, birds, mammals, and reptiles on-site would decrease due to the loss of suitable habitat, and new

equilibrium population densities would naturally become established based on post-Project habitat conditions. This loss of habitat on-site would affect all plants and wildlife occur within the Project site, including common plants, mammals, and reptiles, the Blainville's horned lizard (CSC), and a suite of common and special-status birds. At a local scale within the Project site, these species would be expected to continue utilizing areas that are not proposed for disturbance, such as the southernmost portion of the site along Avenue E West (45 acres) and within the banks of Drainage A and the 100-foot wide buffer along each bank (32 acres). The common plants and wildlife on-site have wide geographic ranges and are abundant in the Project region, and would persist at current levels in undisturbed habitat adjacent to the site. The Project's impacts on common plants and wildlife due to loss of habitat would be ***less than significant***. Impacts to special-status species are addressed specifically in Section 5.5.2 of this Biota Report.

5.5.1.3 Changes in Habitat Suitability for Common Plants and Wildlife

In addition to permanent ground disturbance zones, the proposed Project would also modify a substantial acreage of existing habitat through maintenance practices, vegetation management, and facility-related shading.

5.5.1.3.1 Presence of PV Solar Panels. As described in Section 2.0 of this Biota Report and illustrated on Figure 2-1, the proposed Project would include a total of 706,500 PV solar panels, and proposed solar arrays would occupy an area of approximately 1,676 acres. Although the footprint of these panels would not be graded or cleared during construction, the presence of these facilities would result in long-term physical and biological alterations to the areas beneath the panels. These changes are discussed in greater detail in Section 5.1.2.3.1 of this Biota Report. Physical changes expected include substantially reduced irradiance, decreased maximum ground surface temperatures, increased nighttime ground surface temperatures, and decreased precipitation beneath the solar arrays. Biological effects are likely to include changes in plant community composition, such as an increase in the abundance of non-native species, as well as decreased overall plant biomass. These general effects are also expected to occur in the gaps between the proposed solar panels, though to a lesser extent than directly beneath the panels.

For plants and wildlife that depend on portions of the Project site proposed for solar development, the effects identified above could potentially alter the suitability of the habitat. For plants, the effects would likely include changes in community structure favoring desert forbs adaptable to greater levels of shading, although Smith (1980) suggests that increased diversity may also occur. For granivorous mammals, the most important effects would probably stem from the overall decrease in biomass that could be expected within the solar arrays, as seeds would become less abundant. A decrease in seed production could precipitate a decline in the insect population, affecting the food supply of small reptiles as well. For reptile species, which rely on exposure to direct sunlight to elevate their body temperatures in

the morning hours, an increase in shaded areas would correspond to a decrease in suitable basking habitat. This would likely lead to competition for basking sites, increased concentrations of reptiles at suitable sites, and increased risk of predation. For birds, the structural elements of the PV panels would provide additional perching habitat that could potentially favor particular species over others. Common ravens, for example, are highly adaptable and able to utilize a broad variety of habitats and structures for roosting, and are known to thrive where suitable habitat is present. A shift in the composition of the bird community on-site towards disturbance-tolerant species could potentially occur as a result of the solar arrays. For predatory wildlife species, the effects described above would alter the availability of prey, potentially affecting the carrying capacity of the site to support animals at higher trophic levels. Although wildlife populations within the Project site may be reduced as a result of the proposed Project, the common species on-site have wide geographic ranges and are abundant in the Project region, and would persist in adjacent, undisturbed habitat, as well as on-site in decreased numbers. For this reason, the impacts of shading and habitat alterations from the solar arrays on common plants and wildlife would be ***less than significant.*** Impacts to special-status species are addressed specifically in Section 5.5.2 of this Biota Report.

5.5.1.3.2 Vegetation Management Practices. To reduce the risk of fire within the Project site, vegetation management practices would be implemented, and on-site vegetation would be reduced to a level of 3 to 6 inches above ground, using primarily mechanical means and limited application of herbicides. Vegetation management practices would be implemented primarily at the end of May after most annuals have set seed, but would also occur at other times of year on an as needed basis, and would affect all vegetation occurring within and surrounding the solar arrays. Vegetation would also be trimmed or cleared on an as-needed basis to avoid entanglement with the solar tracking machinery and to eliminate worker hazards. Portions of the site that are not proposed for solar development, such as the southernmost portion of the site adjacent to West Avenue E, Drainage A and a 100-foot setback, the Joshua tree recruitment area, and a small area surrounding Drainage B, would not be subject to vegetation controls. In addition, along the proposed transmission line route, clearances for vegetation will be maintained in accordance with Public Utilities Commission General Order 95 (Rules for Overhead Electric Line Construction).

Mowing of on-site vegetation to a height of 3 to 6 inches would have substantial effects on the composition of the existing vegetation communities within the Project site, as described in section 5.1.2.3.1 of this Biota Report. These effects would be particularly evident in communities where shrubs are currently dominant, and would include reduction of shrub and tree biomass and a corresponding conversion of habitat to low-growing grasses and forbs.

In herbaceous plant communities, such as California annual grassland and wildflower fields, a large portion of the plants that make up the California annual grassland habitat are annuals that bloom and set seed before the end of May when the majority of vegetation would be

mowed to the proposed 3 to 6 inch height, so the impact of the mowing during this time would be minimal. Mowing and plant removal that occurs during other times of year would have an impact to these plants, particularly if implemented prior to native species setting seed. A few native species that make up this plant community bloom and set seed in later summer. The proposed vegetation management program is not anticipated to lessen the suitability of these communities for use by common wildlife species, although a shift in community composition may occur as described above.

Although the proposed vegetation management program is likely to alter the community composition of plants and wildlife within the Project site, the program is unlikely to completely eliminate any species from the site. In addition, the common species on-site have wide geographic ranges and are abundant in the Project region, and would persist in adjacent, undisturbed habitat, as well as on-site in decreased numbers. For this reason, the impacts of the proposed vegetation management practices on common plants and wildlife would be ***less than significant***. Impacts to special-status species are addressed specifically in Section 5.5.2 of this Biota Report.

5.5.1.3.3 Nighttime Illumination. The proposed Project includes a lighting system intended to provide operation and maintenance personnel with illumination for both normal and emergency conditions. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be directed downward and shielded to focus illumination on the desired areas only and minimize light trespass into adjacent areas, consistent with the Draft Exterior Lighting Standards developed for the rural unincorporated Antelope Valley (Ordinance No. 2007-0077, Sections 22.44.110 and 22.44.141 [dated July 26, 2007] and Section 22.44.500 [dated July 7, 2009]). Project lighting will be located only at the O&M building, parking area, and the main plant access road; there will be no lighting within the solar arrays or along the site perimeter.

Nighttime illumination has been shown to cause demonstrable effects on the behavioral and population ecology of organisms in natural settings. These effects generally derive from temporal and/or spatial disorientation and attraction or repulsion from the altered light environment, which in turn may affect essential behaviors such as foraging, reproduction, migration, and communication. Temporal disorientation caused by artificial lighting can lead to diurnal or crepuscular behaviors being extended into the nighttime (Rich and Longcore 2006), and some species are able to exploit this phenomenon and forage under artificial lighting conditions (Longcore and Rich 2004). For other species, however, disruption of the natural activity cycle would make them more vulnerable to predation by nocturnal predators such as owls and coyotes. Artificial nighttime illumination lighting may spatially disorient prey species normally accustomed to navigating in a dark environment, exacerbating this effect.

For species that are inherently attracted to light sources, such as some insects and birds, the proposed lighting system may result in adverse effects on a small scale. Attraction to light can lead to artificially high concentrations of insects which birds and other predators are able to exploit, leading to higher predation-related insect mortality than would occur absent the artificial light source. Occasionally, some species of birds can become disoriented and entrapped by lights at night. Once within illuminated zones at night, birds may become behaviorally "trapped" and will not leave the lighted areas. (Ogden 1996).

Because the proposed lighting system would be limited to the proposed O&M area and plant access road, which would no longer contain natural habitats following construction of the proposed Project, effects of nighttime illumination on on-site wildlife populations would be minimal. However, impacts as described above could potentially affect individual wildlife entering the illuminated portions of the site, as well as those occupying portions of the unlighted solar field immediately adjacent to the O&M area. No effects on plants from nighttime illumination are anticipated. Due to the very limited area proposed for nighttime illumination and the correspondingly low number of wildlife individuals potentially affected, combined with the fact that the common species on-site have wide geographic ranges and are abundant in the Project region, impacts of nighttime illumination from the proposed Project on common wildlife species would be ***less than significant.*** Impacts to special-status species are addressed specifically in Section 5.5.2 of this Biota Report.

5.5.1.3.4 <u>Invasive Species</u>. Because the proposed Project would substantially alter the existing characteristics of the site, the potential exists for the site to become increasingly suitable for non-native plants and wildlife species. A substantial portion of the site would be subjected to temporary construction impacts, where the ground surface would be disturbed and existing topsoil salvaged, stockpiled, and replaced after completion of construction. Ground clearing and surface disturbance is known to dramatically increase the susceptibility of vegetation communities to colonization by invasive, non-native plant species. In the Project region, species including black mustard, and Russian thistle, and numerous Mediterranean grasses, among others, could be expected to occur in areas subjected to ground clearing. (Although these species currently occur on the site in limited numbers, they do not currently dominate the landscape in a manner characteristic of ruderal species in freshly disturbed habitats.) Such species, if they were to colonize the site, would be subjected to the same height controls as other recovering vegetation (i.e., mowing vegetation to a height of 3 to 6 inches, primarily at the end of May, and limited application of herbicides where necessary to control invasive weeds (primarily in the first growing season following construction). An increase in invasive, ruderal plants within the Project site would likely be accompanied by decreases in native plant cover species diversity (Smith 1980), which could precipitate adverse effects on the wildlife assemblage on-site.

In addition to non-native plants, invasive wildlife species could also potentially colonize the Project site after construction. Argentine ants are a prevalent and widespread pest insect in

Southern California, and are well adapted for colonizing sites where soil moisture is high, especially when foundation slabs, roadbeds, or other large, impervious surfaces are present (Holway et al. 2002). Once established, the overwhelming abundance and cooperative nature of Argentine ants allows them to displace native ants through interference competition. This effect has been noted to have deleterious effects on native wildlife species that prey on native ants, such as horned lizards (impacts to the Blainville's horned lizard are addressed specifically in Section 5.5.2.1.1 of this Biota Report). By displacing native insect pollinators, invading Argentine ants can also adversely affect native flora. Some of the proposed Project facilities, such as the paved parking areas, roadways, and building and tracker foundations, would increase the susceptibility of the site to Argentine ant invasions following construction. Also equipment maintenance, such as periodic cleaning of the PV panels, would create an artificial source of moisture on the site which could potentially exacerbate this effect. Although invasions of non-native plants and insects onto the Project site could potentially reduce native plant and wildlife populations on-site, the common species on-site have wide geographic ranges, are abundant in the Project region, and would persist in adjacent, undisturbed habitat, as well as on-site in decreased numbers. For this reason, the Project's effects on common plants and wildlife due to increased risk of non-native species invasions would be ***less than significant***. Impacts to special-status species are addressed specifically in Section 5.5.2 of this Biota Report.

5.5.1.4 Edge Effects Associated with Project Construction and Operations

Although the proposed AVSR1 generating facility would be located entirely within the Project site, the potential exists for construction- and operations-related edge effects from the Project to affect plants and wildlife in adjacent areas. Specifically, nighttime illumination, construction runoff, and fugitive dust from the site could have such effects.

5.5.1.4.1 Edge Effects from Nighttime Illumination. Artificial sources of nighttime illumination can have adverse effects on native wildlife species, as described in Section 5.5.1.3.3 above. However, because proposed lighting would be downcast, shielded, and installed only in areas located in the interior of the Project site, away from the site perimeter, the vast majority of light generated by the proposed lighting system would remain on-site. The proposed illuminated areas at the O&M area, parking lot, and along the site access road are nearly 0.5 miles from the site boundary, and any light spillover into the adjacent SEA or other surrounding properties would be very minimal. Edge effects associated with nighttime illumination on areas outside the Project site would be ***less than significant***.

5.5.1.4.2 Edge Effects from Construction-related Dust and Runoff. The process of installing the proposed Project would involve a relatively large-scale construction effort, including peak crews totaling approximately 341 and 668 workers during the 8 MW and 15-per-month construction rates, respectively, and heavy equipment including scrapers, front-end loaders, bulldozers, and tracked excavators and cranes. Within the Project site, the entire

solar array area will be covered in a network of excavated infiltration basins and the associated dirt spoils, dirt access roads, and areas of permanent disturbance where the fire breaks will be located (Figure 2-1a and Figure 2-1d). Additionally, two areas adjacent to 170th Street West will be cleared of vegetation: 6-acre area to allow construction of the O&M area, and a 3-acre area to allow construction of the substation. As shown on Figures 5-1 and 2-1, Project-related construction in the solar field areas would be include the construction of the perimeter fence, access roads (temporary and permanent), infiltration basins, vegetation breaks, and installation of solar panels. Because the panels would be assembled at the O&M area prior to being transported to the installation locations, only a minimal amount of construction work on the solar panel arrays would occur within the solar field areas.

In order to meet the Los Angeles County Department of Public Works requirements for post-development runoff volume, a series of an estimated 9,600 infiltration basins measuring approximately 8 feet wide by 15 feet long by 1 foot deep, and spaced about 50 feet apart, will be constructed behind every other row of solar panels. The infiltration basin alignments will be staggered from row to row (see Figure 4.4-1B). The cut from each basin will be placed into spoils banks located between the basins; each spoils bank will measure approximately 50 feet long by 16 feet wide by 4 inches thick.

During the period following vegetation clearing in the proposed O&M and substation areas, and in the portions of the site designated as access roads, infiltration basins, and spoils banks, these areas would be covered by bare earth without the benefit of vegetative stabilization. Only portions of the site would be cleared at any given time, since the clearing and construction would proceed in phases. As the Project region is susceptible to very high winds, the potential would exist for the cleared portions of the Project site to generate substantial quantities of windblown dust. Because the prevailing winds in the Antelope Valley are generally out of the west or southwest (Antelope Valley AQMD 2005), fugitive dust from the Project site would have the potential to enter the adjacent Joshua tree woodland in SEA #60 east of the site boundary. Fugitive dust can carry heavy metals and other toxins, and excessive dust in this area could adversely affect the entire suite of plants and wildlife that inhabit this sensitive area. The proposed use of watering and/or dust palliatives or tackifiers to increase the soil stability would lessen this impact. Cleared and graded surfaces that would not be subject to future disturbance would be revegetated as practical to minimize dust and erosion. Revegetation would be conducted as soon as practicable, based on seasonal weather conditions, to maximize revegetation success. To facilitate redevelopment of on-site vegetation, topsoil generated by Project grading would be saved and spread over disturbed areas, as available. Because of the potentially large number of species affected and the designation of the area as ecologically significant, edge effects from fugitive dust on common plants and wildlife in SEA #60 would be ***significant, absent mitigation***.

As described in Section 4.3 of this Biota Report, the Project site contains portions of four unnamed, ephemeral, and intermittent drainages that convey flows across the site in a

generally eastward direction during and immediately after precipitation events. Because the Project site has a very low gradient (difference of 120 feet between the highest and lowest elevations on-site) and is located in an arid region with low rainfall, surface flows in these drainages do not travel quickly, and hierarchical stream structure on-site is poorly developed as a result. Rather than conveying surface flows into larger and larger tributaries and ultimately to an ocean or lake, as is typical in well-developed hierarchical stream systems, the streams within the Project site lose surface flows to groundwater via infiltration and simply terminate with no confluences or similar features present. During very large storms, surface flows can overtop the existing on-site channels, travelling as sheet flow across the site. The four drainages on-site are therefore isolated from one another, and are not tributary to any other streams or bodies of surface water. Due to this lack of hydrologic connectivity, there is little potential for construction-related sediment or debris to flow off the Project site and affect plants and wildlife in adjacent areas except during exceedingly large storms. The low gradient of the site would minimize the amount of material washed from construction areas into the drainages, and the slow-flowing, isolated nature of the streams would further inhibit the spread of such material. In addition, because the on-site streams do not flow into any permanent aquatic or semi-aquatic habitat, there is no potential for construction runoff to come into contact with any aquatic species, such as fishes or amphibians, which are generally more sensitive to water quality changes than are terrestrial species. Finally, the infiltration basins will serve to detain the excess stormwater runoff flow and volume on-site and let the detained stormwater infiltrate into the ground. Edge effects from construction runoff on plants and wildlife in adjacent areas would therefore be ***less than significant***.

5.5.1.5 Impacts of the Proposed Transmission Line

Along the proposed transmission line route, the only proposed permanent alteration to habitat would be the presence of round, steel transmission line poles (4 to 6 feet in diameter and 85 to 125 feet tall) and aerial power lines. The use of transmission poles rather than lattice towers would discourage nesting and perching by common ravens. Temporary construction impacts to natural habitats along the route would total 0.85 acres, and would be associated with construction zones surrounding the proposed poles (50 feet by 100 feet disturbed around each pole) and four temporary stringing sites (50 feet by 200 feet, one located at each end of one transmission line and two located at the midpoint). In general, little to no grading is expected to be required in these areas, the poles and stringing sites would be located to avoid mature trees. Because the areas disturbed during construction of the proposed transmission poles and stringing sites would be small, and would be separated by distances of approximately 600 feet, impacts of transmission line construction on common plants and wildlife would be minimal. Due to the long, narrow nature of the proposed disturbance areas, the maximum distance from any disturbed point to the closest undisturbed area would be 25 feet, and all but the least mobile species would be able to avoid collisions with construction equipment and escape into suitable adjacent habitat areas. Following construction, the areas disturbed would be recolonized by individuals from adjacent areas. Therefore, impacts on

common plants and wildlife from the proposed transmission line would be ***less than significant.***

5.5.2 Impacts to Special-status Plants and Wildlife

Eighteen of the special-status species identified on the Project site and along the proposed transmission line route, or identified as likely to occur, were birds. In addition, one special-status reptile species, Blainville's horned lizard, was identified on the Project site. Because of the degraded habitat throughout the Project site, this special-status reptile species has a low potential to occur. Of the 18 special-status bird species documented within the Project site and along the proposed transmission line route, seven were observed either outside the nesting season or in unsuitable habitat. The remaining 11 species all were present in the season at which they are assigned special status and were in habitat suitable for the species. Ten of these sensitive birds were documented within the Project site: the burrowing owl, greater roadrunner, lark sparrow, loggerhead shrike, long-eared owl, merlin, mountain bluebird, prairie falcon, vesper sparrow, and western meadowlark. The eleventh, Lawrence's goldfinch, was recorded along the proposed transmission line route. One additional species, the ferruginous hawk, likely forages on the Project site and along the proposed transmission line route, because of habitat suitability and the species' regular presence in the Antelope Valley. A thirteenth species, the mountain plover, may occur on occasion in agricultural fields along the proposed transmission line route, but is not likely to occur within the Project site.

This section addresses the impacts of the Project on these fourteen special-status wildlife species. Some special-status bird species share similar ecological requirements, and are grouped together in the analysis because the effects of the Project on these species would be identical. Most special-status bird species, however, are treated individually because their needs are different from those of other species, and thus the impacts of the Project affect each species differently. Impacts of the proposed Project on special-status species are presented in a tabular fashion in Appendix M.

The term "substantial adverse effect on a special-status species," which appears in the County's significance criteria, may be hold several valid interpretations. Owing to the relatively large size of the Project site, for the purposes of this analysis, the term is meant to encompass those impacts that would substantially, adversely affect individuals or habitat for a species on-site. Thus, an impact need not have a substantial adverse effect on an entire species throughout the species' range to be considered significant; rather, effects that would substantially reduce the numbers or habitat suitability for a species on-site would be considered sufficiently adverse to warrant a finding of significance.

5.5.2.1 Special-status Reptile Species

One special-status reptile species was found on the Project site; impacts to this species are described below.

5.5.2.1.1 Blainville's Horned Lizard (*Phrynosoma blainvillii*, CSC). This species was observed within the southeastern corner of the Project site, and has the potential to occur throughout the Project site due to the presence of suitable habitat. Suitable habitat found within the Project site includes sandy soils with scattered scrubs for cover, and abundant native ants for forage. However, this lizard is not expected to be common on the site, especially north of SR-138, due to the following three factors: 1) current range maps show the Blainville's horned lizard as not occurring on the floor of Antelope Valley (CDFG, 2008). The horned lizard observed on-site was in the portion of the Project site closest to the Fairmont Buttes area i.e., the very edge of Antelope Valley; 2) the disking which occurred on-site over a period of approximately 50 years would have been very detrimental to the habitat suitability for this species; and 3) SR-138 presents a movement barrier to horned lizards, due to increased mortality from vehicle impact.

***Loss of Individuals Due to Injury or Mortality*.** Within the Project site, a total of 975 acres of existing natural habitat would be disturbed during construction. Direct impacts to Blainville's horned lizards would potentially include being hit by vehicles on access roads; mechanical crushing during construction of the infiltration basins, solar panel installation, vegetation management activities, and preparation of construction laydown areas; fugitive dust; vibration from the installation of the sheet piles, and general disturbance due to increased human activity. Blainville's horned lizards could be injured or killed during ground-disturbing Project activities in developed areas throughout the proposed Project. Indirect impacts to these species include compaction of soils and the introduction of exotic plant species. Operational impacts include risk of mortality by vehicles and disturbance on access roads due to increased use by the construction workers and maintenance personnel. Other operational impacts include removal and trimming of vegetation during vegetation management activities.

In addition to these temporary, construction-related impacts, permanent features of the Project may also pose a threat to Blainville's horned lizards. Specifically, the PV panels and other permanent features associated with the site (such as the perimeter fence and the O&M building) may provide increased perching opportunities for common ravens, which are known to prey on juvenile and adult Blainville's horned lizards. The Project description incorporates a "slack wire" along the top of the perimeter fence that would discourage birds from perching. Therefore, the Project would likely not result in increased predation of Blainville's horned lizards by ravens around the perimeter of the site. However, should Blainville's horned lizards be present on-site after construction, increased raven perching opportunities may pose a minimal threat in the interior of the site. Therefore, the impacts of

construction and long-term operation of the proposed Project on this species on-site would be ***significant, absent mitigation***.

Loss or Modification of Suitable Habitat. Furthermore, Project implementation may result in permanent loss of habitat due to permanent structures and/or roads and temporary loss of habitat from construction activities. The Project would permanently eliminate 400 acres of rabbitbrush scrub, California annual grassland, and wildflower fields, which were could potentially be suitable habitats for this species. Areas where vegetation is permanently eliminated would be made permanently unsuitable for use by horned lizards.

Development of the site would result in the installation of solar PV panels on 1,676 acres within the Project site. The density of the proposed PV panels, which would be arrayed with the intention of capturing the maximum possible amount of sunlight, would permanently and substantially decrease the amount of solar radiation reaching the soil surface in these areas. This phenomenon could result in adverse effects on Blainville's horned lizard and other reptiles, as these species rely on direct sunlight to elevate body temperature in the morning.

The foundations of the proposed panels would create areas of elevated soil moisture, which could become invaded by Argentine ants following Project construction. As these structures would be scattered throughout the proposed solar arrays, the potential would exist for such an invasion to spread from one foundation to the next, penetrating into the interior of the site. Argentine ants are able to competitively displace harvester ants, the preferred food source of horned lizards, and an extensive Argentine ant presence on-site would be likely to cause a substantial decline in the prey base available for horned lizards, which would permanently reduce the carrying capacity for this species within the Project site. The proposed Project would therefore be likely to precipitate a decline in horned lizard abundance on-site in the long term.

The Project site is at the margins of this species range, and it is likely that relatively few Blainville's horned lizards are present. In addition, some areas of undisturbed and restored horned lizard habitat would remain on-site after construction of the Project. A 45-acre portion of the Project site near West Avenue E and an additional 32-acre area within and surrounding Drainage A would remain in their current states, and would continue to provide suitable habitat after completion of the Project. However, given the extensive loss of suitable habitat on the Project site, the decreased suitability of the 1,676 acres due to facility-related shading, and the high potential for Argentine ant invasions, permanent impacts to Blainville's horned lizard on-site from habitat loss and modification would be ***significant, absent mitigation***. As discussed above, the Project site is at the margin of the Blainville's horned lizard's range, and past agricultural activity (e.g., disking) and the presence of SR-138, which presents a movement barrier, likely have limited this species' presence on-site.

Impacts of the Proposed Transmission Line*.** Along the proposed transmission line route, the only permanent alteration to habitat would be the presence of steel transmission line poles and power lines. Since these structures would not substantially alter the existing habitat, and since the transmission line is to the north of the Project site, while the documented occurrences of this species are to the south, the impact to Blainville's horned lizards from permanent habitat loss along the proposed transmission line route would be ***less than significant.

5.5.2.2 Special-status Bird Species

Impacts to the thirteen special-status bird species documented within the Project site and along the proposed transmission line route are described below.

5.5.2.2.1 Burrowing Owl (*Athene cunicularia*, CSC). This species is present on the Project site year-round and is known to nest in burrows along the vertical banks of Drainage A (on-site) and Drainage C (approximately 150 feet south of the site; see Section 4.7). The pair of owls nesting in Drainage C raised six young in 2009, and it is very likely that the adults and fledglings from this location forage on-site due to the close proximity of the burrow to the site boundary. No burrowing owls were found along the proposed transmission line route and, while suitable foraging habitat is present there, no burrows suitable for burrowing owls were found along the route during Phase II burrow searches.

***Loss of Individuals Due to Injury or Mortality*.** Within the Project site and along the proposed transmission line route, a total of 975 acres of existing natural habitat would be disturbed during construction (including permanent habitat removal within the footprint of proposed facilities and temporary disturbance in surrounding construction zones). Of the vegetation communities on-site, rabbitbrush scrub, California annual grassland, and wildflower fields would be the most extensively impacted, with total disturbance acreages of 711, 186, and 78, respectively. Since burrowing owls nest and roost underground, it is possible that adult and juvenile/nestling owls may be killed or injured, or eggs may be destroyed, by being crushed during construction-related ground disturbances. If construction occurs when nestlings are present, adult owls might have the ability to escape, but nestlings likely would not. In addition, disturbances from construction could potentially cause burrowing owls to abandon their nest burrows, leaving nestlings unattended and exposed to injury and mortality.

In addition to injury and mortality caused by physical contact with construction equipment, Project construction could result in harm to owls through substantial windblown dust in bare areas where vegetation has been cleared. Fugitive dust can carry heavy metals and other toxins, and excessive dust could adversely affect the entire suite of plants and wildlife that inhabit the area.

Permanent features of the Project pose relatively little threat of mortality and injury to burrowing owls. Increased perching opportunities for common ravens, known to prey on juvenile and even adult burrowing owls, would potentially pose a threat to the owls. Such an impact would be limited to the perimeter of the site and areas surrounding on-site mitigation areas, as owls are not likely to be present within the solar arrays after development (see below). The incorporation of a "slack wire" along the top of the perimeter fence would discourage perching by common ravens (see Section 2.4.2.3), thus lessening long-term mortality and injury impacts of the proposed Project. However, the impacts of construction and long-term operation of the proposed Project on this species on-site would still be ***significant, absent mitigation***.

Loss or Modification of Suitable Habitat. The Project would permanently eliminate 400 acres of rabbitbrush scrub, California annual grassland, and wildflower fields, which were identified as suitable burrowing owl habitat during the Phase I habitat assessment in December 2008. Areas where vegetation is permanently eliminated would be made permanently unsuitable for burrowing owl foraging, roosting, and nesting.

Development of the site would result in the installation of solar PV panels on 1,676 acres within the Project site. In these areas, to reduce the risk of fire within the Project site, vegetation management practices would include mowing to a height of 3 to 6 inches at the end of May, and mowing and limited use of herbicide at other times of year as determined appropriate for fire protection and for equipment operations and maintenance. The density of the proposed PV panels, which are arrayed with the intention of capturing the maximum possible amount of sunlight, would permanently and substantially alter the habitat by making it much less open. As burrowing owls generally prefer open habitats, these alterations would likely make the areas where the PV panels are located unsuitable for continued use by this species.

Some suitable burrowing owl habitat would remain on-site after construction of the Project. A 45-acre portion of the Project site near West Avenue E and a 32-acre area within and surrounding Drainage A would remain in their current states. Both locations include areas that hosted active burrowing owl burrows in the spring 2009 and may provide sufficient suitable habitat for owls to persist. However, CDFG (1995) and California Burrowing Owl Consortium (1993) guidelines recommend that a minimum of 6.5 acres of habitat, and a buffer of 160 feet, be preserved around any burrow known to be active within three years of construction (250 feet around any nest). Given this, that construction will occur less than 160 feet from any area within Drainage A (therefore potentially resulting in the displacement of one burrowing owl pair on-site), and that extensive suitable habitat will be removed or altered on the Project site, the permanent impacts to burrowing owls on-site from habitat loss would be ***significant, absent mitigation***.

Impacts of the Proposed Transmission Line*.** Along the proposed transmission line route, the only permanent alteration to habitat would be the presence of steel transmission line poles and power lines. Since the design of these structures would deter perching by common ravens, a potential predator to the burrowing owl; since the structures would not constitute any substantial alteration of burrowing owl habitat; and since burrowing owls have not been shown to use these areas, the impact to burrowing owls from permanent habitat loss along the proposed transmission line route would be ***less than significant.

5.5.2.2.2 Ferruginous Hawk (*Buteo regalis*, CDFG Watch List Species When Wintering), Long-eared Owl (*Asio otus*, CSC When Nesting), Merlin (*Falco columbarius*, CDFG Watch List Species When Wintering). The ecological requirements met for these three raptor species by the Project site are similar. The site provides suitable foraging habitat for all three species, as well as some possibility for roosting or nesting. Merlins forage in a variety of habitats in winter, especially open forests and grasslands (Warkentin et al. 2005). They usually hunt aerially, often using high-speed pursuit to surprise prey, although they also hunt from perches. They require dense trees for roosting near foraging habitat. They usually specialize in one or two locally abundant prey item, such as the horned lark, an abundant species in winter on the Project site. Ferruginous hawks prefer the sort of open habitat that exists on the Project site, especially those areas where their preferred prey items—prairie dogs, rabbits, or pocket gophers—are present (Bechard and Schmutz 1995). They usually hunt from a perch, or even from the ground, in open areas. They also need trees, or perhaps utility poles, for roosting. Long-eared owls also favor the sort of open habitats that occur at the Project site, where they hunt aerially, occasionally hovering, but also use perches from which to hunt. Their nest sites are typically sited in dense trees.

***Loss of Individuals Due to Injury or Mortality*.** Within the Project site, a total of 975 acres of existing natural habitat would be disturbed during construction (including permanent removal of habitat within the footprint of proposed facilities and temporary disturbance in surrounding construction zones). In addition, 11 acres of ornamental vegetation and orchard habitat would be destroyed during construction. As the ferruginous hawk, long-eared owl, and merlin are all highly mobile species, adult individuals would be able to fly away and avoid injury or mortality caused by collisions with construction equipment working in the open habitats where these species forage. Should any of these species be roosting or nesting in trees at the time of clearing of ornamental or orchard habitat, adults and fledged juveniles would likely be flushed before clearing occurs. In addition, as efforts to find these species roosting or nesting in ornamental and orchard habitat on-site failed to result in any observations of these species, it is relatively unlikely that any would be found in these habitats during clearing. In addition, potential toxins in windblown dust originating in construction areas are not expected to be a factor for these species. All three species are highly mobile and forage over wide areas, thus are likely to avoid such dangers, and no suitable roosting or nesting areas are immediately downwind under prevailing wind

conditions. Therefore, the Project's impacts on the ferruginous hawk, long-eared owl, and merlin due to construction-related injury or mortality would be ***less than significant***.

Loss or Modification of Suitable Habitat. Approximately 11 acres of orchard and ornamental habitat where these species have potential to roost or nest would be permanently removed by the Project. While none of these species were found roosting or nesting in this habitat in 2009, some potential still exists for them to do so in the future. In addition, 400 acres of natural habitats (rabbitbrush scrub, California annual grassland, and wildflower fields) would be permanently eliminated on-site by construction of the proposed project. An additional 1,487 acres of the same natural habitats would be shaded by PV panels. The highest point of the PV panels and associated tracker units would be 12 to 15 feet above the ground. This height is suitable for hunting perches of these three species, but the presence of many panels close together would probably prevent these birds from locating prey visually from a perch on a PV panel. These raptors typically utilize roosting sites in open areas lacking structures and other visual obstructions, which offer an unimpeded view of the ground. Furthermore, given the reliance of these species on their aerial maneuverability in open spaces, the presence of PV panels would render this habitat unsuitable. Because of the loss of 11 acres of potential roosting and nesting habitat, and the loss/modification of 1,887 acres of suitable foraging habitat, the Project's impacts on the ferruginous hawk, long-eared owl, and merlin on-site due to permanent habitat loss would be ***significant, absent mitigation***.

Impacts of the Transmission Line. Along the proposed transmission line route, the only permanent alteration to habitat would be the presence of steel transmission line poles and power lines. Temporary construction impacts to natural habitats associated with construction of these facilities would total 0.85 acre. Since the presence of transmission poles would not substantially alter the suitability of the surrounding habitat for raptor foraging, impacts of the proposed transmission line on the ferruginous hawk, long-eared owl, and merlin would be ***less than significant***.

5.5.2.2.3 Greater Roadrunner (*Geococcyx californianus*, SBS). This species is known to be present in the Antelope Valley, where it is more readily found than elsewhere in the county (LACSBSWG 2009). One individual was observed at the northern boundary of the Project site on December 8, 2008, near Joshua tree woodland, the only roadrunner observed during biological surveys in 2008–2009. This species may nest in the Joshua tree woodland near the site, but is not likely to nest in the common habitats on the Project site, since these areas lack the larger shrubs and trees typically used by this species for nesting. However, it may use the site to forage during the nesting season.

Loss of Individuals Due to Injury or Mortality. Within the Project site, a total of 975 acres of existing natural habitat would be disturbed during construction. As this species is relatively mobile, adults would be able to fly or run to avoid injury or mortality from

collisions with construction equipment. Construction activities could displace roadrunners from foraging areas within their territories. Those displaced could be exposed to competition for territory and resources, leading to mortality or injury. This risk is relatively low on the Project site, however, given that most of the site is marginally suitable habitat for roadrunners, and that only one of this fairly conspicuous and readily identifiable species was observed in 2008–2009, despite extensive biological surveys. Construction activities on-site should present little risk to eggs and nestlings, since no nests are expected there. Therefore, on-site impacts to greater roadrunners due to construction-related injury and mortality would be ***less than significant***.

Loss or Modification of Suitable Habitat*.** Development of the site would result in the installation of solar PV panels on 1,676 acres within the Project site. Rabbitbrush scrub would account for 1,135 acres of this area. This habitat is mostly located north of SR-138 and abuts the Joshua tree woodland (SEA #60) near the northern boundary of the site, where this species may nest. In areas where PV panels are proposed, vegetation management practices would include mowing of vegetation to a height of 3 to 6 inches at the end of May. By essentially eliminating the shrub component of the habitat, this practice would make these areas unsuitable for the greater roadrunner, which prefers open scrub habitats. For similar reasons, the 400 acres permanently impacted acres, which would include the O&M building, substation, paved parking areas, roadways, fencelines, and fire breaks, would also be made unsuitable. Although the site likely does not support nesting by this species, the probability that they nest nearby and forage in areas that would contain solar PV arrays after construction means that the impact from habitat loss to the greater roadrunner on-site would be ***significant, absent mitigation.

Impacts of the Transmission Line*.** Along the proposed transmission line route, the only permanent alteration to habitat would be the presence of steel transmission line poles and power lines. Construction of the transmission line would require construction laydown areas of approximately 100 feet by 50 feet for each pole, for a total of 0.85 acres of natural habitats removed. The proposed transmission line corridor provides suitable habitat for the greater roadrunner in areas of Joshua tree woodland. In these areas, the Joshua trees themselves are likely the only suitable locations for nests, since shrubs present are smaller than this species typically uses. Construction activities would be unlikely to affect this species, as the closest distance from a Joshua tree to a construction zone along the proposed transmission line route is 67 feet. Therefore, the Project's impacts on greater roadrunners along the proposed transmission line route would be ***less than significant.

5.5.2.2.4 Lark Sparrow (*Chondestes grammacus*, SA When Nesting). This species is known to nest in the vicinity of the Project site (LACBBA unpublished data). Surveys detected this species at various locations, mainly in the northern portion of the Project site, and one individual was also observed along the proposed transmission line route, in Kern

County. This species is most likely to breed in areas with trees or larger shrubs, which provide lookout and singing perches.

***Loss of Individuals Due to Injury or Mortality*.** Within the Project site, a total of 975 acres of existing natural habitats would be disturbed during construction. As this species is highly mobile, adults should be able to fly away to avoid injury or mortality from collisions with construction equipment. However, nestlings of this species, which frequently nests on the ground, could be subject to injury and mortality, and eggs could be destroyed, during vegetation clearing or other construction activities. In addition to injury and mortality caused by physical contact with construction equipment, construction of the Project could result in harm to lark sparrows through substantial windblown dust in bare areas where vegetation has been cleared. Fugitive dust can carry heavy metals and other toxins, and excessive dust could adversely affect the entire suite of plants and wildlife that inhabit the area.

In addition to these temporary, construction-related impacts, permanent features of the Project may also pose a threat to lark sparrows. The PV panels and other permanent structures associated with the site (such as the O&M building) would provide increased perching opportunities for common ravens, which may prey on small songbirds, including their young and eggs. (The design of the perimeter fence, however, incorporates a "slack wire" along the top of the fence to discourage bird perching, which should minimize any increase in the threat to lark sparrows from ravens.) In addition, annual mowing associated with vegetation management practices would potentially expose lark sparrow nests, nestling, or eggs to mortality and injury. Due to risk of injury and mortality to nestlings and potential destruction of eggs (from construction and mowing), the potential effects of fugitive dust, and the possible increased threat from common ravens, the construction and long-term impacts of the proposed Project on lark sparrows would be ***significant, absent mitigation***.

***Loss or Modification of Suitable Habitat*.** If implemented, the Project would permanently eliminate 400 acres of rabbitbrush scrub, California annual grassland, and wildflower fields within the Project site. Lark sparrows are strongly associated with rabbitbrush scrub on the site, but were not detected in the latter three habitats (although the Joshua tree recruitment area on-site is essentially identical to rabbitbrush scrub with regard to habitat suitability for this species). The Project would permanently eliminate only 294 acres of rabbitbrush scrub due to initial clearing, but vegetation management practices would result in the elimination of all of this habitat within the solar arrays. In all 1,322 of 1,451 acres of this habitat on the Project site would either be removed or converted to habitat dominated by annual grasses and forbs. At the same time, PV panels would be erected over 1,676 acres of natural habitat on the site (including that converted from rabbitbrush scrub to other habitats), further altering the habitat. These conditions may continue to provide nesting opportunities for this species, as well as suitable lookout and song perches on PV panels. However, the response of this species to these unusual conditions is not predictable. Therefore, the Project's potential

impact on the lark sparrow on-site from permanent habitat loss would be ***significant, absent mitigation***.

Impacts of the Transmission Line. Along the proposed transmission line route, the only permanent alteration to habitat would be the presence of steel transmission line poles and power lines. Temporary construction impacts to natural habitats associated with construction of these facilities would total 0.85 acres. Since the presence of transmission poles would not substantially alter the suitability of the surrounding habitat for foraging by this species, impacts of the proposed transmission line on the lark sparrow would be ***less than significant***.

5.5.2.2.5 Lawrence's Goldfinch (*Carduelis lawrencei*, SA When Nesting). This species is known to nest in the vicinity of the Project site (LACBBA unpublished data). Four individuals were found near suitable nesting habitat along the proposed transmission line route, near a residence and other structures in Kern County on May 8, 2009. This species usually nests near a source of surface water, and no such source exists on the Project site.

Loss of Individuals Due to Injury or Mortality. Since no suitable nesting habitat for this species is present on the Project site, Lawrence's goldfinch would not be expected to occur on-site during construction activities. Thus the proposed construction activities within the site would pose no physical threat to the species. Therefore, the impacts of the Project on Lawrence's goldfinch due to injury and mortality from temporary construction activities would be ***less than significant***.

Loss or Modification of Suitable Habitat. Since Lawrence's goldfinches do not nest on the Project site, the Project would result in no loss of habitat for this species on-site. Impacts to this species associated with habitat loss and alteration within the Project site would therefore be ***less than significant***.

Impacts of the Transmission Line. Along the proposed transmission line route, the only proposed permanent alteration to habitat would be the presence of steel transmission line poles and power lines. Temporary construction impacts to natural habitats associated with construction of these facilities would total 0.85 acres. However, the proposed poles would be sited within the road ROW, and no disturbance would occur on the property where Lawrence's goldfinches potentially nest, near 170th Street West and Gaskell Road. Given this, the possibility that an adult Lawrence's goldfinch could collide with construction equipment would be remote, and no loss of eggs or nestlings would occur. Since the presence of transmission poles would not substantially alter the suitability of the surrounding habitat for foraging by this species, impacts of the proposed transmission line on Lawrence's goldfinch would be ***less than significant***.

5.5.2.2.6 Loggerhead Shrike (*Lanius ludovicianus*, CSC When Nesting). This species is a year-round resident on the Project site, in nearby Joshua tree woodland, and along the proposed transmission line route. In 2009, the species was detected nesting in the pistachio

orchard on-site, in a planted tree along the transmission line route in Kern County, and near the eastern site boundary.

***Loss of Individuals Due to Injury or Mortality*.** Construction activities within the Project site would include clearing of the pistachio orchard south of SR-138, where shrikes are presumed to nest. While adult shrikes and fledged juveniles would likely be able to avoid contact with construction equipment in this area, any shrike nestlings in the orchard would be exposed to injury or mortality, and any eggs would be destroyed, should clearing take place in the nesting season. Construction activities on-site in areas other than the existing orchard would not affect shrike nesting habitat, and individuals foraging in these areas would be mobile enough to avoid collisions with equipment.

In addition to possible harm to shrike nestlings and eggs from the clearing of the orchard, shrikes could suffer harm from fugitive dust, which can carry heavy metals and other toxins; particularly because the area along 160th Street West where shrikes nested in 2009 is downwind of the site under prevailing wind conditions. Because of the potential of the clearing of the on-site orchard to expose shrike nestlings to injury or mortality and cause destruction of shrike eggs, and because construction activities on-site could result in harm to shrikes through substantial windblown dust in bare areas where vegetation has been cleared, the Project's impacts on shrikes on-site due to injury or mortality from temporary construction activities on-site would be ***significant, absent mitigation***.

***Loss or Modification of Suitable Habitat*.** The Project would result in the permanent loss of 9 acres of on-site orchard habitat, where loggerhead shrikes are believed to have nested in 2009. The Project would also result in the permanent replacement of 400 acres of natural habitat with on-site facilities, parking areas, and roads. All of the habitats lost to these facilities, especially rabbitbrush scrub (294 acres), but also including smaller amounts of California annual grassland and wildflower fields, provide foraging habitat for loggerhead shrikes. In the case of rabbitbrush scrub, in addition to removal of habitat during construction, fuel management practices will result in the conversion of all but 129 of the 1,451 acres of this habitat on-site to habitats dominated by annual grasses and forbs.

If the proposed Project is implemented, 1,676 acres of existing natural habitats would be shaded by PV panels after construction. While the effects of shading on the suitability of the habitat for loggerhead shrikes are uncertain, they are likely to be negative. Shrikes use higher areas in open habitat (shrubs, small trees, fences, telephone lines) as lookout perches when hunting. While PV panels (which would be up to a maximum of 12 to 15 feet high) may be a suitable height for shrike perches, they likely would also provide visual obstructions of the surrounding area, and thus make habitat unsuitable for foraging. Therefore, the Project's impacts on loggerhead shrikes on-site due to habitat loss would be ***significant, absent mitigation***.

Impacts of the Transmission Line*.** Along the proposed transmission line route, the only proposed permanent alteration to habitat would be the presence of steel transmission line poles and power lines. Temporary construction impacts to natural habitats associated with construction of these facilities would total 0.85 acres. In general, little to no grading is expected to be required in these areas, and the removal of mature trees, such as those preferred for nesting by shrikes, would be avoided. Therefore, given the shrike's ability to avoid physical harm from contact with construction equipment, adult and fledged juvenile shrikes should not suffer injury or mortality because of construction activities in the proposed transmission line route. Therefore, the Project's impacts on loggerhead shrikes along the transmission line route would be ***less than significant.

5.5.2.2.7 Mountain Bluebird (*Sialia currucoides*) and Vesper Sparrow (*Pooectes gramineus*, SBS). The impacts of the Project on these two species is likely to be similar, since the Project site and proposed transmission line route meet similar needs for them both, including the Oregon subspecies of the vesper sparrow, a CSC that has not been confirmed on the site, but that likely occurs there. Both songbird species depend on open habitats, such as the grasslands and open scrub habitat of the Project site. Mountain bluebirds forage in "flat grasslands with few scattered trees and bushes, meadows, hedgerows, agricultural areas" (Power and Lombardo 1996). However, at the Project site, several were also found in some of the denser areas of rabbitbrush scrub. Vesper sparrows in the western United States are found "in tree and shrub savanna and semiarid scrub and in areas with stunted and sparse vegetation" (Jones and Cornely 2002). On the Project site, they were found in winter in wildflower fields and California annual grassland south of SR-138 and in early spring in rabbitbrush scrub, mostly in the northeastern part of the site.

Loss of Individuals Due to Injury or Mortality*.** Within the Project site, a total of 975 acres of existing natural habitat would be disturbed during construction (including permanent removal of habitat within the footprint of proposed facilities and habitat modification in surrounding construction zones). This would include rabbitbrush scrub (711 acres), California annual grassland (186 acres), and wildflower fields (78 acres), all habitats where mountain bluebirds and vesper sparrows may potentially be found in winter. Since these species are mobile and able to fly away from construction equipment, they are unlikely to suffer injury or mortality during construction activity. Since neither species nests in the region, no nestlings or eggs would be lost. In addition to injury and mortality caused by physical contact with construction equipment, construction of the Project could result in harm to birds through substantial windblown dust in bare areas where vegetation has been cleared. Fugitive dust can carry heavy metals and other toxins, and excessive dust could adversely affect the entire suite of plants and wildlife that inhabit the area. However, since both species are mobile, and neither is bound to a limited territory in winter, they would be able to move to nearby areas to avoid windblown dust. Since mountain bluebirds and vesper sparrows would be able to avoid construction machinery and windblown dust, the Project's impacts on these species would be ***less than significant.

Loss or Modification of Suitable Habitat*.** Development of the site would result in permanent impacts to 400 acres of natural habitat. PV panels would be installed over an additional 1,487 acres of rabbitbrush scrub, California annual grassland, and wildflower fields. The presence of solar panels extending a maximum of 12 to 15 feet above the ground would shade previously open habitats preferred by these species and have unknown consequences on plant composition, and on food resources for mountain bluebirds and vesper sparrows. Therefore, the Project's impacts on the mountain bluebird and vesper sparrow from habitat loss within the Project site would be ***significant, absent mitigation.

Impacts of the Transmission Line*.** Construction along the proposed transmission line route would not permanently change habitat, other than through the presence of the transmission lines and the steel poles that support them. Temporary impacts would be limited to a 50 x 100 foot area surrounding each pole, and would total 0.85 acres. Therefore, the impact on mountain bluebird and vesper sparrow habitat along the proposed transmission line route would be ***less than significant.

5.5.2.2.8 Mountain Plover (*Charadrius montanus*, CSC When Wintering). This species, which occurs in fallow agricultural fields, among other habitats with bare ground or short vegetation, has occurred in winter within 3.5 miles of the Project site (CNDDDB). Much of the western Antelope Valley that was previously agricultural has now reverted to other uses, but some agricultural sites persist, including within the proposed transmission line route. No suitable habitat is present on the Project site, which is neither grazed nor actively farmed.

Loss of Individuals Due to Injury or Mortality*.** Since no suitable nesting habitat is present on the Project site, construction activities and permanent features created by Project construction pose no threat of injury or mortality to mountain plovers. The Project's impacts on mountain plovers due to injury and mortality would therefore be ***less than significant.

Loss or Modification of Suitable Habitat*.** Since no habitat suitable for mountain plovers is present on the Project site, the Project would result in no habitat loss on-site for this species. Therefore, the impact on mountain plovers due to habitat loss would be ***less than significant.

Impacts of the Transmission Line*.** Along the transmission line route, active agricultural fields could potentially attract mountain plovers in migration or winter, in years when conditions in the fields are suitable. However, erection of the steel transmission line poles, which would occur in construction laydown areas measuring 100 feet by 50 feet in area, would potentially affect only a small portion of these fields. Also, as all mountain plovers present in the winter would be fully grown and able to fly, all would be mobile, and able to avoid isolated areas of construction. The poles and lines would also pose no permanent threat to the health of any plovers that may occur in this area. Because the erection of the transmission lines and poles poses no threat to this species, impacts of the proposed transmission line on the mountain plover would be ***less than significant.

5.5.2.2.9 Prairie Falcon (*Falco mexicanus*, CDFG Watch List Species When Nesting). This species may nest at Fairmont Buttes, near the southeastern portion of the Project site, and in the Sierra Pelona, five miles to the south of the site. The species may forage miles from nesting sites, and therefore has the potential to use the site or the proposed transmission line route for foraging when nesting. No suitable nesting sites (cliffs, rock outcroppings) are present on-site or along the transmission line route. Single prairie falcons were recorded twice on the Project site during biological surveys in 2008–2009, once in winter and once during the nesting season. Both sightings occurred over California annual grassland vegetation south of SR-138.

Loss of Individuals Due to Injury or Mortality*.** The Project's impacts on this species due to injury and mortality would be the same as those affecting the ferruginous hawk, long-eared owl, and merlin, described in Section 5.5.2.2 above, and would be ***less than significant.

Loss or Modification of Suitable Habitat*.** Since there are no suitable nesting sites for this species on the Project site, the Project would have no impact on nesting habitat for prairie falcons. The Project's impacts on foraging habitat for this species would be the same as those affecting the ferruginous hawk, long-eared owl, and merlin, described in Section 5.5.2.2 above, and would be ***significant, absent mitigation.

Impacts of the Transmission Line*.** The impacts of construction of the proposed transmission line would be the same as those affecting the ferruginous hawk, long-eared owl, and merlin, described in Section 5.5.2.2. above, and would be ***less than significant.

5.5.2.2.10 Western Meadowlark (*Sturnella neglecta*, SBS). This species was widespread on the Project site during surveys in 2008–2009. Meadowlarks were seen in modest numbers on the Project site, mostly in grasslands, but also in rabbitbrush scrub. This species was confirmed breeding in rabbitbrush scrub in the northeastern part of the site in mid-April 2009. It was also recorded in agricultural fields and other open habitats along the proposed transmission line route.

***Loss of Individuals Due to Injury or Mortality*.** Within the Project site, a total of 975 acres of existing natural habitat would be disturbed during construction (including permanent removal of habitat within the footprint of proposed facilities and habitat modification in surrounding construction zones). Adult meadowlarks would be able to avoid ground disturbances during construction by flying away from construction equipment. However, should construction occur in the nesting season, injury or mortality to nestlings, or destruction of nests with eggs, could result. In addition to injury and mortality caused by physical contact with construction equipment, construction of the Project could result in harm to meadowlarks through substantial windblown dust in bare areas where vegetation has been cleared. Fugitive dust can carry heavy metals and other toxins, and excessive dust could adversely affect the entire suite of plants and wildlife that inhabit the area. Thus, given the

potential exposure to injury and mortality caused by construction-related ground disturbances and windblown dust, the Project's impacts on western meadowlarks due to construction-related injury and mortality would be ***significant, absent mitigation***.

Loss or Modification of Suitable Habitat. Development of the site would result in permanent impacts to 400 acres of natural habitat, including areas where the O&M building, parking areas, and roads would be located. PV panels would be installed over an additional 1,487 acres of existing rabbitbrush scrub, California annual grassland, and wildflower fields. The presence of solar panels extending a maximum of 12 to 15 feet above the ground would shade previously open habitats preferred by this species and have unknown consequences on plant composition, and on food sources for western meadowlarks. Therefore, the Project's impacts on the western meadowlark from habitat loss on the Project site would be ***significant, absent mitigation***.

Impacts of the Transmission Line. Construction along the proposed transmission line route would not permanently change the existing habitat, other than through the presence of the transmission lines and poles. Therefore, the Project impact on western meadowlark habitat along the proposed transmission line route would be ***less than significant***.

5.6 IMPACTS TO WILDLIFE MOVEMENT

Criterion: Impacts would be significant if the proposed project would interfere substantially with any wildlife corridor, adjacent open space linkage, or identified resources nearby and on the site.

Intact movement linkages are an integral component of functional wildlife habitat, and preventing habitat fragmentation and isolation has long been a tenet of conservation biology. On a large scale, functional habitat linkages are instrumental in allowing gene flow between regional populations, and in allowing species to recolonize habitats following local extirpations. On a local scale, habitat connectivity allows species to accomplish essential behaviors including foraging, dispersal, and searching for mates. As habitats become increasingly fragmented, accomplishing these behaviors becomes more difficult, and wildlife must expend additional effort to survive. While the Project site is not within an area identified as a large-scale habitat linkage (South Coast Wildlands 2008), many small and medium-sized wildlife species nonetheless move within and through the site, relying on on-site habitat and the permeability of the site to satisfy biological requirements.

Currently, the Project site is bounded in some areas by unpaved roads, but is not separated topographically from the surrounding landscape. However, movement through the site by terrestrial wildlife is somewhat constrained by the presence of two paved roadways, SR-138 and 170th Street West, which bisect the site travelling east-west and north-south, respectively. Although they are not completely impassable, periodic mortality of wildlife attempting to cross these roadways undoubtedly occurs due to vehicle collisions. Within the site,

observations of tracks and sign indicate that Drainage A appears to be used preferentially as a movement route through the site by common mammals. Although the relatively flat topography and lack of fences or other barriers suggest that the entire site is likely suitable for this purpose as well, the drainage provides cover and shelter, which may make this feature preferable over the exposed portions of the site. Implementation of the proposed Project would entail the installation of chain-link fencing around the majority of the Project site, with a wildlife-permeable design incorporated. Wildlife-permeable fencing (see Figure 2-1c) would not impede the movement of small- or medium-sized wildlife across the site boundaries, and would be installed at key movement locations, such as the ends of the proposed wildlife corridor surrounding Drainage A. In addition, fencing around the site boundary as a whole would include 50-foot segments of wildlife-permeable fencing located approximately every 200 feet. Fencing along SR-138 would not be wildlife-permeable, to reduce wildlife mortality from vehicle collisions.

The wildlife species present in the Project region vary greatly in their size and mobility, from small mammals and reptiles with home ranges a fraction the size of the Project site, to mountain lions and mule deer in the mountains south of the Project site that can forage over many square miles. These different groups of wildlife have vastly different habitat connectivity requirements, and it is therefore not reasonable to assume that installation of the proposed Project facilities would impede the movement of all species equally. To address these realities, this section evaluates impacts of the proposed Project on movement of three wildlife groups: small mammals and reptiles, such as squirrels and lizards; medium-sized wildlife, such as black-tailed jackrabbits; and large, high-mobility species such as deer and mountain lions.

5.6.1 Impacts to Movement of Small Mammals and Reptiles

Small mammals and reptiles generally have relatively small home ranges and limited dispersal capabilities. For example, the white-tailed antelope squirrel (*Ammospermophilus leucurus*) is a fairly mobile small mammal on-site, with average home range estimated at 14.9 acres (Bradley and Deacon 1965); while territory size for the desert horned lizard (*Phyrnosoma platyrhinos*) has been estimated at 0.39 acres (Pianka and Parker 1975). Due to their relative lack of mobility, these species tend to depend on habitat areas that meet virtually all of the species' life history needs, rather than using many habitat patches that are each suitable only for a specific purpose. Because of their limited ability to disperse, small mammals and reptiles typically do not cross large areas of unsuitable habitat. Even in areas where habitat is suitable, these species tend to disperse gradually and incrementally over many generations, rather than through long-distance movements by individuals. Habitat connectivity is therefore especially important for small mammals and reptiles, because their low mobility makes habitat isolation more probable in occurrence and more difficult to overcome.

In order for the daily movement of individual wildlife to be impacted by the proposed Project, the Project would need to create an obstacle to movement within the individual's home range. However, because of the small home ranges typically occupied by these species, it is probable that the majority of the small mammals and reptiles that inhabit the 2,100-acre Project site occupy home ranges that are wholly contained within the site; and that individuals inhabiting areas outside the Project site occupy home ranges located completely outside the Project site. The proposed Project would use nearly the entire site for solar energy production, and Project activities would therefore be likely to affect the home ranges of small mammals and reptiles on-site in their entirety. In short, the Project would impact small mammals and reptiles on-site through habitat loss and modification throughout the home range, rather than by restricting movement. Movement of individuals occupying home ranges outside the Project site would not be restricted by Project activities occurring within the site. Impacts associated with on-site habitat loss are addressed in Section 5.5.1 of this Biota Report.

The site perimeter fencing would not present an obstacle to small mammals and reptiles, as even those chain-link fence segments without wildlife permeable designs would feature spaces in the mesh that are large enough for these species to pass through unimpeded. The existing SR-138 and 170th Street West roadways within the Project site present a substantial barrier to movement of small mammals and reptiles, due to the low mobility of these species; these existing constraints would remain unchanged by the proposed Project. Because small mammals and reptiles occupy home ranges small enough that they are likely to be located either wholly inside or wholly outside the Project site, the proposed Project is unlikely to substantially impede the movement of these species. Impacts of the proposed Project on the movement of small mammals and reptiles would therefore be ***less than significant.***

5.6.2 Impacts to Movement of Medium-sized Wildlife

Medium-sized wildlife, such as coyotes, would be affected by the proposed Project in a manner much different than that affecting lower-mobility species. Home range sizes for the black-tailed jackrabbit vary based on physical and ecological factors, but average approximately 45 acres in California (Lechleitner 1958). Such ranges are large enough that travel off of the site could very possibly be a requirement, yet small enough that the Project site could be relied on substantially to partly fulfill basic biological needs including foraging, searching for mates, and potentially short-range dispersal. Due to the larger home range sizes occupied by these species, it is likely that some medium-sized wildlife individuals in the area utilize habitat both within and outside the Project site. Therefore, the potential exists for Project components to disrupt movement of these individuals within their home ranges.

The existing constraints to movement of medium-sized wildlife within the Project site presented by the SR-138 and 170th Street West roadways would be unchanged by the proposed Project. However, the relatively low traffic volumes on these roads, combined with

the relatively high mobility of medium-sized wildlife, suggest that the on-site roads are more passable by these species than by small mammals and reptiles.

As stated previously, the proposed Project design includes chain-link fencing around the site perimeter (see Figure 2-1c). While such fencing would not obstruct the movement of small mammals and reptiles (snakes and lizards), medium-sized wildlife are not small enough to fit through the mesh openings, and would therefore be unable to pass through those portions of the perimeter fencing that are not designed to be wildlife-permeable. Within the permeable segments (minimum 50 feet in length every 200 feet), there would be a 1-foot space at ground level to allow for wildlife passage. The 1-foot space at the bottom may include a slack wire to allow wildlife movement while discouraging human passage. The presence of wildlife-permeable segments of fencing over more than 20 percent of the total fenced length would avoid detrimental effects on the movement and behavior of these species.

As stated previously, wildlife currently use Drainage A as a northeast-southwest movement corridor through the Project site. After construction, access to this drainage would continue to be available from 170th Street West, similar to the existing condition. Wildlife-permeable fencing would be installed at each end of the drainage, spanning 450 feet at the southwestern (upstream) end and 200 feet on the northeastern (downstream) end. This design would ensure that the wildlife corridor remains accessible to wildlife in the post-Project condition. In addition, because no fencing is proposed separating this corridor from the remainder of the Project site, the topographic cover provided by the corridor would also be available for use by wildlife inhabiting the interior of the site.

Following implementation of the proposed Project, the Project site would remain passable by medium-sized wildlife, due to the 200-foot wide corridor centered on drainage A, and the proposed wildlife-permeable fencing design. As it is reasonably certain that medium-sized wildlife currently move through the Project site and across the site boundary, and because implementation of the Project would only marginally decrease their ability to continue doing so, impacts of the proposed Project on medium-sized wildlife would be ***less than significant.***

5.6.3 Impacts to Movement of Large Mammals

For the largest wildlife, such as mountain lions, mule deer, and species of similar size and mobility, the Project site represents only a small portion of a typical home range. A previous study conducted in the western foothills of the Sierra Nevada found the average mountain lion home range size to be 285 square miles (Neal et al. 1987). Although not detected on-site during biological field investigations of the Project site and proposed transmission line route (see Section 4.0 of this Biota Report), large, highly mobile mammals such as mountain lions and mule deer occur in the Project region and may occasionally use the site as a component of the larger habitat mosaic required by these species. However, evidence suggests that large mammals preferentially travel along the periphery of the Antelope Valley, utilizing habitat

linkages in the Tehachapi, Sierra Madre, Castaic, and San Gabriel mountain ranges, rather than along the valley floor (South Coast Wildlands 2008, and CDFG 2008b; see Section 4.12 of this Biota Report).

The presence of the existing SR-138 and 170th Street West roadways within the Project site presents a constraint to movement of large mammals through the site, which would be unchanged by the proposed Project. However, the relatively low traffic volumes on these roads, combined with the high mobility of large mammals and the fact that the Antelope Valley floor is not a preferred movement corridor for these species, suggest that the on-site roads are passable by these species, although vehicle-related mortality may occasionally occur.

Because the proposed wildlife-permeable fencing design would not allow sufficient clearance to be passable by large wildlife, installation of the proposed perimeter fencing would limit large wildlife travel through the site to the corridors along the SR-138 and 170th Street West roadways. These travel routes would range from approximately 190 to 333 feet in width, and would consist of the roadway itself as well as portions of adjacent firebreaks. Limiting site permeability to these two roadways would probably increase the density of large mammals travelling near the roads, leading to increased mortality due to vehicle collisions. However, large mammals would be able to skirt the site and travel outside the site perimeter much more easily than medium-sized wildlife. The Project site represents a much smaller portion of the home range for large mammals, and loss of access to resources within the site would not necessarily require these species to change their foraging or dispersal patterns. In addition, due to the lower level of dependence on the site, evidenced by the lack of signs of use and absence of documented sightings, and preference for sheltered movement routes exhibited by these species, the probability of large mammals utilizing as a movement corridor is relatively low. Impacts of the proposed Project on movement of large mammals would therefore be ***less than significant.***

5.6.4 Impacts of the Proposed Transmission Line on Wildlife Movement

Due to the nature of construction impacts along the proposed transmission line route (i.e., many small, isolated patches of disturbance with ample undisturbed habitat between them), construction of the transmission line would not substantially affect the movement of wildlife along the proposed transmission line route.

5.7 IMPACTS TO SIGNIFICANT ECOLOGICAL AREAS

Criterion: Impacts would be significant if the proposed Project would adversely affect SEA resources, including linkages to other SEAs, or undisturbed habitats.

As stated in Section 3.2.2.1, the Project site overlaps approximately 20 acres of SEA #60, and the proposed transmission line route traverses this SEA for approximately 0.4 linear

miles along 170th Street West. The County has established guidelines to assess whether projects proposed within and adjacent to SEAs are compatible with the biological resources present, set forth at Section 22.56.215 of the Los Angeles County Code, and it is assumed for purposes of this analysis that any project satisfying the compatibility criteria would not result in a significant impact pursuant to the criterion stated above. For an evaluation of the proposed Project's effect on SEA #60, as determined using the County's SEA compatibility guidelines, please refer to Section 7.0 of this Biota Report. Because the proposed Project meets all of the established SEA compatibility criteria, impacts associated with SEA resources would be ***less than significant.***

5.8 CUMULATIVE IMPACTS

5.8.1 Introduction

In accordance with the SEATAC Guidelines, this Biota Report presents an analysis of cumulative impacts on biological resources that may result from construction and operation of the proposed Project. As defined at §15355 of the State CEQA Guidelines, cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. This section presents the cumulative projects basis for consideration in the cumulative impact analysis in Section 5.8.3, as well as the cumulative impact assessments (by environmental topic) in Section 5.8.4.

The cumulative impact analyses consider a number of variables including geographic (spatial) limits, time (temporal) limits, and the characteristics of the resource being evaluated. The geographic study area of each analysis is based on the nature of the geography surrounding the proposed Project, the characteristics of each resource, and the region to which they apply. In addition, each project in a region will have its own implementation schedule, which may or may not coincide or overlap with the proposed Project's schedule. For reference, the proposed AV Solar Ranch One Project is planned to be under construction between the fourth quarter of 2010 through the fourth quarter of 2013. The proposed off-site 230-kV transmission line is currently planned to be constructed in the spring and summer months of 2011.

5.8.2 Methods

CEQA Guidelines (§15130[b][1]) recommend two methods for establishing the cumulative impact scenario. One approach is to use a "list of past, present, and probable future projects producing related or cumulative impacts…" (§15130[b][1][A]). Another approach is to use a "summary of projects contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area-wide conditions contributing to the cumulative impact" (§15130[b][1][B]).

This Biota Report considers a combination of both methods to provide a tangible understanding and context for analyzing the potential cumulative effects of the proposed Project. The geographic boundary for assessment of potential cumulative effects focuses on a review of applicable projects within 5 miles of the proposed Project site and off-site transmission line route. Based on consultation with the LACDRP, the cumulative resource study area was expanded to include a review of projects within the City of Lancaster, the Centennial master planned community along SR-138, and the community of Gorman near the intersection of SR-138 and I-5. As requested by SEATAC, the cumulative assessment for the Biota Report also considers other potential solar development project in the western Mojave Desert, including the area covered by the Bureau of Land Management (BLM) West Mojave Plan.

The cumulative scenario was developed through a review of active project lists from LACDRP, Kern County Planning Department, City of Lancaster, California Energy Commission (CEC), the California Independent System Operator (CAISO) interconnection queue and the U.S. Bureau of Land Management (BLM). The cumulative impact basis presented herein also considers planning documents, including general plans, area plans, specific plans, and previously certified EIRs, and Southern California Association of Governments (SCAG) growth projections.

5.8.3 Cumulative Projects

The following sections discuss the cumulative projects scenario identified for the proposed Project. Refer to Table 5-3 for a listing of projects and planning areas identified that are considered in the Project cumulative impact analysis. The cumulative projects considered are presented graphically on the topographic map included in Appendix C.

5.8.3.1 Energy and Transmission Projects

5.8.3.1.1 Tehachapi Renewable Transmission Project. SCE proposes the Tehachapi Renewable Transmission Project (TRTP), which involves constructing and operating a series of primarily 500-kV transmission system improvements to deliver electricity from renewable energy projects in eastern Kern County to the Los Angeles Basin. The TRTP Draft EIR/Environmental Impact Statement (EIS) was released on February 13, 2009, and the Final EIR/EIS is currently planned to be issued in the summer of 2009. Construction is estimated to begin in 2009 and end in 2013. The AV Solar Ranch One site is located near the northern portion of the Antelope-Whirlwind transmission line (Segment 4) and the Project proposes to interconnect into the planned SCE Whirlwind Substation (TRTP-Segment 9) in southern Kern County.

TABLE 5-3
CUMULATIVE PROJECTS/SCENARIOS CONSIDERED

Map ID[1]	Project Type	Project/Plan Name	Description	Acres	Jurisdiction	Timeframe/ Status	Location	Project/Plan Proponent
Projects Within 5 Miles of AV Solar Ranch One Site								
	Recreation/ Commercial	Fairmont Butte Motorsports Park Project	Motor recreational (racetrack) facility encompassing 320 acres. Facility includes 186,808 sq ft of appurtenant facilities, such as an administration building, servicing units, 2 caretaker houses, a restaurant, and garages.	320	Los Angeles County	DEIR released July 2009; construction anticipated in July 2010, and operation in December 2012.	Located approximately 0.5 mile east of Project site; bounded by SR-138 to the north, 155th Street West to the west, 150th Street West to the east, and open space to the south.	Unspecified
4	Public Services	Antelope Valley Water Bank Project	Project to develop facilities to recharge and store imported surface water beneath properties in the Antelope Valley. Project area spans across approximately 13,440 acres, and requires construction of wells, facilities, and accessory structures for water transportation.	13,440	Kern County	Project Approved 2006.	Area proposed for recharge and recovery facilities is bounded by Rosamond Blvd to the north, Avenue A (south), 170th Street West (west), and 100th Street West (east).	Western Development and Storage, LLC
	Energy	Tehachapi Renewable Transmission Project	Proposed transmission system improvements to deliver electricity from renewable energy projects in Kern County to Los	--	CPUC	DEIR/S issued Feb 2009; construction anticipated in 2009 and end in	Project area traverses portions of Kern, Los Angeles, Riverside County, and San Bernardino counties, and the ANF.	Southern California Edison

TABLE 5-3 (CONTINUED)
CUMULATIVE PROJECTS/SCENARIOS CONSIDERED

Map ID[1]	Project Type	Project/Plan Name	Description	Acres	Jurisdiction	Timeframe/ Status	Location	Project/Plan Proponent
			Angeles Basin.			2013.		
11	Energy	Pacific Wind Energy Project	Proposed wind energy facility to generate up to 250 MW, with proposed interconnection into Whirlwind Substation.	8,300	Kern County	NOP issued September 30, 2009.	Project site is generally bound on the north and west by the Tehachapi Mountains, to the south by Patterson Road, and to the east by 160th Street West.	enXco Development Corporation
10	Large-Scale Planned Community	Willow Springs Specific Plan	Specific plan for mixed use development in Kern County	--	Kern County	Residential housing subdivision approved as part of specific plan.	South Kern County, from Avenue A to Dawn Road and 50th Street West to 190th Street West.	Kern County
City of Lancaster								
	Infill/ Redevelopment	Proposed developments in redevelopment areas	Development summary consists of: total of 11,630 residential units; 385 acres public facilities; 379 acres commercial development, 163 acres industrial development, and 17 acres mixed uses.	--	City of Lancaster	Development Summary Report (current as of July 2009).	City of Lancaster, within redevelopment areas: Residential Project Area; Central Business District; Fox Field Project Area; Amargosa Project Area; and Project Areas 5, 6, and 7.	Various

TABLE 5-3 (CONTINUED)
CUMULATIVE PROJECTS/SCENARIOS CONSIDERED

Map ID[1]	Project Type	Project/Plan Name	Description	Acres	Jurisdiction	Timeframe/ Status	Location	Project/Plan Proponent
	Infill	Proposed developments (excludes redevelopment areas)	Development summary indicates: total of 11,279 residential units; 73 acres public facilities; 134 acres commercial development, 104 acres industrial development, and 73 acres mixed uses.	--	City of Lancaster	Development Summary Report (current as of July 2009).	City of Lancaster, outside of redevelopment areas.	Various
	Transportation	North County Highway Corridor Plan	Proposed regional transportation plan to expand SR-138 into a 6-lane expressway, and improve corridor integration on I-5 and SR-14.	__	California Department of Transportation	Improvements to I-5 and SR-14 expected around 2020 and 2025, and SR-138 expansion corridor would likely be implemented after 2030.	North Los Angeles County	Multiple local and state agencies
	Transportation	California High Speed Rail	Proposes 800 mile statewide high-speed train system from Sacramento to San Diego.	--	California Department of Transportation	Construction of Southern CA segment is proposed to begin as early as 2011.	A portion of the Southern California route would traverse the Cities of Lancaster and Palmdale about 15 miles east of Project site.	California High-Speed Rail Authority

TABLE 5-3 (CONTINUED)
CUMULATIVE PROJECTS/SCENARIOS CONSIDERED

Map ID[1]	Project Type	Project/Plan Name	Description	Acres	Jurisdiction	Timeframe/ Status	Location	Project/Plan Proponent
Centennial Specific Plan								
	Master Planned Community	Centennial Specific Plan	Master Plan Community of up to 23,000 dwelling units, and 14 million total square feet of non-residential development, including commercial facilities, 3 schools, 1 golf course, open space areas, and roads.	12,000	Los Angeles County	EIR NOP issued March 2004; Project build-out over 20 years.	Northwestern portion of the Antelope Valley, 1 mile east of I-5 and immediately adjacent to the north and south of SR-138.	Centennial Founders, LLC
Community of Gorman								
	Large-Scale Planned Community	Gorman Post Ranch	Residential development consisting of 533 single family units on 2,725.38 acres.	2,725	County of Los Angeles	NOP issued 1/10/07; EIR in progress.	Northwest corner of unincorporated Los Angeles County just south of Kern County. The site is located on Gorman Post Road, between Gorman School Road and Lancaster Road (SR-138), just northeast of I-5 and southeast of Gorman.	Gorman Post Ranch, LLC
CAISO Interconnection Queue								
--	Renewable Energy	Solar Photovoltaic Electric Generation Facility	Proposed solar photovoltaic electric generation project with a maximum capacity of 211.76 MW. Proposed interconnection into the planned SCE Whirlwind	--	Kern County	Current anticipated on-line date: December 2011.	Location unspecified in Kern County. Project not identified within 5 miles of the proposed AV Solar Ranch One Project site.	Unspecified

TABLE 5-3 (CONTINUED)
CUMULATIVE PROJECTS/SCENARIOS CONSIDERED

Map ID[1]	Project Type	Project/Plan Name	Description	Acres	Jurisdiction	Timeframe/ Status	Location	Project/Plan Proponent
			Substation.					
--	Renewable Energy	Solar Thermal Electric Generation Facility	Proposed solar thermal generation project with a maximum capacity of 231 MW. Proposed interconnection into the SCE Antelope-Magunden 230-kV transmission line.	--	CEC	AFC not filed; anticipated on-line date: April 2011.	Kern County, location unspecified.	Unspecified
--	Renewable Energy	Solar Thermal Electric Generation Facility	Proposed solar thermal generation project with a maximum capacity of 420 MW. Proposed interconnection into the planned SCE Whirlwind Substation.	--	CEC	AFC not filed; anticipated on-line date: October 2013.	Los Angeles County, location unspecified.	Unspecified
--	Renewable Energy	Wind Electric Generation Facility	Proposed wind generation project with a maximum capacity of 100 MW. Proposed interconnection into the planned SCE Whirlwind Substation.	--	Kern County	Current anticipated on-line date: December 2012.	Location unspecified in Kern County. Project not identified within 5 miles of the proposed AV Solar Ranch One Project site.	Unspecified

TABLE 5-3 (CONTINUED)
CUMULATIVE PROJECTS/SCENARIOS CONSIDERED

Map ID[1]	Project Type	Project/Plan Name	Description	Acres	Jurisdiction	Timeframe/ Status	Location	Project/Plan Proponent
--	Renewable Energy	Wind Electric Generation Facility	Proposed wind generation project with a maximum capacity of 160 MW. Proposed interconnection into the planned SCE Whirlwind Substation.	--	Kern County	Current anticipated on-line date: December 2013.	Location unspecified in Kern County. Project not identified within 5 miles of the proposed AV Solar Ranch One Project site.	Unspecified
--	Renewable Energy	Wind Electric Generation Facility	Proposed wind generation project with a maximum capacity of 250 MW. Proposed interconnection into the planned SCE Whirlwind Substation.	--	Kern County	Current anticipated on-line date: October 2010.	Location unspecified in Kern County. Project not identified within 5 miles of the proposed AV Solar Ranch One Project site.	Unspecified
--	Renewable Energy	Wind Electric Generation Facility	Proposed wind generation project with a maximum capacity of 340 MW. Proposed interconnection into the planned SCE Whirlwind Substation.	--	Kern County	Current anticipated on-line date: December 2011.	Location unspecified in Kern County. Project not identified within 5 miles of the proposed AV Solar Ranch One Project site.	Unspecified
--	Renewable Energy	Wind Electric Generation Facility	Proposed wind generation project with a maximum capacity of 500 MW. Proposed interconnection into the planned SCE Whirlwind Substation.	--	Kern County	Current anticipated on-line date: December 2014.	Location unspecified in Kern County. Project not identified within 5 miles of the proposed AV Solar Ranch One Project site.	Unspecified

[1] Refer to Appendix C for general locations of cumulative projects considered, as available in July 2009.

5.8.3.1.2 Solar Power Generation Projects.

Sierra Demonstration Plant. The eSolar Sierra Demonstration Plant is a solar thermal test site occupying 95 acres in the City of Lancaster. The facility can generate a maximum of 7.5 MW, and is expected to be in full operation in 2009 (City of Lancaster Development Summary Report, January 1, 2009 – March 31, 2009).

Alpine SunPower Project. Alpine SunPower, LLC, a subsidiary of NRG Energy Inc., has proposed a 92-MW solar thermal power facility located near Lancaster. The project is a collaboration between eSolar and NRG Energy, LLC, and would apply eSolar's concentrating solar power tower technology. An Application for Certification (AFC) has not yet been filed with the CEC. The project is scheduled for completion in 2012 (CEC Solar Thermal Projects Under Review or Announced, June 25, 2009).

Other Proposed Solar Thermal Projects. Currently eSolar is proposing two additional solar thermal projects that may be located within the AV Solar Ranch One site project region. These projects are eSolar 2, which is a 66-MW solar tower facility in Los Angeles County, and Gaskell SunPower, which is a 105- to 245-MW solar tower facility in Kern County. The AFCs for these two projects have not been filed with the CEC (CEC Solar Thermal Projects Under Review or Announced, June 25, 2009).

5.8.3.1.3 Pacific Wind Energy Project. enXco Development Corporation proposes to develop the Pacific Wind Energy Project, which would generate up to 250 MW of electricity using wind turbines in the Willow Springs Specific Plan area, in eastern Kern County. The project occupies approximately 8,300 acres, and is generally bound on the north and west by the Tehachapi Mountains, to the south by Patterson Road, and to the east by 160th Street West. The project proposes to interconnect at the planned SCE Whirlwind Substation. Project construction is expected to require between 2 to 4 years, over two phases. During operation, the project would need between 8 to 12 permanent workers. The lead agency, Kern County Planning Department, issued the project Notice of Preparation of a Draft Environmental Impact Report on September 30, 2009. As of September 2009, the proposed construction start date has not been specified.

5.8.3.1.4 California Independent System Operator Interconnection Queue. As energy projects are proposed, completed, or withdrawn, the CAISO queue changes and is regularly updated. As of July 12, 2009, a total of nine energy projects, including the proposed Project, were identified that requested interconnection either into the planned SCE Whirlwind Substation or through the Antelope-Magunden 230-kV transmission line east of the proposed Project site. These projects consist of two photovoltaic facilities (including the proposed AV Solar Ranch One project), two solar thermal projects, and five wind generation projects. Combined, there projects would supply approximately 2,700 MW of renewable energy.

5.8.3.1.5 Solar Development in the Mojave Desert. Multiple solar projects are under consideration for development in the portion of the Mojave Desert east of the proposed AV Solar Ranch One Project. The majority of these potential future projects are located east of the City of Barstow and/or the Twentynine Palms Marine Corps Base in San Bernardino County and east of Joshua Tree National Park in Riverside County. Additionally, solar projects are under consideration in Imperial County as well. In general, the solar projects for which a formal permit application had been filed as of August 2009 in the Mojave Desert are: 1) located more than 10 miles east of the proposed AV Solar Ranch One Project; 2) located in areas with different biological species of potential concern; and 3) subject to project-specific environmental permitting and mitigation requirements associated with federal and state requirements, as applicable.

Given these considerations, the potential for significant cumulative biological impacts to occur with the AV solar Ranch One Project is low. The following discussions provide more information in accordance with SEATAC requests.

Mojave Desert Ecoregion/Biome. The AV Solar Ranch One Project site is located within the western portion of the West Mojave ecoregion/biome. The Mojave Desert ecoregion, or bioregion is defined by the U.S. Forest Service's National Hierarchical Framework of Ecological Units to define ecoregions within the southwest Untied States. The Mojave Desert ecoregion occurs across southern California, southern Nevada, northeastern Arizona, and southwestern Utah. The area comprises widely separated mountain ranges and broad desert plains, and ranges in elevation from 328 feet below sea level in Death Valley National Park, to over 9,843 feet in the mountains. Vegetation is predominantly creosote bush, pinyon-juniper, desert saltbrush, and Joshua tree woodlands. Higher elevations and mountain ranges support ponderosa pine, bristlecone pine, and white fir. Mule deer and desert bighorn sheep are the dominant native ungulates in most of the desert ranges.

BLM Solar Energy Development Programmatic Environmental Impact Statement. The U.S. Department of Energy (DOE) and the BLM are preparing a draft Programmatic Environmental Impact Statement (PEIS) to evaluate utility-scale solar energy development in six Western states: Arizona, California, Colorado, Nevada, New Mexico, and Utah. The BLM has identified four solar energy study areas in California: Imperial East (12,830 acres) in southeastern Imperial County; Iron Mountain (109,642 acres) in southeastern San Bernardino County; Pisgah (26,282 acres) in roughly mid-San Bernardino County; and Riverside East (202,295 acres) in eastern Riverside County.

The public scoping meeting period occurred from May 2008 to July 2008, and from July 2009 to September 2009. Currently the schedule for release of the draft PEIS is to be determined. It is expected that the PEIS will identify preferable areas for solar development and that it may influence future solar development accordingly.

***BLM West Mojave Plan*.** The Project site is located within the western extent of the Bureau of Land Management (BLM) West Mojave Plan, which is a federal land use plan approved on March 13, 2006. The West Mojave Planning Area encompasses 9,357,929 acres within the West Mojave ecoregion and biome within California, and is located roughly within the central area of southern California. The Plan Area consists of portions of Inyo County, Kern County, Los Angeles County, San Bernardino County, and Riverside County. Federally listed threatened or endangered species identified in the planning area are: Arroyo toad *(Bufo californicus)*, Bald eagle *(Haliaeetus leucocephalus)*, California red-legged frog *(Rana aurora draytonii)*, Cushenbury Milkvetch *(Astragalus albens)*, Cushenbury oxytheca *(Oxytheca parishii* var. *goodmaniana)*, Desert tortoise (*Gopherus agassizii)*, Inyo California towhee *(Pipilo crissalis eremophilus)*, Lane Mountain milkvetch *(Astragalus jaegerianus)*, Least Bell's vireo *(Vireo bellii pusillus)*, Mojave tui chub *(Gila bicolor mohavensis)*, Parish's daisy *(Erigeron parishii)*, and Southwestern willow flycatcher *(Empidonax traillii extimus)*. State listed species in the planning area are: Bald eagle, Inyo California towhee, Least Bell's vireo, Mojave ground squirrel *(Spermophilus mojavensis)*, Mojave tarplant *(Hemizonia [Deinandra] mohavensis)*, Mojave tui chub, Red rock tarplant *(Hemizonia [Deinandra] arida)*, Southwestern willow flycatcher *(Empidonax traillii extimus)*, Swainson's hawk *(Buteo swainsoni)*, and Western yellow-billed cuckoo *(Coccyzus americanus occidentalis)*.

Based on the surveys performed, none of these species were observed on the 2,100-acre AV Solar Ranch One Project site. Additionally, based on the habitat observed on the Project site during biological survey efforts, none of these species have a high likelihood of occurring on the Project site.

***UCSB Master Program Group Project, Cumulative Impacts of Large-SCALE Renewable Energy Development in the West Mojave*.** Masters program students at the University of California, Santa Barbara (UCSB), Donald Bren School of Environmental Science and Management, submitted a group project report, *Cumulative Impacts of Large-Scale Renewable Energy Development in the West Mojave* (May 2, 2009), which analyzes the ecological consequences to desert tortoise and desert bighorn sheep resulting from potential development of large-scale renewable energy (wind and solar) projects in the West Mojave Desert in California.

The UCSB study analyzes the effects of renewable energy projects based on the development of proposed wind, solar, and geothermal projects and their associated transmission lines within the California Energy Commission's Renewable Energy Transmission Initiative (RETI)'s identified Competitive Renewable Energy Zones (CREZs) in the West Mojave study region. RETI characterizes 29 CREZs in California based on clusters of proposed projects; of these, the UCSB study selected specific CREZs for likely development scenarios, based on environmental and economic viability. The UCSB study assumed a low development scenario with the build-out of 6 CREZs, and a high development scenario with build-out of the 18 CREZs in the West Mojave Desert.

The UCSB analysis is based on modeling results from the software, Circuitscape, which was used to predict desert tortoise and bighorn sheep habitat connectivity in 2050. Baseline conditions for 2050 absent of CREZ development were based on assumed: habitat conditions in 2050; species occurrences in 2050; and climate conditions in 2050 as a result of global climate change. The modeling predicted desert tortoise connectivity between 8 desert tortoise critical habitats (designated in the U.S. Fish and Wildlife Service Desert Tortoise Recovery Plan (1994) in the Mojave Desert, and concluded that many CREZs in the High Renewable Energy Development Scenario are planned in areas important for tortoise connectivity in 2050. For desert bighorn sheep, Circuitscape was used to predict effects in 2050 to 69 current sheep populations as well as analysis on a subset of 8 populations. The analysis indicated that the proposed future development, especially in the High Scenario would decrease movement of sheep movement in 2050.

5.8.3.2 Proposed Water Projects

5.8.3.2.1 Antelope Valley Water Bank Project. Western Development and Storage, LLC proposes to develop facilities to store and recharge imported surface water and associated delivery and distribution pipelines. The 13,440-acre facility area would be bound by the Kern/Los Angeles County border line to the south and Rosamond Boulevard to the north, and between 170th Street West and 100th Street West in unincorporated Kern County. The proposed AV Solar Ranch One off-site transmission line route traverses the proposed water bank facility along 170th Street West.

5.8.3.3 Proposed Transportation Projects

5.8.3.3.1 North County Corridor Plan. The North County Corridor Plan is a regional transportation plan to address future transportation needs in North Los Angeles County. In the vicinity of the Project site, the Plan includes expansion of SR-138 into a 6-lane expressway. The Plan also includes corridor integration improvements to Interstate (I)-5 and SR-14. This Project is a regional effort involving multiple local and state agencies. According to the North County Combined Highway Corridors Study (MTA 2004), funding constraints make it unlikely that the I-5 and SR-14 corridor improvements will be completed until 2020 or 2025, and the SR-138 expansion corridor would likely be implemented after 2030.

5.8.3.3.2 California High Speed Rail. The California High-Speed Rail Authority proposes an 800-mile statewide high-speed train system from Sacramento to San Diego. A portion of the route in southern California would traverse the cities of Lancaster and Palmdale passing within about 15 miles to the east of the proposed AV Solar Ranch One site. Groundbreaking of the southern California rail segment is proposed to begin as early as 2011 subject to final routing, approvals, right of way acquisition, and funding. The actual timing of the California

High Speed Rail Project is heavily dependent on the availability of the substantial state and federal funding (estimated at $40 billion or more) that would be required.

5.8.3.4 Applicable Cumulative Projects Within 5-mile Radius

A summary of foreseeable projects that could contribute to cumulative effects scenario are listed by jurisdiction in Table 5-3. These projects in conjunction with planning documents and regional projections represent known and anticipated activities that may occur in the Project vicinity that have the potential to contribute to a cumulative impact on the environment.

5.8.3.4.1 Fairmont Butte Motorsports Park Project. The proposed Fairmont Butte Motorsports Park (FBMP) project is located on a 320-acre site approximately 0.5 mile east of the AV Solar Ranch One Project site. The FBMP proposes a paved racetrack approximately 3.6 miles in length, 186,808 square feet of appurtenant facilities, including an administration building, three tower buildings, servicing units, two caretaker houses, a restaurant, two paddock garages, and twenty-six garage lounges. The primary use of the FBMP would be as a venue for racing events open to the public. Typical racing events generally occur over a two or three-day weekend period that includes Friday, Saturday, and Sunday, and attendance during a typical racing weekend is estimated to range from between 250 and 1,325 persons. The FBMP Draft EIR was issued in July 2009. Construction of the project is anticipated in July 2010, and operation in December 2012 (FBMP DEIR July 2009).

5.8.3.5 Planning Documents and Forecasted Growth

5.8.3.5.1 Antelope Valley. The Los Angeles County Antelope Valley Planning Area encompasses the portion of Antelope Valley within the County and excluding the cities of Lancaster and Palmdale. The Planning Area envelops a wide diversity of rural communities, from Gorman and Three Points to the west, Lake Los Angeles, Llano, and Wrightwood to the east, Roosevelt, and Antelope Acres to the north, and Acton and Juniper Hills to the south. Based on the U.S. Census, the planning area had a total population of 66,800 in 2000. According to the SCAG 2008 Regional Transportation Plan (RTP), the population in the Antelope Valley Planning Area is projected to grow by 164 percent by year 2030 (243,015 residents)[1] (LACDRP Antelope Valley Area Plan Update Background Report, April 2009).

5.8.3.5.2 Willow Springs Specific Plan. The Willow Springs Specific Plan (adopted September 1986, amended April 1, 2008) Area is located in the southwest Kern County portion of Antelope Valley, and encompasses 50,560 acres. The specific plan provides for a maximum development of 1,597 acres for public facilities, 46,775 residential units, 515 acres commercial development, 3,770 acres industrial development, and 9,108 acres of resource

[1] The Antelope Valley Planning Area data have been adjusted by the Los Angeles County Department of Regional Planning (Antelope Valley Area Plan Update Background Report, April 2009).

uses. Based on the Kern County Planning Department cumulative projects list provided on May 27, 2009, no projects were identified within 5 miles of the proposed Project site.

5.8.3.6 City of Lancaster

The City of Lancaster Development Review Summary (current as of July 2009) contains a listing of active projects proposed in the City. The City emphasizes an effort to use infill parcels and revitalize urban areas within the urban core (City of Lancaster 2030 General Plan FEIR, April 2009). Based on the development review summary, a large portion of the active projects are proposed within the City's seven redevelopment project areas. These projects consist of planning and development of a total of approximately 11,630 residential units, 385 acres of public facilities, 379 acres of commercial areas, 163 acres of industrial development, and 17 acres of mixed uses. The remaining active projects are located outside of the redevelopment areas, and consist of planning and development of a total of approximately 11,279 residential units, 73 acres of public facilities, 134 acres of commercial areas, 104 acres of industrial development, and 73 acres of mixed uses.

Lancaster is considered a city with rapid growth; however, the rate of urban development in Lancaster and the Antelope Valley has historically increased during robust economic cycles and decreased during weak economic cycles (City of Lancaster 2030 General Plan Master Environmental Assessment, April 2009). As a result, the current economic downturn may result in delays or withdrawals of previously proposed projects.

5.8.3.7 Centennial Specific Plan

The Centennial Specific Plan provides for a master-planned community encompassing approximately 12,000 acres in the northwestern portion of the Antelope Valley, about 12 miles west of the proposed AV Solar Ranch One project along SR-138 near the intersection with I-5. The Centennial project proposes a maximum of 23,000 dwelling units, 14 million total square feet of non-residential development, including commercial, business parks, schools, recreational areas, open space, roads, and utilities. The project NOP was issued in March 2004, and the DEIR is currently in preparation. Certification of the EIR and approval of the Specific Plan is anticipated in 2010, and build-out of the community is planned over 20 years (Centennial Specific Plan NOP, March 2004).

5.8.3.8 Community of Gorman

5.8.3.8.1 Gorman Post Ranch. The proposed Gorman Post Ranch Project planned community is located at the northwest corner of unincorporated Los Angeles County along Gorman Post Road, and is roughly 20 miles west of the proposed AV Solar Ranch One Project site. The Gorman Post Ranch Project consists of the development of 531 single-family residential lots on 422 acres; two single-family ranch lots on 307 acres; 18 open space lots totaling 1,875 acres; one 7-acre water tank lot; six debris basin lots on 8 acres; one sewer

pump station lot on 0.9 acre; and five private and future street lots on 99 acres. The project NOP was issued on January 10, 2007, and the DEIR is currently in preparation (Gorman Post Ranch NOP, January 10, 2007).

5.8.4 Cumulative Impact Assessment

5.8.4.1 Introduction

There are multiple projects identified in the Project region which have the potential to result in cumulative impacts when considered together with the proposed Project. Additionally, this assessment also considers the potential overall solar development in the Mojave Desert/BLM West Mojave Plan area, as applicable. Cumulative impacts that are potentially associated with implementation of the proposed Project are discussed in the following sections. As appropriate, potential cumulative impacts are also discussed by specific project or project type. In general, the significance criteria used to assess Project impacts in Sections 5.1 through 5.7 of this Biota Report are considered in the cumulative impact assessment as well.

According to the Governor's Office of Planning and Research (OPR), which provides CEQA Guidelines in Section 15355, cumulative impacts refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. When the combined cumulative impact associated with the project's incremental effect and the effects of other projects is not significant, the discussion shall briefly indicate why the cumulative impact is not significant and is not discussed in further detail.

CEQA Guidelines provide the following guidance regarding cumulative impact significance:

> *"Projects can cause significant impacts by direct changes to the environment or by triggering reasonably foreseeable indirect physical changes. Physical changes caused by a project can contribute incrementally to cumulative effects that are significant, even if individual changes resulting from a project are limited. You must determine whether the cumulative impact is significant, as well as whether an individual effect is "cumulatively considerable"…*

When considering the relationship between the cumulative condition and the incremental effect of an individual project, keep in mind "<u>the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the</u>

proposed Project's incremental effects are cumulatively considerable" (Guidelines Section 15064(h)(4)" (Note: emphasis added).

5.8.4.2 Cumulative Impacts on Biological Resources

The past, proposed, and reasonably foreseeable future projects identified in the vicinity of the Project site would have the potential to adversely affect biological resources, and the effects of these projects could in some instances be expected to compound or worsen the impacts of the proposed Project. For those projects that are linear in nature, such as transportation routes and proposed electrical transmission lines, impacts would generally be minor in terms of acreage, but would occur over a large distance. For development projects within fixed sites, such as electrical generating facilities and proposed urban expansions, the acreage impacted would generally be larger, but direct impacts would usually be limited to the proposed site and immediate surroundings.

5.8.4.2.1 Impacts to Natural Habitats. As described in Section 5.2 of this Biota Report, the proposed Project would have significant on-site impacts on biological resources related to the conversion of substantial natural habitat areas to a developed condition. As lost habitat cannot be replaced, these impacts would remain significant after incorporation of all feasible on-site mitigation measures. However, with implementation of the proposed off-site mitigation measures, Project impacts would be reduced to less than significant levels. Development trends in the Antelope Valley, and the corresponding habitat loss that occurs as a result, have not been steady over time. (Galloway *et al.* 1998). Rather, rates of development have risen and fallen in response to economic drivers, including real estate prices and the overall vitality of the region. Rates of proposed development in the Antelope Valley have generally slowed since the late 1980s, but some development projects are nevertheless proposed, as detailed in Table 5-3. However, because many of these projects are currently in the early planning stages and have not yet been approved, substantial details regarding the impacts of such projects on the environment are not yet known. Although the exact acreage to be impacted by these projects is not known, it is anticipated that all of the proposed and reasonably foreseeable future projects identified within the Project vicinity would involve some level of development within natural habitats. However, the floor of the Antelope Valley is fairly homogeneous with regard to the types of vegetation present, and the habitats disturbed by proposed and reasonably foreseeable future projects are generally abundant throughout the valley. Thus, although the proposed Project would represent an incremental reduction in the available natural habitat within the Antelope Valley, the cumulative impact of all proposed and reasonably foreseeable future projects on general habitat in the Valley would be less than significant.

5.8.4.2.2 Impacts to Sensitive Natural Communities. As discussed in Section 5.2 of this Biota Report, the proposed Project would result in incremental impacts to two sensitive natural communities: Joshua tree woodlands and wildflower fields. The proposed Project

would involve the placement of two transmission line poles within mapped Joshua tree woodland habitat. This impact was determined to be less than significant at the project level due to the small acreage (less than one acre total) to be disturbed, and the fact that no Joshua trees would be impacted. Due to these factors, the Project's minor effects on this vegetation community would not contribute considerably to a significant impact on Joshua tree woodlands.

The proposed Project would remove and permanently alter a substantial acreage of wildflower field habitat on-site. Because publicly available environmental documentation indicates that currently proposed projects in the vicinity would also impact this sensitive vegetation community, the potential exists for the Project's effects to worsen or compound the impacts of other proposals. Given this, the Project's incremental impact on wildflower fields has potential to contribute considerably to cumulative impacts on this resource. The Project's impact on wildflower fields would be reduced by Project-level mitigation measures requiring the unimpacted portion of the on-site wildflower field to be enhanced and monitored. It is also expected that following initial site clearing of rabbitbrush scrub habitat areas, the cleared areas would be converted to annual grass and forb dominated habitats that may include wildflower fields. Additionally, the proposed off-site mitigation which includes consideration of Project impacts to wildflower field habitat would reduce Project impacts to a less than significant level. It is anticipated that the incorporation of similar measures into other proposed and reasonably foreseeable future projects would further reduce cumulative impacts on this resource. With mitigation, Project impacts are not anticipated to be cumulatively significant.

5.8.4.2.3 Impacts on Unique Native Trees. The proposed Project would require the removal of an existing non-producing pistachio orchard (abandoned) and 12 ornamental trees. Because the pistachio orchard and ornamental trees to be removed were established by humans, and because these species do not occur naturally in the region, they are not "unique native trees" for purposes of this analysis. The proposed Project would not contribute considerably to any cumulatively significant impacts on unique native trees.

5.8.4.2.4 Impacts on Special-status Species. As discussed in Section 5.5 of this Biota Report, the proposed Project would have significant impacts on one sensitive reptile and several special-status bird species, absent mitigation. Impacts associated with injury or mortality of individual birds would be substantially lessened by the mitigation measures recommended in this Biota Report, and would be unlikely to compound or worsen effects of other projects in the region. With implementation of the proposed off-site mitigation measures, impacts on special-status species associated with loss of habitat would be less than significant at the project level. Because many of the proposed and reasonably foreseeable future projects in the Antelope Valley are currently in the early planning stages and have not yet been approved, substantial details regarding the impacts of such projects on the environment are not yet known. Although the exact acreage to be impacted by these projects

is not known, it is anticipated that all of the proposed and reasonably foreseeable future projects identified within the Project vicinity would involve some level of development within natural habitats. However, the floor of the Antelope Valley is fairly homogeneous with regard to the types of vegetation present, and the habitats disturbed by proposed and reasonably foreseeable future projects are generally abundant throughout the valley. The common and special-status species occupying sites proposed for development are also expected to occupy similar habitats elsewhere in the Antelope Valley, and suitable foraging habitats, such as rabbitbrush and California annual grasslands, would remain abundant in the region despite the current and future development proposals. Thus, although the proposed Project would represent an incremental reduction in suitable foraging habitats for special-status species within the Antelope Valley, the cumulative impact of all proposed and reasonably foreseeable future projects on such habitats would be less than significant.

5.8.4.2.5 Impacts to Wildlife Movement. As stated in Section 5.6 of this Biota Report, the proposed Project would not significantly impede the movement of medium-sized mammals in the vicinity, with mitigation and inclusion of the major wildlife movement corridor and wildlife permeable fencing around key portions of the site perimeter. Because the home ranges of these species are small compared to the overall size of the Antelope Valley, it is highly unlikely that any wildlife individual would be affected by more than one Project. The impacts of the proposed Project would not be expected to compound or worsen the impacts of other projects, thus the Project's incremental effect would not be considerable or result in a cumulatively significant impact on wildlife movement.

5.8.4.2.6 Impacts to Significant Ecological Areas. As stated in Section 5.7 of this Biota Report, the proposed Project would involve development of solar generating arrays and a transmission line within portions of SEA #60, but impacts would not be significant at the Project level due to design considerations that would minimize adverse effects, and because no Joshua trees within the SEA would be removed as a result of the Project. Because no proposed or reasonably foreseeable future projects are located within or adjacent to SEA #60, the effects of the proposed Project on this SEA would not be worsened or compounded by the effects of other projects. Therefore, the proposed Project would not contribute considerably to a cumulatively significant impact on biological resources within SEA #60.

5.8.4.2.7 Impacts on Mojave Desert Ecoregion/Biome. The AV Solar Ranch One Project site is largely comprised of rabbitbrush scrub (approximately 1,452 acres), followed by California annual grasslands (approximately 368 acres), and wildflower fields (approximately 236 acres). The off-site transmission line traverses approximately 0.25 mile of Joshua tree woodland. The Project site is located within the western margin of the Mojave Desert, and as shown with the existing habitat types on the Project site (Section 4.2), the site contains a mix of non-desert habitat types including California grasslands, and disturbance-maintained communities (i.e., rabbitbrush scrub, orchard, agricultural, ruderal, etc., which are not characteristic of Mojave ecoregion habitat. Additionally, the majority of the site has been

previously used for and currently displays evidence of agricultural production. The Project site does not exhibit the habitat characteristics of the Mojave Desert ecoregion to the east, and does not support State or Federal endangered species, thus the potential for significant cumulative effects with other potential solar projects further to the east is diminished.

Based on biological surveys, literature review, and consultation with USFWS and CDFG, the Project site does not contain and is not known to contain desert tortoise, suitable desert tortoise habitat, desert bighorn sheep, suitable desert bighorn sheep habitat, or migration routes or habitat connectivity areas for the desert tortoise or desert bighorn sheep. The nearest potential desert bighorn sheep habitat is located more than 10 miles from the Project site, in mountainous areas generally well east of the Project area. As a result, while the UCSB study concluded that solar development in the CREZs could adversely impact desert tortoise and/or desert bighorn sheep in some areas, the proposed AV Solar Ranch One Project would be highly unlikely to have any project-specific or cumulative impacts on these species. Additionally, based on biological surveys, literature review, and consultation with USFWS and CDFG, the Project site would not be expected to have any project-specific or cumulative impacts on any other federal or state listed threatened or endangered species.

SECTION 6.0
MITIGATION

For each of the potentially significant impacts identified in Section 5.0 of this Biota Report, this section recommends feasible mitigation measures intended to avoid or substantially lessen the effects of the identified impact. In addition, this section presents the level of significance that would be achieved if the recommended measures are implemented for each significant impact.

Because the proposed Project is intended to produce a given amount of energy (230 MW) using a pre-selected, renewable technology (PV panels), the number and area of panels required cannot be adjusted significantly without affecting the electrical output of the project. Given this, opportunities to utilize large portions the Project site for mitigation or set-aside purposes are limited. However, the impacts of the proposed Project on biological resources have been reduced through informed site selection and planning, and via avoidance of sensitive biological resource areas on the site. In addition, recommended mitigation measures include the following strategies:

- Enhancement of selected on-site areas via implementation of a Habitat Enhancement and Vegetation Management Plan
- Off-site mitigation for loss of habitat
- Ongoing surveys for nesting birds prior to annual vegetation management activities
- Fugitive dust control measures
- Various other measures, as recommended herein

6.1 MITIGATION INCORPORATED INTO THE PROJECT DESIGN

The Project, as proposed by the Applicant, contains some design characteristics intended to reduce impacts to biological resources within and adjacent to the Project site. Although these features have been taken into consideration in the impacts analysis presented in Section 5.0 of this Biota Report, they are briefly described below to provide greater context and understanding of the Project's impacts on biological resources.

6.1.1 Site Selection

The size and location of the Project site were selected with substantial care and after consideration of numerous alternative sites by the Applicant. Among the sites considered, the Project site was chosen because of its flat topography, the absence of federally- or state-listed species on-site, lack of federally-jurisdictional waters or wetlands, proximity to existing vehicle access routes, close proximity to an appropriate electrical substation, and correct size to accommodate the proposed solar generating facility without impacting an unnecessarily

large area. All of these characteristics serve to lessen the impacts of the proposed Project. For example, if a site with poor vehicular access and distant proximity to a substation had been selected, impacts associated with transmission line construction would increase, and new impacts associated with construction and improvement of roadways would occur. A topographically complex site would require much more extensive site preparation, leading to greater surface disturbance, greater quantities of excavation and fill, and correspondingly greater pollutant emissions and impacts to vegetation.

If a larger site had been selected, impacts to the site interior such as access roads and minor transmission lines would be greater, and the lower overall density of solar arrays would lead to greater acreages impacted by shading. Installation of perimeter fencing around a larger site would also result in increased impacts to wildlife movement. In addition, assuming that no changes to the proposed vegetation management practices would occur, the acreage of vegetation altered by such practices would be greater on a larger site.

6.1.2 Site Planning

In addition to the impact reductions realized through informed and conscientious site selection, additional features incorporated into the Project design would serve to lessen the Project's impacts on biological resources. Because the Project site would be almost wholly occupied by the proposed solar array, opportunities to mitigate impacts by setting aside portions of the site containing natural habitats are limited. The following areas within the Project site have been avoided in order to enhance or preserve natural habitat. An existing 45-acre area adjacent to the southern site boundary (Drainage C) would remain undeveloped (see Figure 6-1), and no ground clearing or vegetative fuel clearing activities are proposed in this portion of the site. The area to be preserved has relatively high habitat value compared to the majority of the site, and includes approximately 26.6 acres of wildflower field vegetation, the entire 1.02-acre on-site portion of Drainage C, and suitable burrowing owl foraging habitat near the location in Drainage C where owls successfully nested in 2009. In addition to this preserved area, the proposed Project would avoid approximately 46 acres within and surrounding Drainage A in the central portion of the site. This would maintain the natural character of the drainage, and would create a swath of largely undeveloped area up to approximately 250 feet wide traversing the site. It is anticipated that the acreage of habitat provided would create an opportunity for wildlife movement and the establishment of resident wildlife populations. Drainage B would be protected by a 20-foot wide setback (approximately 6 acres) to avoid impacts to this isolated, disconnected feature. The Joshua tree recruitment area along the north border of the project site will also be avoided and protected by a minimum 50-foot buffer from the Joshua tree seedlings (8.6 acres, including buffer). The Project design also incorporates a minimum 50-foot development setback between the solar arrays and the property line, which would separate the proposed development from biological resources in adjacent areas. Figure 6-1 displays the on-site mitigation and avoidance areas.

Lighting for the Project has been designed to minimize or avoid affects to biological resources on-site. Lighting will be designed to provide the minimum illumination needed to achieve safety and security objectives and will be directed downward and shielded to focus illumination on the desired areas only and minimize light trespass in accordance with the Draft Exterior Lighting Standards developed for the rural unincorporated Antelope Valley (Ordinance No. 2007-0077, Sections 22.44.110 and 22.44.141 [dated July 26, 2007] and Section 22.44.500 [dated July 7, 2009]). Project lighting will be located only at the O&M building, parking area, and the main plant access; there will be no lighting within the solar array.

To facilitate wildlife movement throughout the Project site, wildlife permeable fencing would be installed around the site perimeter in 50-feet lengths (minimum) every 200 feet, with the following exceptions: 1) at the ingress and egress sections of the wildlife corridor (see Figure 2-1c and Section 2.4.4.1), the length of wildlife permeable fencing would equal the width of the corridor; fencing at these areas would include approximately 450 feet along 170th Street West just north of SR-138, 200 feet at the intersection of 160th Street West and West Avenue C8, and 100 feet along West Avenue C; and 1) wildlife permeable fencing would not be installed adjacent to SR-138 or the substation area (Figure 2-1c).

6.2 ADDITIONAL MITIGATION MEASURES PROPOSED IN THIS BIOTA REPORT

For each of the potentially significant impacts identified in Section 5.0 of this Biota Report, feasible mitigation measures have been identified, and are proposed herein, that would avoid or substantially lessen the severity of the identified impact.

6.2.1 Mitigation Measures Related to Loss and Alteration of Natural Habitats

6.2.1.1 Significant Impact 1

The proposed Project would result in the permanent loss of 400 acres of existing natural vegetation communities, including common and sensitive habitats, and would modify an additional 1,487 acres. This impact is described in detail in Section 5.1 of this Biota Report.

6.2.1.1.1 Proposed Mitigation Measures.

BIO-1: Habitat Enhancement and Vegetation Management Plan. Prior to issuance of a grading permit, the Project Applicant shall develop a Habitat Enhancement and Vegetation Management Plan (HEVMP) to restore/compensate for impacts to existing vegetation communities. In areas suitable for on-site mitigation, the HEVMP shall identify appropriate mitigation objectives, standards, and monitoring/reporting requirements. In areas rendered unsuitable for mitigation due to proposed development, the HEVMP shall identify appropriate restrictions, such as limiting noxious weeds, but shall not impose mitigation

standards. The HEVMP shall be prepared by a qualified restoration biologist experienced with desert habitat restoration, and shall specify appropriate revegetation and management practices for the following portions of the Project site:

- Avoidance Areas:
    1. Drainage A, a 100-foot setback, and the associated wildlife corridor (46 acres)
    2. Drainage B and a 20-foot buffer (approximately 6 acres)
    3. The southernmost portion of the Project site along Drainage C, where no development is proposed (45 acres)
    4. The Joshua tree recruitment area (8.6 acres, including buffer)
- Areas of Modified/Impacted Habitat:
    1. All portions of the site within the fire breaks (217 acres)
    2. All interior portions of the site within the proposed solar arrays, excluding locations of proposed infiltration basins and fire breaks (1,336 acres)
    3. All portions of the site to be occupied by proposed infiltration basins (253 acres)

For each of the locations enumerated above, the HEVMP shall specify, at a minimum, the following:

- The location and extent of any on-site enhancement/revegetation areas, to be depicted graphically on an aerial photograph or schematic of appropriate scale
- The quantity and species of plants to be seeded (if appropriate), including the locations where each type of vegetation would be created
- A schedule and action plan to maintain and monitor the enhancement/revegetation areas
- A list of success criteria (e.g., growth, plant cover, plant/wildlife diversity) by which to measure success of the enhancement/revegetation effort
- Contingency and/or adaptive management measures in the event that enhancement/ revegetation efforts are not successful

In addition, the standards and practices set forth in the HEVMP for each area shall conform to the requirements stated below:

- Within the setback zones surrounding Drainage A, Drainage B, and Drainage C the HEVMP shall provide for 91 acres of on-site mitigation, as well as 6 acres of additional avoidance area (due to its small and isolated nature, the 6-acre area surrounding Drainage

B is not included as suitable mitigation land, but would nonetheless be avoided), and shall ensure the following:

1. Drainages A, B, and C and the adjacent setbacks shown on Figure 6-1, shall be set aside and preserved, and no Project-related disturbance shall be permitted in these areas.
2. Any anthropogenic discontinuities in the existing vegetation (unofficial roads, dump sites, etc.) within the ephemeral drainage setbacks shall be remedied, and such areas shall be seeded with native plant species characteristic of the surrounding vegetation.
3. Vegetative cover in herbaceous communities (grasslands, wildflower fields) shall exceed 95 percent. Non-native forbs shall not exceed five percent cover, and bare ground shall not exceed five percent excluding bare ground located within the channel bottom of an ephemeral drainage or bare ground where there is clear evidence that the bare ground was the result of mammal activity (burrows, wildlife trails, etc.).
4. Vegetative cover in shrub-dominated communities (desert saltbush scrub, rabbitbrush scrub) shall exceed 90 percent, and shrub cover shall exceed 50 percent. Non-native forbs and shrubs combined shall not exceed five percent cover, and bare ground shall not exceed five percent excluding bare ground located within the channel bottom of an ephemeral drainage or bare ground where there is clear evidence that the bare ground was caused by mammal activity (burrows, wildlife trails, etc.).
5. In Drainages A and C vegetation in the area shall remain suitable for foraging by burrowing owls and other grassland bird species. Habitat enhancement/revegetation shall be implemented if necessary to ensure continued suitability.

- Within the Joshua tree recruitment area, the HEVMP shall provide 8.6 acres of mitigation land, and shall ensure the following:

  1. The Joshua tree recruitment area and a 50-foot buffer from the Joshua tree seedlings shall be set aside and preserved, and no Project-related disturbance shall be permitted in this area.
  2. Any anthropogenic discontinuities in the existing vegetation (other than the roadbed of West Avenue C, which passes through this area) shall be remedied, and such areas shall be seeded with native plant species characteristic of the surrounding vegetation.
  3. Measures shall be implemented to encourage the continued recruitment of Joshua trees into this area. Such measures may include standards for herbaceous and shrub cover, removal of non-native plants and/or wildlife, and others.

- Within the proposed fire breaks, no suitable on-site mitigation opportunities exist. However, the HEVMP shall ensure the following:

1. To prevent the potential spread of fire onto the Project site, vegetative cover within the fire breaks will be kept to a minimum, through mechanical clearing and selective herbicide use.
2. If herbicides are used to control vegetation, they shall be applied by a qualified individual and in a manner consistent with the product labeling. Under no circumstances shall herbicides be allowed to pass into any ephemeral drainage.
3. Under no circumstances shall species identified by the California Invasive Plant Council (Cal-IPC) as invasive weeds be allowed to thrive in the fire breaks. Cover of these species, collectively, shall be maintained at or below five percent.

- Within all interior portions of the site within and adjacent to the proposed solar arrays, excluding locations of proposed infiltration basins, no suitable on-site mitigation opportunities would exist. However, the HEVMP shall ensure the following:

  1. To control fugitive dust, vegetative cover of grasses and forbs within the proposed solar arrays shall be maximized.
  2. Vegetation seeded in these areas shall be comprised of low-growing communities such as native grasslands and wildflower fields, to minimize the effects of vegetation management practices on the revegetated areas.
  3. Under no circumstances shall species identified by the Cal-IPC as invasive weeds be used in the revegetation efforts.
  4. To promote the growth of local, native plant species, the top 2-6 inches of topsoil removed during Project-related ground clearing shall be stockpiled and spread across disturbance zones after completion of construction in the area.
  5. Vegetation management in these areas shall be limited to mechanical trimming of vegetation to a height of 3 to 6 inches at the end of May, and selective mowing and trimming and application of herbicides at other times as determined appropriate for fire protection, control of noxious weeds, and equipment operation and maintenance. Herbicides must be approved for use by the County, and. herbicide application must be performed by trained personnel that can identify the species to be treated. If herbicide is applied, it will be applied during dry and low wind conditions in order to prevent herbicide drift into non-target areas.
  6. Vegetation management practices shall occur primarily at the end of May, to allow native annual plants an opportunity to seed prior to mowing and trimming.

- Within the proposed infiltration basins, no suitable on-site mitigation opportunities exist. However, the HEVMP shall ensure the following:

1. If herbicides are used to control vegetation, they shall be applied by a qualified individual and in a manner consistent with the product labeling. Under no circumstances shall herbicides be allowed to pass into any ephemeral drainage.
2. Under no circumstances shall species identified by Cal-IPC as invasive weeds be allowed to thrive in the fire breaks. Cover of these species, collectively, shall be maintained at or below five percent.

- Within all portions of the 170th Street West ROW to be impacted during installation of transmission line poles and temporary stringing sites, the HEVMP shall ensure the following:

  1. Under no circumstances shall ground disturbance occur within 25 feet of an existing Joshua tree. In applicable areas, Joshua tree avoidance zones shall be delineated with high-visibility construction fencing.
  2. All impact zones shall be revegetated with appropriate plant communities native to the Project region, such as native grasslands, wildflower fields, desert scrub, rabbitbrush scrub, desert saltbush scrub, and Joshua tree woodland.
  3. Where impacts would occur in existing agricultural lands outside the Applicant's ownership, it is presumed that agricultural practices would resume after completion of construction. Therefore, revegetation shall not be required in these areas.
  4. If earthwork is proposed in areas where native vegetation exists, the top 2-6 inches of topsoil removed during Project-related ground clearing shall be stockpiled and spread across disturbance zones after completion of construction in the area.
  5. Under no circumstances shall species identified by the Cal-IPC as invasive weeds be used in the revegetation efforts.
  6. The HEVMP shall include provisions to minimize the effects of transmission line maintenance on biological resources, including a requirement that no Joshua trees shall be removed during such maintenance.

In addition to the location-specific requirements set forth above, the HEVMP shall also ensure that the following standards are met or exceeded within the Project site as a whole:

1. The HEVMP shall identify appropriate locations for creation of rabbitbrush scrub, California annual grassland, and wildflower fields, the three most abundant existing natural communities on-site, within avoided portions of the Project site. In total, 99 acres of on-site mitigation shall be provided.
2. Site-wide, the acreage of wildflower field vegetation to be modified by Project-related ground disturbance shall be mitigated through on-site revegetation, as applicable.

3. Performance monitoring of the on-site enhancement and revegetation areas shall be monitored approximately quarterly, in January, April, June, and November, and a report detailing the monitoring results shall be submitted to the County annually. Monitoring and reporting shall be required for a period of five years. The HEVMP shall contain contingency measures identifying corrective actions required in the event that the mitigation standards are not met.
4. All percent cover standards shall be evaluated during the spring biomass peak.
5. Anti-coagulant rodenticides shall not be used within the Project site or along the proposed transmission line route.

The HEVMP shall be approved by the County prior to issuance of a grading permit.

BIO-2: Off-site Mitigation for Loss of Habitat. To supplement the 99 acres of on-site preservation/enhancement of natural habitats required by Mitigation Measure BIO-1, the applicant shall preserve and/or restore natural habitats at an off-site location within the Antelope Valley, either through direct acquisition and protection or by contracting with a County-approved land management entity. In total, the loss of existing natural habitat shall be mitigated at a 0.20:1 ratio (20 percent). This ratio would result in the overall preservation and enhancement of 377 acres of natural habitats including both on-site and off-site mitigation areas, and would be adequate to preserve and enhance wildflower field vegetation at a ratio of 1.5:1. Because 99 acres of mitigation would be provided on-site, the off-site mitigation area would need to provide the remaining 278 acres. A 0.2:1 mitigation ratio is appropriate for the Project due to the relatively low intensity of the proposed land uses on-site, the relatively high quality of the mitigation land proposed, and the fact that the impacted habitat is former agricultural land rather than undisturbed habitat.

As discussed above, the Applicant may fund a County-Approved land management organization in an amount agreed to by the County to be sufficient for the management organization to meet the above mitigation goals. Under this scenario, the Applicant shall provide the management organization with an annual endowment sufficient to fund management, maintenance, and monitoring of the mitigation site for a minimum of five years.

Historically, new residential developments in the County have been required to reserve approximately 33 percent (1/3) or more of the site acreage as open space. However, stark differences exist between the proposed Project and a typical residential subdivision, both in terms of habitat impacts and in the condition of the dedicated open space. When residential subdivisions are constructed the existing vegetation is lost and hardscaped, replaced with impervious surfaces, structures, manufactured slopes, and ornamental vegetation. In contrast, the proposed Project would remove vegetation in some areas, and would alter the composition of the existing plant communities, but would leave the majority of the site

vegetated, with topography and drainage patterns in their present condition. Open spaces associated with residential developments are often perceived as amenities by the residents, and have impaired habitat value due to chronic human use (i.e., foot trail development, dirt/mountain bike courses, dog walking, etc.) or use associated with edge effects of residential development (domestic pets, lighting, noise, etc.). Domestic cats and dogs are likely to hunt songbirds, small mammals, and reptiles in the "open space" of residential mitigation lands, thereby affecting the habitat value for the native wildlife community. Frequent human presence in these areas results in further reductions in habitat quality for resident wildlife, and favor species better adapted to human presence, such as ravens, house finches, European starlings, California ground squirrels, and gophers. In contrast, the on-site and off-site mitigation areas associated with the proposed Project would be preserved, enhanced, and managed explicitly for the purpose of providing habitat value, and would be free from residential edge effects that would detract from this purpose. Thus, these lands would have a greater habitat value for the resident wildlife community than residential open space, justifying a somewhat lower mitigation ratio.

The selected off-site mitigation lands shall contain vegetation communities similar to those found within the Project site, including rabbit brush scrub, annual grassland, and wildflower fields. Although the proposed Project would not significantly impact Joshua tree woodland habitat, lands containing this vegetation community shall also be considered desirable due to the County's concern over the continuing loss and degradation of Joshua tree woodlands. The selected lands shall accommodate the following mitigation requirements:

1. The subject property shall be located within the greater Project vicinity, generally defined to include the Antelope Valley and surrounding foothills.
2. The subject property shall contain a minimum of 278 acres of land (20 percent of 1,887 acres, minus 99 acres mitigated on-site), which shall be either comprised of vegetation communities characteristic of the Antelope Valley (rabbitbrush scrub, annual grassland, wildflower fields, and/or Joshua tree woodlands) or be reasonably capable of being converted to such habitat through the use of maintenance and management practices.
3. The subject property shall be capable of mitigating impacts to wildflower field vegetation at a ratio of 1.5:1. As currently proposed, the Project would impact 208.8 acres of this vegetation (22.5 acres permanently removed and an additional 186.3 acres modified by the presence of solar arrays and vegetation management practices), necessitating a total of 313.2 acres of wildflower field mitigation. However, because approximately 90 acres of this habitat would be mitigated at on-site locations pursuant to mitigation measure BIO-1, only 223.2 acres of off-site wildflower field mitigation would be required. The subject property shall either contain the requisite acreage of wildflower field, or shall be reasonably capable of being converted to this vegetation through maintenance and management practices.

4. The subject property shall provide at least 13 acres of suitable foraging habitat for the burrowing owl, including presence of suitable burrows. If suitable natural burrows are unavailable, artificial burrows shall be constructed in accordance with California Burrowing Owl Consortium (1993) guidelines.
5. The subject property shall contain a minimum of 278 acres of suitable foraging habitat for grassland bird species occurring in the Antelope Valley.
6. The subject property shall contain habitat suitable for the Blainville's horned lizard. Within the mitigation site, suitable locations shall be identified for relocation of horned lizards captured and removed from the Project site pursuant to Mitigation Measure BIO-7.

In addition to meeting the requirements detailed above, the following desirable factors shall also be considered when selecting an off-site mitigation property:

1. Lands adjacent to other protected open space are desirable locations for off-site mitigation, as they can serve to create large, contiguous blocks of protected habitat. Protected open space areas within the greater Project vicinity include SEA #60, SEA #57, the Antelope Valley California Poppy Reserve, and the Arthur B. Ripley Desert Woodlands State Park.
2. Privately-owned lands within designated SEAs are desirable locations for off-site mitigation, as acquiring these lands would protect them from development.
3. Lands located between blocks of protected habitat are desirable locations for off-site mitigation, as protecting these areas can ensure that essential habitat connections remain in perpetuity.
4. Lands containing Joshua tree woodland habitat are desirable locations for off-site mitigation, due to the continuing loss and degradation of this resource.
5. Lands containing important landscape features, sensitive habitats, or listed species are desirable locations for off-site mitigation, due to the sensitivity of these resources and the general understanding that such elements are indicative of high biological value.

If the off-site mitigation lands are purchased directly by the Applicant, the selected parcel or parcels shall be dedicated in fee to a County-approved land management entity qualified to manage, maintain, and monitor the parcel, and shall be protected in perpetuity through an appropriate legal vehicle, such as a conservation easement. The Applicant shall provide an endowment to the land management entity sufficient to fund management, maintenance, and monitoring of the mitigation site for a minimum of five years.

Alternatively, if the Applicant opts to meet the off-site mitigation requirements by contracting with a County-approved land management organization, the Applicant shall provide the management organization sufficient funding to acquire the habitat acreage

prescribed above. In addition, the Applicant shall provide the management organization with an annual endowment sufficient to fund management, maintenance, and monitoring of the mitigation site for a minimum of five years.

6.2.1.1.2 Impact Significance after Mitigation. The preservation, enhancement, and seeding practices required by Mitigation Measure BIO-1 would create opportunities to mitigate for a portion of the Project's impacts on natural habitats on-site. Although the majority of the site would be utilized by the proposed generating facility and would therefore be unsuitable for use as mitigation land, the site contains three areas (the Joshua tree recruitment area, the corridor surrounding Drainage A, and the southeastern portion of the site near Drainage C) that are of sufficient size, configuration, and connectivity to provide viable habitat in the post-Project condition. Location of proposed on-site avoidance and mitigation areas are depicted graphically on Figure 6-1. In total, these three locations would provide 99 acres of on-site mitigation acreage. Mitigation Measure BIO-2 would require the preservation/enhancement of an additional 278 acres at an off-site location in the greater Project vicinity, bringing the total mitigation acreage to 377 acres. This acreage would mitigate the Project's overall impact upon natural habitats at a ratio of 0.20:1. Due to the abundance of remaining natural habitat throughout the region, implementation of BIO-1 and BIO-2 would reduce this impact to a ***less than significant*** level after incorporation of the proposed mitigation measures.

6.2.2 Mitigation Measures Related to Sensitive Natural Communities

6.2.2.1 Significant Impact 2

The proposed Project would result in the permanent loss of 22.5 acres of wildflower fields within the Project site, and would modify a much larger area (186 acres) through the proposed habitat modification from ground disturbance, vegetation management practices, and panel-related shading. This impact is described in detail in Section 5.2 of this Biota Report.

6.2.2.1.1 Proposed Mitigation Measures.

BIO-1: Habitat Enhancement and Vegetation Management Plan. (Refer to Section 6.2.1.1.1 of this Biota Report.)

BIO-2: Off-site Mitigation for Loss of Habitat. (Refer to Section 6.2.1.1.1 of this Biota Report.)

6.2.2.1.2 Impact Significance after Mitigation. The preservation, enhancement, and seeding practices required by Mitigation Measure BIO-1 would create opportunities to mitigate for a portion of the Project's impacts on wildflower field vegetation in on-site locations. Although the majority of the site would be utilized by the proposed generating

facility and would therefore be unsuitable for use as mitigation land, the site contains three areas (the Joshua tree recruitment area, the corridor surrounding Drainage A, and the southeastern portion of the site near Drainage C) that are of sufficient size, configuration, and connectivity to provide viable habitat in the post-Project condition. Location of proposed on-site avoidance and mitigation areas are depicted graphically on Figure 6-1. In total, these three locations would provide 99 acres of on-site mitigation acreage. Although some shrub-dominated habitats would be included in the on-site mitigation areas to increase habitat suitability for songbirds, it is anticipated that the majority of the available on-site mitigation areas (approximately 90 acres) would be dedicated to wildflower field mitigation. The exact configuration of vegetation communities within on-site mitigation lands would be identified in the HEVMP required by Mitigation Measure BIO-1.

Due to the sensitive nature of wildflower field vegetation, the mitigation measures proposed would preserve and enhance this habitat at a ratio of 1.5:1 to compensate for Project impacts. This ratio is appropriate because of the herbaceous nature of this community, which reduces temporal losses of habitat function as enhanced and re-seeded areas mature quickly, and because the vegetation to be impacted is former agricultural land rather than undisturbed habitat. In total, the Project would impact 208.8 acres of wildflower field vegetation (22.5 acres permanently removed and an additional 186.3 acres modified by habitat modification through ground disturbance, and shading and vegetation management practices). The proposed measures therefore mandate a total of 312.2 acres of wildflower field mitigation, comprised of approximately 90 acres on-site (BIO-1) and an additional 223.2 acres off-site (BIO-2). These measures would result in a net increase of wildflower field vegetation in the Project vicinity, and would reduce this impact to a ***less than significant*** level.

6.2.2.2 Significant Impact 3

The proposed Project would result in fugitive dust during Project construction and during maintenance of the fire breaks, which would adversely affect the Joshua tree recruitment area within the Project site and the mature Joshua tree and two seedlings along 170th Street. This impact is described in detail in Section 5.2 of this Biota Report.

6.2.2.2.1 Proposed Mitigation Measures.

BIO-1: Habitat Enhancement and Vegetation Management Plan. (Refer to Section 6.2.1 of this Biota Report.)

BIO-3A: Biological Restrictions on Dust Suppression. Where construction activities are proposed within 100 feet of mapped Joshua tree woodland vegetation, chemical dust suppression shall not be utilized unless authorized by the County. Where determined necessary by a qualified biologist, a screening fence (i.e., a 6-foot-high chain link fence with green fabric up to a height of 5 feet) shall be installed to protect locations where sensitive resources may be present.

BIO-3B: Implement Construction Fugitive Dust Control Plan. Fugitive dust emissions within the Project site area in the Antelope Valley are regulated by the Antelope Valley Air Quality Management District (AVAQMD), and this agency stipulates that fugitive dust must not be visible in the air beyond the property line of the construction parcel. The Applicant is compelled to comply with this requirement to avoid violating applicable air quality regulations; however, the exact methods by which fugitive dust on-site will be controlled are not biological in nature and are therefore beyond the scope of this Biota Report. The mitigation measures identified below are adapted from the preliminary Air Quality section of the EIR for the proposed Project, and are provided for informational purposes only. Revisions to the air quality section of the EIR may lead to changes in the mitigation measures proposed for fugitive dust impacts, but the intent of such measures would be to ensure compliance with the regulations promulgated by the AVAQMD.

The project shall develop a Fugitive Dust Emission Control Plan (FDECP) for construction work. The Plan shall be completed prior to construction and approved by the AVAQMD and the County. Measures to be incorporated into the plan shall include, but are not limited to the following:

- Non-toxic soil binders shall be applied per manufacturer recommendations to active unpaved roadways, unpaved staging areas, and unpaved parking area(s) throughout construction to reduce fugitive dust emissions.
- Unpaved road travel will be limited to the extent possible, by limiting the travel of heavy equipment in and out of the unpaved areas.
- Water the disturbed areas of the active construction sites at least three times per day and more often if visible dust leaving the site is noted.
- Enclose, cover, water daily as needed, and/or apply non-toxic soil binders according to manufacturer's specifications to exposed piles with a five percent or greater silt content.
- Maintain unpaved road vehicle travel to the lowest practical speeds, and no greater than 15 miles per hour (mph), to reduce fugitive dust emissions.
- All vehicle tires shall be inspected, are to be free or dirt, and washed as necessary prior to entering paved roadways.
- Install wheel washers or wash the wheels of trucks and other heavy equipment where vehicles exit the site.
- Cover all trucks hauling soil and other loose material, or require at least 2 feet of freeboard.
- Establish a vegetative ground cover (in compliance with biological resources impact mitigation measures) or otherwise create stabilized surfaces on all unpaved areas at each of the construction sites within 21 days after active construction operations have ceased.

- Prepare contingency for high wind periods (greater than 25 mph).

Travel routes to each construction site shall be developed to minimize unpaved road travel.

6.2.2.2.2 Impact Significance after Mitigation. The mitigation measures identified above would substantially reduce the amount of fugitive dust likely to be generated by construction and operations within and surrounding the Project site and along the transmission line. The proposed mitigation measures would reduce the impacts of fugitive dust upon the Joshua tree recruitment area within the Project site, the mature Joshua tree and two seedlings along 170th Street, and the mature Joshua trees in SEA #60 along the southern part of the off-site transmission line to ***less than significant*** after incorporation of the proposed mitigation measures.

6.2.3 Mitigation Measures Related to Unique Native Trees

6.2.3.1 Significant Impact 3

The effects of fugitive dust from construction operations, described as Significant Impact 3 in Section 6.2.2.2 above, would have the potential to impact native trees on-site as well as sensitive vegetation communities. Significant Impact 3 is therefore also relevant to the discussion of unique native trees, although the mitigation measures proposed are identical to those identified in the preceding section.

6.2.3.1.1 Proposed Mitigation Measures.

BIO-1: Habitat Enhancement and Vegetation Management Plan. (Refer to Section 6.2.1.1.1 of this Biota Report.)

BIO-3A: Biological Restrictions on Dust Suppression. (Refer to Section 6.2.2.2.1 of this Biota Report.)

BIO-3B: Implement Construction Fugitive Dust Control Plan. (Refer to Section 6.2.2.2.1 of this Biota Report.)

6.2.3.1.2 Impact Significance after Mitigation. The mitigation measures identified above would substantially reduce the amount of fugitive dust likely to be generated by construction and operations within and surrounding the Project site and along the transmission line. The proposed mitigation measures would reduce the impacts of fugitive dust upon seedlings within the Joshua tree recruitment area on-site and the mature Joshua tree and two seedlings along 170th Street, and the mature Joshua trees in SEA #60 along the southern part of the off-site transmission line to ***less than significant*** after incorporation of the proposed mitigation measures.

6.2.4 Mitigation Measures Related to Plants and Wildlife

6.2.4.1 Significant Impact 4

Construction of the proposed Project could potentially result in fugitive dust which would adversely affect plants and wildlife in adjacent areas. This impact is described in detail in Section 5.5 of this Biota Report.

6.2.4.1.1 Proposed Mitigation Measures.

BIO-3A: Biological Restrictions on Dust Suppression. (Refer to Section 6.2.2.2.1 of this Biota Report.)

BIO-3B: Implement Construction Fugitive Dust Control Plan. (Refer to Section 6.2.2.2.1 of this Biota Report.)

6.2.4.1.2 Impact Significance after Mitigation. The mitigation measures identified above would substantially reduce the amount of fugitive dust likely to be generated by construction and operations within the Project site. Because the measures above would ensure compliance with applicable regulations prohibiting fugitive dust emissions, this impact would be ***less than significant*** after incorporation of the proposed mitigation measures.

6.2.4.2 Significant Impact 5

Mowing the vegetation within the solar arrays annually at the end of May to a height of 3 to 6 inches may result in the destruction of bird nests or eggs, mortality or injury to nestlings, or the disruption of bird nesting, particularly among ground nesting birds. This may affect special-status species such as the lark sparrow or common native birds, in violation of the Migratory Bird Treaty Act and the California Fish and Game Code.

6.2.4.2.1 Proposed Mitigation Measures.

BIO-4: Annual Nesting Bird Surveys Prior to Mowing. Should mowing for vegetation management purposes occur during the nesting/breeding season of native bird species potentially nesting on the site (typically February through August in the Project region, or as determined by a qualified biologist), the applicant shall have weekly nesting bird surveys conducted. These surveys shall be conducted by a qualified biologist, shall commence within 30 days prior to any mowing, and shall be conducted to determine whether any active nests of special-status bird species, or of any bird species protected by the Migratory Bird Treaty Act or the California Fish and Game Code, are present in the disturbance zone or within 100 feet of the area to be disturbed. The surveys shall occur on a weekly basis, with the last survey being conducted no more than seven days prior to initiation of disturbance work. If mowing is delayed, then additional surveys shall be conducted such that no more than seven

days will have elapsed between the survey and mowing. The Applicant or contractor shall provide the biologist with plans detailing the extent of proposed mowing prior to the survey effort.

If active nests are found, clearing and construction within 300 feet of the nest shall be postponed or halted, at the discretion of the biologist, until the nest is vacated and juveniles have fledged, as determined by the biologist, and there is no evidence of a second attempt at nesting. Limits of mowing to avoid an active nest shall be established in the field with highly visible construction fencing, and solar plant personnel shall be instructed on the sensitivity of nest areas. Occupied nests adjacent to the Project site may also need to be avoided for short durations to ensure nesting success. The results of the surveys, including graphics showing the locations of any nests detected, and any avoidance measures recommended, shall be submitted to the County and CDFG within 14 days of completion of the surveys to document compliance with applicable state and federal laws pertaining to the protection of native birds. Nesting bird surveys shall be conducted in each of the first five years after Project development. At the end of this period, the results of the first five years of surveys shall be submitted to the County and CDFG. At this time, the County, under consultation with CDFG, shall determine whether or not the nesting bird surveys shall continue.

6.2.4.2.2 Impact Significance after Mitigation. Mitigation measure BIO-4 above would substantially reduce the likelihood that native bird species or their nests are harmed and that nesting is disrupted during mowing. After incorporation of this measure, the impacts to nesting birds from mowing associated with vegetation management on-site would be ***less than significant***.

6.2.4.3 Significant Impact 6

Construction of the proposed Project could result in mortality of Blainville's horned lizard, a resident special-status reptile species within the Project site. This impact is described in detail in Section 5.5 of this Biota Report.

6.2.4.3.1 Proposed Mitigation Measures.

BIO-5: Biological Monitor. If construction activities are proposed to occur during the nesting season (from February through August), the applicant shall hire a County-approved biologist to monitor the presence of any special-status wildlife species, bird nests (from February to August), or ground-dwelling animals that may be potentially harmed during the installation of PV panels. The monitor shall be responsible for ensuring that impacts to these resources will be avoided to the fullest extent possible. If any special-status wildlife species are observed foraging, frequenting, or nesting during construction activities, the biological monitor shall relocate the species to undisturbed areas of suitable habitat using appropriate methods that would not injure the wildlife. If relocation cannot be accomplished without causing injury to the wildlife being relocated, the area in which the special-status species was

observed shall be flagged or fenced off to protect the species until the individual can be safely relocated. These restricted areas shall be monitored to ensure their protection during construction. In addition, the equipment operators shall be informed of the species' presence and provided with photographs or illustrations to better enable the workers to detect and avoid the sensitive species. The biological monitor shall have the authority to stop the work of the construction crews if the monitor believes the work may injure or kill sensitive wildlife.

BIO-6: Worker Environmental Education Program. A Worker Environmental Education Program shall be developed for construction crews by a qualified biologist(s) provided by the applicant. Training materials and briefings shall include but not be limited to: discussion of the value and identification of special-status species, including the burrowing owl, review of sensitive species likely to occur within the construction area, the Migratory Bird Treaty Act and the consequences of non-compliance with this act, a contact person in the event of the discovery of dead or injured wildlife, and a review of mitigation requirements. The training sessions shall be conducted by a qualified biologist or other individual approved by the biologist. Maps showing the location of special-status wildlife or other construction limitations will be provided to the environmental monitors and construction crews prior to construction activities. As part of the environmental training, contractors and heavy equipment operators shall be provided with photographs or illustrations of expected special-status wildlife species so they will able to identify them, and avoid harming them during construction.

BIO-7: Blainville's Horned Lizard Capture and Relocation. Prior to the initiation of ground clearing activities, capture and relocation efforts shall be conducted for the Blainville's horned lizard. Trapping shall be conducted by a County-approved biologist possessing proper scientific collection and handling permits, and shall include the following steps:

- Prior to initiating the capture and relocation effort, a suitable receptor location shall be identified to receive relocated horned lizards. The receptor locations shall contain suitable habitat for this species, including open, shrub-dominated vegetation. The 45-acre avoidance area near the southern edge of the Project site likely constitutes a suitable receptor location.
- The capture and relocation effort shall take place during the spring season (April through May) preceding commencement of ground disturbance activities, when lizards are at peak activity. All areas proposed for ground disturbance shall be surveyed for the Blainville's horned lizard.
- Surveys shall be conducted by placing coverboards on the ground 4 to 6 weeks in advance of the survey effort, and checking the area under the coverboards for horned lizards on a weekly basis. Coverboards can consist of untreated lumber, sheet metal,

corrugated steel, or other flat material. Captured lizards will be placed immediately into containers containing sand or moist paper towels and released in designated receptor locations no more than three hours after capture.

- If the biologist believes there is high potential for previously relocated lizards to return to the impact sites following relocation, silt fence shall be installed to prevent relocated individuals from reoccupying areas proposed for disturbance.

6.2.4.3.2 Impact Significance after Mitigation. The suite of mitigation measures identified above would increase awareness regarding sensitive biological resources among site construction workers, and would require surveys and trapping for Blainville's horned lizard during appropriate seasons. The proposed measures would reduce the extent of Project-related injury or mortality to this species, ensuring that all individuals captured are removed from harm's way. However, given the cryptic nature of this species, that it is often underground and therefore not detectable, and the large size of the Project site, it is likely that some individuals would avoid detection and capture during the trapping effort, and these individuals could be crushed during ground clearing activities. Although, this lizard is not expected to be common on the site, especially north of SR-138, due to current range, the disking which occurred on-site, and SR-138 presents a movement barrier to horned lizards. Due to these factors influencing the likelihood of the Blainville's horned lizard occurring on-site and the implementation of the proposed on-site mitigation measures, the Project's impacts related to injury or mortality of Blainville's horned lizard would be ***less than significant***.

6.2.4.4 Significant Impact 7

The proposed Project would result in the loss and permanent modification of 1,887 acres of suitable foraging habitat for the Blainville's horned lizard due to construction impacts, shading, and increased likelihood of Argentine ant invasions into the site. This impact is described in detail in Section 5.5 of this Biota Report.

6.2.4.4.1 Proposed Mitigation Measures.

BIO-1: Habitat Enhancement and Vegetation Management Plan. (Refer to Section 6.2.1.1.1 of this Biota Report.)

BIO-2: Off-site Mitigation for Loss of Habitat. (Refer to Section 6.2.1.1.1 of this Biota Report.)

6.2.4.4.2 Impact Significance after Mitigation. The revegetated areas required by mitigation measure BIO-1 would ensure that a minimum of 105 acres within the Project site are avoided, including 99 acres to be enhanced, managed, and monitored. Implementation of BIO-2 would supplement this on-site avoidance and enhancement of natural habitats, and

would preserve and/or restore additional natural habitat for the Blainville's horned lizard at an off-site location within the Antelope Valley. This impact would be ***less than* significant** after incorporation of the proposed mitigation measure.

6.2.4.5 Significant Impact 8

Construction of the proposed Project could result in mortality of burrowing owls, a resident special-status species within the Project site. This impact is described in detail in Section 5.5 of this Biota Report.

6.2.4.5.1 Proposed Mitigation Measures.

BIO-5: Biological Monitor. (Refer to Section 6.2.4.2.1 of this Biota Report.)

BIO-6: Worker Environmental Education Program. (Refer to Section 6.2.4.2.1 of this Biota Report.)

BIO-9: Pre-construction Nesting Bird Surveys. Within 30 days prior to any vegetation clearing or ground disturbance associated with construction or grading that would occur during the nesting/breeding season of native bird species potentially nesting on the site (typically February through August in the project region, or as determined by a qualified biologist), the applicant shall have weekly surveys conducted by a qualified biologist to determine if active nests of special-status bird species, or of any bird species protected by the Migratory Bird Treaty Act or the California Fish and Game Code, are present in the disturbance zone or within 300 feet (500 feet for raptors) of the area to be disturbed. The surveys shall occur on a weekly basis, with the last survey being conducted no more than seven days prior to initiation of disturbance work. If ground disturbance is delayed, then additional pre-disturbance surveys shall be conducted such that no more than seven days will have elapsed between the survey and ground disturbance activities. The Applicant or contractor shall provide the biologist with plans detailing the extent of proposed ground disturbance prior to the survey effort.

If active nests are found, clearing and construction within 300 feet of the nest (500 feet for raptors) shall be postponed or halted, at the discretion of the biologist, until the nest is vacated and juveniles have fledged, as determined by the biologist, and there is no evidence of a second attempt at nesting. Limits of construction to avoid an active nest shall be established in the field with highly visible construction fencing, and construction personnel shall be instructed on the sensitivity of nest areas. Occupied nests adjacent to the construction site may also need to be avoided for short durations to ensure nesting success. A qualified biologist shall serve as a construction monitor during those periods when construction activities will occur near active nest areas to ensure that no inadvertent impacts on these nests occur. The results of the surveys, including graphics showing the locations of any nests detected, and any avoidance measures recommended, shall be submitted to the County and

CDFG within 14 days of completion of the pre-construction surveys or construction monitoring to document compliance with applicable state and federal laws pertaining to the protection of native birds.

BIO-10: Pre-construction Wintering Burrowing Owl Surveys. If construction or site preparation activities are scheduled during the non-nesting season of the burrowing owl (typically September through January), the applicant shall retain a qualified biologist to conduct wintering burrowing owl surveys within the area to be disturbed. The survey shall be conducted no more than 30 days prior to commencement of construction activities in the area. During the construction period (estimated to be approximately three years), the results of the surveys, including graphics showing the locations of any active burrows detected and any avoidance measures required, shall be submitted to the County and CDFG on a monthly basis. If active burrows are detected, the required avoidance measures shall conform to the following:

- If burrowing owls are observed using burrows during the non-breeding season, occupied burrows shall be left undisturbed, and no construction activity shall take place within 160 feet of the burrow where feasible (see below).
- If disturbance of owls and owl burrows is unavoidable, owls shall be excluded from all active burrows through the use of exclusion devices placed in occupied burrows in accordance with CDFG protocols (CDFG 1995). Specifically, exclusion devices, utilizing one-way doors, shall be installed in the entrance of all active burrows. The devices shall be left in the burrows for at least 48 hours to ensure that all owls have been excluded from the burrows. Each of the burrows shall then be excavated by hand and refilled to prevent reoccupation. Exclusion shall continue until the owls have been successfully excluded from the disturbance area, as determined by a qualified biologist.
- If construction activities must be initiated in any area of the site during the burrowing owl breeding season (typically February through August), pre-construction surveys for burrowing owls shall be conducted. Any active burrowing owl burrows found at this season shall not be disturbed. Construction activities shall not be conducted within 300 feet of an active burrow at this season.
- The biological monitor required under mitigation measure BIO-6 shall ensure that requirements listed above in relation to disturbance of owls are met.

6.2.4.5.2 Impact Significance after Mitigation. The suite of mitigation measures identified above would increase awareness regarding sensitive biological resources among site construction workers, and would require surveys and monitoring for sensitive species during appropriate seasons. The proposed measures would substantially reduce the risk of injury or mortality to burrowing owls, preventing destruction of burrows and prohibiting ground disturbance within 300 feet of active burrows. A 300-foot radius around the burrow

equates to 6.5 acres, the acreage of foraging habitat recommended for a burrowing owl individual or pair by the CDFG (1995) and California Burrowing Owl Consortium (1993). After incorporation of the proposed mitigation measures, the Project's impacts related to injury or mortality of burrowing owls would be ***less than significant***.

6.2.4.6 Significant Impact 9

Construction of the proposed Project could result in mortality of special-status bird species including the lark sparrow, loggerhead shrike, and western meadowlark. This impact is described in detail in Section 5.5 of this Biota Report.

6.2.4.6.1 Proposed Mitigation Measures.

BIO-5: Biological Monitor. (Refer to Section 6.2.4.2.1 of this Biota Report.)

BIO-6: Worker Environmental Education Program. (Refer to Section 6.2.4.2.1 of this Biota Report.)

BIO-9: Pre-construction Nesting Bird Surveys. (Refer to Section 6.2.4.4.1 of this Biota Report.)

6.2.4.6.2 Impact Significance after Mitigation. The suite of mitigation measures identified above would increase awareness regarding sensitive biological resources among site construction workers, and would require surveys and monitoring for sensitive species during appropriate seasons. The proposed measures would substantially reduce the risk of injury or mortality to lark sparrows, loggerhead shrikes, and western meadowlarks. After incorporation of the proposed mitigation measures, the Project's impacts related to injury or mortality of these species would be ***less than significant***.

6.2.4.7 Significant Impact 10

The proposed Project would result in the loss and permanent modification of 1,887 acres of suitable foraging habitat for the burrowing owl, a resident sensitive species within the Project site. This impact is described in detail in Section 5.5 of this Biota Report.

6.2.4.7.1 Proposed Mitigation Measures.

BIO-1: Habitat Enhancement and Vegetation Management Plan. (Refer to Section 6.2.1.1.1 of this Biota Report.)

BIO-2: Off-site Mitigation for Loss of Habitat. (Refer to Section 6.2.1.1.1 of this Biota Report.)

BIO-11: Burrowing Owl Habitat Management Plan. Prior to issuance of a grading permit, a habitat management plan for the burrowing owl shall be developed for portions of the site supporting suitable habitat for burrowing owl and away from Project facilities and the solar panel arrays. Specifically, this plan will be developed for implementation in two areas not proposed for development: the channel of Drainage A and areas within 100 feet on either side, and the southernmost portion of the Project site near West Avenue E, surrounding Drainage C. At a minimum, the plan shall include the following elements:

- If occupied burrows are to be removed, the plan shall contain schematic diagrams of artificial burrow designs and a map of potential artificial burrow locations within Drainage C that would compensate for the burrows removed, as well existing suitable burrows in Drainages A and C (as ten suitable burrows were found in Drainage A in 2009, artificial burrows would provide no benefit to burrowing owls there).
- A methodology for the eviction and passive relocation of any owls from the impact area to proactively establish artificial burrows (see Mitigation Measure BIO-10).
- Provisions for vegetation management, specifying the maximum allowable vegetative cover adjacent to established artificial burrows and the methodology to be used in maintaining the appropriate cover.
- Measures prohibiting the use of anti-coagulant rodenticides.
- The plan shall specify a minimum of 6.5 acres of suitable foraging habitat to be preserved or created through revegetation and enhancement practices for every active burrowing owl burrow within the Project site. These mitigation areas shall not be located in areas shaded by the proposed solar arrays, and shall not be subject to vegetation mowing or other fuel management practices. Foraging areas shall be located in close proximity to suitable natural or artificial burrow locations.

The Burrowing Owl Habitat Management Plan may be prepared and presented either as a stand-alone document or as a component of the HRVMP required by Mitigation Measure BIO-1, and shall be approved by the County and CDFG prior to issuance of a grading permit for the Project.

6.2.4.7.2 Impact Significance after Mitigation. The avoidance areas at the southernmost portion of the Project site near Drainage C, the 100-foot setback from Drainage A, enhancement and revegetation of these areas as required by mitigation measure BIO-1, and the pre-construction wintering burrowing owl surveys conducted under mitigation measure BIO-11 would ensure that a minimum of 6.5 acres of suitable foraging habitat (the recommended minimum in CDFG 1995) is provided for each active burrow on-site. Although the mitigation measures identified above would lessen the proposed Project's effects on biological resources by ensuring that 99 acres of existing suitable habitat on-site would be preserved and enhanced, the Project would nonetheless result in a substantial loss

of foraging habitat for the burrowing owl due to the 400 acres proposed for permanent removal and the additional 1,487 acres to be permanently altered by shading and vegetation management practices. However, off-site mitigation described in Mitigation Measure BIO-2 would provide suitable habitat for this species and lessen this impact substantially. Implementation of the proposed mitigation measures would, therefore, reduce this impact to ***less than significant.***

6.2.4.8 Significant Impact 12

The proposed Project would result in the loss and permanent modification of 1,887 acres of suitable foraging habitat for sensitive bird species including the ferruginous hawk, merlin, long-eared owl, greater roadrunner, mountain bluebird, lark sparrow, loggerhead shrike, vesper sparrow, prairie falcon, and western meadowlark. This impact is described in detail in Section 5.5 of this Biota Report.

6.2.4.8.1 Proposed Mitigation Measures.

BIO-1: Habitat Enhancement and Vegetation Management Plan. (Refer to Section 6.2.1.1.1 of this Biota Report.)

BIO-2: Off-site Mitigation for Loss of Habitat. (Refer to Section 6.2.1.1.1 of this Biota Report.)

6.2.4.8.2 Impact Significance after Mitigation. The HEVMP that would be prepared pursuant to Mitigation Measure BIO-1 would lessen this impact somewhat by avoiding, enhancing, and revegetating 105 acres on-site that are not proposed for development. The Project would nonetheless result in a substantial loss of foraging habitat for sensitive birds due to 400 acres proposed for permanent removal and the additional 1,487 acres to be permanently altered by shading and vegetation management practices. However, implementation of Mitigation Measure BIO-2 would substantially lessen this impact by providing for the preservation of 278 acres of natural habitats off-site. This impact would be ***less than significant*** after implementation of both of the above mitigation measures.

6.3 MITIGATION MONITORING AND REPORTING

As stated previously, URS and the County are currently preparing a Draft EIR for the proposed Project, which will be released for public review and comment. The mitigation measures identified and proposed in this Biota Report are identical to those currently being considered for inclusion in the Draft EIR. However, as the EIR process is still at a relatively early stage (an Administrative Draft has not yet been delivered to the County for review at the time of this writing), these draft mitigation measures are likely to change based on input from the County, other regulatory agencies, and the concerned public throughout the CEQA process. Due to this uncertainty, preparation of a Mitigation Monitoring and Reporting

Program at this stage would be premature. As required by Section 21081.6 of the CEQA Statutes, a Mitigation Monitoring and Reporting Program will be prepared prior to issuance of Project approvals.

SECTION 7.0
SIGNIFICANT ECOLOGICAL AREA DESIGN COMPATIBILITY

This section evaluates the impacts of the proposed Project in light of the County's SEA compatibility guidelines set forth at Section 22.56.215 of the Los Angeles County Code. In addition, for purposes of this analysis, it assumed that any inconsistencies with the compatibility guidelines would constitute a significant impact pursuant to the significance criterion stated in Section 5.7 of this Biota Report.

7.1 THE REQUESTED DEVELOPMENT IS DESIGNED TO BE HIGHLY COMPATIBLE WITH THE BIOTIC RESOURCES PRESENT, INCLUDING THE SETTING ASIDE OF APPROPRIATE AND SUFFICIENT UNDISTURBED AREAS

Although the Project would result in some adverse effects on biological resources, as described in Section 5.0 of this Biota Report, the Project has been designed to minimize such effects to the extent feasible. The solar generating facility is proposed on a 2,100-acre site, which would be almost wholly used for placement of solar PV panels and associated infrastructure and structures (see Figure 2-1). The proposed Project is intended to provide the necessary electricity to meet the needs of a power purchase agreement for the sale of 230 MW of renewable, solar power. Due to this production requirement, and because of the efficiency of the solar panels, the needs of the proposed Project could not be met on a smaller site using currently available solar PV technology. By utilizing the Project site to the maximum extent possible, the Project would avoid the greater impacts that would occur if a larger site were used.

In addition to using the smallest site that would feasibly attain the objectives of the proposed Project, the Project has been designed to minimize impacts on the regional biota through selection of a site with moderate to low biological value. The Project site has been used for agricultural purposes dating back to the late 1940s, and was farmed continuously until 1995. According to the previous landowner, the last crop was grown on 80 acres of land south of the existing farmhouse in 2004. Since then, the Project site has been fallow, and vegetation communities on-site have begun to recover from five decades of chronic disturbance. However, the alteration of the natural vegetation on-site remains visibly evident, as observed during biological field investigations of the site (see Section 4.0 of this Biota Report). The site currently supports vegetation communities typical of the Antelope Valley region, including rabbitbrush scrub, California annual grassland, wildflower fields, and orchard, and ornamental vegetation near the existing farmhouse on the site. The plants and wildlife identified on-site during biological field investigations are typical for the existing habitat types and geographical area. No threatened or endangered species were detected or are suspected to occur on the site, and Joshua tree woodland vegetation is not present.

Despite the lack of Joshua tree woodland within the Project site, approximately 20 acres in the northwest corner of the site is located within SEA #60, as shown on Figure 3-6a. The full-coverage floristic surveys and Joshua tree inventory conducted within the Project site (refer to Section 4.4 of this Biota Report) indicated that no Joshua trees or seedlings are present in this 20-acre area, and vegetation mapping efforts (see Section 4.2 of this Biota Report) classified the area as a rabbitbrush scrub community. This finding was confirmed by CDFG representatives during a site visit conducted on January 28, 2009. Therefore, although the 20-acre overlap area is within the designated SEA, the vegetation in this area does not provide the Joshua tree woodland habitat values that the County intended to preserve through dedication of SEA #60. The proposed Project would not remove any Joshua tree woodland vegetation within or adjacent to the site.

As described in Section 4.0 of this Biota Report, a 7.3 acre area along the northern edge of the Project site, outside SEA #60, is sparsely populated with juvenile Joshua trees. Fifty Joshua tree seedlings are dispersed throughout this area, averaging approximately 6.8 seedlings per acre. As described in Section 6.0 of this Biota Report, the area will be avoided and protected by a minimum 50-foot buffer. Outside of the buffer, a perimeter fence and fire access road will be constructed along the south side of the Joshua tree recruitment area. No juvenile Joshua trees will be removed by the Project.

Because the Project site would be almost wholly occupied by the proposed generating facility, opportunities for setting aside natural habitat areas within the site are limited. However, two areas on the Project site totaling 77 acres would remain undeveloped: one in the southernmost portion of the site, and one including Drainage A and a 100-foot buffer on either side, in the central portion of the site (see Figure 5-1). No ground clearing or vegetation management activities are proposed in these portions of the site. The 45-acre area in the southernmost portion of the site has relatively high habitat value compared to the majority of the site, and includes 26.6 acres of wildflower field vegetation, the entire 1.02-acre on-site portion of Drainage C, and on-site foraging habitat closest to the only location in the Project vicinity where burrowing owls were confirmed as nesting. The 32-acre area within and surrounding Drainage A would provide a swath of undeveloped area at least 100 feet wide and up to approximately 240 feet wide traversing the site, which would provide a wildlife movement corridor across the site. It is anticipated that the acreage of habitat provided would allow for the establishment of resident wildlife populations. The Project design also incorporates a minimum 50-foot development setback from the property line, which would ensure that no Project facilities occur within 50 feet of biological resources in adjacent areas.

The proposed Project would have very limited operational impacts on adjacent biological resources, generating minimal emissions and almost no noise. Human presence would be light with approximately 16 full-time workers, and most of the activity would occur in and around the on-site operations and maintenance building located towards the interior of the

site, away from adjacent resources. Human presence in the solar field would be limited to infrequent maintenance activities. Minimal night lighting would be required, because the solar equipment would not operate during non-daylight hours. Night lighting would primarily be at the O&M building, parking area, and the main plant access, and would be directed downward and shielded.

The Project's proposed 230-kV transmission lines route is proposed to be located within the County's existing road ROW along 170th Street West. The majority of the proposed transmission line right-of-way consists of the disturbed roadbed and shoulder, although natural areas, including Joshua tree woodlands, would be traversed by the proposed line. The transmission line would be supported by tapering tubular steel poles ranging from 85 to 125 feet tall, with 4- to 6-foot diameter bases. The poles would be spaced approximately 700 feet apart, and each would require a construction footprint of approximately 50 feet by 100 feet. The substantial distance between pole locations would allow the poles to be sited to minimize disturbance, and all Joshua trees along the route would be avoided. The transmission line design minimizes the potential for shock or electrocution of birds and discourages nesting and perching on the poles.

Because the proposed Project would avoid impacts to Joshua tree woodlands, would be buffered by a minimum 50-foot setback from adjacent resources, would cause only minimal operational impacts, and would preserve a total of 105 acres of natural habitat on-site, the proposed Project would be highly compatible with the biological resources present within SEA #60.

7.2 THE REQUESTED DEVELOPMENT IS DESIGNED TO MAINTAIN WATER BODIES, WATERCOURSES, AND THEIR TRIBUTARIES IN A NATURAL STATE

There are no drainage channels within the 20-acre portion of the Project site that includes SEA #60. However, the site does contain portions of four jurisdictional streambeds, as described in Section 4.3 of this Biota Report. The four drainages on-site are ephemeral in their flow regime, and do not provide suitable habitat for aquatic or semi-aquatic wildlife. Riparian vegetation is absent from the channels, and the habitat functions provided by these streams consist of foraging and movement habitat for upland wildlife, rather than aquatic functions. All four of these drainages (Drainages A through D: Figure 3-3) would be avoided by the proposed Project, and would remain in their existing state.

The jurisdictional segment of Drainage A would be protected by a 100-foot setback, measured from the top of each cut bank. This would result in a corridor approximately 215 to 240 feet wide. The buffer around the non-jurisdictional segment of the drainage would narrow down to 100-feet wide, and turn 90 degrees north at 160th Street West to end at the northern boundary of the Project site. This corridor also provides the primary movement

corridor for wildlife across the Project site. To prevent the movement of the main drainage channel into the solar panel arrays, a cutoff wall of sub-surface sheet pilings will be driven into the ground along the buffer edge (i.e., 100 feet from top of Drainage A banks where incised) for a distance of approximately 5,000 feet on either side of the incised channel of Drainage A.

Drainage B would be protected by a 20-foot wide buffer throughout its length. This small, isolated drainage is not connected to other hydrologic features on the site.

Drainage C is protected by a minimum 100-foot wide setback, measured from the FEMA Zone A floodplain.

Drainage D lies mostly outside of the Project boundary, and is protected by a minimum 50-foot setback.

No drainages are present along the proposed transmission line route, and the transmission line would not affect this resource.

7.3 THE REQUESTED DEVELOPMENT IS DESIGNED SO THAT WILDLIFE MOVEMENT CORRIDORS (MIGRATORY PATHS) ARE LEFT IN AN UNDISTURBED AND NATURAL STATE

The Project site and proposed line route do not occupy migratory paths for wildlife species of management concern, as determined through agency consultation and literature review. However, wildlife may move through the site during normal behaviors such as foraging, searching for mates, and dispersal. Observations of tracks and sign indicate that Drainage A is used as a movement route through the site by common mammals, although the majority of the site is suitable for this purpose as well. Implementation of the proposed Project would entail the installation of wildlife permeable fencing around the majority of the Project site, which would not significantly impede wildlife movement. Habitat modifications caused by the solar PV panels could render the majority of the site unsuitable for use by many species. For the smallest wildlife species, such as small mammals and reptiles, the proposed Project would be unlikely to have adverse effects related to movement, as the home ranges of these species are far smaller than the acreage of the site. For the largest wildlife, such as mountain lions and species of similar size and mobility, the Project would be unlikely to substantially affect movement patterns because these species preferentially travel along the periphery of the Antelope Valley rather than along the valley floor (see Section 4.12 of this Biota Report), and are sufficiently mobile to skirt the site with minimal expenditure of effort.

The home ranges of medium-sized wildlife are large enough that travel off of the site would be a requirement, yet small enough that the Project site could be relied on substantially to fulfill basic biological needs including foraging, searching for mates, and dispersal. The Project design includes wildlife permeable fencing at either end of Drainage A. This would

allow medium-sized wildlife to use Drainage A, which will remain undeveloped, as a movement corridor through the site in a northeast-southwest orientation. When viewed collectively with the existing roads and proposed associated setbacks that could be used by wildlife to traverse the site in a north-south (170th Street West) and east-west (SR-138) direction, the preservation of Drainage A as a viable movement route would substantially lessen the effects of the proposed Project on wildlife movement. In addition, the Project design calls for the installation of wildlife permeable fencing in 50-foot lengths at 200-foot intervals. In these sections, medium-sized wildlife would be able to pass through a one-foot space at ground level, further reducing any restrictions in movements by these species.

Due to the nature of construction impacts along the proposed transmission line route (i.e., many small, isolated patches of disturbance with ample undisturbed habitat between them), construction of the transmission line would not substantially affect wildlife movement.

7.4 THE REQUESTED DEVELOPMENT RETAINS SUFFICIENT NATURAL VEGETATIVE COVER AND/OR OPEN SPACES TO BUFFER CRITICAL RESOURCE AREAS FROM SAID REQUESTED DEVELOPMENT

The Project would incorporate a minimum 50-foot buffer between the Project facilities and the adjacent SEA #60 to the north and east of the Project site. Because of the low level of activity associated with facility operations, this distance would adequately buffer adjacent resources from disturbance. The Project would be designed to maintain low-lying vegetation on the site to stabilize the soil and reduce fugitive dust. Temporarily disturbed areas would be revegetated with native species as specified in Section 6.0 of this Biota Report.

7.5 WHERE NECESSARY, FENCES OR WALLS ARE PROVIDED TO BUFFER IMPORTANT HABITAT AREAS FROM DEVELOPMENT

Because of the low level of activity associated with operations of a solar power facility (minimal noise, emissions, lighting, and human presence), and because a minimum 50-foot setback from property lines has been included in the Project design, fences or walls would not be necessary to buffer adjacent habitat areas from the proposed development. However, the Project site will be surrounded by an 8-foot high chain link fence for security reasons, as shown on Figure 2-1.

7.6 ROADS AND UTILITIES SERVING THE PROPOSED DEVELOPMENT ARE LOCATED AND DESIGNED SO AS TO NOT CONFLICT WITH CRITICAL RESOURCES, HABITAT AREAS, OR MIGRATORY PATHS

The Project site would be served by existing vehicular access from 170th Street West, and no off-site roads are proposed. The proposed transmission line would be constructed in the existing road ROW of 170th Street West, and would not disrupt wildlife use in surrounding areas due to the limited nature of the construction impacts required. On-site roads and

utilities would not be constructed in areas of critical resources, habitat areas, or migratory paths, and therefore, such facilities would not conflict with these uses.

SECTION 8.0
LIST OF PREPARERS

This Biota Report has been prepared by the Biological Resources staff at URS Santa Barbara with assistance from Michael Honer, an independent subcontractor. This section identifies the individuals responsible for preparation and/or review of this report, as well as the biological field investigations on which the report is largely based. Senior Biologist Christopher Julian directed preparation of this report, and Senior Biologist John Davis IV, the Biological Resources group leader at URS Santa Barbara and a SEATAC-approved biologist, peer reviewed the report. Resumes of all biologists involved in preparation of this Biota Report, as well as those that participated in the associated field surveys, are presented in Appendix N. The preparers and their roles are listed in Table 8-1 below.

TABLE 8-1
LIST OF PREPARERS

Name	Title	Qualifications	Experience	Participation
Christopher Julian	Senior Biologist/ Regulatory Specialist	BS – Aquatic Biology	8 years	Task Leader
John H. Davis IV	Senior Biologist, URS Santa Barbara Biology Group Leader	MS – Biology, BS – Ecology, SEATAC-approved biologist	12 years	Senior Technical Review
Crissy Slaughter	Staff Biologist	BA – Aquatic Biology	13 years	Field Survey Supervisor
David Compton	Staff Biologist	MA – U.S. History, BA – History	11 Years	Bird Survey Leader, Ornithology Subject Matter Support
Julie Love	Staff Biologist	MESM – Coastal and Marine Conservation BS – Marine Biology	7 Years	Jurisdictional Delineation, Plant and Wildlife Field Surveys
Jessica Birnbaum	Staff Biologist	MS – Natural Resources Planning and Interpretation, BS – Biology	3 Years	Plant and Wildlife Field Surveys
Ronald Cummings	Senior Biologist	BS – General Biology	21 Years	Plant and Wildlife Field Surveys
Michael Honer	Independent Consultant	MS – Botany, MFA – Photography, BA – Studio Art	6 Years	Botanical Field Surveys
Whitney Wilkinson	Staff Biologist	BS – Biological Sciences, BA – Environmental Studies	2 Years	Plant and Wildlife Field Surveys

SECTION 9.0
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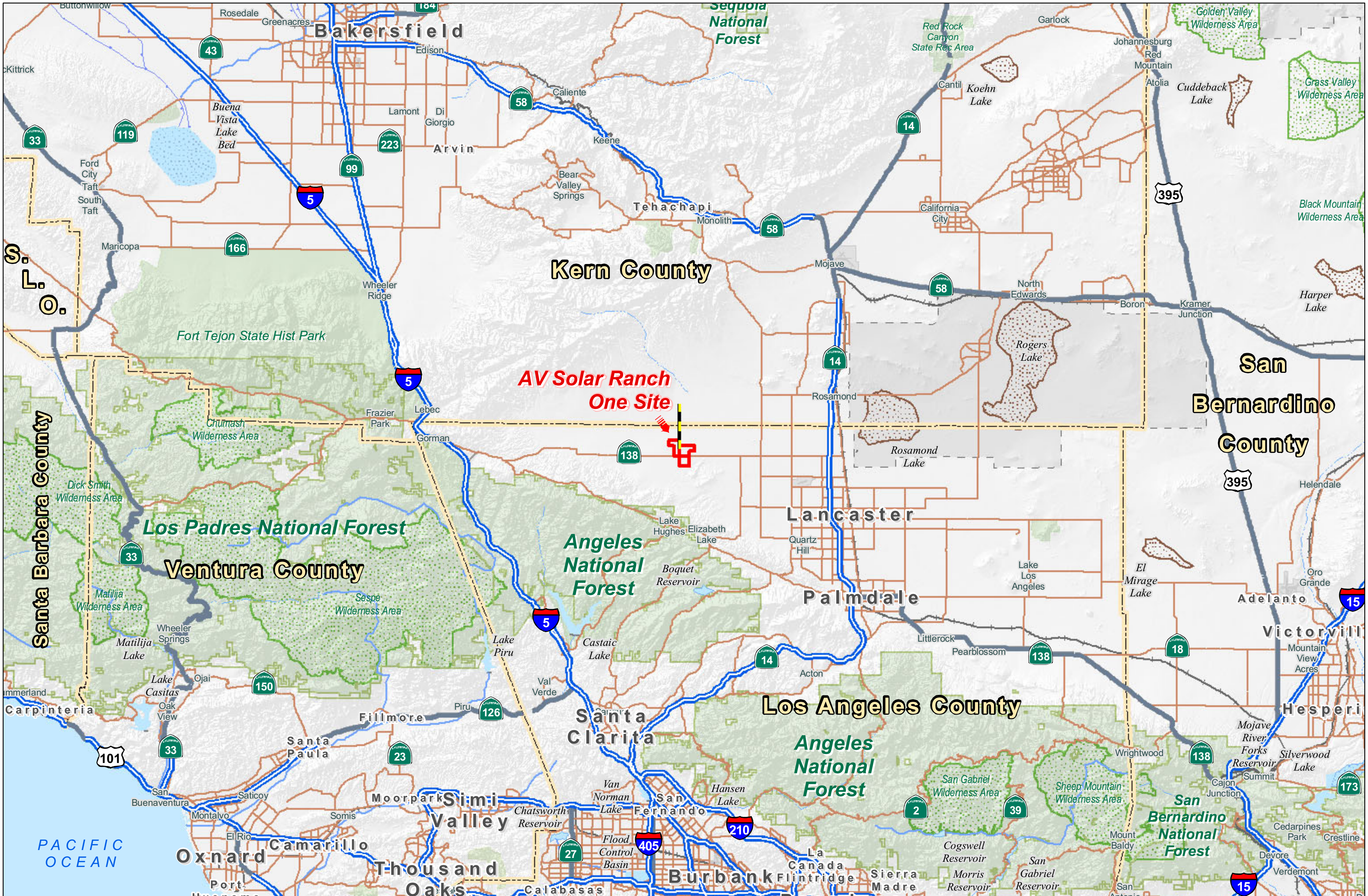
FIGURES



N
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0 5 10 15 20 Miles

Source:
Source: [1] ESRI StreetMap USA (2006). [2] Hillshade, 30 Meter Resolution (based on the National Elevation Dataset (NED) - U.S. Geological Survey, Teale Data Center GIS Solutions Group, USFS Region 5.

AV Solar Ranch One Biota Report

Figure 1-1. REGIONAL LOCATION MAP

2009

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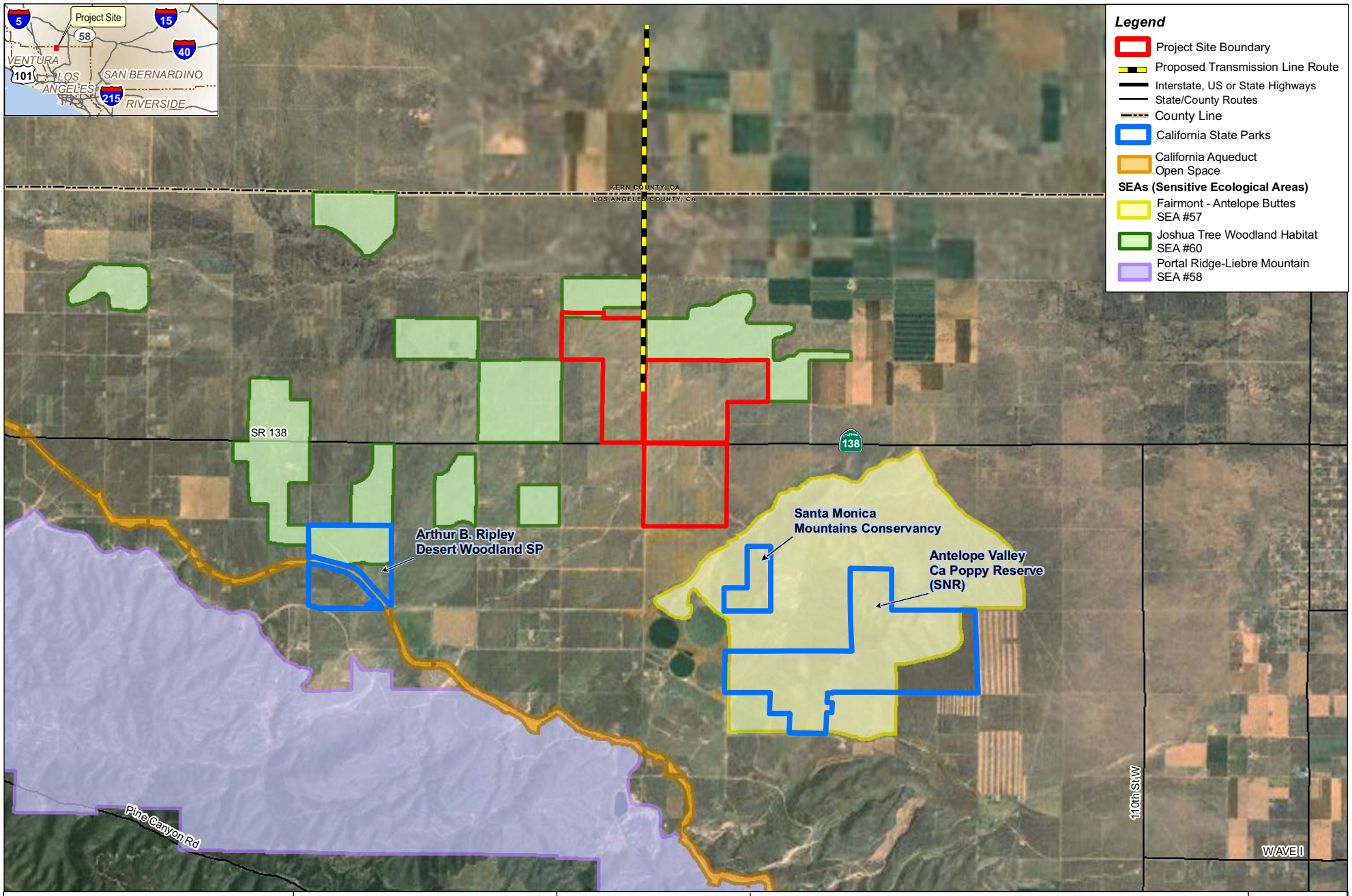


N

1:100,000

0 0.5 1 1.5 Miles

1 in = 2 miles

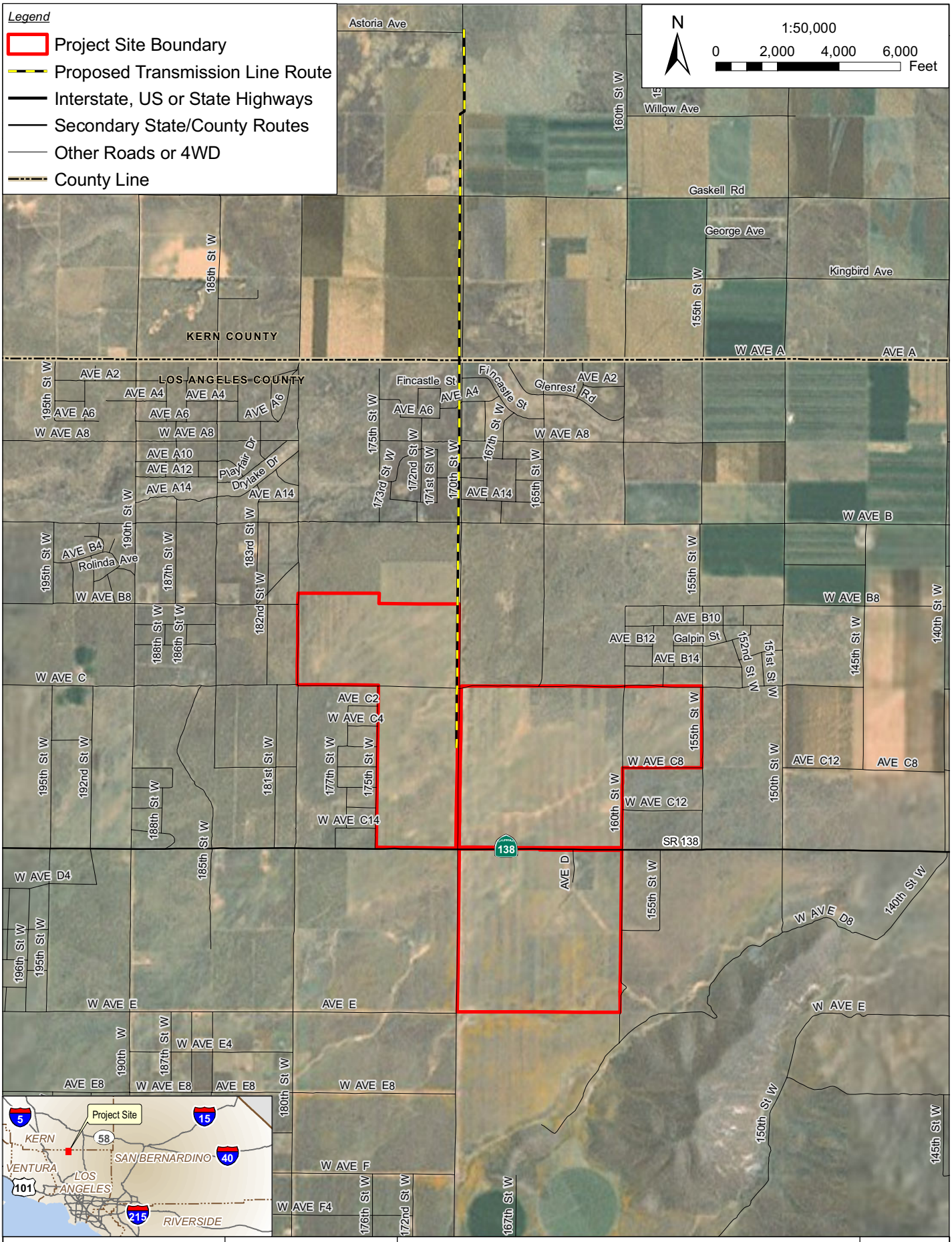
Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [3] LA County General Plan(1986), [4] Antelope Valley Area Wide General Plan (1986), Accessed February 2009: http://planning.lacounty.gov/gis/data.

AV Solar Ranch One Biota Report

Figure 1-2. PROJECT SITE VICINITY MAP

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig1-2_Project_Site_Vicinity_Map.mxd



Source:
Source: [1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007).

AV Solar Ranch One Biota Report

Figure 1-3. PROJECT SITE AERIAL PHOTOGRAPH

2009

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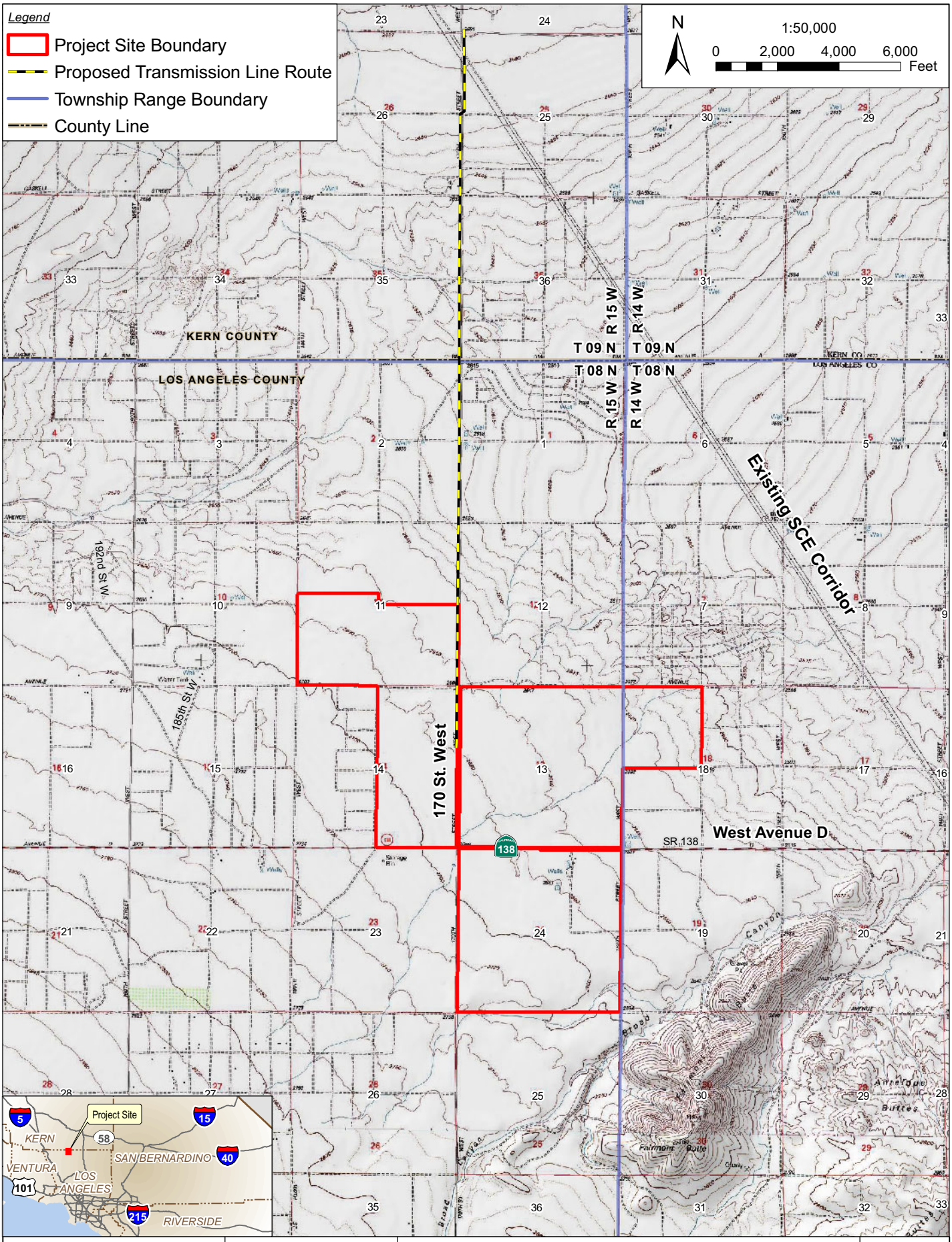

Source:
Source: [1] U.S.G.S 7.5' topographic quadrangles (2005),
[2] ESRI StreetMap USA (2007).

AV Solar Ranch One Biota Report

Figure 1-4. SITE LOCATION TOPOGRAPHIC MAP

2009

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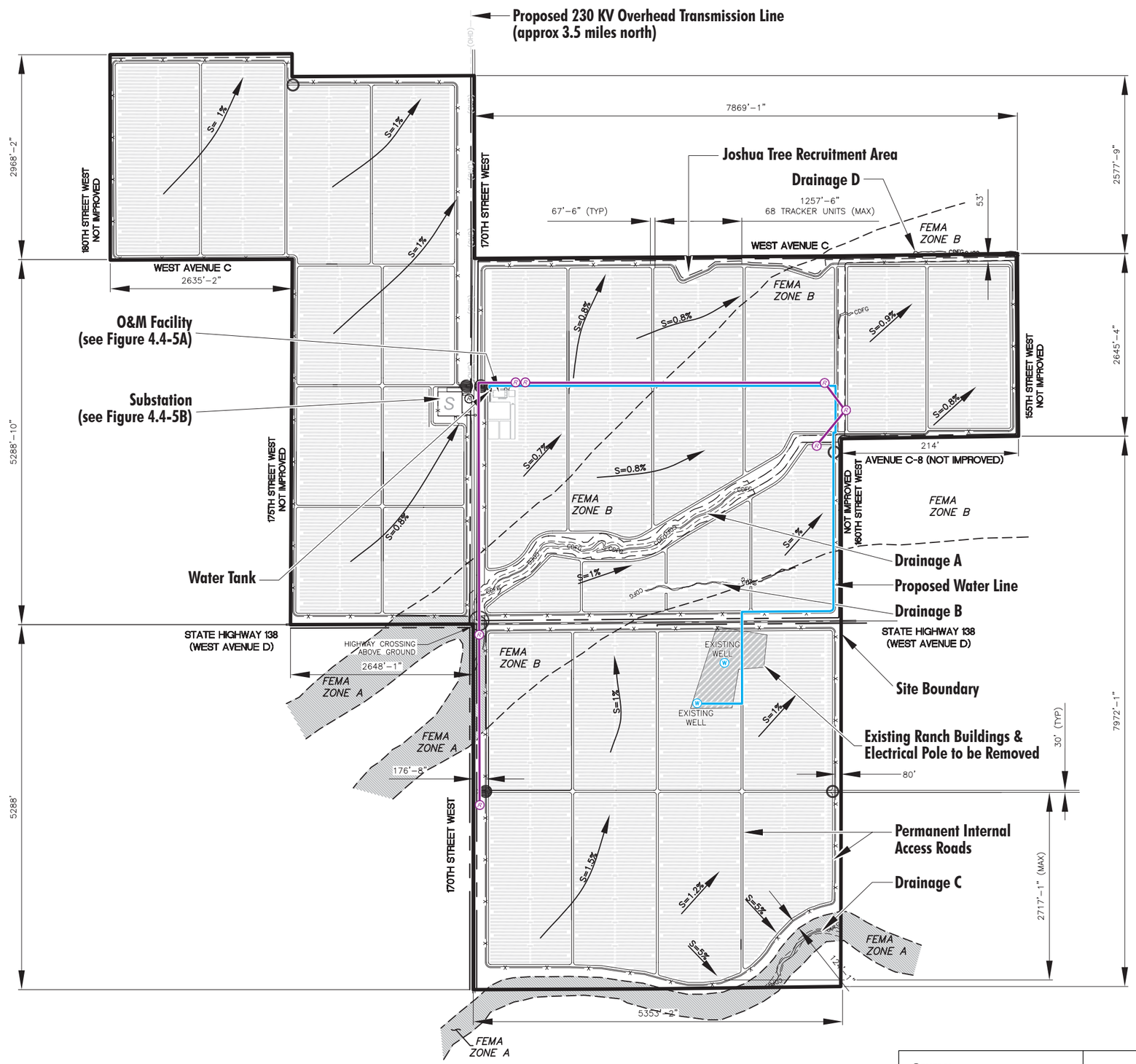
T/Ladd/NextLight/ADEIR#2/BiotaReport/209-019C



SETBACKS

DISTANCE FROM	TO ARRAY		TO FENCE	
	REQUIRED(MIN)	PROVIDED(MIN)	REQUIRED(MIN)	PROVIDED(MIN)
HWY 138 (NORTH)	NA	105 FT	NA	68 FT
HWY 138 (SOUTH)	NA	134 FT	NA	57 FT
160TH NORTH OF HWY 138 (WEST)	NA	96 FT	NA	51 FT
160TH SOUTH OF HWY 138 (WEST)	NA	141 FT	NA	80 FT
170TH NORTH OF HWY 138 (EAST)	NA	200 FT	NA	44 FT
170TH NORTH OF HWY 138 (WEST)	NA	109 FT	NA	40 FT
170TH SOUTH OF HWY 138 (EAST)	NA	220 FT	NA	126 FT
WEST AVE E (NORTH)	NA	119 FT	NA	40 FT
WEST AVE C (SOUTH)	NA	130 FT	NA	71 FT
180TH (WEST)	NA	114 FT	NA	30 FT
175TH (EAST)	NA	110 FT	NA	30 FT
155TH (WEST)	NA	119 FT	NA	67 FT

* – SETBACK DISTANCES ARE MEASURED FROM THE PROPERTY LINE OR EDGE OF ROW AS APPLICABLE

NOTES:

1. THE PROPOSED ARRAY LAYOUT SHOWN IS SUBJECT TO FINAL DESIGN & VERIFICATION OF ACTUAL SITE CONDITIONS.
2. ZONE B AREA BETWEEN LIMITS OF 100 YEAR FLOOD AND 500 YEAR FLOOD; OR CERTAIN AREAS SUBJECT TO 100 YEAR FLOODING WITH AVERAGE DEPTHS LESS THAN (1) FOOT OR WHERE THE CONTRIBUTING DRAINAGE AREA IS LESS THAN ONE SQUARE MILE; OR AREAS PROTECTED BY LEVEES FROM THE BASE FLOOD
3. ZONE A AREAS WITH A 1% ANNUAL CHANCE OF FLOODING AND A 26% CHANCE OF FLOODING OVER THE LIFE OF A 30-YEAR MORTGAGE. BECAUSE DETAILED ANALYSES ARE NOT PERFORMED FOR SUCH AREAS; NO DEPTHS OR BASE FLOOD ELEVATIONS ARE SHOWN WITHIN THESE ZONES
4. DECLINATION AT THE INTERSECTION OF HWY 138 & 170TH W. STREET
5. THIS DRAWING IS A REVISION TO SUNPOWER AV SOLAR RANCH ONE FACILITY SITE PLAN, AND MADE PER THE DIRECTION OF NEXTLIGHT RENEWABLE POWER, LLC

LEGEND

- FEMA FLOOD PLAIN. THIS SURVEY IS BASED ON GRID COORDINATES DERIVED FROM A GPS SURVEY PROVIDED BY **WESTWOOD PROFESSIONAL SERVICES**
- FENCE
- 34.5 KV OVERHEAD LINE 160' POLE SPACING
- 230 KV OVERHEAD LINE
- PROPOSED 8" WATERLINE
- LOS ANGELES COUNTY EASEMENT
- DEVELOPMENT SETBACK AND SHEET PILING
- CALIFORNIA DEPARTMENT OF FISH AND GAME JURISDICTIONAL DRAINAGE AREA
- EXISTING WATER WELL TO REMAIN
- ELECTRICAL RISER
- MAIN PROJECT ENTRY
- SECONDARY PROJECT ENTRY
- SUBSTATION

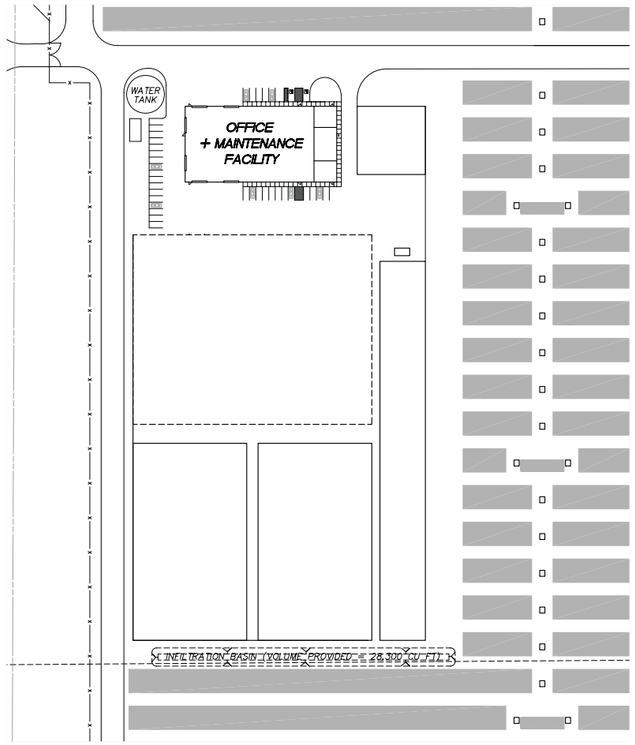
Source:
Psomas and Patch Services
Dated 5/29/2009
Patch Drawing D-5408-2014

AV Solar Ranch One
Biota Report

Figure 2-1a. FACILITY SITE PLAN

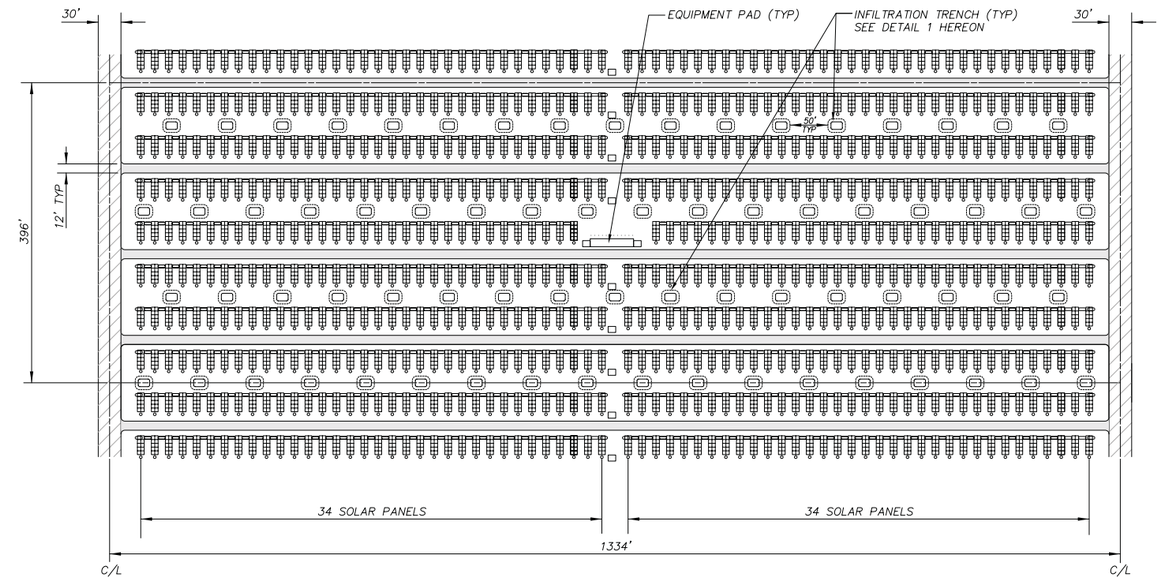
2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/1009-188



FEET 60 30 0 60 120
INCHES 1 1/2 0 1 2

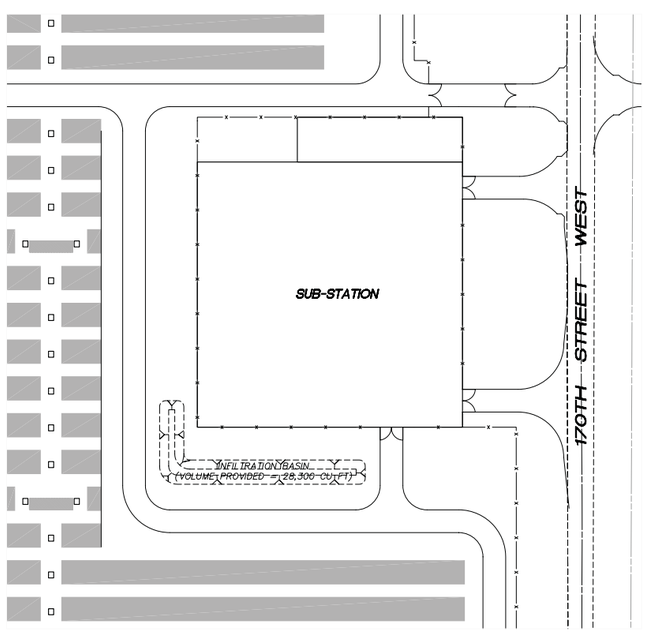
OFFICE AND MAINTENANCE FACILITY
NOT TO SCALE



TYPICAL SOLAR PANEL LAYOUT
NOT TO SCALE

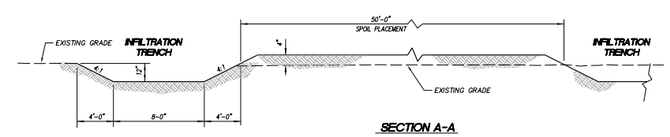
LEGEND:

- 30 FT WIDE DIRT ACCESS ROAD
- 12 FT WIDE DIRT CONSTRUCTION ACCESS ROAD
- INFILTRATION TRENCH

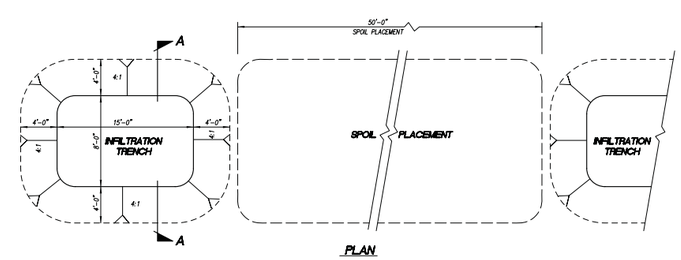


FEET 60 30 0 60 120
INCHES 1 1/2 0 1 2

SUB-STATION LAYOUT
NOT TO SCALE



SECTION A-A

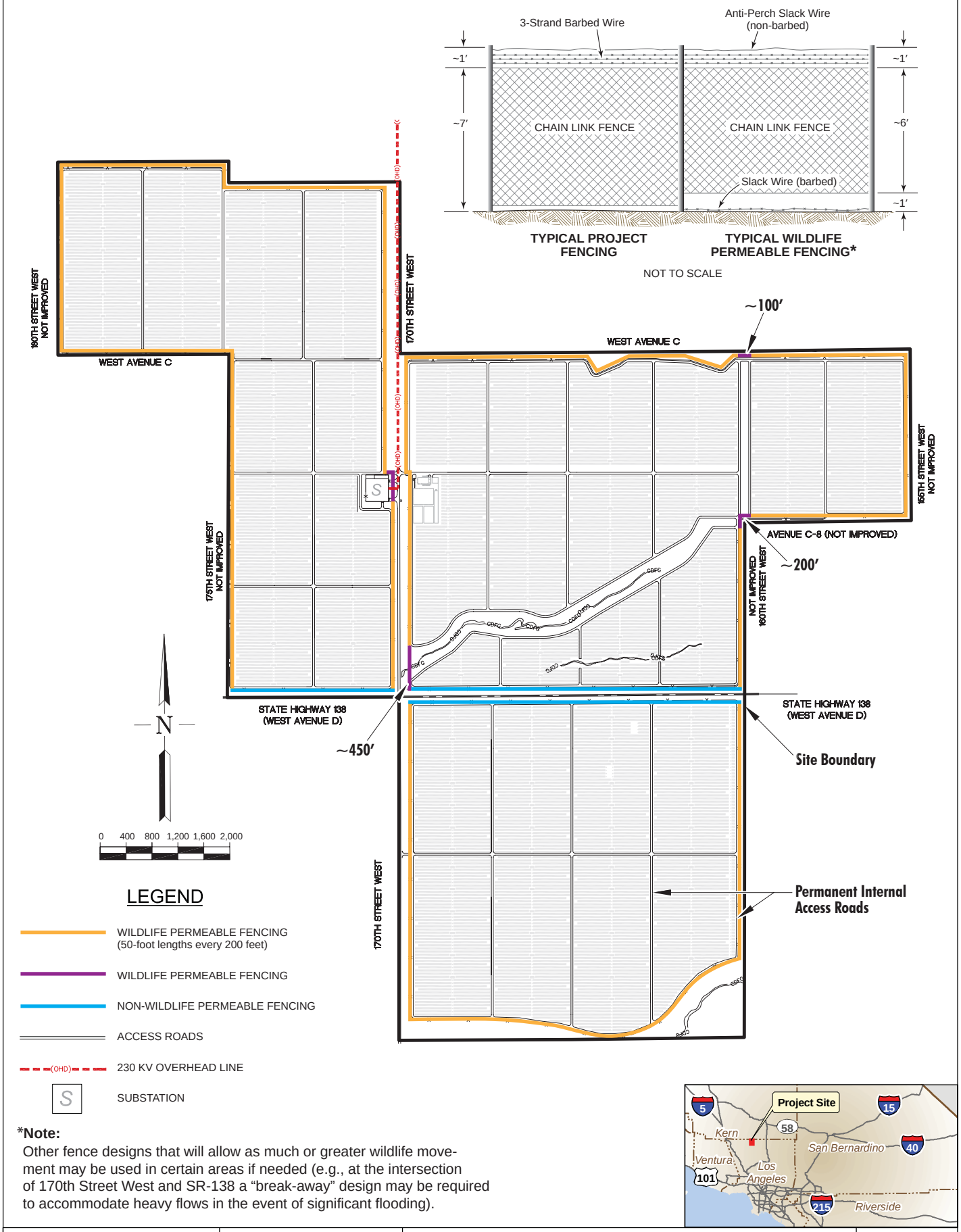


PLAN

1 TYPICAL INFILTRATION TRENCH DETAIL
NOT TO SCALE

Source: Psomas Project No.1NEX010100 HD08-01 DWG October 15 2009	**AV Solar Ranch One** **Biota Report**	**Figure 2-1b.** INFILTRATION TRENCH/ BASIN DETAILS	2009

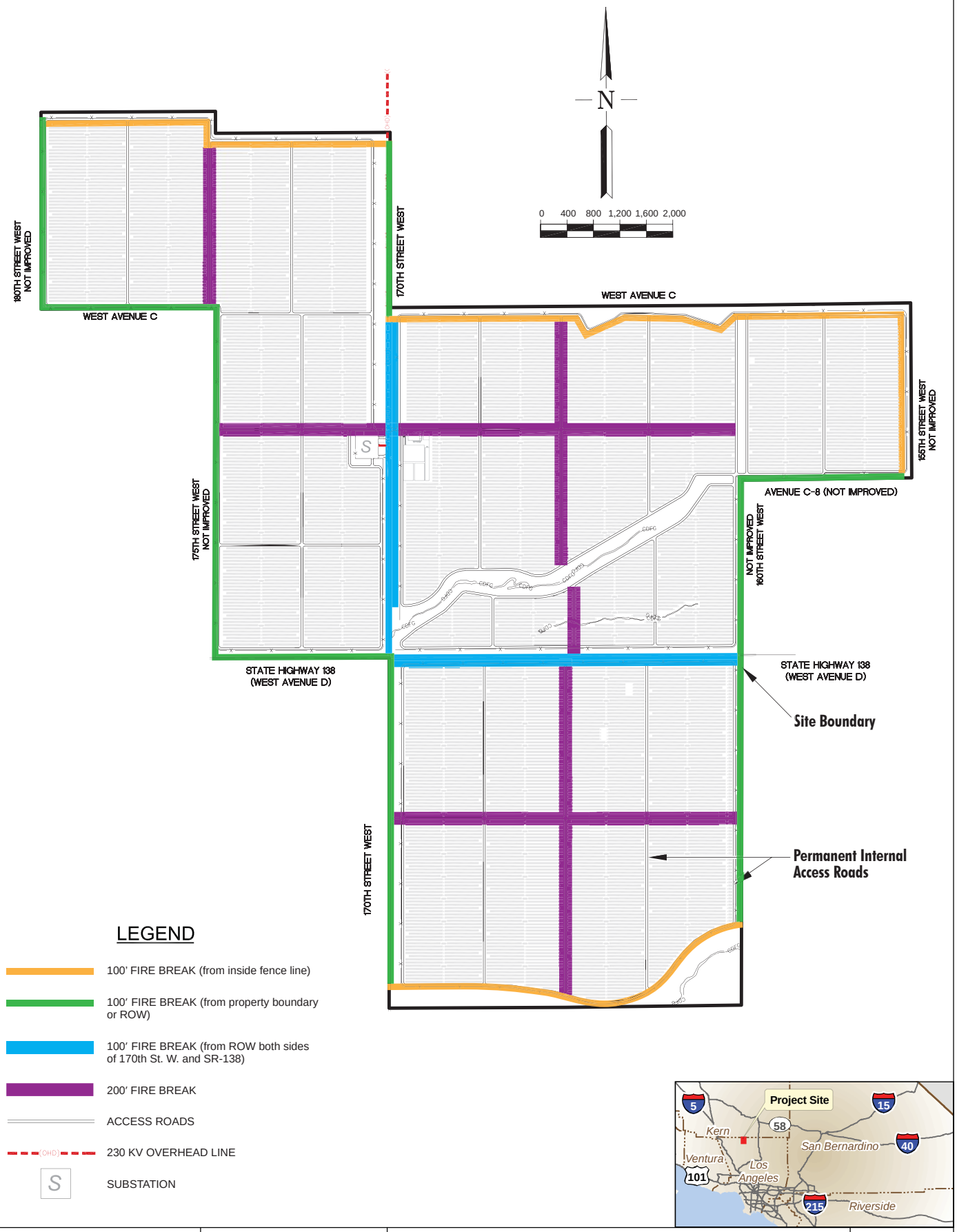
T/Ladd/NextLight/ADEIR#2/BiotaReport/209-023C



***Note:**
Other fence designs that will allow as much or greater wildlife movement may be used in certain areas if needed (e.g., at the intersection of 170th Street West and SR-138 a "break-away" design may be required to accommodate heavy flows in the event of significant flooding).

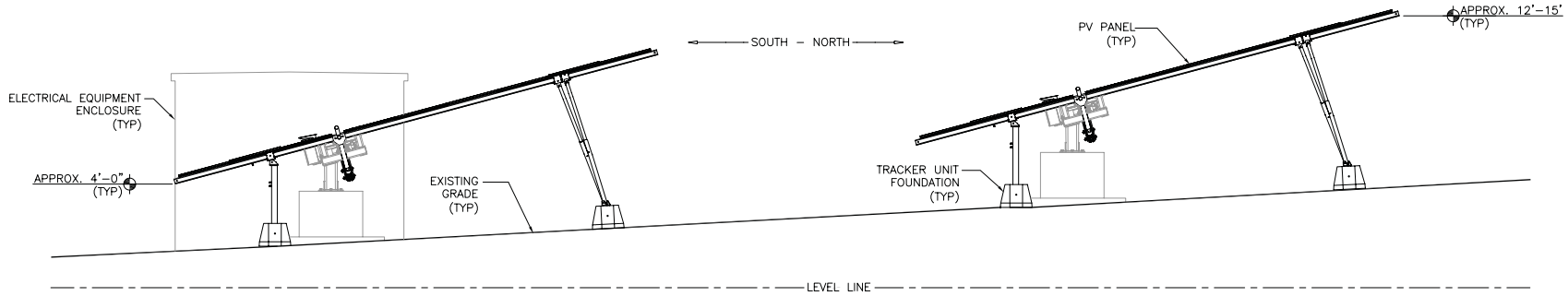
Source: Psomas and Patch Services Dated 5/29/2009 Adapted from Patch Drawing D-5408-2014	**AV Solar Ranch One Biota Report**	**Figure 2-1c.** LOCATION OF WILDLIFE PERMEABLE FENCING	2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/1009-192

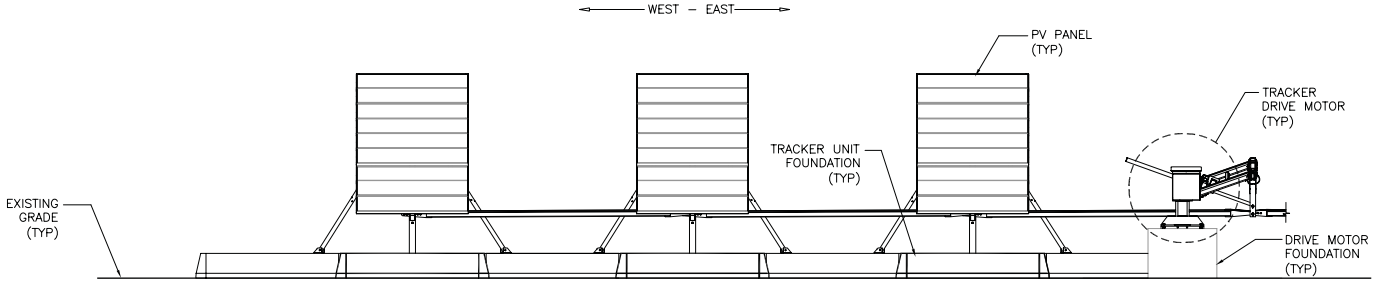


Source: Psomas and Patch Services Dated 5/29/2009 Adapted from Patch Drawing D-5408-2014	**AV Solar Ranch One** **Biota Report**	**Figure 2-1d.** LOCATION OF FIREBREAKS	2009

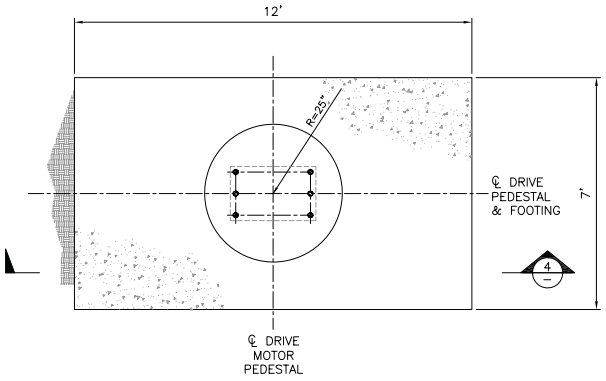
T/Ladd/NextLight/ADEIR#2BiotaReport/209-020B-rev7-09



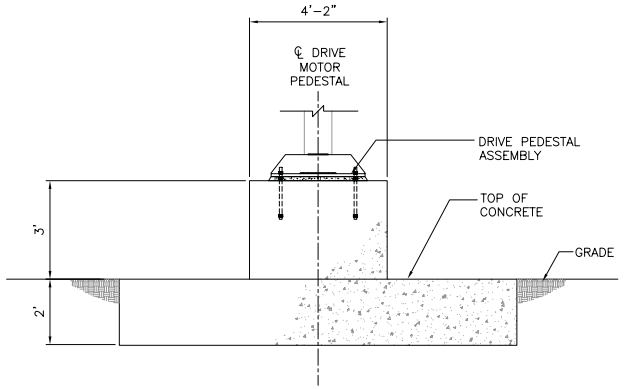
1 TRACKER PRODUCT ELEVATION (SOUTH –NORTH)



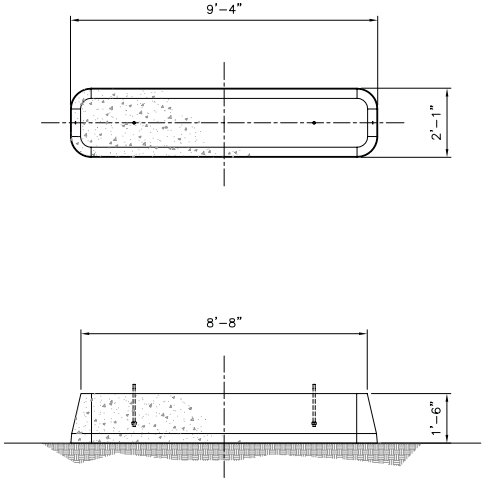
2 TRACKER PRODUCT ELEVATION (WEST–EAST)



3 TRACKER DRIVE MOTOR FOUNDATION – PLAN VIEW



4 TRACKER DRIVE MOTOR FOUNDATION – SECTION CUT



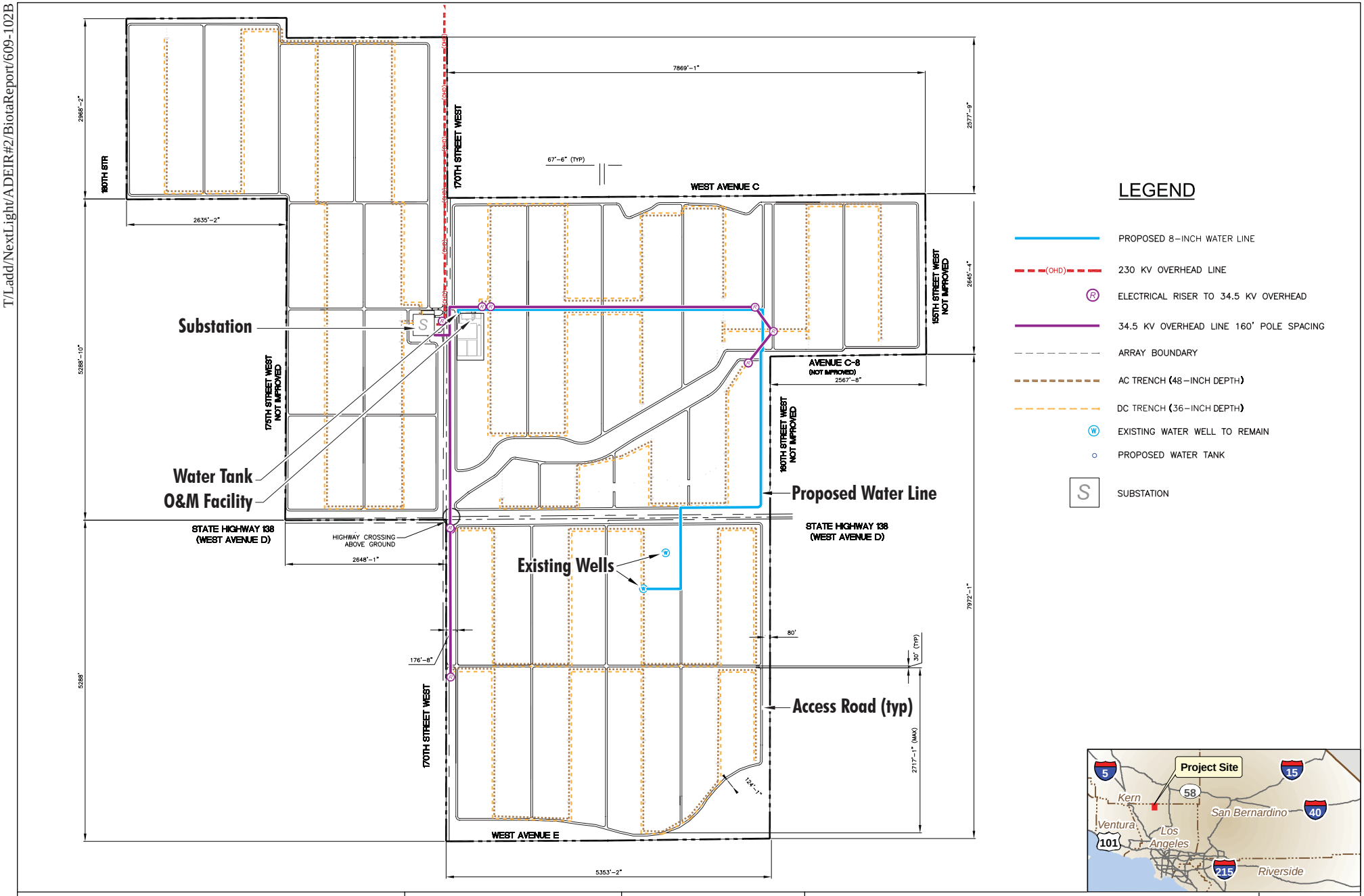
5 TYPICAL TRACKER UNIT FOUNDATION

Source: SunPower - Dated 2009 Drawing C.I.5	**AV Solar Ranch One EIR** **Biota Report**	**Figure 2-2.** TYPICAL TILTED TRACKER DETAILS	2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/709-117A

Source: Patch Services Dated 2009	**AV Solar Ranch One** **Biota Report**	**Figure 2-3.** TILTED TRACKER VISUAL SIMULATION (BALLAST FOUNDATION)	2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/609-102B



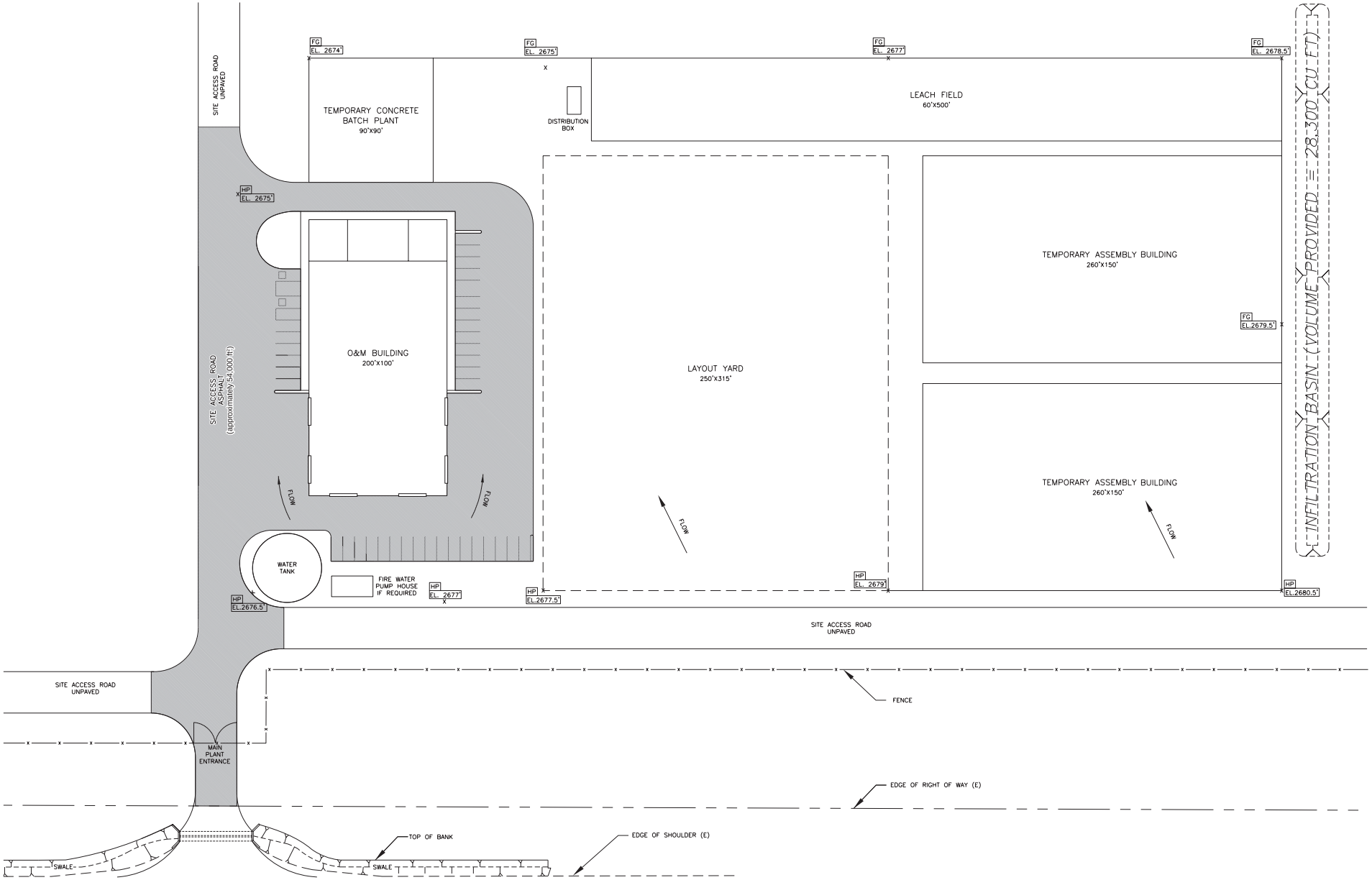
Source:
SunPower and Patch Services
Dated 2009

AV Solar Ranch One
Biota Report

Figure 2-4. PROPOSED UTILITY PLAN

2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/209-022C



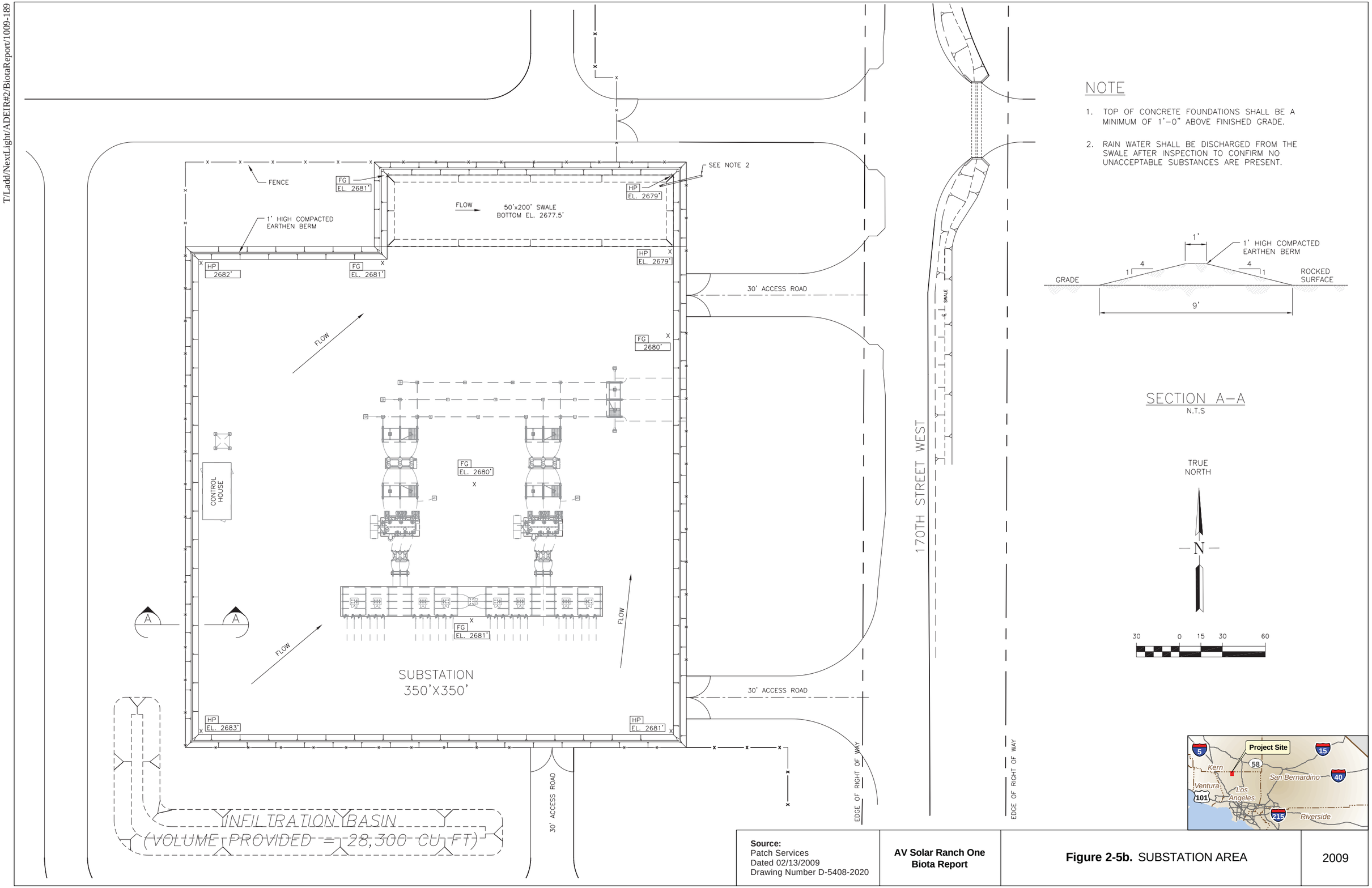
Source:
Patch Services
Dated 01/30/2009
Patch Drawing 5408-2004

AV Solar Ranch One
Biota Report

Figure 2-5a. OPERATIONS & MAINTENANCE FACILITY AREA

2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/1009-189



Source:
Patch Services
Dated 02/13/2009
Drawing Number D-5408-2020

AV Solar Ranch One
Biota Report

Figure 2-5b. SUBSTATION AREA

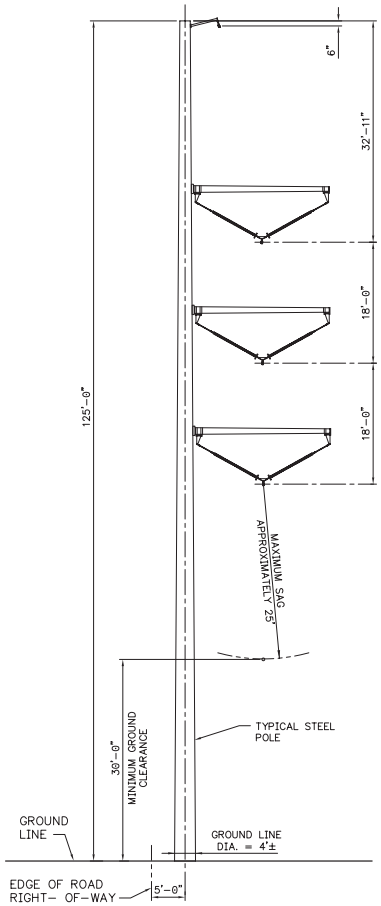
2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/209-021C

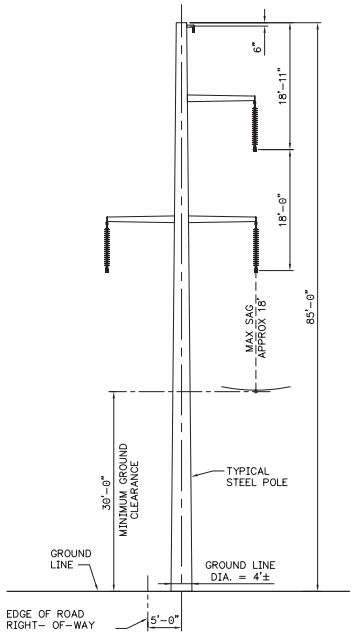
PRELIMINARY CONCEPT

DESIGN ASSUMPTIONS:
- AVERAGE SPAN: 700'
- MAXIMUM SPAN: 800'
- 1–1272 KCMIL "BITTERN" ACSR PER PHASE

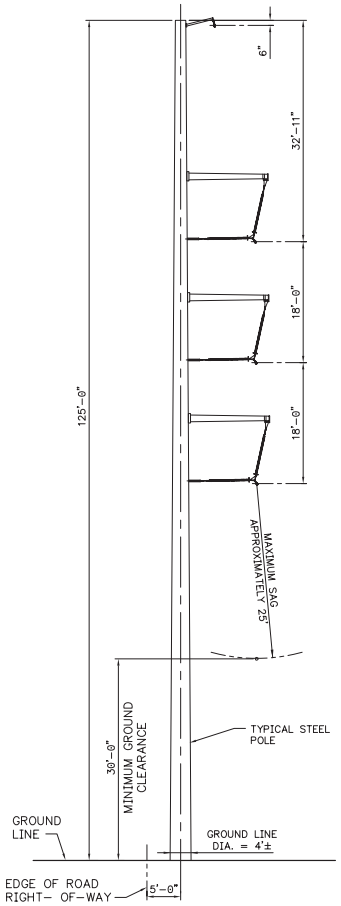
NOTES:
1. STRUCTURE DIMENSIONS ARE APPROXIMATE. ACTUAL DIMENSIONS MAY VARY.
2. DRAWING IS NOT TO EXACT SCALE.



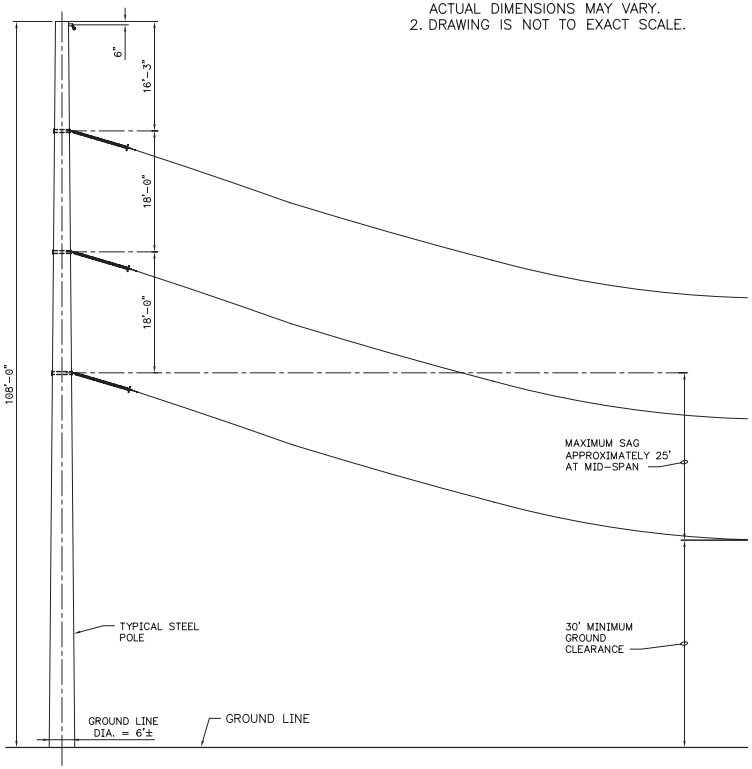
230–kV TUBULAR STEEL TANGENT, SINGLE–CIRCUIT STRUCTURE SKETCH



230–kV TUBULAR STEEL TANGENT, SINGLE–CIRCUIT STRUCTURE SKETCH



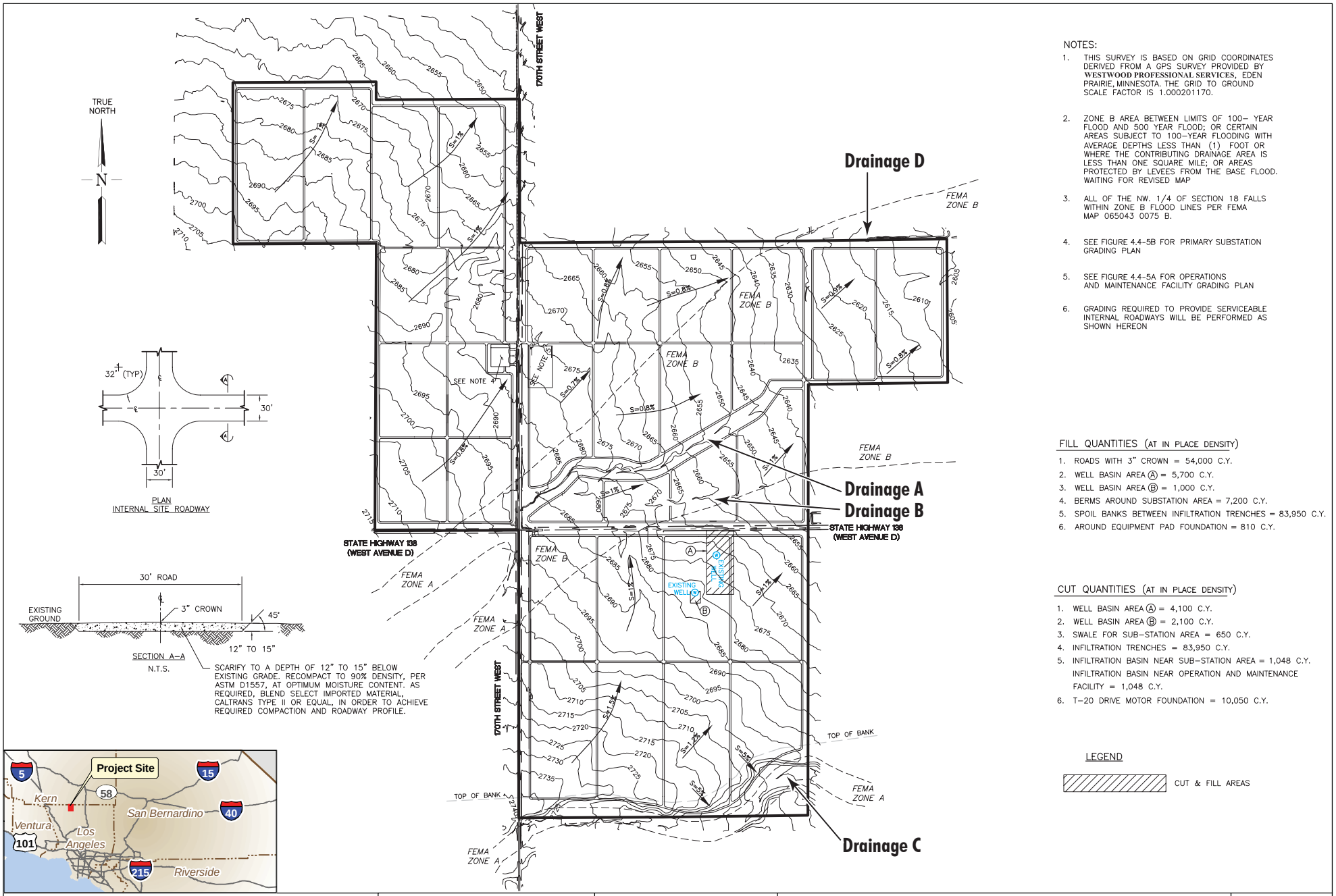
230–kV TUBULAR STEEL SMALL ANGLE, SINGLE–CIRCUIT STRUCTURE SKETCH



230–kV TUBULAR STEEL DEADEND, SINGLE–CIRCUIT STRUCTURE SKETCH

Source: TriAxis Engineering Co. Dated 2009 Drawing TI.0	**AV Solar Ranch One Biota Report**	**Figure 2-6.** TYPICAL TRANSMISSION LINE POLE CONFIGURATION	2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/609-108B



NOTES:

1. THIS SURVEY IS BASED ON GRID COORDINATES DERIVED FROM A GPS SURVEY PROVIDED BY **WESTWOOD PROFESSIONAL SERVICES**, EDEN PRAIRIE, MINNESOTA. THE GRID TO GROUND SCALE FACTOR IS 1.000201170.
2. ZONE B AREA BETWEEN LIMITS OF 100– YEAR FLOOD AND 500 YEAR FLOOD; OR CERTAIN AREAS SUBJECT TO 100–YEAR FLOODING WITH AVERAGE DEPTHS LESS THAN (1) FOOT OR WHERE THE CONTRIBUTING DRAINAGE AREA IS LESS THAN ONE SQUARE MILE; OR AREAS PROTECTED BY LEVEES FROM THE BASE FLOOD. WAITING FOR REVISED MAP
3. ALL OF THE NW. 1/4 OF SECTION 18 FALLS WITHIN ZONE B FLOOD LINES PER FEMA MAP 065043 0075 B.
4. SEE FIGURE 4.4-5B FOR PRIMARY SUBSTATION GRADING PLAN
5. SEE FIGURE 4.4-5A FOR OPERATIONS AND MAINTENANCE FACILITY GRADING PLAN
6. GRADING REQUIRED TO PROVIDE SERVICEABLE INTERNAL ROADWAYS WILL BE PERFORMED AS SHOWN HEREON

FILL QUANTITIES (AT IN PLACE DENSITY)

1. ROADS WITH 3" CROWN = 54,000 C.Y.
2. WELL BASIN AREA Ⓐ = 5,700 C.Y.
3. WELL BASIN AREA Ⓑ = 1,000 C.Y.
4. BERMS AROUND SUBSTATION AREA = 7,200 C.Y.
5. SPOIL BANKS BETWEEN INFILTRATION TRENCHES = 83,950 C.Y.
6. AROUND EQUIPMENT PAD FOUNDATION = 810 C.Y.

CUT QUANTITIES (AT IN PLACE DENSITY)

1. WELL BASIN AREA Ⓐ = 4,100 C.Y.
2. WELL BASIN AREA Ⓑ = 2,100 C.Y.
3. SWALE FOR SUB–STATION AREA = 650 C.Y.
4. INFILTRATION TRENCHES = 83,950 C.Y.
5. INFILTRATION BASIN NEAR SUB–STATION AREA = 1,048 C.Y.
   INFILTRATION BASIN NEAR OPERATION AND MAINTENANCE FACILITY = 1,048 C.Y.
6. T–20 DRIVE MOTOR FOUNDATION = 10,050 C.Y.

LEGEND

CUT & FILL AREAS

N

800 0 400 800 1,600 Feet

Source:
Patch Services
Dated 2009
Drawing D-5408-2013

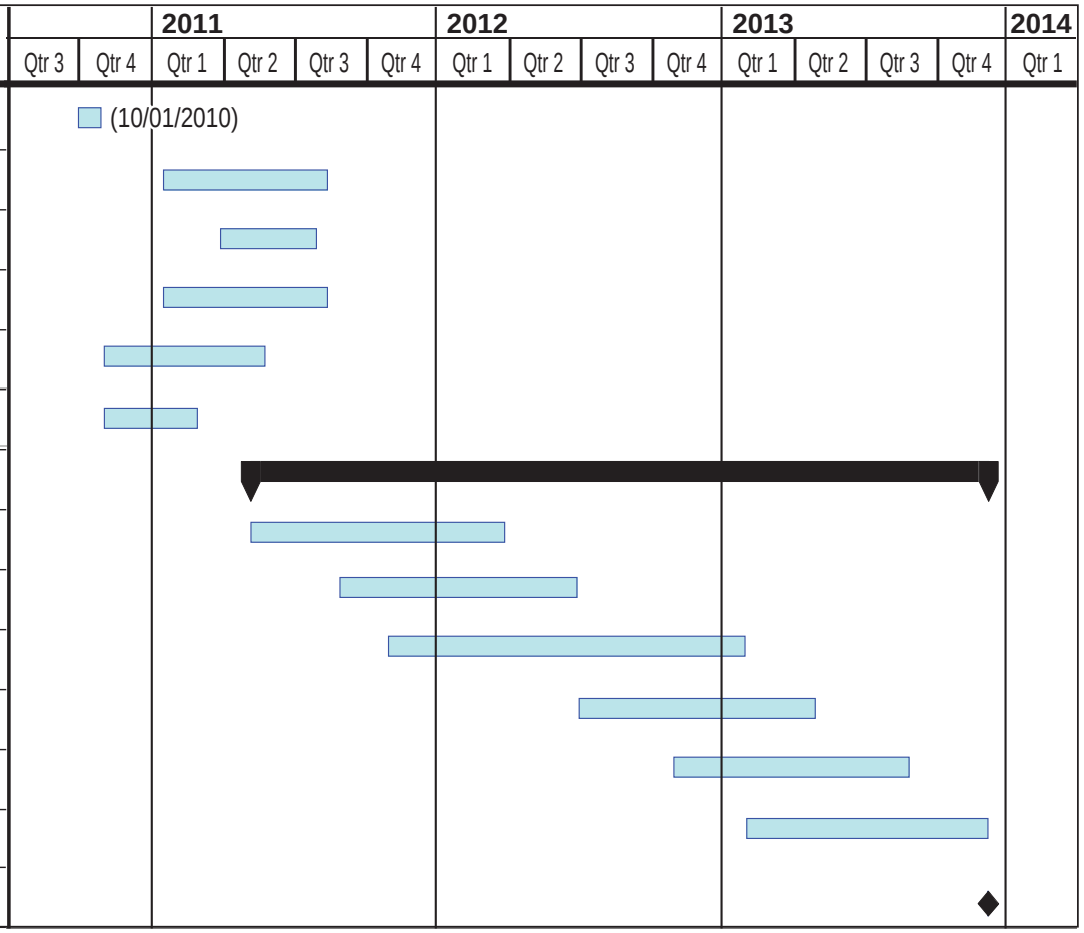
AV Solar Ranch One
Biota Report

Figure 2-7. GRADING AND DRAINAGE PLAN

2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/609-110B

ID	Task Name
1	Site Mobilization
2	Onsite Substation (34.5/230 kV)
3	230 kV Transmission Line
4	Medium Voltage Infrastructure
5	O&M Facility/Temporary Construction Facilities/Utilities-Civil Works
6	Drainage A Sheet Pile/Water supply Pipeline Installation
7	Solar Field Development
8	Field One
9	Field Two
10	Field Three
11	Field Four
12	Field Five
13	Field Six
14	Final Completion/Full Commercial Operation



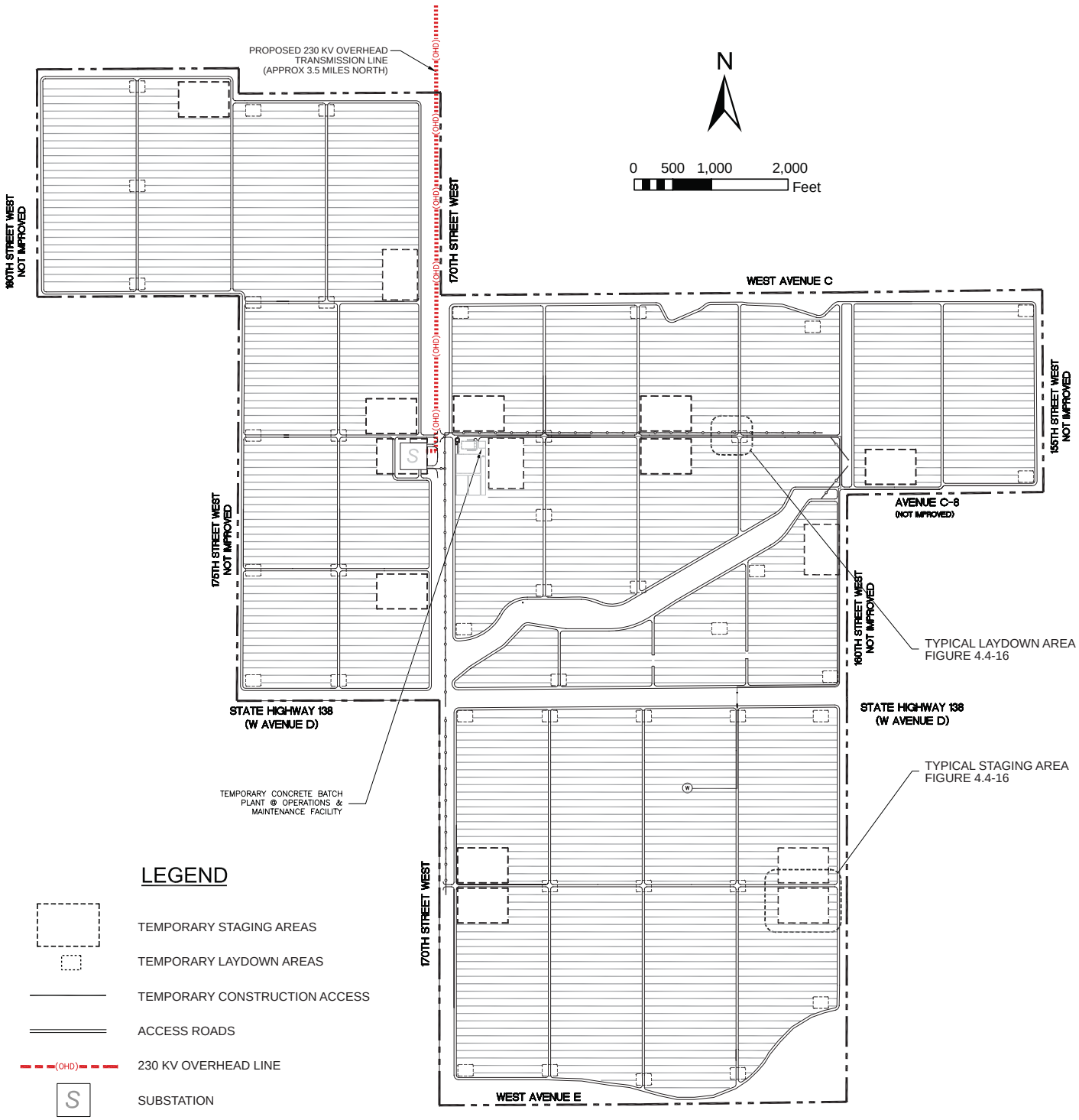
Source:
NextLight - Dated 2009
Construction Schedule Input

AV Solar Ranch One
Biota Report

Figure 2-8. PROJECT CONSTRUCTION SCHEDULE

2009

T/Ladd/NextLight/ADEIR#2/BiotaReport/209-023C



TEMPORARY STAGING AREAS	SIZE (ACRES) APPROX.
15 TOTAL x 7 (ACRES)	103

TEMPORARY LAY-DOWN AREAS	SIZE (ACRES) APPROX.
41 TOTAL x 0.7 (ACRES)	28

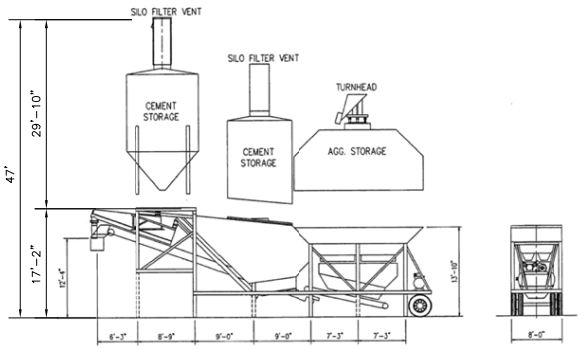
Source:
SunPower and Patch Services
Dated 2009

AV Solar Ranch One
Biota Report

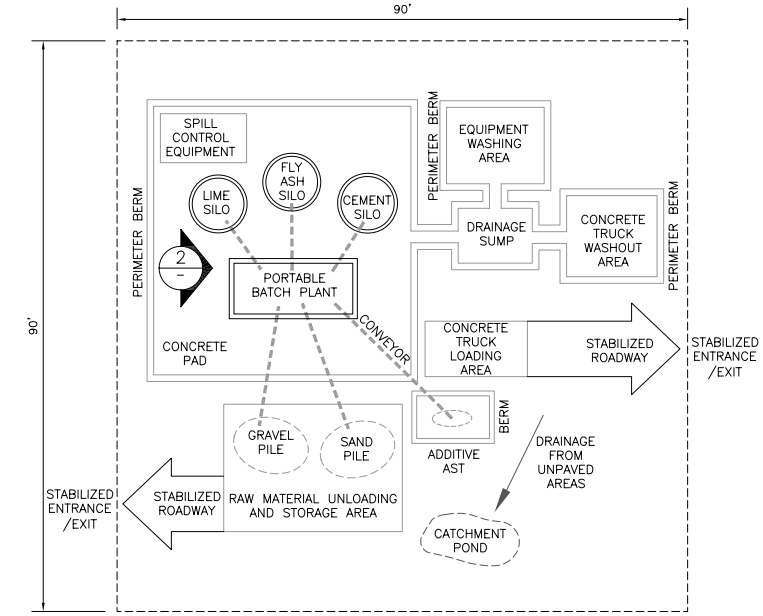
Figure 2-9. TEMPORARY CONSTRUCTION ACCESS, STAGING AND LAYDOWN AREA PLAN

2009

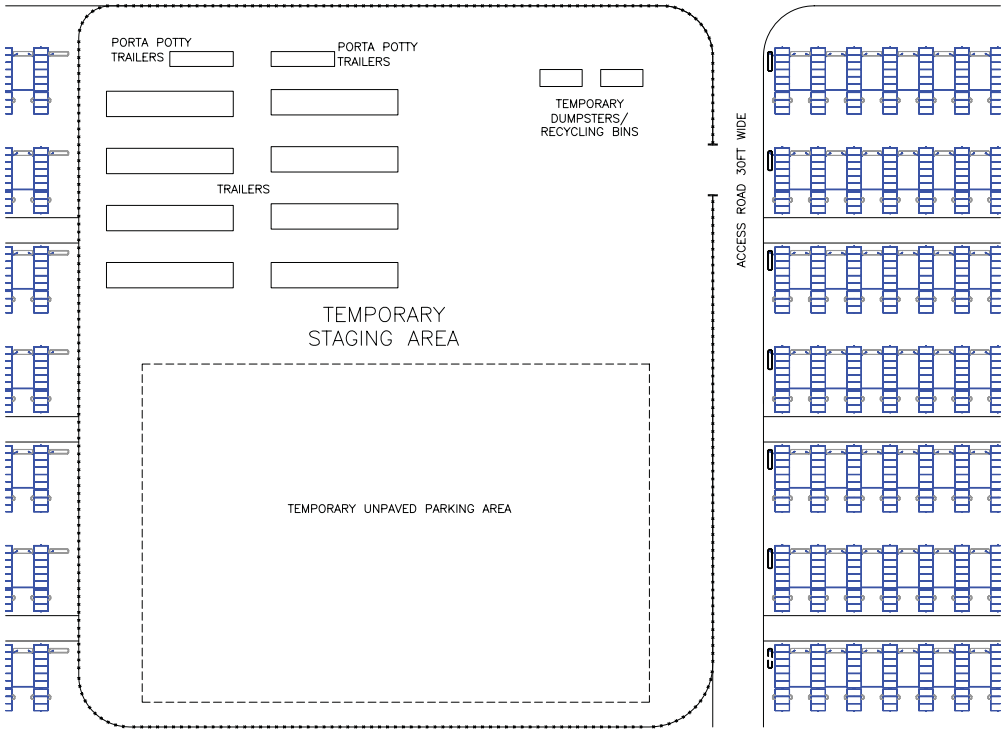
T/Ladd/NextLight/DEIR#2/BiotaReport/609-111B



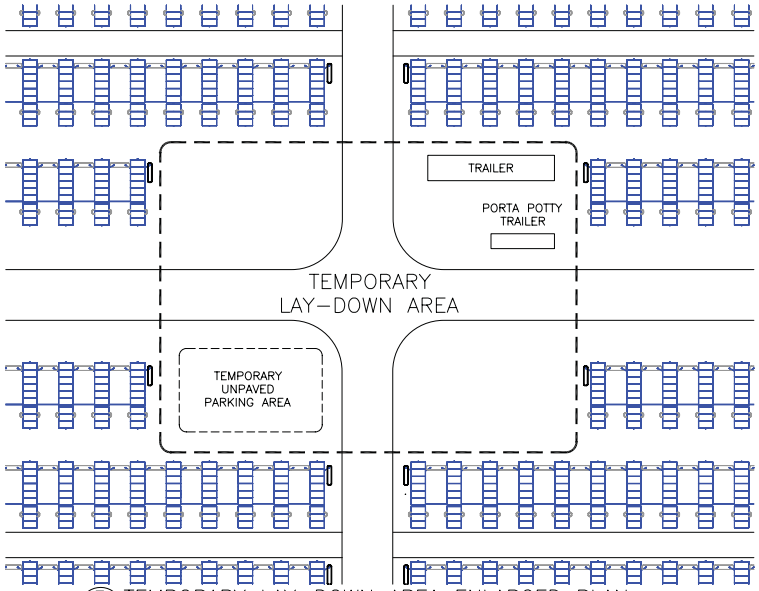
2 PORTABLE BATCH PLANT ELEVATION



1 TEMP. CONC. BATCH PLANT SCHEMATIC AT O&M FACILITY



4 TEMPORARY STAGING AREA ENLARGED PLAN



3 TEMPORARY LAY-DOWN AREA ENLARGED PLAN

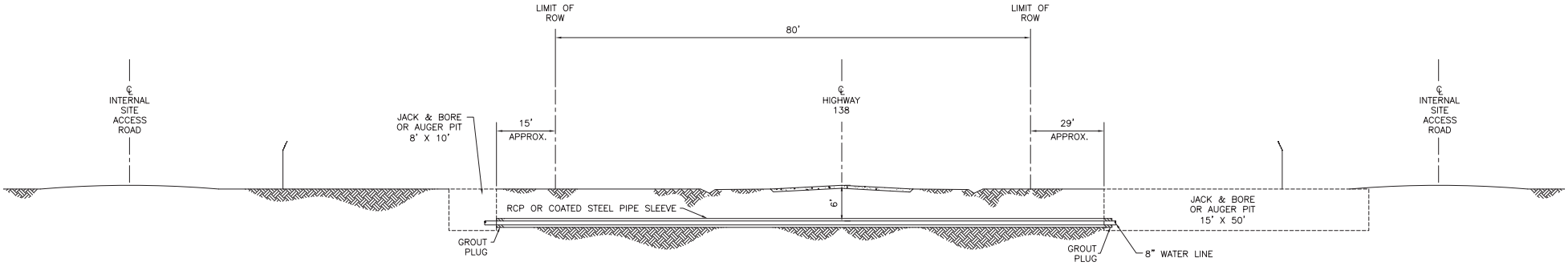
Source:
SunPower - Dated 2009
Drawing C1.2

AV Solar Ranch One
Biota Report

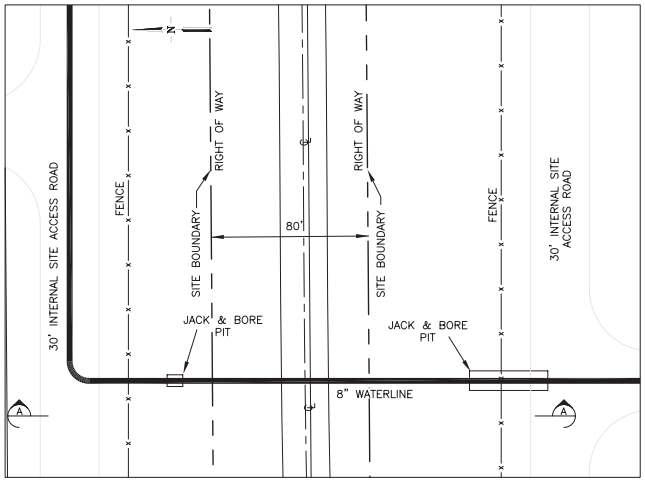
Figure 2-10. STAGING AND LAYDOWN AREA PLAN DETAILS

2009

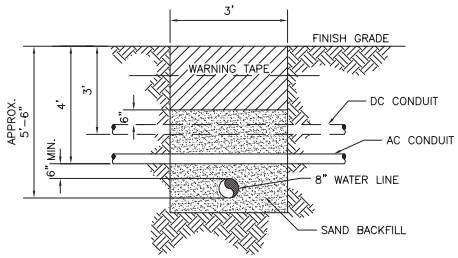
T/Ladd/NextLight/ADEIR#2/BiotaReport/609-112B



SECTION A–A
HIGHWAY 138



DETAIL
JACK & BORE



TYPICAL CONDUIT CROSSING
WATER LINE TO BE INSTALED BELOW
ELECTRICAL CONDUITS AT ALL CROSSINGS

Source: Patch Services - Dated 6/11/09 Drawing D-5408-2018	**AV Solar Ranch One** **Biota Report**	**Figure 2-11.** WATER PIPELINE DETAILS	2009

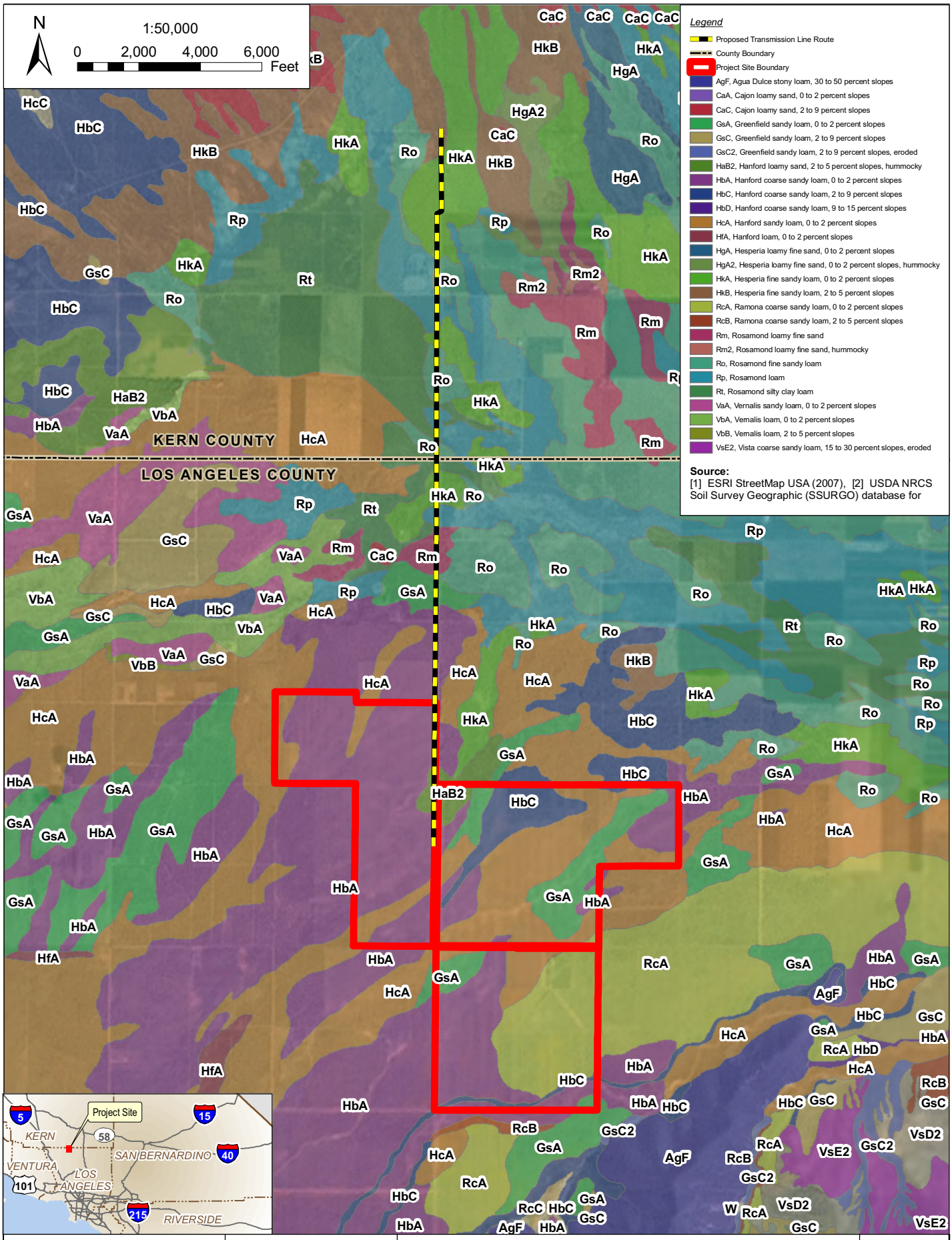


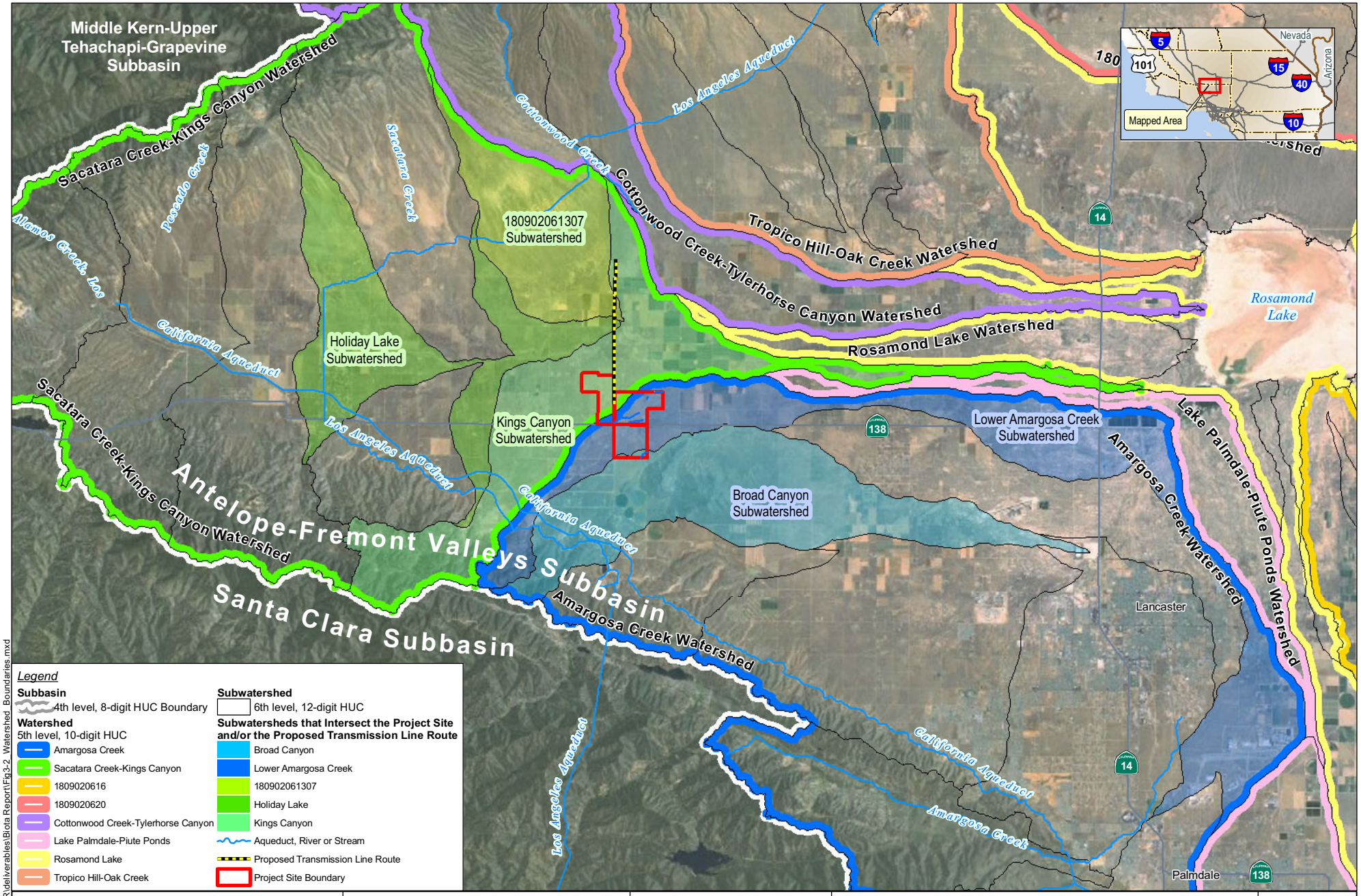
Image Source:
I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution).

AV Solar Ranch One Biota Report

Figure 3-1. SOILS MAP

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig3-1_Soil_Map_of_Project_Site.mxd



Source: [1] USDA/NRCS - National Cartography and Geospatial Center: 12-Digit Watershed Boundary Data 1:24,000 (1999), [2] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [3] 1m Natural Color NAIP (2005).

AV Solar Ranch One Biota Report

Figure 3-2. WATERSHED BOUNDARIES IN THE PROJECT VICINITY

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig3-2_Watershed_Boundaries.mxd

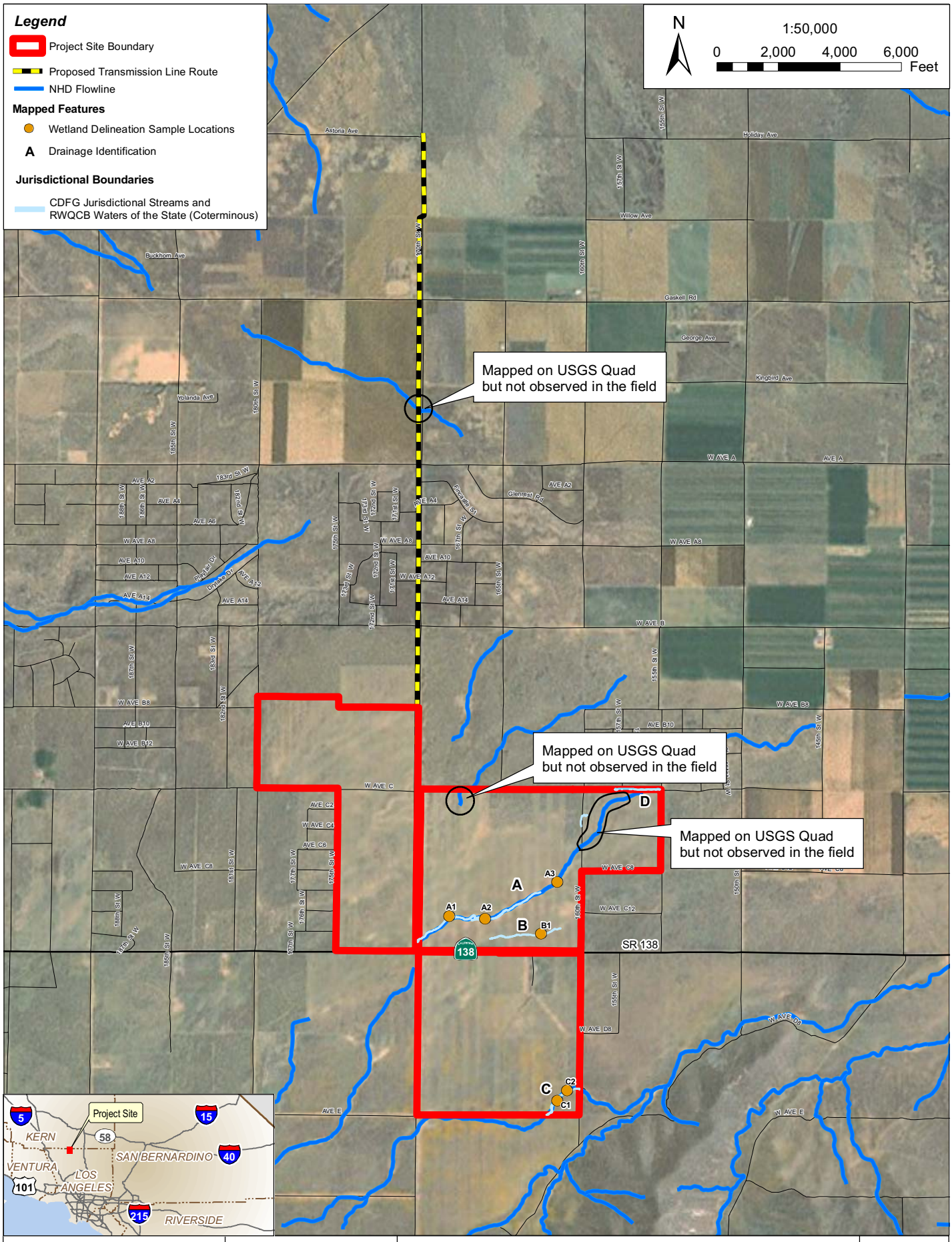


Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution),
[2] ESRI StreetMap USA (2007),
[3] USGS NHD Flowline (2007).

AV Solar Ranch One Biota Report

Figure 3-3. JURISICTIONAL STREAMBEDS ON THE PROJECT SITE

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig3-3_Jurisdictional_Streambeds.mxd

Ca

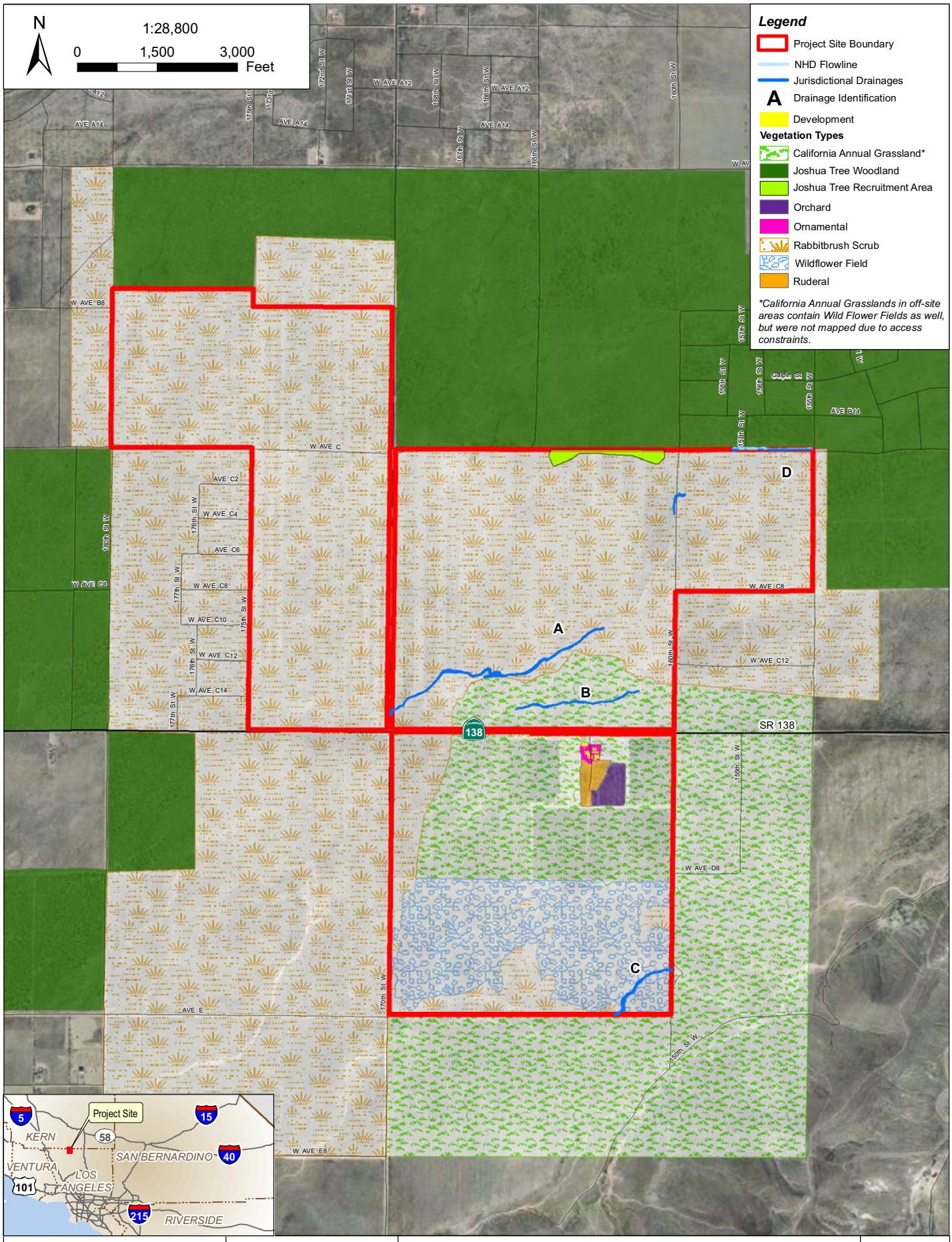


Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Field Surveys, (2009).

AV Solar Ranch One Biota Report

Figure 3-4. VEGETATION COMMUNITIES WITHIN THE PROJECT SITE

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig3-4_Vegetation_Communities.mxd

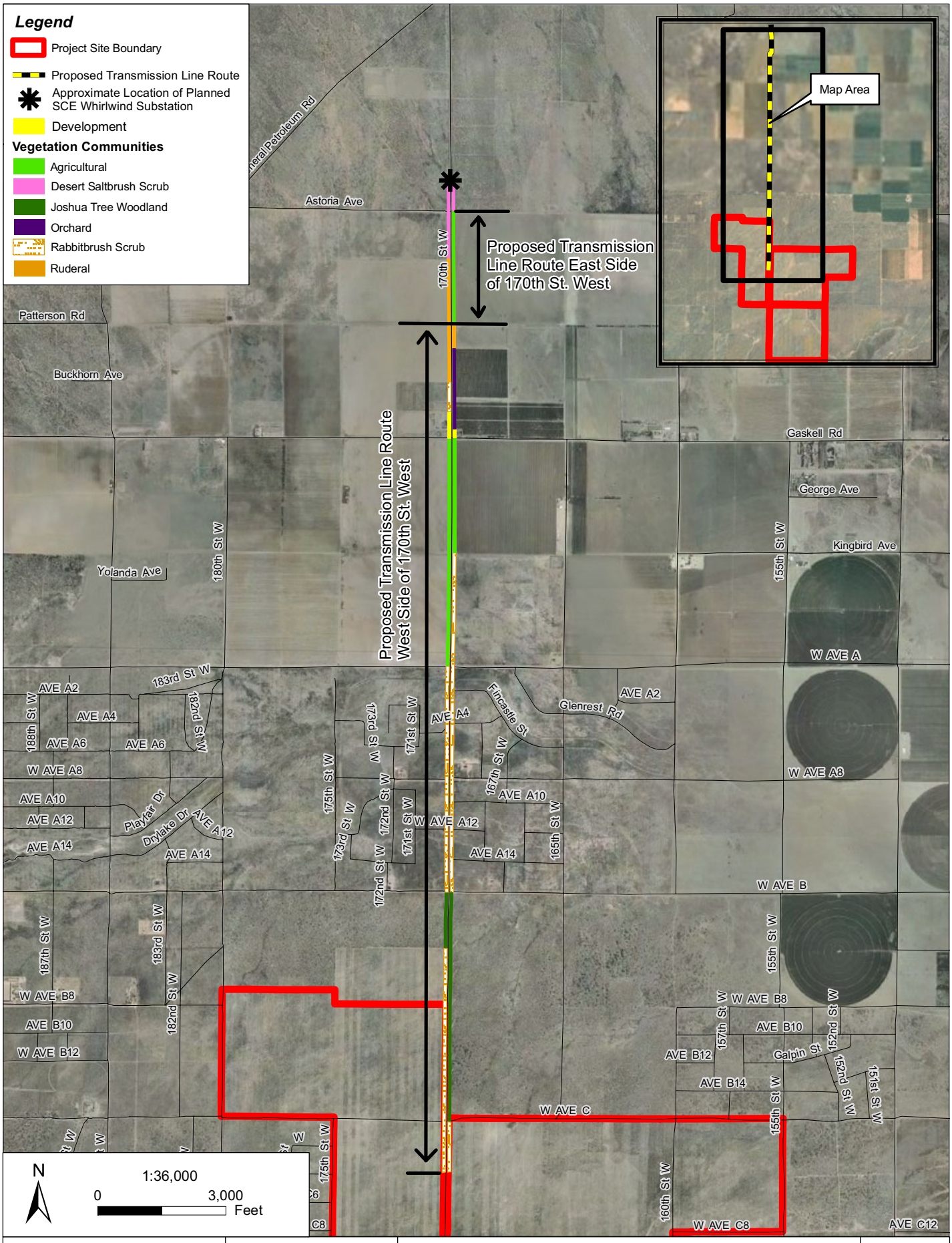


Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Field Surveys (2009), [4] USGS NHD flowline (2007).

AV Solar Ranch One Biota Report

Figure 3-5. VEGETATION COMMUNITIES ALONG THE PROPOSED TRANSMISSION LINE ROUTE

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig3-5_Vegetation_communities_Tline.mxd

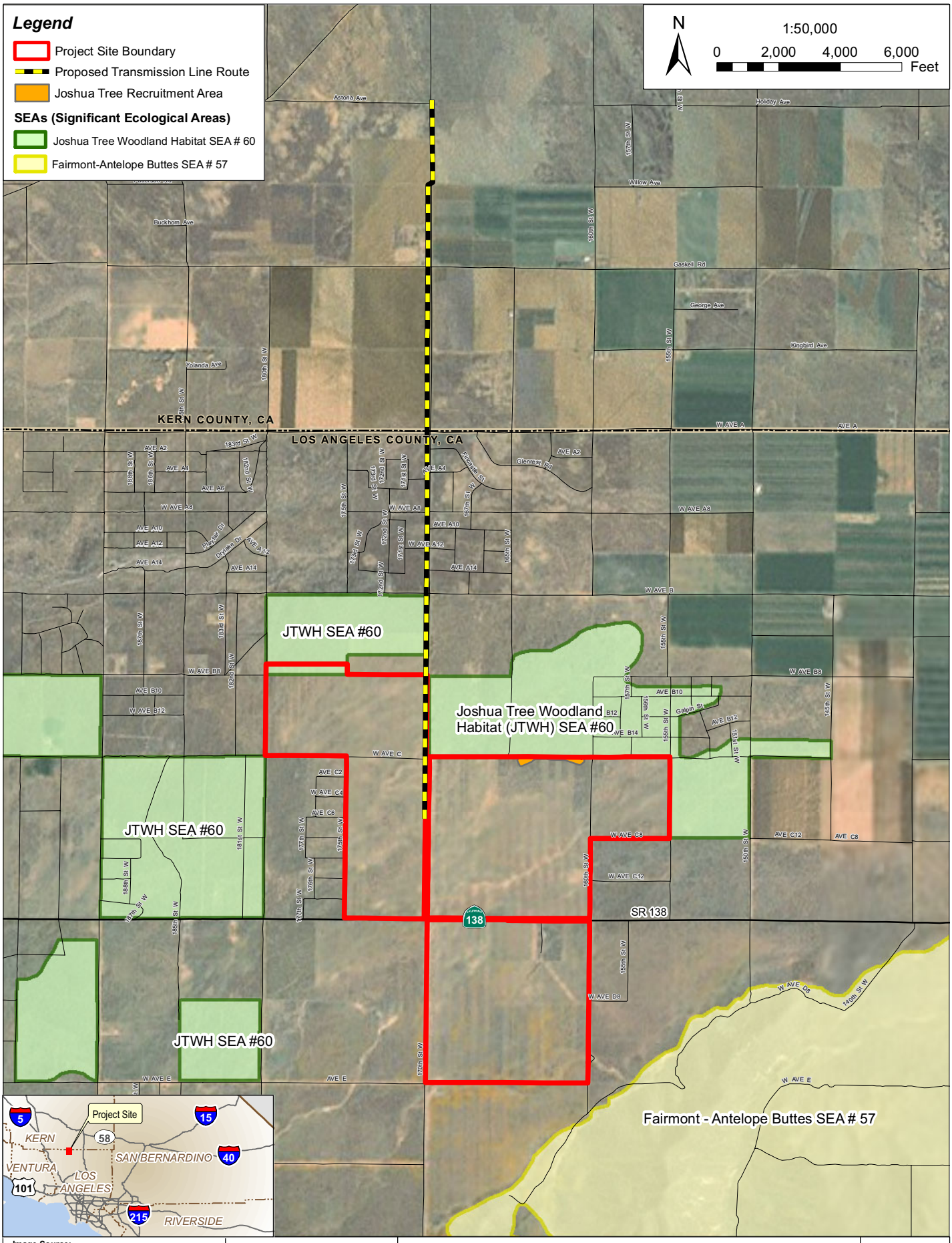


Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [3] LA County General Plan(1986), [4] Antelope Valley Area Wide General Plan (1986), Accessed February 2009: http://planning.lacounty.gov/gis/data, [5] URS Field Surveys, (2009).

AV Solar Ranch One Biota Report

Figure 3-6a. SIGNIFICANT ECOLOGICAL AREAS IN THE PROJECT VICINITY

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig3-6a_Significant_Ecological_Areas.mxd

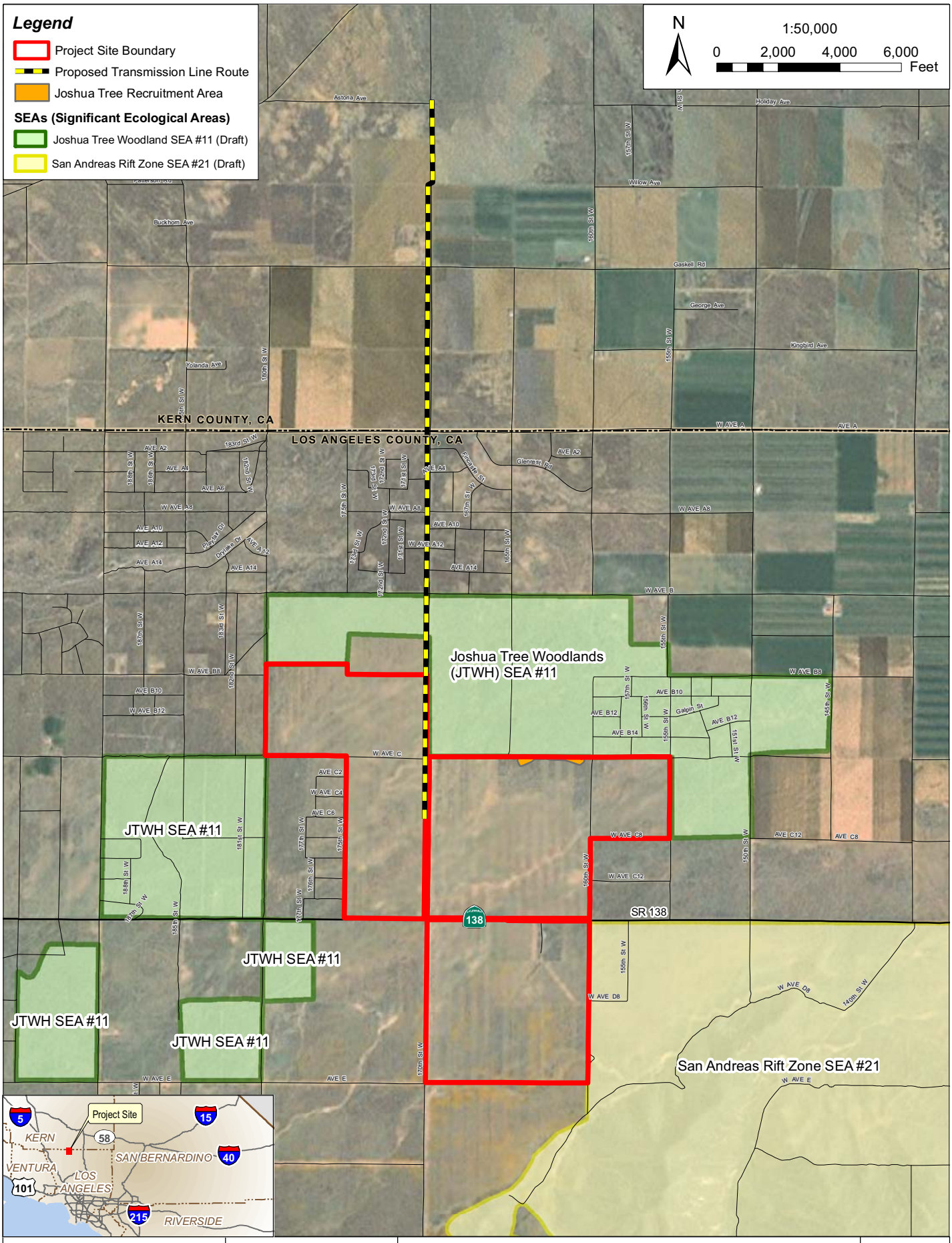


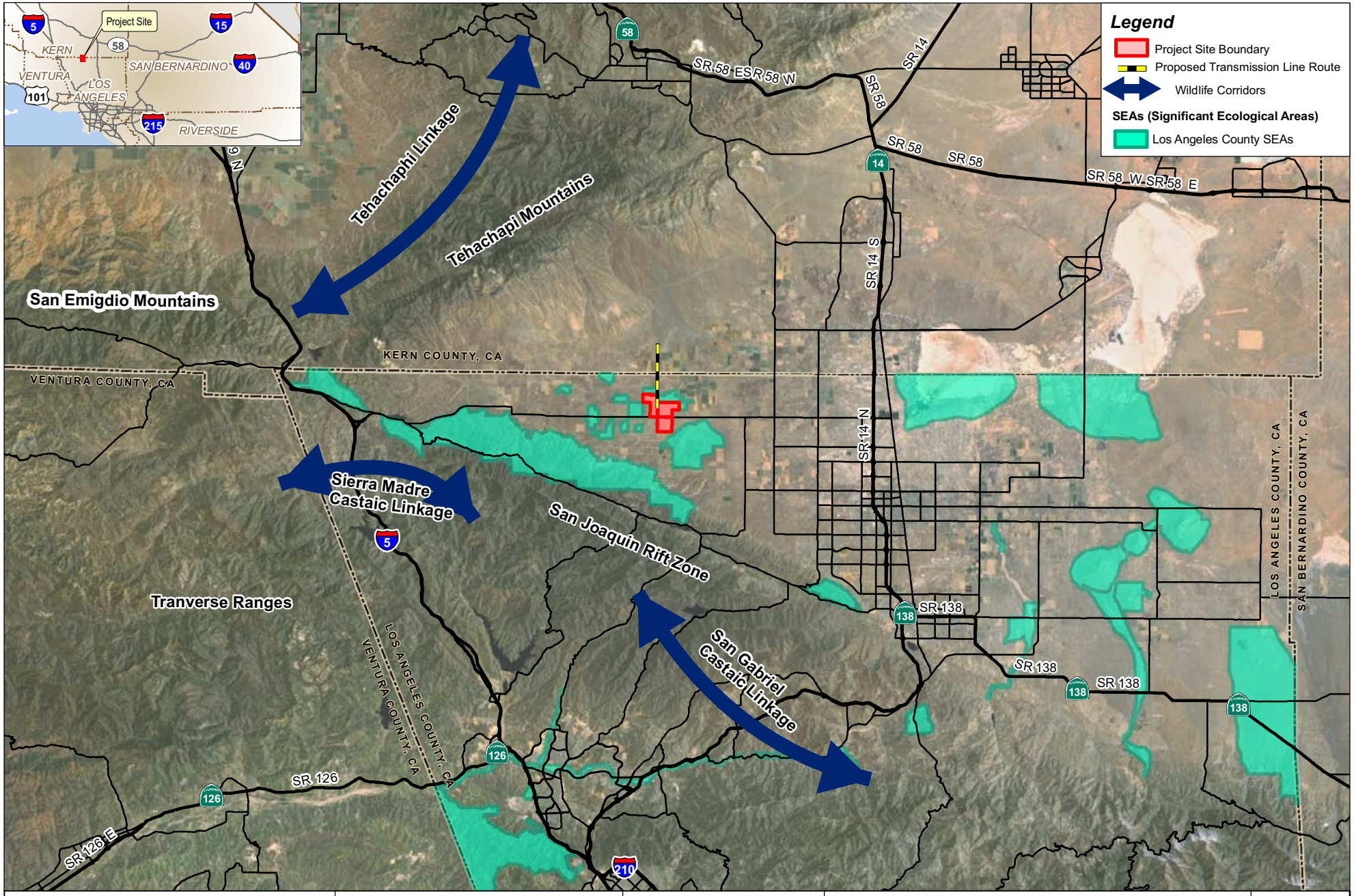
Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] LA County (2008) Draft General Plan Update Figure 6.3.

AV Solar Ranch One Biota Report

Figure 3-6b. PROPOSED REVISIONS TO SIGNIFICANT ECOLOGICAL AREAS IN THE PROJECT VICINITY

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig3-6b_Proposed_Revisions_to_Significant_Ecological_Areas.mxd



N

1:570,000

0 3 6 9 12 Miles

Source:
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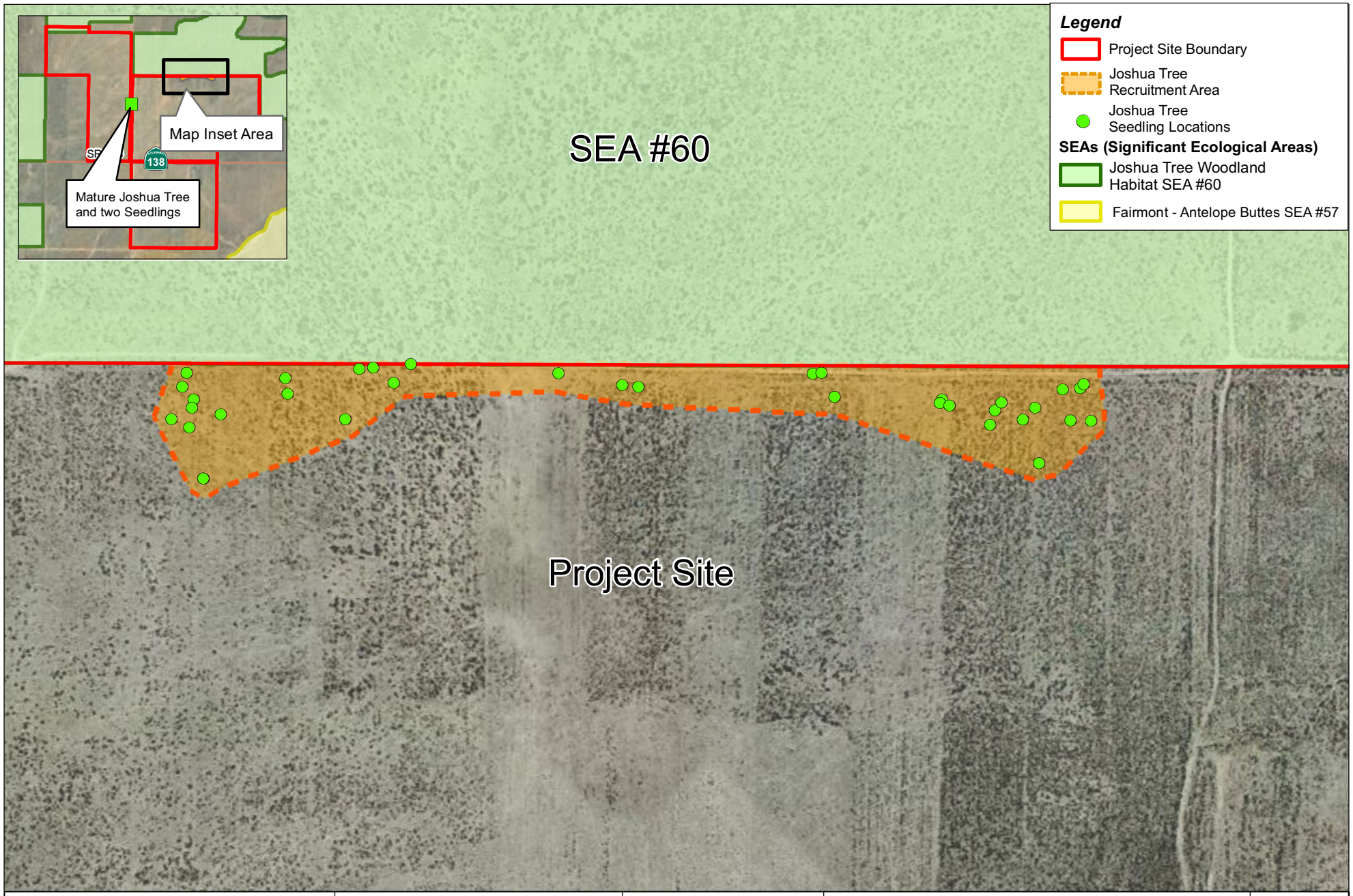
AV Solar Ranch One Biota Report

Figure 3-7. WILDLIFE MOVEMENT IN THE PROJECT REGION

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig3-7_Wildlife_Movement_in_Project_Region.mxd



N

1:3,600

0 300 Feet

Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] LA County General Plan (1986), [4] Antelope Valley Area Wide General Plan (1986), Accessed February 2009: http://planning.lacounty.gov/gis/data, [5] URS Field Surveys, (2009).

AV Solar Ranch One Biota Report

Figure 4-1. JOSHUA TREES WITHIN THE PROJECT SITE

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig4-1_Joshua_Trees_within_Project_Site.mxd

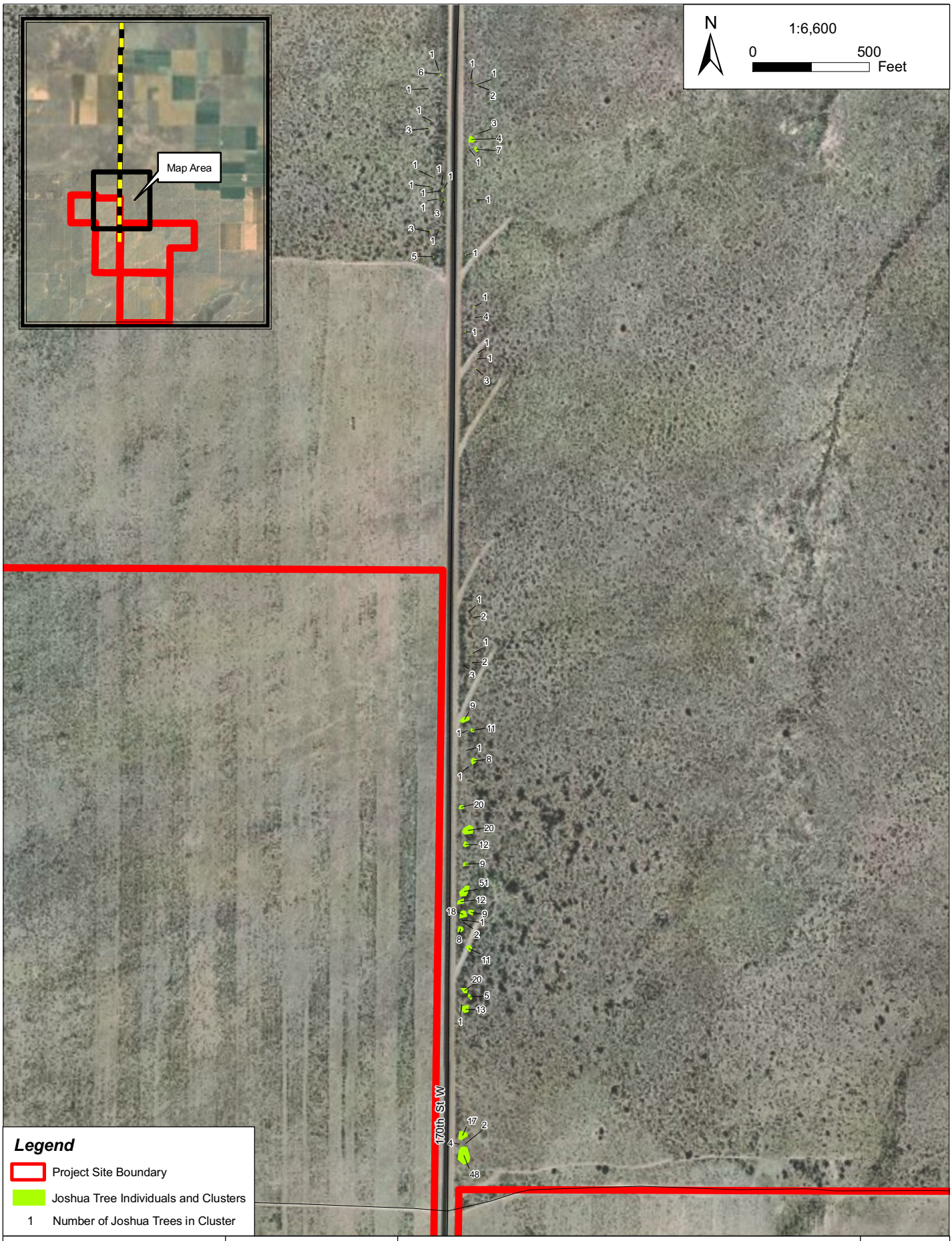


Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Field Surveys, (2009).

AV Solar Ranch One Biota Report

Figure 4-2. JOSHUA TREES ALONG THE PROPOSED TRANSMISSION LINE ROUTE

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig3-4_Vegetation_Communities.mxd

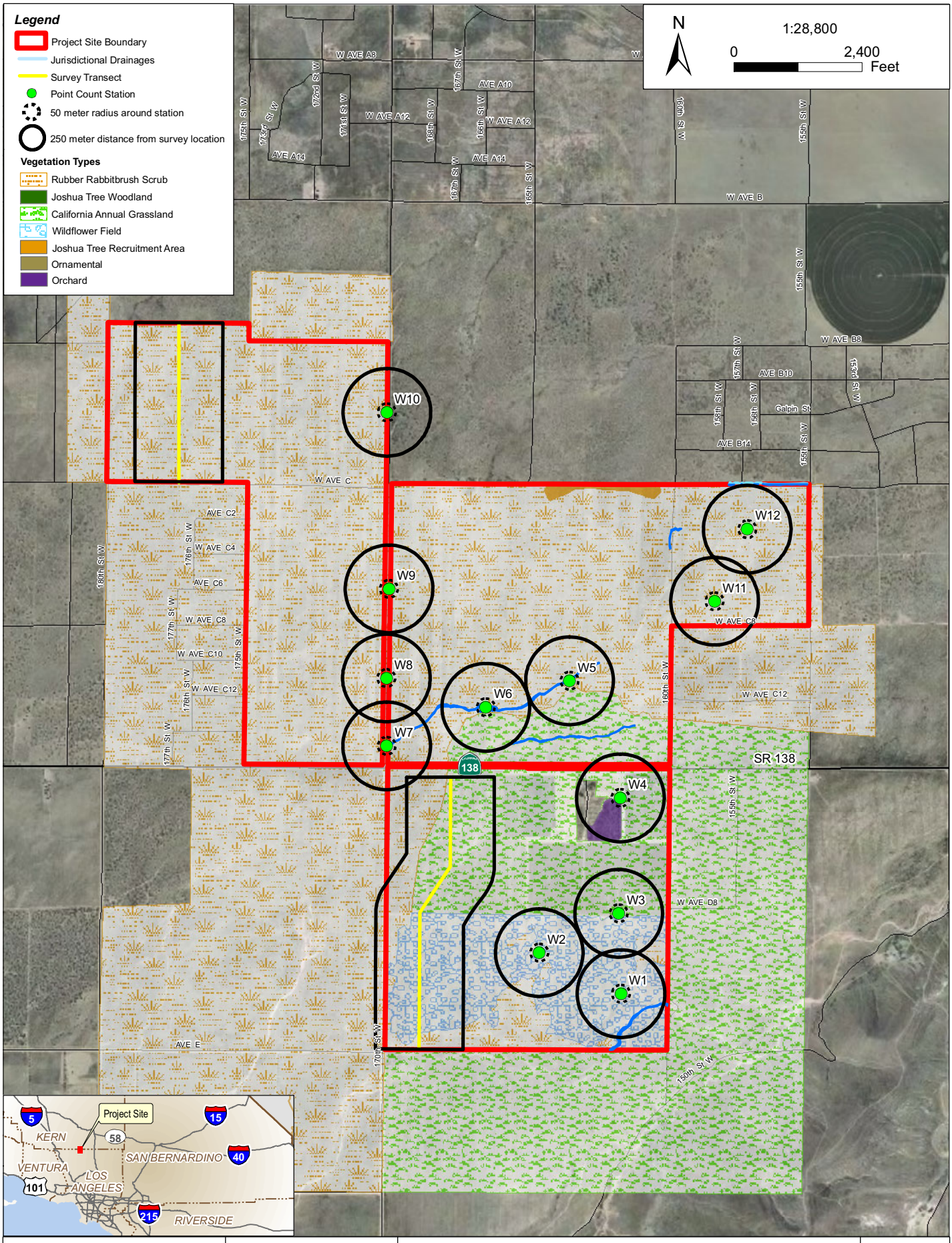


Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Field Surveys, (2009).

AV Solar Ranch One Biota Report

Figure 4-3. WINTERING BIRD SURVEY LOCATIONS WITHIN THE PROJECT SITE

2009

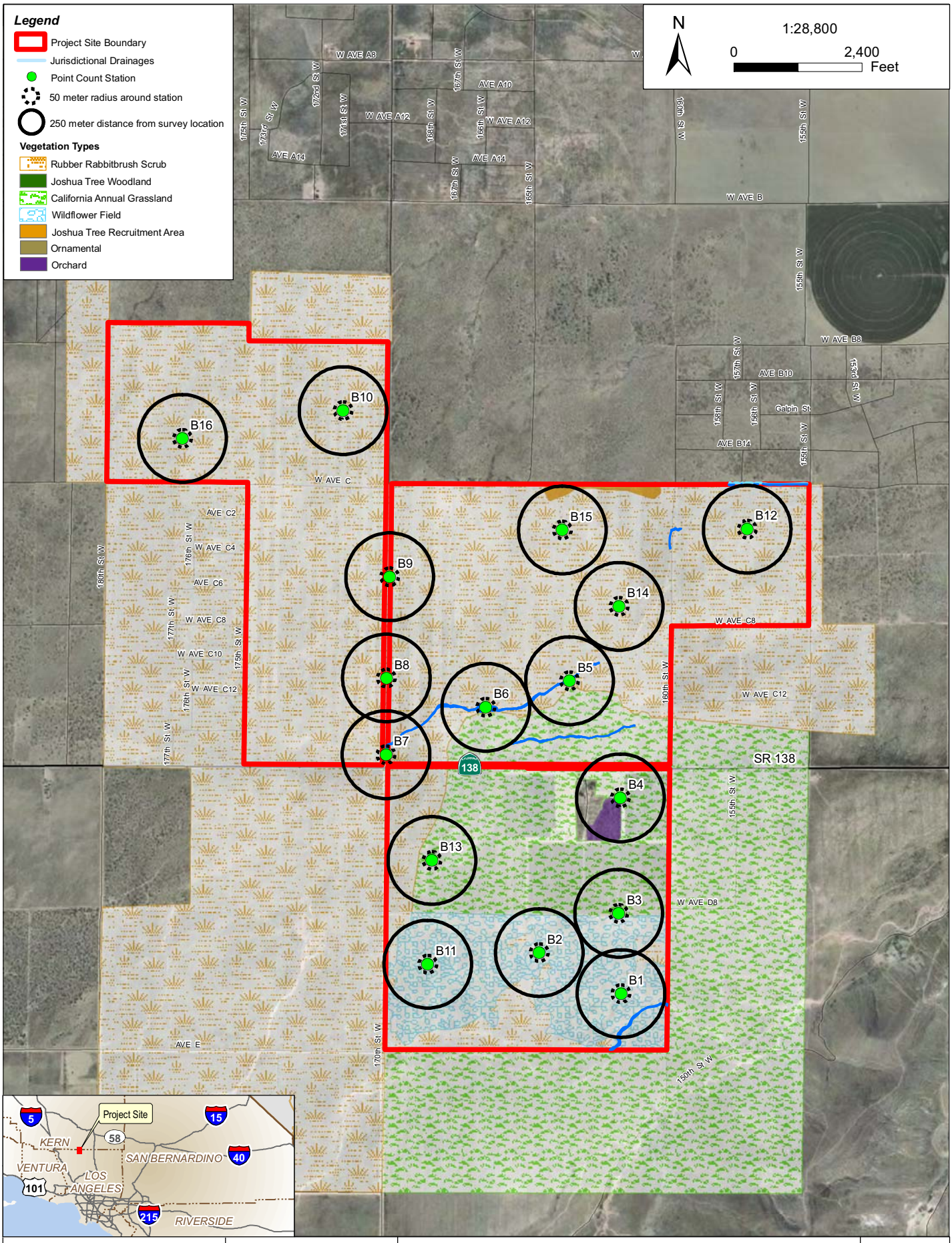


Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Field Surveys, (2009).

AV Solar Ranch One Biota Report

Figure 4-4. BREEDING BIRD SURVEY LOCATIONS WITHIN THE PROJECT SITE

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig4-4_Breeding_Bird_Survey_Locations_within_Project_Site.mxd

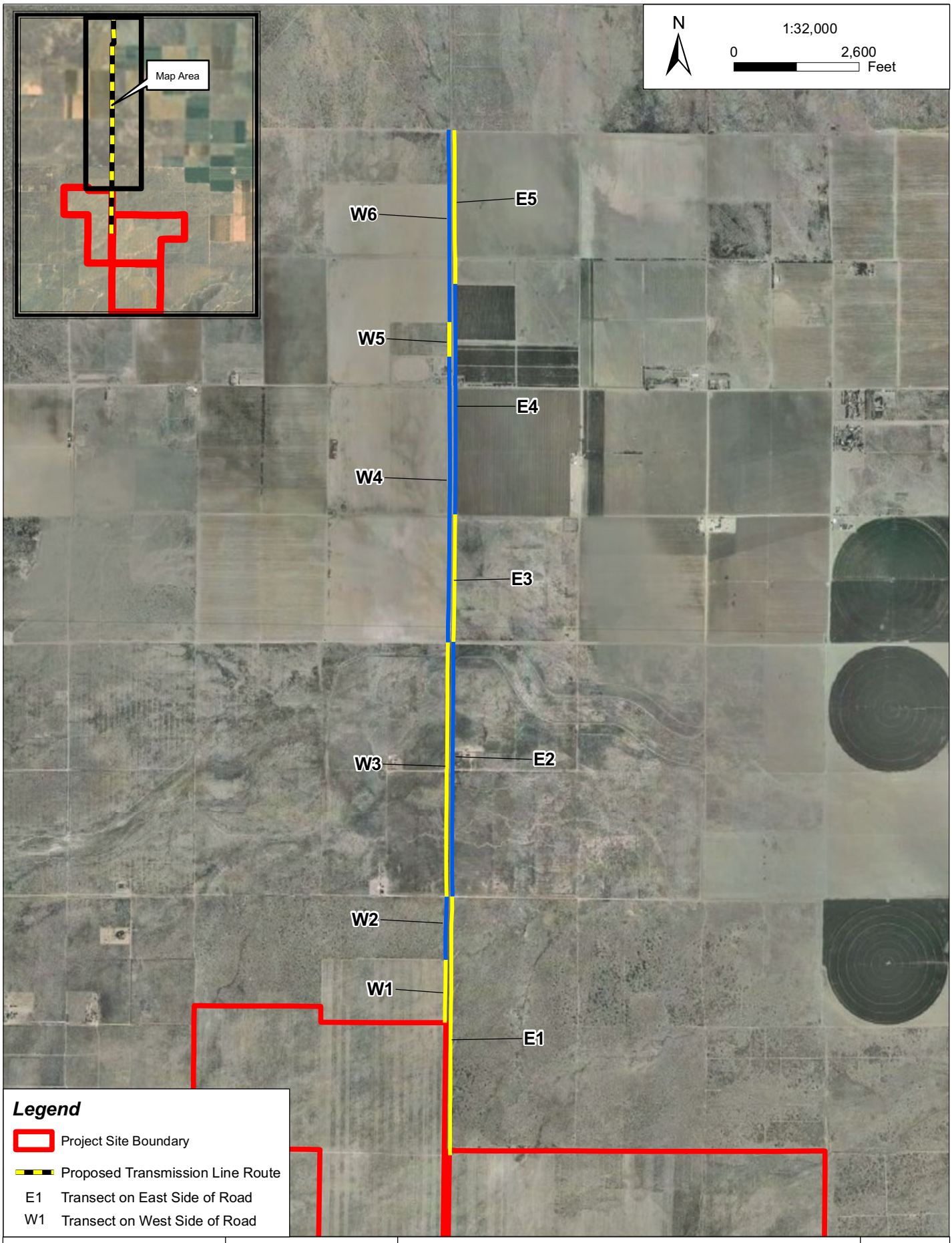


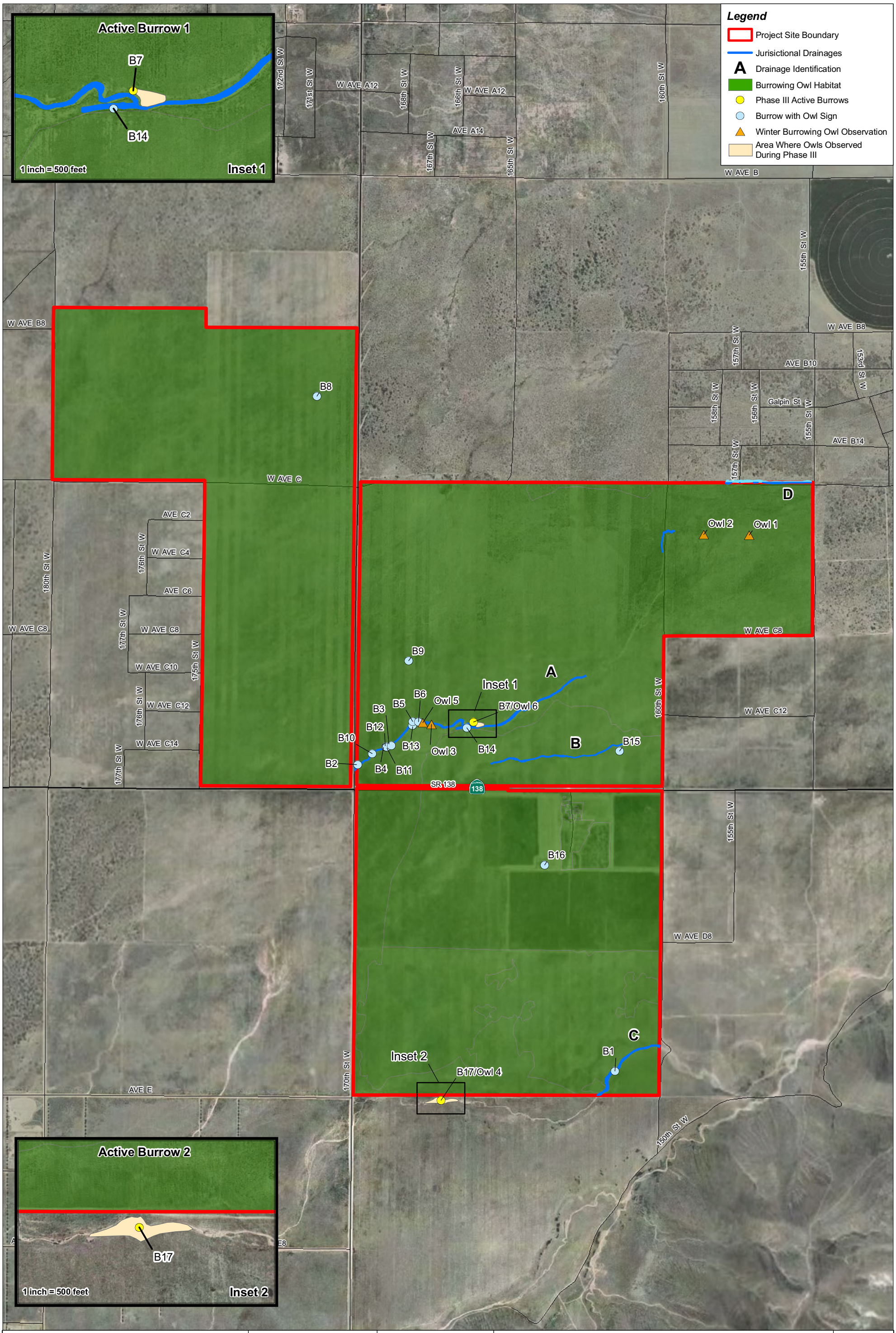
Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Field Surveys, (2009).

AV Solar Ranch One
Biota Report

Figure 4-5. BREEDING BIRD SURVEY LOCATIONS ALONG THE PROPOSED TRANSMISSION LINE ROUTE

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig4-5_Breeding_Bird_Survey_Locations_Tline.mxd



N

1:18,000

0 1,500 3,000 Feet

1 inch = 1,500 feet

Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Field Surveys, (2009).

AV Solar Ranch One
Biota Report

Figure 4-6. BURROWING OWL OBSERVATIONS

2009

T:\Next\Light_AV_EIR\deliverables\Biota Report\Fig4-6_Burrowing_Owl_Observations.mxd

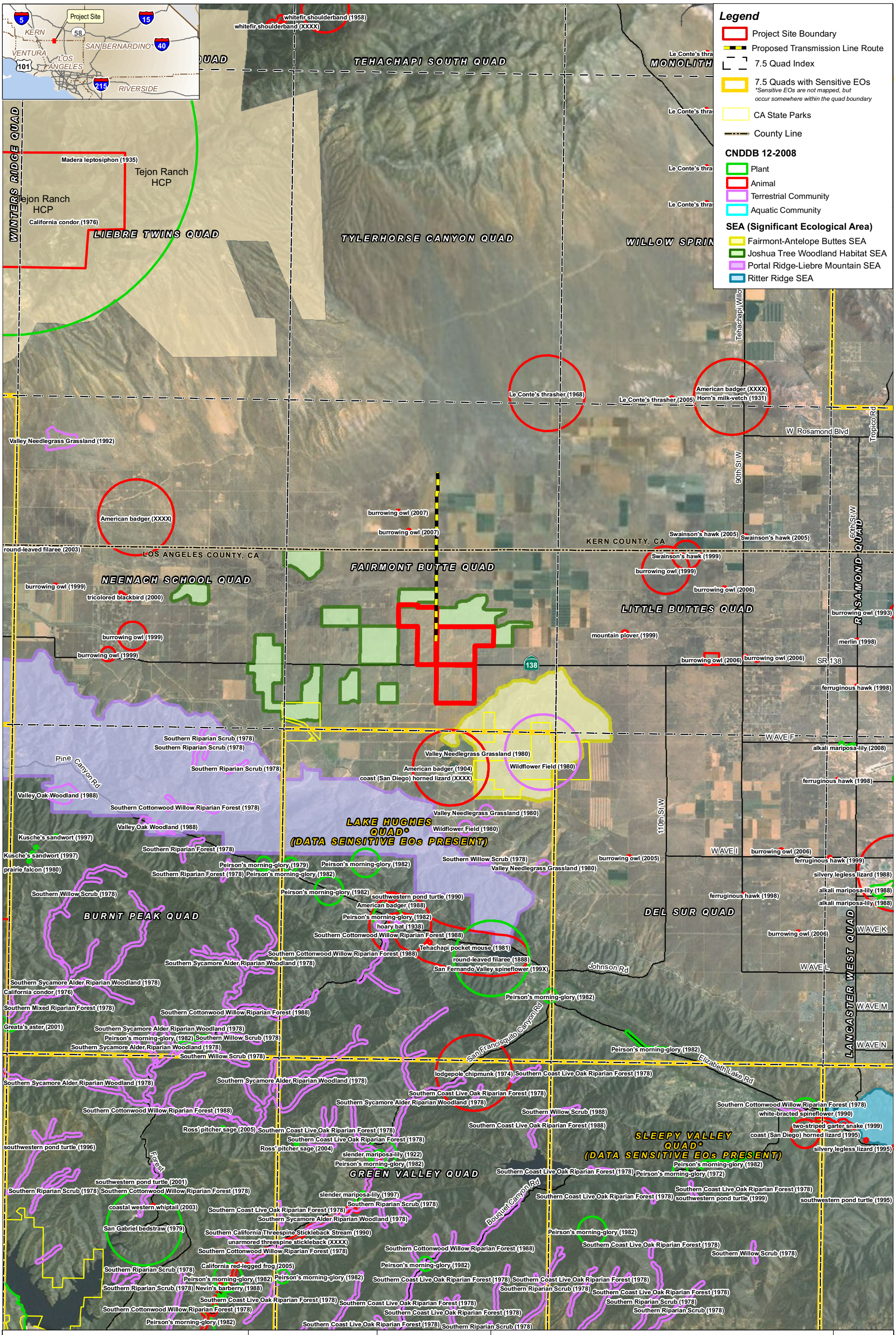


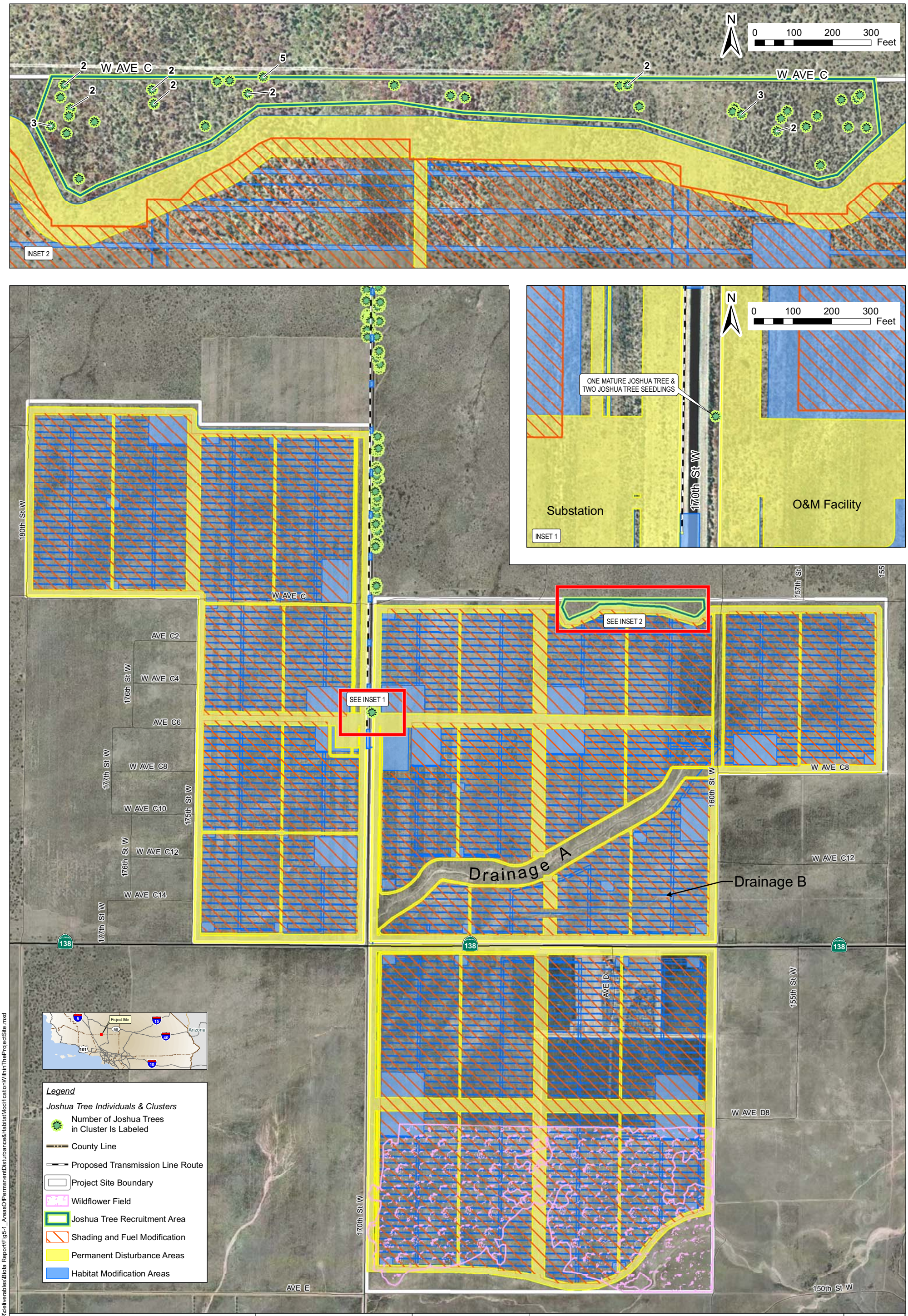
Image Source:
[1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] CNDDB (2008), [3] Los Angeles County SEA Boundary (1986), [4] USFWS, Ventura FWO (2004), California State Parks.

AV Solar Ranch One Biota Report

Figure 4-7. PREVIOUS RECORDS OF SENSITIVE BIOLOGICAL RESOURCES IN THE PROJECT VICINITY

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig4-7_Previous_Sensitive_Biological_Resources_in_Project_Vicinity.mxd



N 0 1,000 2,000 3,000 Ft.

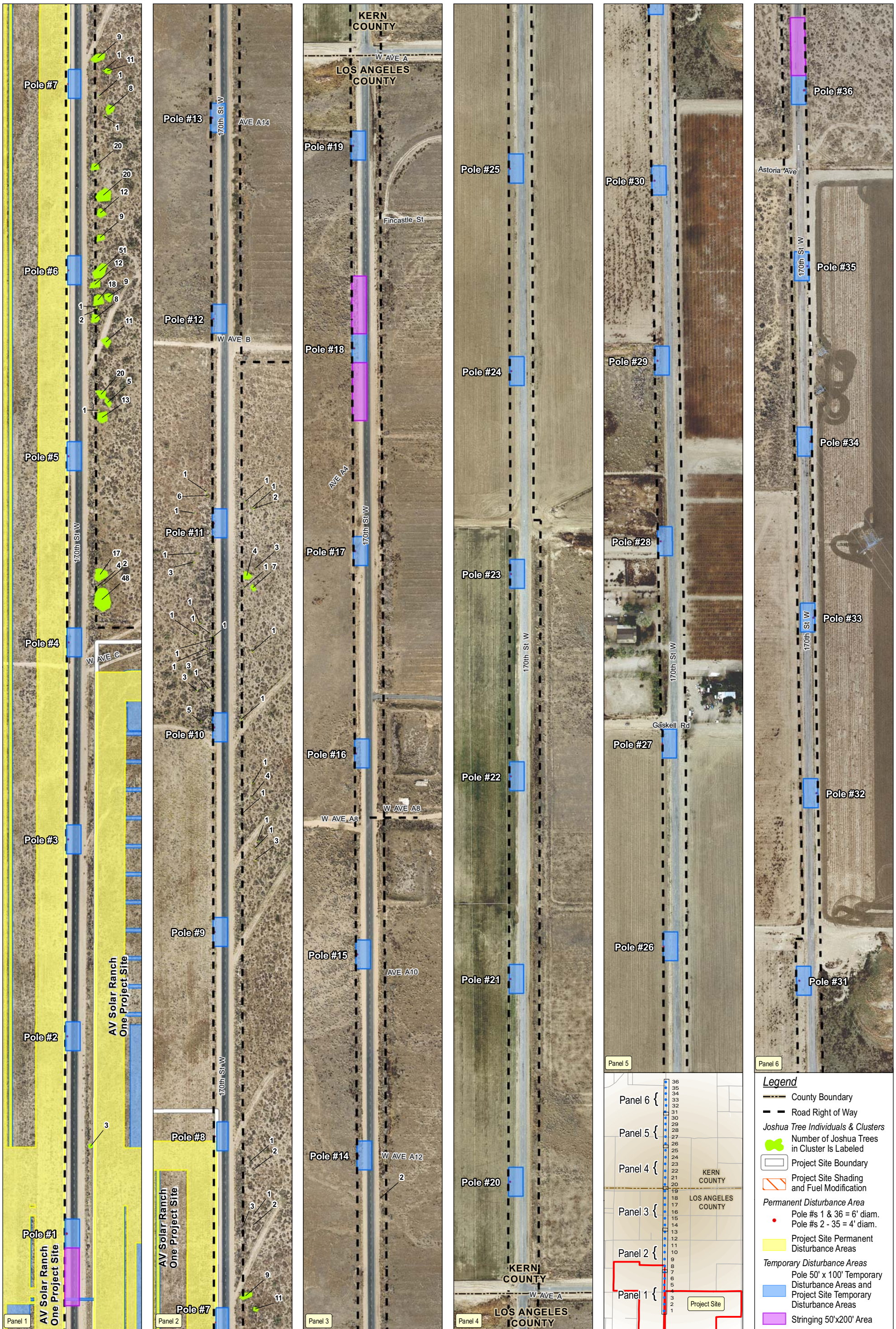
Source: [1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] Patch Services LLC (2009), [3] URS Santa Barbara (2009), [4] ESRI StreetMap USA (2007).

AV Solar Ranch One Biota Report

Figure 5-1. AREAS OF PERMANENT DISTURBANCE AND HABITAT MODIFICATION WITHIN THE PROJECT SITE

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig5-1_AreasOfPermanentDisturbance&HabitatModificationWithinTheProjectSite.mxd



N

1:3,600

0 300 600 Feet

1 inch = 300 feet

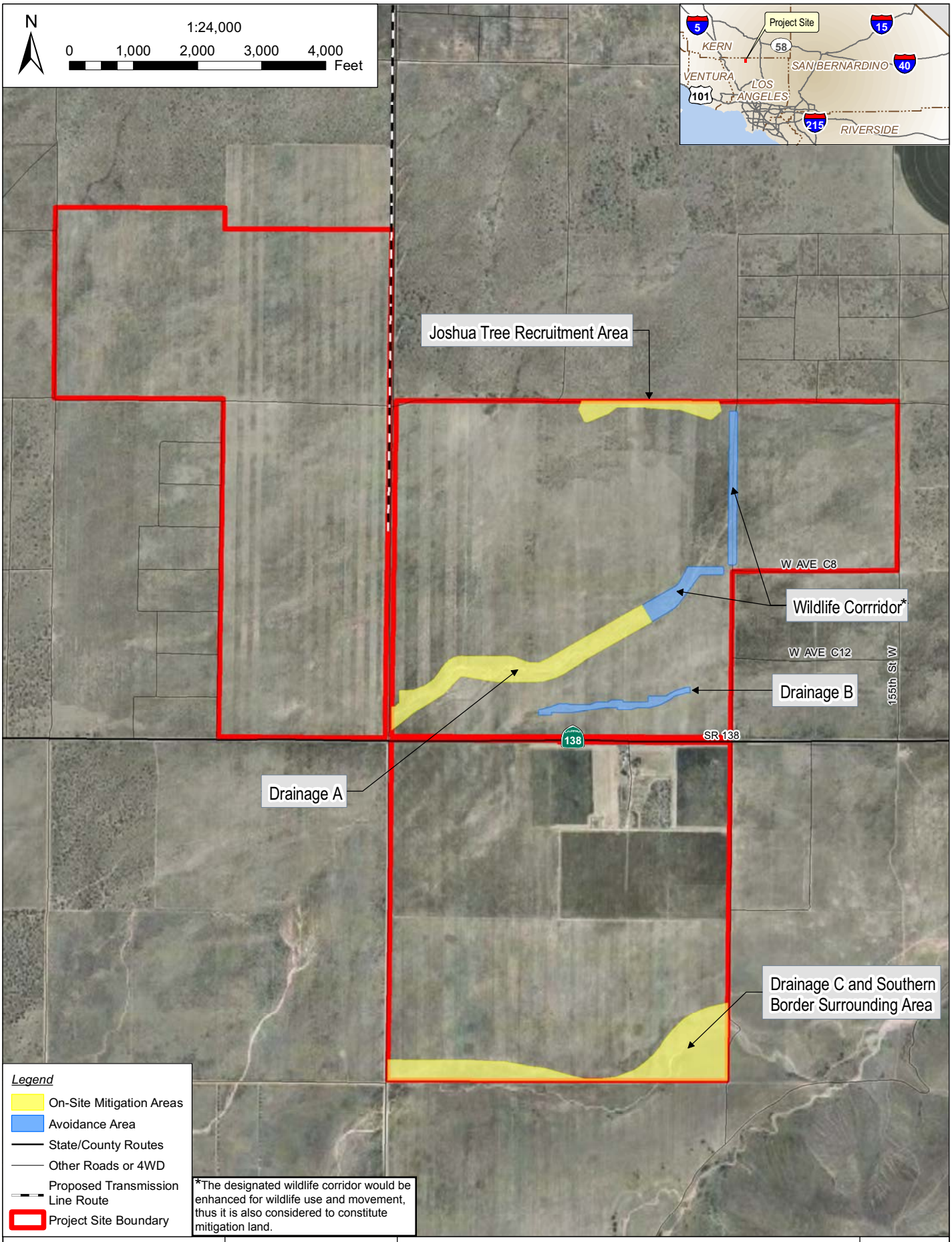
Source: [1] TriAxis Engineering, Inc., [2] Patch Services 2009, [3] URS Santa Barbara 2009, [4] ESRI StreetMap USA (2007), [5] Image Source: Westwood Professional Services, 0.5 ft. resolution (2009).

AV Solar Ranch One Biota Report

Figure 5-2. AREAS OF PERMANENT AND TEMPORARY DISTURBANCE ALONG TRANSMISSION LINE ROUTE

2009

T:\NextLight_AV_EIR\deliverables\Biota Report\Fig5-2_AreasOfPerm&TempDisturbanceAlongTransmissionLineRoute.mxd



T:\NextLight_AV_EIR\deliverables\Biota Report\Fig 6-1_On-SiteMitigationAndAvoidance.mxd

Source: [1] URS Corp. - sites and isolates recorded on May 2009, [2] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [3] ESRI StreetMap USA

AV Solar Ranch One
Biota Report

Figure 6-1. ON-SITE MITIGATION AND AVOIDANCE AREAS

2009

APPENDIX A
INITIAL STUDY QUESTIONNAIRE

STAFF USE ONLY

PROJECT NUMBER: *TR 071035*
CASES: *RCUPT200900026*
RENVT200900027

* * * * INITIAL STUDY * * * *
COUNTY OF LOS ANGELES
DEPARTMENT OF REGIONAL PLANNING

GENERAL INFORMATION

I.A. Map Date: *March 18, 2009* Staff Member: *Christina Tran / Anthony Curzi*

Thomas Guide: *Page F (no map page) (2008)* USGS Quad: *Fairmont Butte*

Location: *Project site is located on parcels north and south of SR-138 between 155th Street West to the east and 180th Street West to the west, between West Avenue B-8 to the north, and by West Avenue E to the south*

Description of Project: *Application for Tentative Tract Map TR071035 for a reversion to acreage from 147 parcels to 1 parcel. Application also includes a CUP request for the construction and operation of a 230 megawatt (MW) photovoltaic (PV) solar facility in an agricultural zone; for onsite grading of a maximum of 700,000 cubic yards of soil; and for development within an SEA. The facility consists of a PV panel array system mounted on tracker units or fixed tilt support structures; associated electrical equipment; a 3 acre onsite substation; a 20,000 square foot operations and maintenance building; employee parking area; eight foot high perimeter fencing; and associated access roads. The project also includes a 230 Kilovolt (kV) transmission line that is approximately 3.5 miles long and interconnect to Southern California Edison's (SCE) planned Whirlwind Substation north of the project site in southern Kern County. An alternate 1.5-mile-long transmission line would interconnect the project to SCE's existing 230 kV Antelope-Magunden transmission line east of the site. Approximately 12 acre feet of water will be required annually for domestic use and to process water uses which include washing solar panels approximately twice per year and maintenance uses. Water will be provided by onsite water wells and sewage disposal will be handled by the proposed septic and leach field system.*

Gross Acres: *2,100 acres*

Environmental Setting: *Project site is located in the Antelope Valley and within the Joshua Tree Woodland Habitat (JTWH) Significant Ecological Area (SEA). The majority of the project site had been used for agricultural production since 1940; however, farming activities ceased by 2004. The remainder of the project site is undeveloped with the exception of the residential ranch development on an approximately 27-acre area consisting of two residences, a mobile home, and associated storage and equipment structures that will all be demolished. The site also contains an exploratory oil well that has been plugged and abandoned. The project site is surrounded by undeveloped and agricultural land. Three primary ephemeral drainages traverse the project site and a small portion of a fourth ephemeral drainage is located within the northeastern property boundary.*

Zoning: *A-2-5 (Heavy Agriculture, minimum five acre lot) and A-1-2 (Light Agriculture, minimum two acre lot)*

General Plan: *N1 (Non-Urban 1)*

Community/Area wide Plan: *Antelope Valley Area Plan*

Major projects in area:

PROJECT NUMBER	DESCRIPTION & STATUS
CUP 02-176	*Automotive racetrack on 322 acres southeast of project site (pending/EIR in progress)*
CPUC No. A.07-06-031	*SCE Tehachapi Renewable Transmission Project (500 kV transmission line project) east and north of project site (environmental review [EIR/EIS] in progress; CPUC decision due August 2009)*
Pending	*Pending eSolar concentrated solar project near Lancaster/Antelope Valley (pre-permitting phase)*

NOTE: For EIRs, above projects are not sufficient for cumulative analysis.

REVIEWING AGENCIES

Responsible Agencies

- ☐ None
- ☒ Regional Water Quality Control Board
  - ☐ Los Angeles Region
  - ☒ Lahontan Region
- ☐ Coastal Commission
- ☒ Army Corps of Engineers
- ☒ *California Energy Commission*
- ☒ *CA Public Utilities Commission*
- ☒ *Caltrans Aeronautics*
- ☒ *Caltrans*
- ☐

Trustee Agencies

- ☐ None
- ☒ State Fish and Game
- ☒ State Parks
- ☒ *U.S. Fish & Wildlife*

Special Reviewing Agencies

- ☐ None
- ☐ Santa Monica Mountains Conservancy
- ☐ National Parks
- ☒ National Forest
- ☒ Edwards Air Force Base
- ☐ Resource Conservation District of Santa Monica Mtns. Area
- ☒ *Kern County*
- ☒ *SCV Historical Society*
- ☒ *Southern California Edison*
- ☒ *City of Lancaster and Palmdale*
- ☒ *NAHC; CSUF*
- ☒ *DTSC; DOGGR*
- ☐ *CA DHS – Drinking Water Program; CA St. Water Res. Control Board; Dept. of Water Resources*
- ☒ *Antelope Valley AQMD; FAA*
- ☒ *Antelope Valley Conservancy; Antelope Acres Town Council;*
- ☒ *Nature Conservancy*
- ☒ *SCAG; CHP*

Regional Significance

- ☐ None
- ☐ SCAG Criteria
- ☒ Air Quality
- ☒ Water Resources
- ☐ Santa Monica Mtns. Area
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐

County Reviewing Agencies

- ☒ Subdivision Committee
- ☒ *SEATAC; Sheriff*
- ☒ DPW: *GMED; Drainage & Grading; Traffic & Lighting; Environmental Programs; Land Development (NPDES review and water supply); Transportation Planning; Waterworks*
- ☒ *Public Health: Land Use Programs; Environmental Hygiene; Environmental Health*
- ☒ *Fire Department (and Hazardous Material)*

IMPACT ANALYSIS MATRIX		ANALYSIS SUMMARY (See individual pages for details)				
			Less than Significant Impact/No Impact			
				Less than Significant Impact with Project Mitigation		
					Potentially Significant Impact	
CATEGORY	**FACTOR**	Pg				Potential Concern
HAZARDS	1. Geotechnical	5	☐	☐	☒	*700,000 c.y. of grading*
	2. Flood	6	☐	☐	☒	*Existing onsite drainage and floodplain conditions*
	3. Fire	7	☐	☐	☒	*Use of flammable materials during project construction and operation, private water wells*
	4. Noise	8	☒	☐	☐	
RESOURCES	1. Water Quality	9	☐	☐	☒	*Septic system*
	2. Air Quality	10	☐	☐	☒	*Potential construction emissions and fugitive dust*
	3. Biota	11	☐	☐	☒	*Drainage modification, biological resources, and SEA areas*
	4. Cultural Resources	12	☐	☐	☒	*Potential presence of onsite cultural resources*
	5. Mineral Resources	13	☒	☐	☐	
	6. Agriculture Resources	14	☒	☐	☐	
	7. Visual Qualities	15	☐	☐	☒	*California Poppy Trail, scenic highway*
SERVICES	1. Traffic/Access	16	☐	☐	☒	*Construction and maintenance activities*
	2. Sewage Disposal	17	☒	☐	☐	
	3. Education	18	☒	☐	☐	
	4. Fire/Sheriff	19	☐	☐	☒	*Extend service to undeveloped area*
	5. Utilities	20	☐	☐	☒	*Solid waste, limited utility services*
OTHER	1. General	21	☐	☐	☒	*Change of character*
	2. Environmental Safety	22	☐	☐	☒	*Historical and potential use of hazardous materials onsite*
	3. Land Use	23	☐	☐	☒	*Green building ordinance, SEA criteria*
	4. Pop/Hous./Emp./Rec.	24	☐	☐	☒	*Growth inducing effect*
	5. Mandatory Findings	25	☐	☐	☒	*Biota, air quality, flood, cultural resources, geotechnical, fire, water quality, traffic/access, environmental safety, utilities*

Environmental Finding:

FINAL DETERMINATION: On the basis of this Initial Study, the Department of Regional Planning finds that this project qualifies for the following environmental document:

☐ NEGATIVE DECLARATION, inasmuch as the proposed project will not have a significant effect on the environment.

An Initial Study was prepared on this project in compliance with the State CEQA Guidelines and the environmental reporting procedures of the County of Los Angeles. It was determined that this project will not exceed the established threshold criteria for any environmental/service factor and, as a result, will not have a significant effect on the physical environment.

☐ MITIGATED NEGATIVE DECLARATION, in as much as the changes required for the project will reduce impacts to insignificant levels (see attached discussion and/or conditions).

An Initial Study was prepared on this project in compliance with the State CEQA Guidelines and the environmental reporting procedures of the County of Los Angeles. It was originally determined that the proposed project may exceed established threshold criteria. The applicant has agreed to modification of the project so that it can now be determined that the project will not have a significant effect on the physical environment. The modification to mitigate this impact(s) is identified on the Project Changes/Conditions Form included as part of this Initial Study.

☒ ENVIRONMENTAL IMPACT REPORT*, inasmuch as there is substantial evidence that the project may have a significant impact due to factors listed above as "significant".

☐ At least one factor has been adequately analyzed in an earlier document pursuant to legal standards, and has been addressed by mitigation measures based on the earlier analysis as described on the attached sheets (see attached Form DRP/IA 101). The Addendum EIR is required to analyze only the factors changed or not previously addressed.

Reviewed by: Christine Cram Date: 4/13/09

Approved by: Carl Ebner Curtis Date: 4-13-09

☐ This proposed project is exempt from Fish and Game CEQA filling fees. There is no substantial evidence that the proposed project will have potential for an adverse effect on wildlife or the habitat upon which the wildlife depends. (Fish & Game Code 753.5).

☐ Determination appealed – see attached sheet.

*NOTE: Findings for Environmental Impact Reports will be prepared as a separate document following the public hearing on the project.

HAZARDS - 1. Geotechnical

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project located in an active or potentially active fault zone, Seismic Hazards Zone, or Alquist-Priolo Earthquake Fault Zone?
b.	☐	☒	☐	Is the project site located in an area containing a major landslide(s)?
c.	☐	☒	☐	Is the project site located in an area having high slope instability?
d.	☐	☒	☐	Is the project site subject to high subsidence, high groundwater level, liquefaction, or hydrocompaction?
e.	☐	☒	☐	Is the proposed project considered a sensitive use (school, hospital, public assembly site) located in close proximity to a significant geotechnical hazard?
f.	☒	☐	☐	Will the project entail substantial grading and/or alteration of topography including slopes of over 25%? *700,000 c.y. of grading proposed, most of which is associated with drainage channel improvements*
g.	☐	☐	☒	Would the project be located on expansive soil, as defined in Table 18-1-B of Uniform Building Code (1994), creating substantial risks to life or property?
h.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Building Ordinance No. 2225 – Sections 308B, 309, 310, and 311 and Chapters 29 and 70

☐ **MITIGATION MEASURES**

☐ Lot Size ☐ Project Design

☐ **OTHER CONSIDERATIONS**

☒ Approval of Geotechnical Report by DPW

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by, **geotechnical** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

HAZARDS - 2. Flood

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Is the major drainage course, as identified on USGS quad sheets by a dashed line, located on the project site?
				Four ephemeral drainage courses occur on the project site
b.	☒	☐	☐	Is the project site located within or does it contain a floodway, floodplain, or designated flood hazard zone?
				100-year floodplain is located on the southeast corner of the project site
c.	☐	☒	☐	Is the project site located in or subject to high mudflow conditions?
				Project site is relatively flat and is not located adjacent to significant slopes
d.	☐	☐	☒	Could the project contribute or be subject to high erosion and debris deposition from run-off?
				Construction activities and removal of vegetation
e.	☐	☐	☒	Would the project substantially alter the existing drainage pattern of the site or area?
				One of the primary drainage courses will be channelized
f.	☐	☐	☐	Other factors (e.g., dam failure)?

STANDARD CODE REQUIREMENTS

☐ Building Ordinance No. 2225 – Section 308A ☐ Ordinance No. 12,114 (Floodways)

☒ Approval of Drainage Concept by DPW

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by **flood (hydrological)** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

HAZARDS - 3. Fire

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project site located in a Very High Fire Hazard Severity Zone (Fire Zone 4)?
b.	☐	☒	☐	Is the project site in a high fire hazard area and served by inadequate access due to lengths, width, surface materials, turnarounds or grade?
c.	☐	☒	☐	Does the project site have more than 75 dwelling units on a single access in a high fire hazard area?
d.	☒	☐	☐	Is the project site located in an area having inadequate water and pressure to meet fire flow standards? *Project will utilize private water wells*
e.	☐	☒	☐	Is the project located in close proximity to potential dangerous fire hazard conditions/uses (such as refineries, flammables, explosives manufacturing)?
f.	☐	☐	☒	Does the proposed use constitute a potentially dangerous fire hazard? *Potential ignition sources such as vehicles, generators and motors during construction and operation*
g.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☒ Water Ordinance No. 7834 ☒ Fire Ordinance No. 2947 ☒ Fire Regulation No. 8
☐ Fuel Modification / Landscape Plan

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Project Design ☐ Compatible Use

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by **fire hazard** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

HAZARDS - 4. Noise

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☐	☒	Is the project site located near a high noise source (airports, railroads, freeways, industry)? *SR-138 bisects the site*
b.	☐	☒	☐	Is the proposed use considered sensitive (school, hospital, senior citizen facility) or are there other sensitive uses in close proximity?
c.	☐	☒	☐	Could the project substantially increase ambient noise levels including those associated with special equipment (such as amplified sound systems) or parking areas associated with the project?
d.	☐	☒	☐	Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels without the project?
e.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☒ Noise Control (Title 12 – Chapter 8) ☐ Uniform Building Code (Title 26 - Chapter 35)

☐ **MITIGATION MEASURES** ☒ **OTHER CONSIDERATIONS**

☐ Lot Size ☒ Project Design ☒ Compatible Use

The project shall comply with all applicable building code requirements and County noise ordinance

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be adversely impacted by **noise**?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

RESOURCES - 1. Water Quality

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☐	☒	Is the project site located in an area having known water quality problems and proposing the use of individual water wells? *Project is proposing water wells*
b.	☒	☐	☐	Will the proposed project require the use of a private sewage disposal system? *Septic system proposed*
	☐	☐	☒	If the answer is yes, is the project site located in an area having known septic tank limitations due to high groundwater or other geotechnical limitations *or* is the project proposing on-site systems located in close proximity to a drainage course? *Septic system and leach field proposed. Four drainage courses occur onsite*
c.	☐	☐	☒	Could the project's associated construction activities significantly impact the quality of groundwater and/or storm water runoff to the storm water conveyance system and/or receiving water bodies? *Earth disturbance and use of equipment and vehicles would potentially increase sediment and construction-related pollutants in runoff flows*
d.	☐	☐	☒	Could the project's post-development activities potentially degrade the quality of storm water runoff and/or could post-development non-storm water discharges contribute potential pollutants to the storm water conveyance system and/or receiving bodies? *Storage and usage of hazardous materials onsite*
e.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Industrial Waste Permit
☐ Plumbing Code – Ordinance No.2269
☐ Health Code – Ordinance No.7583, Chapter 5
☒ NPDES Permit Compliance (DPW)

☐ **MITIGATION MEASURES**
☐ Lot Size ☐ Project Design ☐ Compatible Use

☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be adversely impacted by, **water quality** problems?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

RESOURCES - 2. Air Quality

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Will the proposed project exceed the State's criteria for regional significance (generally (a) 500 dwelling units for residential users or (b) 40 gross acres, 650,000 square feet of floor area or 1,000 employees for non-residential uses)? *Project site is 2,100 acres*
b.	☐	☒	☐	Is the proposal considered a sensitive use (schools, hospitals, parks) and located near a freeway or heavy industrial use?
c.	☐	☐	☒	Will the project increase local emissions to a significant extent due to increased traffic congestion or use of a parking structure or exceed AQMD thresholds of potential significance? *Construction activities and traffic; project operation including maintenance vehicle and equipment emissions*
d.	☒	☐	☐	Will the project generate or is the site in close proximity to sources that create obnoxious odors, dust, and/or hazardous emissions? *700,000 c.y. of grading proposed*
e.	☐	☒	☐	Would the project conflict with or obstruct implementation of the applicable air quality plan?
f.	☐	☐	☒	Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation? *Project region is designated as non-attainment for ozone*
g.	☐	☐	☒	Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under applicable federal or state ambient air quality standard (including releasing emission which exceed quantitative thresholds for ozone precursors)? *Project region is designated as non-attainment for ozone*
h.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Health and Safety Code – Section 40506

☐ **MITIGATION MEASURES**

☐ Project Design ☐ Air Quality Report

☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be adversely impacted by, **air quality**?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

RESOURCES - 3. Biota

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Is the project site located within Significant Ecological Area (SEA), SEA Buffer, or coastal Sensitive Environmental Resource (ESHA, etc.), or is the site relatively undisturbed and natural? *Project site is located within SEA #60*
b.	☐	☐	☒	Will grading, fire clearance, or flood related improvements remove substantial natural habitat areas? *Majority of project site is natural*
c.	☒	☐	☐	Is a drainage course located on the project site that is depicted on USGS quad sheets by a dashed blue line or that may contain a bed, channel, or bank of any perennial, intermittent or ephemeral river, stream, or lake? *Four ephemeral drainages occur onsite*
d.	☐	☒	☐	Does the project site contain a major riparian or other sensitive habitat (e.g. coastal sage scrub, oak woodland, sycamore riparian, woodland, wetland, etc.)?
e.	☒	☐	☐	Does the project site contain oak or other unique native trees (specify kinds of trees)? *Joshua trees*
f.	☒	☐	☐	Is the project site habitat for any known sensitive species (federal or state listed endangered, etc.)? *Burrowing owls, loggerhead shrike, merlin, mountain bluebird, northern harrier, prairie falcon, coast horned lizard, and western meadowlark*
g.	☐	☐	☒	Other factors (e.g., wildlife corridor, adjacent open space linkage)? *California Poppy Reserve, Arthur B. Ripley Desert Woodland Preserve, wildflower field at southeastern property boundary*

☐ **MITIGATION MEASURES**
☐ Lot Size ☐ Project Design

☐ **OTHER CONSIDERATIONS**
☐ ERB/SEATAC Review ☐ Oak Tree Permit

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, **biotic** resources?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

RESOURCES - 4. Archaeological/Historical/Paleontological

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Is the project site in or near an area containing known archaeological resources or containing features (drainage course, spring, knoll, rock outcroppings, or oak trees) that indicate potential archaeological sensitivity? *Drainage courses onsite*
b.	☐	☒	☐	Does the project site contain rock formations indicating potential paleontological resources?
c.	☐	☒	☐	Does the project site contain known historic structures or sites?
d.	☐	☐	☒	Would the project cause a substantial adverse change in the significance of a historical or archaeological resource as defined in 15064.5? *Cultural resources identified onsite*
e.	☐	☒	☐	Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?
f.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☐ Phase 1 Archaeology Report

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **archaeological, historical**, or **paleontological** resources?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

RESOURCES - 5. Mineral Resources

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?
b.	☐	☒	☐	Would the project result in the loss of availability of a locally important mineral resource discovery site delineated on a local general plan, specific plan or other land use plan?
c.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES**

☐ Lot Size ☐ Project Design

☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **mineral** resources?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

RESOURCES - 6. Agriculture Resources

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency to non-agricultural use?
b.	☐	☒	☐	Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?
c.	☐	☒	☐	Would the project involve other changes in the existing environment that due to their location or nature, could result in conversion of Farmland, to non-agricultural use?
d.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **agriculture** resources?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

RESOURCES - 7. Visual Qualities

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Is the project site substantially visible from or will it obstruct views along a scenic highway (as shown on the Scenic Highway Element), or is it located within a scenic corridor or will it otherwise impact the viewshed? *SR-138 is secondary scenic highway*
b.	☐	☐	☒	Is the project substantially visible from or will it obstruct views from a regional riding or hiking trail? *California Poppy Trail southeast of site*
c.	☐	☒	☐	Is the project site located in an undeveloped or undisturbed area that contains unique aesthetic features?
d.	☒	☐	☐	Is the proposed use out-of-character in comparison to adjacent uses because of height, bulk, or other features? *Surrounding areas and the majority of project site is undisturbed*
e.	☐	☐	☒	Is the project likely to create substantial sun shadow, light or glare problems? *Outdoor and security lighting*
f.	☐	☐	☐	Other factors (e.g., grading or landform alteration)?

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☐ Visual Report ☐ Compatible Use

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **scenic** qualities?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

SERVICES - 1. Traffic/Access

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Does the project contain 25 dwelling units or more and is it located in an area with known congestion problems (roadway or intersections)?
b.	☐	☒	☐	Will the project result in any hazardous traffic conditions?
c.	☐	☒	☐	Will the project result in parking problems with a subsequent impact on traffic conditions?
d.	☐	☒	☐	Will inadequate access during an emergency (other than fire hazards) result in problems for emergency vehicles or residents/employees in the area?
e.	☒	☐	☐	Will the congestion management program (CMP) Transportation Impact Analysis thresholds of 50 peak hour vehicles added by project traffic to a CMP highway system intersection or 150 peak hour trips added by project traffic to a mainline freeway link be exceeded? *Project site bisected by SR-138 (Avenue D)*
f.	☐	☒	☐	Would the project conflict with adopted policies, plans, or program supporting alternative transportation (e.g., bus, turnouts, bicycle racks)?
g.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Project Design ☒ Traffic Report ☒ Consultation with Traffic & Lighting Division

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **traffic/access** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

SERVICES - 2. Sewage Disposal

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	If served by a community sewage system, could the project create capacity problems at the treatment plant?
b.	☐	☒	☐	Could the project create capacity problems in the sewer lines serving the project site?
c.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Sanitary Sewers and Industrial Waste – Ordinance No. 6130

☐ Plumbing Code – Ordinance No. 2269

☐ **MITIGATION MEASURES** ☒ **OTHER CONSIDERATIONS**

Project is proposing private septic system

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **sewage disposal** facilities?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

SERVICES - 3. Education

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Could the project create capacity problems at the district level?
b.	☐	☒	☐	Could the project create capacity problems at individual schools that will serve the project site?
c.	☐	☒	☐	Could the project create student transportation problems?
d.	☐	☒	☐	Could the project create substantial library impacts due to increased population and demand?
e.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Site Dedication ☐ Government Code Section 65995 ☐ Library Facilities Mitigation Fee

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) relative to **educational** facilities/services?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

SERVICES - 4. Fire/Sheriff Services

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Could the project create staffing or response time problems at the fire station or sheriff's substation serving the project site? *Nearest fire station is the Lancaster Fire Station which is approximately 17 miles from the site; nearest sheriff station is in Lancaster located at 501 West Lancaster Blvd. which is approximately 20 miles from the site*
b.	☐	☒	☐	Are there any special fire or law enforcement problems associated with the project or the general area?
c.	☐	☐	☐	Other factors?

☒ **MITIGATION MEASURES**

☒ Fire Mitigation Fee

☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) relative to **fire/sheriff** services?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

SERVICES - 5. Utilities/Other Services

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Is the project site in an area known to have an inadequate public water supply to meet domestic needs or to have an inadequate ground water supply and proposes water wells? *Project proposes use of water wells*
b.	☐	☐	☒	Is the project site in an area known to have an inadequate water supply and/or pressure to meet fire fighting needs? *Project will utilize water wells*
c.	☐	☐	☒	Could the project create problems with providing utility services, such as electricity, gas, or propane? *Site has limited utility services*
d.	☐	☐	☒	Are there any other known service problem areas (e.g., solid waste)? *Limited landfill capacities*
e.	☐	☒	☐	Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services or facilities (e.g., fire protection, police protection, schools, parks, roads)?
f.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Plumbing Code – Ordinance No. 2269 ☐ Water Code – Ordinance No. 7834

☐ **MITIGATION MEASURES**

☐ Lot Size ☐ Project Design

☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) relative to **utilities** services?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

OTHER FACTORS - 1. General

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Will the project result in an inefficient use of energy resources?
b.	☒	☐	☐	Will the project result in a major change in the patterns, scale, or character of the general area or community? *Surrounding areas and majority of site is undeveloped*
c.	☐	☒	☐	Will the project result in a significant reduction in the amount of agricultural land?
d.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ State Administrative Code, Title 24, Part 5, T-20 (Energy Conservation)

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☐ Compatible Use

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to any of the above factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

OTHER FACTORS - 2. Environmental Safety

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Are any hazardous materials used, transported, produced, handled, or stored on-site? *Paint, solvents, compressed gas, diesel or gasoline, hydrochlorofluorocarbons*
b.	☒	☐	☐	Are any pressurized tanks to be used or any hazardous wastes stored on-site? *Propane tanks, pressurized gas canisters, and other flammable substances*
c.	☐	☒	☐	Are any residential units, schools, or hospitals located within 500 feet and potentially adversely affected?
d.	☐	☐	☒	Have there been previous uses that indicate residual soil toxicity of the site or is the site located within two miles downstream of a known groundwater contamination source within the same watershed? *Past agricultural uses and farming activities; one plugged and abandoned dry hole*
e.	☐	☒	☐	Would the project create a significant hazard to the public or the environment involving the accidental release of hazardous materials into the environment?
f.	☐	☒	☐	Would the project emit hazardous emissions or handle hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
g.	☐	☒	☐	Would the project be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or environment?
h.	☐	☒	☐	Would the project result in a safety hazard for people in a project area located within an airport land use plan, within two miles of a public or public use airport, or within the vicinity of a private airstrip?
i.	☐	☒	☐	Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
j.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES**
☐ Toxic Clean-up Plan

☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact relative to **public safety**?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

OTHER FACTORS - 3. Land Use

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Can the project be found to be inconsistent with the plan designation(s) of the subject property?
b.	☐	☒	☐	Can the project be found to be inconsistent with the zoning designation of the subject property?
c.				Can the project be found to be inconsistent with the following applicable land use criteria:
	☐	☒	☐	Hillside Management Criteria?
	☒	☐	☐	SEA Conformance Criteria?
	☐	☐	☐	Other?
d.	☐	☒	☐	Would the project physically divide an established community?
e.	☒	☐	☐	Other factors? *County green building ordinance*

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **land use** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

OTHER FACTORS - 4. Population/Housing/Employment/Recreation

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Could the project cumulatively exceed official regional or local population projections?
b.	☒	☐	☐	Could the project induce substantial direct or indirect growth in an area (e.g., through projects in an undeveloped area or extension of major infrastructure)? *Commercial development in an undeveloped area; availability of increased renewable energy supply*
c.	☐	☒	☐	Could the project displace existing housing, especially affordable housing?
d.	☐	☒	☐	Could the project result in substantial job/housing imbalance or substantial increase in Vehicle Miles Traveled (VMT)?
e.	☐	☒	☐	Could the project require new or expanded recreational facilities for future residents?
f.	☐	☒	☐	Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?
g.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **population, housing, employment,** or **recreational** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

MANDATORY FINDINGS OF SIGNIFICANCE

Based on this Initial Study, the following findings are made:

	Yes	No	Maybe	
a.	☒	☐	☐	Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory? *Biota, cultural resources*
b.	☒	☐	☐	Does the project have possible environmental effects that are individually limited but cumulatively considerable? "Cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. *Water quality, air quality, visual qualities, traffic/access, utilities, fire/sheriff services*
c.	☒	☐	☐	Will the environmental effects of the project cause substantial adverse effects on human beings, either directly or indirectly? *Geotechnical, flood, fire hazard, environmental safety*

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CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the environment?

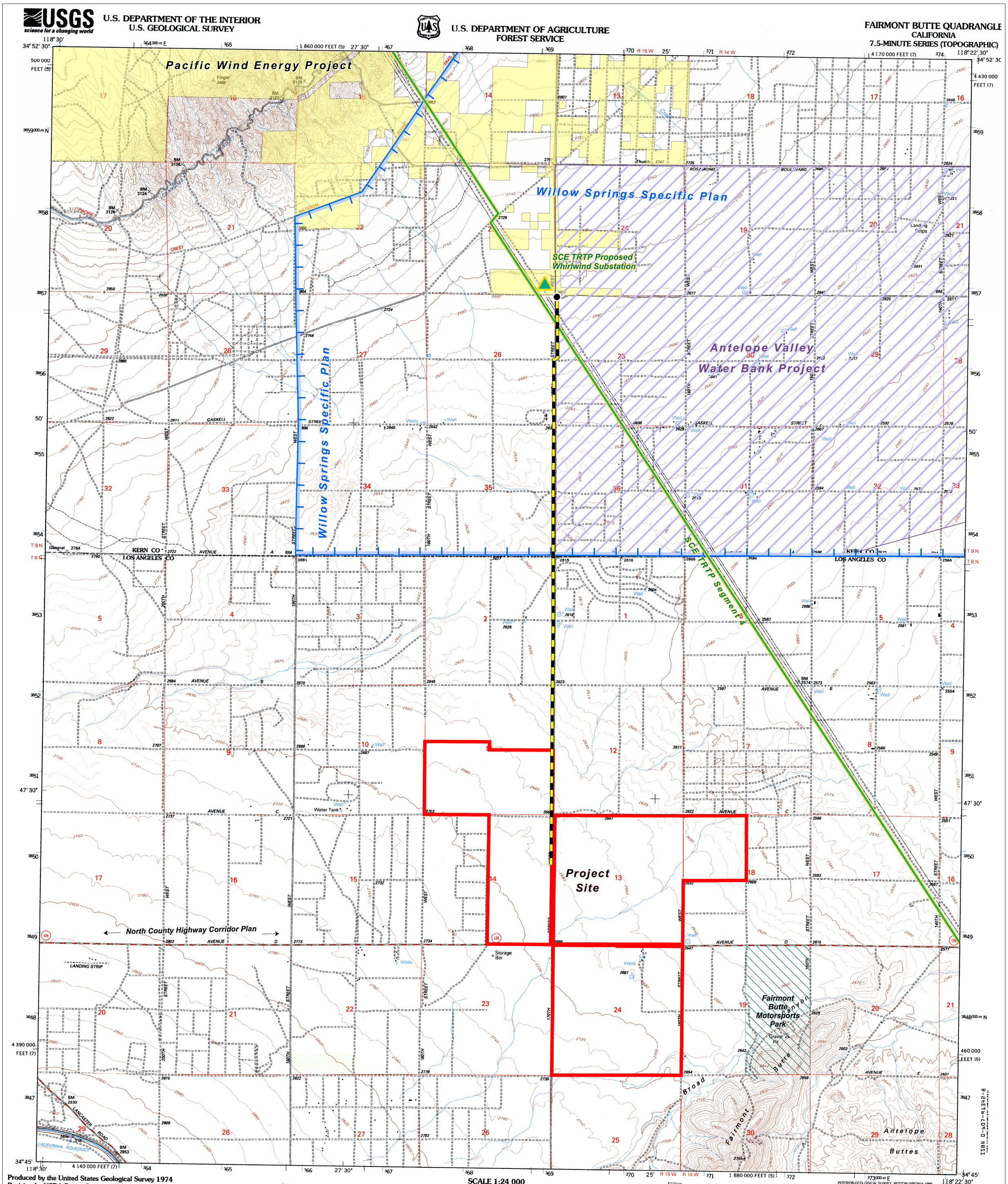
☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

APPENDIX B
BIOTA REPORT GUIDELINES COMPLIANCE CHECKLIST

BIOTA REPORT GUIDELINES COMPLIANCE CHECKLIST

	Page	Preparer's Initials
Setting	Page 3-1	CJ
Original topographical quad sheet (or color photocopy)	Appendix C	CJ
Project site photographs or color photocopies	Appendix H	CJ
Color aerial photographs	Figure 1-3 and Appendix H	CJ
SEA/SERA map	Figure 3-6a	CJ
Biotic survey of the project site	Page 4-1 and Appendix L	CJ
Floral and faunal lists in systematic/alphabetic order	Appendices I and J	CJ
Table of sensitive species impacts matrix	Appendix M	CJ
Document showing CNDDB contact	Appendix G	CJ
Site/grading plans	Figures 2-1, 2-7, and 2-8	CJ
Initial study questionnaire	Appendix A	CJ
Impacts	Page 5-1	CJ
Mitigation measures	Page 6-1	CJ
Mitigation monitoring	Page 6-21	CJ
Preparer's resume/qualifications	Appendix O	CJ

APPENDIX C
FAIRMONT BUTTE USGS QUADRANGLE WITH PROJECT LOCATION AND NEARBY PROJECTS MAPPED



0 0.5 1 Mile

0 2,000 4,000 Feet

1:24,000
1 inch equals 2,000 feet

Source: California Digital Raster Graphics, 7.5 Minute (O) Series, Albers Nad83 Untrimmed provided online by the California Spatial Information Library (CaSIL) and produced by the State of California, Stephen P. Teale Data Center, GIS Solutions Group (Teale) from scanned USGS topographic maps: http://casil.ucdavis.edu/casil/gis.ca.gov/drg.

Legend

- Proposed Transmission Line Route
- Site Boundary

Cumulative Projects

- Energy: Proposed SCE TRTP (Tehachapi Renewable Transmission Project) Whirlwind Substation
- Energy: SCE TRTP Segment 4
- Planned Community: Willow Springs Specific Plan
- Public Services: Antelope Valley Water Bank Project
- Recreation/Commercial: Fairmont Butte Motorsports Park
- Renewable Energy: Pacific Wind Energy Project

AV Solar Ranch One Biota Report

AV SOLAR RANCH ONE
CUMULATIVE PROJECTS

USGS 7.5' FAIRMONT BUTTE QUAD

2009

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APPENDIX D
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

TABLE D-1
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

Common Name	Scientific Name
Acton daisy	*Encelia actoni*
Alfalfa	*Medicago sativa*
Alkali goldenbush	*Isocoma acradenia*
Alkali mariposa lily	*Calochortus striatus*
Allscale	*Atriplex polycarpa*
American badger	*Taxidea taxus*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Carduelis tristis*
American kestrel	*Falco sparverius*
American pipit	*Anthus rubescens*
Anderson's boxthorn	*Lycium andersonii*
Anglestem buckwheat	*Eriogonum angulosum*
Annual bursage	*Ambrosia acanthicarpa*
Argentine ants	*Linepithema humile*
Arizona popcorn flower	*Plagiobothrys arizonicus*
Ash-throated flycatcher	*Myiarchus cinerascens*
Bailey’s buckwheat	*Eriogonum baileyi*
Barn owl	*Tyto alba*
Beavertail cactus	*Opuntia basilaris*
Bermuda grass	*Cynodon dactylon*
Bicolored lupine	*Lupinus bicolor*
Big brown bat	*Eptesicus fuscus*
Big sagebrush	*Artemisia tridentate*
Big squirrel-tail	*Elymus multisetus*
Bigelow's tickseed	*Leptosyne bigelovii*
Bindweed	*Convolvulus arvensis*
Black locust	*Robinia pseudoacacia*
Black mustard	*Brassica nigra*
Black mustard	*Brassica nigra*
Black-tailed jackrabbits	*Lepus californicus*
Blainville's (coast) horned lizard	*Phyrnosoma blainvillii*
Blue dicks	*Dichelostemma capitatum*
Blue grosbeak	*Guiraca caerulea*

TABLE D-1 (CONTINUED)
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

Common Name	Scientific Name
Bombardier beetles	*Family Carabidae*
Botta's pocket gopher	*Thomomys bottae*
Brewer's sparrow	*Spizella breweri*
Brewer's blackbird	*Euphagus cyanocephalus*
Broad fruited combseed	*Pectocarya platycarpa*
Brownplume wirelettuce	*Stephanomeria pauciflora*
Bulbous barley	*Hordeum murinum*
Bullock's oriole	*Icterus bullockii*
Burrowing owl	*Athene cunicularia*
Cactus wren	*Campylorhynchus brunneicapillus*
California buckwheat	*Eriogonum fasciculatum* var. *polifolium*
California burclover	*Medicago polymorpha*
California condor	*Gymnogyps californianus*
California dandelion	*Malacothrix californica*
California goldfields	*Lasthenia californica*
California ground squirrel	*Spermophylis beecheyi*
California kingsnake	*Lampropeltis getula*
California milkweed	*Asclepias californica*
California myotis	*Myotis californicus*
California poppy	*Eschscholzia californica*
California primrose	*Oenothera californica*
California quail	*Callipepla californica*
Canyon bat	*Parastrellus Hesperus*
Carrot	*Daucus carota*
Cattle spinach	*Atriplex polycarpa*
Chamise	*Adenostoma fasciculatum*
Chaparral sand-verbena	*Abronia villosa* var. *aurita*
Cheatgrass	*Bromus tectorum*
Cheese bush	*Hymenoclea salsola*
Cheesebush	*Ambrosia salsola*
Chick lupine	*Lupinus microcarpus*
Chilean cheat grass	*Bromus trinii*
Chipping sparrow	*Spizella passerina*

TABLE D-1 (CONTINUED)
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

Common Name	Scientific Name
Cliff swallow	*Petrochelidon pyrrhonota*
Coachwhip	*Masticophis flagellum*
Comet blazing star	*Mentzelia albicaulis*
Common knotweed	*Polygonum aviculare* ssp. *depressum*
Common phacelia	*Phacelia distans*
Common raven	*Corvus corax*
Common sandaster	*Corethrogyne filaginifolia*
Common sunflower	*Helianthus annuus*
Cooper's goldenbush	*Ericameria cooperi*
Coopers' boxthorn	*Lycium cooperi*
Coyote	*Canus latrans*
Cream cups	*Platystemon californicus*
Creosote bush	*Larrea tridentata*
Cushion cryptantha	*Cryptantha circumscissa*
Davidson buckwheat	*Eriogonum davidsonii*
Deer	*Odocoileus hemionus* ssp. *fuliginatus*
Desert cottontail	*Sylvilagus audubonii*
Desert dandelion	*Malacothrix glabrata*
Desert horned lizard	*Phyrnosoma platyrhinos*
Desert kit fox	*Vulpes macrotis arsipus*
Desert needlegrass	*Achnatherum speciosum*
Desert pincushion	*Chaenactis fremontii*
Desert redmaids	*Cistanthe ambigua*
Desert senna	*Cassia armata*
Desert tidy tips	*Layia glandulosa*
Desert tortoise	*Gopherus agassizii*
Desert woodrat	*Neotoma lepida*
Dock	*Rumex hymenosepalus*
Dodder	*Cuscuta* spp.
Domestic dog	*Canus lupus* ssp. *familiaris*
Domestic sheep	*Ovis aries*
Doveweed	*Croton setigerus*
Ephedra	*Ephedra nevadensis*

TABLE D-1 (CONTINUED)
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

Common Name	Scientific Name
Eurasian collared-dove	*Streptopelia decaocto*
European starling	*Sturnus vulgaris*
Ferruginous hawk	*Buteo regalis*
Fiddleneck	*Amsinckia tessellata*
Flix weed	*Descurainia sophia*
Flycatcher	*Empidonax* spp.
Four-wing saltbush	*Atriplex canescens*
Freckled milk vetch	*Astragalus lentiginosus* var. *variabilis*
Giant reed	*Arundo donax*
Golden eagle	*Aquila chrysaetos*
Goldfields	*Lasthenia californica*
Gopher snake	*Pituophis catenifer*
Grape soda lupine	*Lupinus excubitus*
Grasshopper	*Family Acrididae*
Great Basin collared lizard	*Crotaphytus bicinctores*
Great Basin vesper sparrow	*Pooectees gramineus confinis*
Great Basin whiptail	*Aspidoscelis tigris* ssp. *tigris*
Greata's aster	*Symphyotrichum greatae*
Greater roadrunner	*Geococcyx californianus*
Green rabbitbrush	*Ericameria teretifolia*
Harvester ant	*Pogonomyrmex barbatus*
Hoary bat	*Lasiurus cinereus*
Horehound	*Marrubium vulgare*
Horn's milk-vetch	*Astragalus hornii* var. *hornii*
Horned lark	*Eremophila alpestris*
Horseweed	*Conyza canadensis*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
Indian rice grass	*Achnatherum hymenoides*
Interior goldenbush	*Ericameria linearifolia*
Jacumba milk vetch	*Astragalus douglasii*
Jimson weed	*Datura wrightii*
Joshua tree	*Yucca brevifolia*

TABLE D-1 (CONTINUED)
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

Common Name	Scientific Name
Juniper	*Juniperus* sp.
Kangaroo rat	*Dipodomys* sp.
Kellogg's tarweed	*Deinandra kelloggii*
Killdeer	*Charadrius vociferus*
Kusche's sandwort	*Arenaria macradenia* var. *kuschei*
Lark sparrow	*Chondestes grammacus*
Lawrence's goldfinch	*Carduelis lawrencei*
Lazuli bunting	*Passerina amoena*
Le Conte's thrasher	*Toxostoma lecontei*
Leafy fleabane	*Erigeron foliosus*
Lemmon's lessingia	*Lessingia lemmonii*
Lesser goldfinch	*Carduelis psaltria*
Little gilia	*Gilia minor*
Little golden poppy	*Eschscholzia minutiflora*
Lodgepole chipmunk	*Neotamias speciosus* ssp. *speciosus*
Loggerhead shrike	*Lanius ludovicianus*
Long-eared owl	*Asio otus*
Long-nosed leopard lizard	*Gambella wislizenii*
Lupine	*lupinus* sp.
Mediterranean grass	*Schismus barbatus*
Menzies' fiddleneck	*Amsinckia menziesii*
Merlin	*Falco columbarius*
Merriam's kangaroo rat	*Dipodomys merriami*
Mexican free-tailed bat	*Tadarida brasiliensis*
Miniature lupine, Bicolored lupine	*Lupinus bicolor*
Mohave ground squirrel	*Spermophilus mohavensis*
Mojave Horsebrush	*Tetradymia stenolepis*
Mojave prickly-pear	*Opuntia mojavensis*
Mojave rattlesnake	*Crotalus scutulatus*
Mojave sun cup	*Camissonia campestris*
Mojave thistle	*Cirsium mohavense*
Mountain bluebird	*Sialia currucoides*
Mountain lion	*Puma concolor*

TABLE D-1 (CONTINUED)
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

Common Name	Scientific Name
Mountain plover	*Charadrius montanus*
Mountain plover	*Charadrius montanus*
Mountain tansy mustard	*Descurainia incise*
Mourning dove	*Zenaida macroura*
Mustard	*Sisymbrium, Hirschfeldia,* and *Brassica* spp.
Narrowflower flaxflower	*Leptosiphon liniflorus*
Northern harrier	*Circus cyaneus*
Northern mockingbird	*Mimus polyglottos*
One sided blue grass	*Poa secunda*
Oregon vesper sparrow	*Pooecetes gramineus* ssp. *affinis*
Oriental mustard	*Sisymbrium orientale*
Pale yellow sun cup	*Camissonia pallida*
Pale-yellow layia	*Layia heterotricha*
Pallid bat	*Antrozous pallidus*
Palmer's grapplinghook	*Harpagonella palmeri*
Peirson's morning-glory	*Calystegia peirsonii*
Peninsular pectocarya	*Pectocarya peninsularis*
Penstemon	*Penstemon heterophyllus*
Pineapple weed	*Matricaria matricarioides*
Pistachio	*Pistacia* spp.
Povertyweed	*Iva axillaris* ssp. *Robustior*
Prairie falcon	*Falco mexicanus*
Prickly lettuce	*Lactuca serriola*
Prickly poppy	*Argemone munita*
Pronghorn antelope	*Antilocarpa americana*
Purple needlegrass	*Nassella pulchra*
Purple owl's clover	*Castilleja exserta*
Rattail fescue	*Vulpia myuros*
Rattlesnake weed	*Chamaesyce albomarginata*
Raven's primrose	*Camissonia pusilla*
Rayless goldenhead	*Acamptopappus sphaerocephalus*
Red brome	*Bromus madritensis* ssp. *rubens*
Red coachwhip	*Masticophis flagellum piceus*

TABLE D-1 (CONTINUED)
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

Common Name	Scientific Name
Red-spotted toad	*Anaxyrus punctatus*
Red-stem filaree	*Erodium cicutarium*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Rescue brome	*Bromus catharticus*
Ripgut brome	*Bromus diandrus*
Rock pigeon	*Columba livia*
Rock wren	*Salpinctes obsoletus*
Round-leaved filaree	*California macrophylla*
Rubber rabbitbrush	*Ericameria nauseosa*
Russian thistle	*Salsola tragus*
Rye	*Secale cereal*
Sage sparrow	*Amphispiza belli*
Saltbush	*Atriplex* spp.
San Fernando Valley spineflower	*Chorizanthe parryi* var. *fernandina*
Sapphire woolystar	*Eriastrum sapphirinum*
Savannah sparrow	*Passerculus sandwichensis*
Schott's calico	*Loeseliastrum schottii*
Shepard's purse	*Capsella bursa-pastoris*
Short-eared owl	*Asio flammeus*
Short-joint beavertail	*Opuntia basilaris* var. *brachyclada*
Siberian elm	*Ulmus pumila*
Side-blotched lizard	*Uta stansburiana*
Silver puffs	*Uropappus lindleyi*
Slender comb seed	*Pectocarya linearis* ssp. *ferocula*
Slender keel fruit	*Tropidocarpum gracile*
Small fescue	*Vulpia microstachys*
Small flowered nemacladus	*Nemacladus sigmoideus*
Small wirelettuce	*Stephanomeria exigua*
Smallflower tamarisk	*Tamarix parviflora*
Smilo grass	*Piptatherum miliaceum*
Soft chess	*Bromus hordeaceus*
Southern grasshopper mouse	*Onychomys torridus*

TABLE D-1 (CONTINUED)
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

Common Name	Scientific Name
Southwestern pond turtle	*Actinemys marmorata* ssp. *pallida*
Spiny hopsage	*Grayia spinosa*
Sticky matchweed	*Gutierezzia microcephala*
Strigose sun cup	*Camissonia strigulosa*
Summer mustard	*Hirschfeldia incana*
Swainson's hawk	*Buteo swainsoni*
Tarragon	*Artemisia dracunculus*
Tehachapi pocket mouse	*Perognathus alticolus* ssp. *inexpectatus*
Townsend's big-eared bat	*Corynorhinus townsendii*
Townsend's warbler	*Dendroica townsendi*
Tree swallow	*Tachycineta bicolor*
Tricolored blackbird	*Agelaius tricolor*
Tumble mustard	*Sisymbrium altissimum*
Valley popcorn flower	*Plagiobothrys canescens*
Vaux's swift	*Chaetura vauxi*
Velvet ant	*Dasymutilla occidentalis*
Vesper sparrow	*Pooecetes gramineus*
Virgate wire lettuce	*Stephanomeria virgata*
Watson's spineflower	*Chorizanthe watsonii*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella neglecta*
Western spadefoot toad	*Spea hammondii*
Western tanager	*Piranga ludoviciana*
Western tansy mustard	*Descurainia pinnata*
Wheat	*Triticum aestivum*
Whimbrel	*Numenius phaeopus*
White pygmy-poppy	*Canbya candida*
White-crowned sparrow	*Zonotrichia leucophrys*
White-tailed antelope squirrel	*Ammospermophilius leucurus*
White-tailed kite	*Elanus leucurus*
White-throated swift	*Hirundapus caudacutus*
Wild cucumber	*Marah macrocarpus*
Wild heliotrope	*Heliotropium curassavicum*

TABLE D-1 (CONTINUED)
GUIDE TO COMMON AND SCIENTIFIC NOMENCLATURE USED IN THIS BIOTA REPORT

Common Name	Scientific Name
Wild licorice	*Glycyrrhiza lepidota*
Wild oat	*Avena fatua*
Winged cryptantha	*Cryptantha angustifolia*
Winter fat	*Krascheninnikovia lanata*
Wirelettuce	*Stephanomeria exigua*
Wishbone bush	*Mirabilis laevis*
Wooly sunflower	*Eriophyllum wallacei/pringle*
Yellow pincushion	*Chaenactis glabriuscula*
Yellow warbler	*Dendroica petechia*
Yellow-backed desert spiny lizard	*Sceloporus magister* ssp. *uniformis*
Yellow-breasted chat	*Icteria virens*
Yellow-rumped warbler	*Dendroica coronata*
Yucca moth	*Tegeticula* spp.
Yucca night lizard	*Xanatusia vigilis vigilis*

APPENDIX E
CONSTRUCTION EQUIPMENT, TRUCK DELIVERIES, AND WORKPLACE DETAILS

This appendix presents additional construction phase details for the proposed AV Solar Ranch One Project in support of the Project Description presented in Section 2.0 of the Biota Report. This appendix includes the following tables:

- Table E-1: Project Schedule Major Milestones
- Table E-2A: Estimated Construction Equipment Usage – 8 MW Per Month
- Table E-2B: Estimated Construction Equipment Usage – 15 MW Per Month
- Table E-3A: Estimated Construction Deliveries Schedule – 8 MW Per Month
- Table E-3B: Estimated Construction Deliveries Schedule – 15 MW Per Month
- Table E-4: Construction Trade Projections – 8 MW Per Month
- Table E-4: Construction Trade Projections – 15 MW Per Month

TABLE E-1
PROJECT SCHEDULE MAJOR MILESTONES

Activity	Date
Begin construction	Fourth quarter 2010
Initial energy delivery	Third quarter 2011
Commercial operation	Fourth quarter 2013

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TABLE E-2A
ESTIMATED CONSTRUCTION EQUIPMENT USAGE – 8 MW PER MONTH

Construction Equipment Description	HP	Construction Duration in Months/Equipment Pieces per Month																																							Total Pieces per Month	Total Hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Truck Tractor	275	0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	619
Line Truck	220	0	0	0	0	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	825
Pressure Digger (Truck Mounted)	220	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	248
Truck (1 ton) Conductor Reel Trailer	220	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Truck (1 ton) Wire Puller/Tensioner	220	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Truck (1 ton) Trailer	220	0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	248
Crane (100T)[1]	290	0	0	0	0	0	0	2	3	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	536
High Reach Bucket Truck (1 ton)	220	0	0	0	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	545
Hydraulic Auger Drill	200	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	83
Backhoe (CAT-225)	135	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	578
Forklift (10T)[3]	100	0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	215
Portable Welding Machine[4]	50	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	1,485
Plate Compactor[2,4]	5	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	25
Wheel Loader (CAT 950)	130	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	578
Conveyor Truck for Rock/Sand	250	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Concrete Pump Truck	250	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Manlift (Scissors)	30	0	0	0	0	5	6	6	6	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	2,145
AC Paver	200	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	83
Carry Lift, Pettibone	100	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	330
Hydraulic Mobile Crane (35T)	175	0	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	660
Scraper, Cat 621B	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1 ton), Maintenance	220	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	578
Fuel Truck	220	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	330
Grader (CAT-12)	135	0	1	1	1	1	0	0	1	1	1	0	1	1	2	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	22	1,815
Excavator, Cat 235	195	0	1	1	1	1	0	0	1	1	1	0	1	1	2	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	22	1,815
Dozer (D-8)	300	0	1	1	0	0	0	0	1	1	1	0	1	1	2	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	20	1,650
Dump Truck (15cy)	275	0	3	3	4	2	1	1	2	2	1	0	4	4	2	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	40	2,574
Compactor (Bomag BW211)	130	0	0	1	2	2	1	0	1	1	1	0	1	1	2	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	24	1,782
Water Truck, 4,000 gal	220	0	1	1	1	1	0	0	1	1	1	1	2	2	3	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	60	4,950

TABLE E-2A (CONTINUED)
ESTIMATED CONSTRUCTION EQUIPMENT USAGE – 8 MW PER MONTH

Construction Equipment Description	HP	Construction Duration in Months/Equipment Pieces per Month																																									Total Pieces per Month	Total Hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Concrete Truck	250	0	0	0	3	1	2	4	5	1	1	1	2	2	3	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	70	5,775
Case Backhoe/Front End Loader (580)	90	0	0	0	0	0	0	0	2	2	2	2	4	4	6	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	112	9,240
Hydraulic Mobile Crane (15T)	130	0	0	0	0	0	1	1	3	3	3	3	4	4	6	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	118	9,735
Grade All	100	0	1	2	0	2	2	2	3	1	1	1	2	2	3	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	67	5,528
Flatbed – Stake Body Truck	220	0	0	0	2	2	2	5	10	10	10	7	12	12	15	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	10	10	10	10	5	5	5	0	312	25,740
Crawler Trencher	180	0	0	0	0	0	0	1	2	2	1	1	2	2	3	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	0	59	4,670
Pick Up Truck[4]	150	0	1	1	3	2	2	5	5	5	5	26	26	26	24	48	48	72	72	48	48	48	24	24	24	48	48	48	48	48	48	48	48	48	48	48	24	24	24	0	1,019	84,068
Project Totals	0	16	17	29	29	27	44	64	51	47	50	69	66	73	92	92	116	116	79	74	74	55	55	55	74	92	92	92	92	92	92	74	74	74	74	37	37	37	0	0	2,110	170,107

[1] Based on 25 percent utilization.

[2] Based on 5 percent utilization.

[3] Based on 10 percent utilization.

[4] Gasoline engine.

TABLE E-2B
ESTIMATED CONSTRUCTION EQUIPMENT USAGE – 15 MW PER MONTH

Construction Equipment Description	HP	Construction Duration in Months/Equipment Pieces per Month																																							Total Pieces per Month	Total Hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Truck Tractor	275	0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	619
Line Truck	220	0	0	0	0	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	825
Pressure Digger (Truck Mounted)	220	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	248
Truck (1 ton) Conductor Reel Trailer	220	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Truck (1 ton) Wire Puller/Tensioner	220	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Truck (1 ton) Trailer	220	0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	248
Crane (100T)[1]	290	0	0	0	0	0	0	2	3	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	536
High Reach Bucket Truck (1 ton)	220	0	0	0	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	545
Hydraulic Auger Drill	200	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	83
Backhoe (CAT-225)	135	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	578
Forklift (10T)[3]	100	0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	215
Portable Welding Machine[4]	50	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	1,485
Plate Compactor[2,4]	5	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	25
Wheel Loader (CAT 950)	130	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	578
Conveyor Truck for Rock/Sand	250	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Concrete Pump Truck	250	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	165
Manlift (Scissors)	30	0	0	0	0	5	6	6	6	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	2,145
AC Paver	200	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	83
Carry Lift, Pettibone	100	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	330
Hydraulic Mobile Crane (35T)	175	0	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	660
Scraper, Cat 621B	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck (1 ton), Maintenance	220	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	578

TABLE E-2B (CONTINUED)
ESTIMATED CONSTRUCTION EQUIPMENT USAGE – 15 MW PER MONTH

Construction Equipment Description	HP	Construction Duration in Months/Equipment Pieces per Month																																							Total Pieces per Month	Total Hours
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Fuel Truck	220	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	330
Grader (CAT-12)	135	0	1	1	1	1	0	0	1	2	3	2	2	3	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	1,815
Excavator, Cat 235	195	0	1	1	1	1	0	0	1	2	3	2	2	3	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	1,815
Dozer (D-8)	300	0	1	1	0	0	0	0	1	2	3	2	2	3	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	1,650
Dump Truck (15cy)	275	0	3	3	4	2	1	1	2	3	3	2	5	6	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2,574
Compactor (Bomag BW211)	130	0	0	1	2	2	1	0	1	2	3	2	2	3	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	1,782
Water Truck, 4,000 gal	220	0	1	1	1	1	0	0	1	2	3	3	4	5	6	6	6	6	6	4	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	4,950
Concrete Truck	250	0	0	0	3	1	2	4	5	2	3	3	4	5	6	6	6	6	6	4	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	5,775
Case Backhoe/Front End Loader (580)	90	0	0	0	0	0	0	0	2	4	6	6	8	10	12	12	12	12	12	8	8	8	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	9,240
Hydraulic Mobile Crane (15T)	130	0	0	0	0	0	1	1	3	5	7	7	8	10	12	12	12	12	12	8	8	8	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	9,735
Grade All	100	0	1	2	0	2	2	2	3	2	3	3	4	5	6	6	6	6	6	4	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	5,528
Flatbed – Stake Body Truck	220	0	0	0	2	2	2	5	10	15	20	17	22	27	30	30	30	30	30	20	20	20	15	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	312	25,740
Crawler Trencher	180	0	0	0	0	0	0	1	2	3	3	3	4	5	6	6	6	6	6	4	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	4,670
Pick Up Truck[4]	150	0	1	1	3	2	2	5	5	5	5	26	50	74	72	96	120	144	144	96	96	96	72	48	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,019	84,068
Project Totals		0	16	17	29	29	27	44	64	69	83	86	124	163	170	189	203	222	222	148	148	148	111	74	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,110	170,107

[1] Based on 25 percent utilization.

[2] Based on 5 percent utilization.

[3] Based on 10 percent utilization.

[4] Gasoline engine.

TABLE E-3A
ESTIMATED CONSTRUCTION DELIVERIES SCHEDULE – 8 MW PER MONTH

Construction Equipment Description	HP	Construction Deliveries per Month																																									Total Pieces per Month
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
Light Weight and Delivery Trucks[1]	200	0	11	11	16	16	16	19	33	33	33	31	55	55	72	72	72	72	72	48	48	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	0	1,721
Truck Tractor	275	0	37	37	43	43	17	42	46	36	26	26	50	50	72	72	72	72	72	48	48	48	48	48	48	48	72	72	72	72	72	72	48	48	48	48	24	24	24	0	1,845
Concrete Batch Deliveries	27	0	0	0	61	3	6	73	236	163	163	163	326	326	489	489	489	489	489	326	326	326	326	326	326	326	489	489	489	489	489	489	326	326	326	326	163	163	163	0	10,974
Totals		0	48	48	120	62	39	134	315	232	222	220	431	431	633	633	633	633	633	422	422	422	422	422	422	422	633	633	633	633	633	633	422	422	422	422	211	211	211	0	14,540

[1] Gasoline engine.

TABLE E-3B
ESTIMATED CONSTRUCTION DELIVERIES SCHEDULE – 15 MW PER MONTH

Construction Equipment Description	HP	Construction Deliveries per Month																																								Total Pieces per Month
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
Light Weight and Delivery Trucks[1]	200	0	11	11	16	16	16	19	33	57	81	79	103	127	144	144	144	144	144	96	96	96	72	48	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,721
Truck Tractor	275	0	37	37	43	43	17	42	46	60	74	74	98	122	144	144	144	144	144	96	96	96	72	48	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,845
Concrete Batch Deliveries	27	0	0	0	61	3	6	73	236	326	489	489	652	815	978	978	978	978	978	652	652	652	489	326	163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10,974
Totals		0	48	48	120	62	39	134	315	443	644	642	853	1,064	1,266	1,266	1,266	1,266	1,266	844	844	844	633	422	211	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14,540

[1] Gasoline engine.

TABLE E-4A
CONSTRUCTION TRADE PROJECTIONS – 8 MW PER MONTH

	Construction Trade and Field Non-labor Resources per Month																																							Total Worker-Months
Construction Trade	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
Journeyman Lineman	0	0	0	0	0	0	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
Apprentice Lineman	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
Groundman/Helper	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Operating Engineers	0	19	18	18	17	6	13	18	18	18	9	14	14	15	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	10	10	10	10	5	5	5	0	472
Carpenters	0	0	0	0	12	4	0	2	2	2	2	4	4	6	6	6	6	6	4	4	4	4	4	4	4	6	6	6	6	6	6	4	4	4	4	2	2	2	0	148
Cement Masons	0	0	0	2	18	28	5	5	5	5	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74
Foundationman	0	0	0	0	0	0	0	6	6	6	6	12	12	18	18	18	18	18	12	12	12	12	12	12	12	18	18	18	18	18	18	12	12	12	12	6	6	6	0	396
Electricians	0	0	0	4	8	8	8	62	62	66	68	118	118	150	150	150	150	150	100	100	100	100	100	100	100	150	150	150	150	150	150	100	100	100	100	50	50	50	0	3422
Trackerman	0	0	0	0	0	0	0	20	20	20	20	40	40	60	60	60	60	60	40	40	40	40	40	40	40	60	60	60	60	60	60	40	40	40	40	20	20	20	0	1320
Iron Workers/Sheetmetal	0	0	0	6	6	20	20	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66
Laborers	0	23	18	21	21	12	9	15	15	11	11	17	17	18	18	18	18	18	12	12	12	12	12	12	12	18	18	18	12	12	12	6	6	6	6	0	0	0	0	478
Miscellaneous Crews	0	0	0	0	0	20	20	30	30	30	10	20	20	30	30	30	30	30	20	20	20	20	20	20	20	30	30	30	30	30	30	20	20	20	20	10	10	10	0	760
Painters	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Pipefitters/Plumbers	0	0	0	0	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
Teamsters	0	2	12	13	12	12	12	12	12	12	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105
Technicians	0	0	0	2	2	2	6	10	14	14	10	14	14	12	12	12	12	12	8	8	8	8	8	8	8	12	12	12	12	12	12	8	8	8	8	4	4	4	0	320
Area Craft Labor (Worker-Months)	0	44	48	66	98	114	108	209	199	199	140	243	243	309	309	309	309	309	206	206	206	206	206	206	206	309	309	309	303	303	303	200	200	200	200	97	97	97	0	7,625
Field Non-Manual	0	8	8	15	15	15	18	26	26	25	18	26	26	32	32	32	24	24	16	16	16	16	16	16	16	24	24	24	24	24	24	16	16	16	16	8	8	8	9	720
Area Manpower (Worker-Months)	0	52	56	81	113	129	126	235	225	224	158	269	269	341	341	341	333	333	222	222	222	222	222	222	222	333	333	333	327	327	327	216	216	216	216	105	105	105	9	9,550

Note: Unless noted, construction worker-hours are based on assumed 165 hours per month.

TABLE E-4B
CONSTRUCTION TRADE PROJECTIONS – 15 MW PER MONTH

	Construction Trade and Field Non-labor Resources per Month																																							Total Worker-Months
Construction Trade	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
Journeyman Lineman	0	0	0	0	0	0	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
Apprentice Lineman	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
Groundman/Helper	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Operating Engineers	0	19	18	18	17	6	13	18	23	28	19	24	29	30	30	30	30	30	20	20	20	15	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	472
Carpenters	0	0	0	0	12	4	0	2	4	6	6	8	10	12	12	12	12	12	8	8	8	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148
Cement Masons	0	0	0	2	18	28	5	5	5	5	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74
Foundationman	0	0	0	0	0	0	0	6	12	18	18	24	30	36	36	36	36	36	24	24	24	18	12	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	396
Electricians	0	0	0	4	8	8	8	62	112	166	168	218	268	300	300	300	300	300	200	200	200	150	100	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3422
Trackerman	0	0	0	0	0	0	0	20	40	60	60	80	100	120	120	120	120	120	80	80	80	60	40	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1320
Iron Workers/Sheetmetal	0	0	0	6	6	20	20	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66
Laborers	0	23	18	21	21	12	9	15	21	23	23	29	35	30	30	30	30	30	18	18	18	12	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	478
Miscellaneous Crews	0	0	0	0	0	20	20	30	40	50	30	40	50	60	60	60	60	60	40	40	40	30	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	760
Painters	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Pipefitters/Plumbers	0	0	0	0	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
Teamsters	0	2	12	13	12	12	12	12	12	12	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105
Technicians	0	0	0	2	2	2	6	10	18	22	18	22	26	24	24	24	24	24	16	16	16	12	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320
Area Craft Labor (Worker-Months)	0	44	48	66	98	114	108	209	302	405	346	449	552	612	612	612	612	612	406	406	406	303	200	103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,625
Field Non-Manual	0	8	8	15	15	15	18	26	34	41	34	42	50	56	56	56	48	48	32	32	32	24	16	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	711
Area Manpower (Worker-Months)	0	52	56	81	113	129	126	235	336	446	380	491	602	668	668	668	660	660	438	438	438	327	216	111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,541

Note: Unless noted, construction worker-hours are based on assumed 165 hours per month.

APPENDIX F
JURISDICTIONAL DELINEATION REPORT

DRAFT
WETLAND DELINEATION AND JURISDICTIONAL DETERMINATION REPORT

FOR THE

AV SOLAR RANCH ONE PROJECT
LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

AV Solar Ranch 1, LLC
101 California Street, Suite 2450
San Francisco, CA 94111

Prepared by:

URS
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Project No. 28907103

August 2009

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SECTION 1.0
INTRODUCTION

On behalf of AV Solar Ranch 1, LLC URS Corporation (URS) has prepared this Wetland Delineation and Jurisdictional Determination Report for the AV Solar Ranch One Project site located in Los Angeles County, California. This report assesses and delineates U.S. Army Corps of Engineers (USACE) jurisdictional waters of the U.S. including wetlands, Regional Water Quality Control Board (RWQCB) waters of the state, and California Department of Fish and Game (CDFG) jurisdictional streams and wetlands.

1.1 PROJECT LOCATION

The proposed AV Solar Ranch One (Project) site is located in the Antelope Valley, in unincorporated Los Angeles County, approximately 15 miles northwest of the City of Lancaster (see Figure 1). The Project site can be accessed from Interstate 5 (I-5) or State Route 14 (SR-14) via SR-138 (West Avenue D) from the west and east, respectively. The property consists of approximately 2,100 acres, and is located within Sections 11, 13, 14, and 24 in Township 8 North, Range 15 West, and within Section 18 in Township 8 North, Range 14 West (San Bernardino Base and Meridian) (see Figure 2). This site occupies an area both north and south of SR-138, and is approximately bounded on the north by West Avenue B-8, on the south by West Avenue E, on the east by 155th Street West and on the west by 180th Street West. Most of the Project site is undeveloped or had been used for agricultural production since the 1940s, and includes a residential ranch area.

A small portion of the site overlaps the existing Joshua Tree Woodland Habitat (JTWH) Significant Ecological Area (SEA) (SEA #60). The area surrounding the Project site is similar to the site itself and generally consists of agricultural or undeveloped land with occasional residential or farm-related structures. Fairmont Butte is near the southeast corner of the property, and the Antelope Valley Poppy Reserve (Poppy Reserve) is located approximately 1.5 miles to the southeast. Santa Monica Mountains Conservancy land is located approximately 0.5 to 1 mile to the southeast, and includes a portion of Fairmont Butte. Arthur B. Ripley Desert Woodland State Park is located approximately 2.5 miles to the southwest, and SEA #60 is also adjacent to the Project on the north and east.

The proposed Project transmission line is approximately 4.25 miles long, and is proposed to run along the right-of-way (ROW) of 170th Street West to interconnect to Southern California Edison's (SCE) planned Whirlwind Substation north of the Project site in southern Kern County. The northern portion of the proposed transmission line route (approximately 2 miles) is located in southern Kern County and generally consists of agricultural land within the Willow Springs Specific Plan area. The route is adjacent to the Antelope Valley Water Bank Project area located immediately to the east.

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1.2 PROJECT DESCRIPTION

The proposed Project consists of a 230-megawatt (MW) solar photovoltaic (PV) facility on 2,100 acres of primarily vacant land located in northern Los Angeles County. Major project components include PV panel arrays, an electrical substation, and a 20,000 square-foot Operations and Maintenance building with associated parking. The Project also includes a 230-kilovolt (kV) transmission line for interconnecting the electrical output of the Project to the regional transmission system. The proposed transmission line is approximately 4.25 miles long, and will interconnect to SCE's planned Whirlwind Substation north of the Project site in southern Kern County. The Project is currently planned to begin construction in the fourth quarter of 2010 and to be completed by the fourth quarter of 2013.

1.3 BIOLOGICAL SETTING

The Project site is zoned A-2, a heavy agricultural designation used for commercial agricultural operations on parcels exceeding two acres in size. The majority of the Project site was used for agricultural production between the 1940s and 1990s, and the vegetation on-site is in the process of recovering from this chronic disturbance. Early successional communities such as California annual grasslands have colonized the previously farmed fields, and shrub-dominated communities have developed as well. In one small area in the northern portion of the site, Joshua tree seedlings have taken root. Currently, the only agricultural uses on-site include a pistachio root stock orchard and a ranch area supporting one occupied residence. The last crop was grown on the site in 2004, on an 80-acre area south of the existing on-site ranch house and orchard. The Project site is not adjacent to existing development, and is bordered by undeveloped lands and agricultural areas in all directions. The proposed transmission line route is approximately 3.5 miles in length, and follows 170th Street West in a northerly direction to the planned SCE Whirlwind Substation in Kern County. The proposed route is entirely contained within the County road ROW.

1.4 EXISTING CONDITIONS

1.4.1 Vegetation

The Project site is located within the Mojave Desert geographical region (Sawyer Keeler-Wolf 1995), a unique vegetation region. Six natural vegetation communities occur on the Project site and along the proposed transmission line. They include rabbitbrush scrub, California annual grassland, Joshua tree woodland, Joshua tree recruitment area, wildflower field, and desert saltbush scrub. In addition, four disturbed or human converted vegetation community occurs on the Project site – orchard, agriculture, ornamental, and ruderal.

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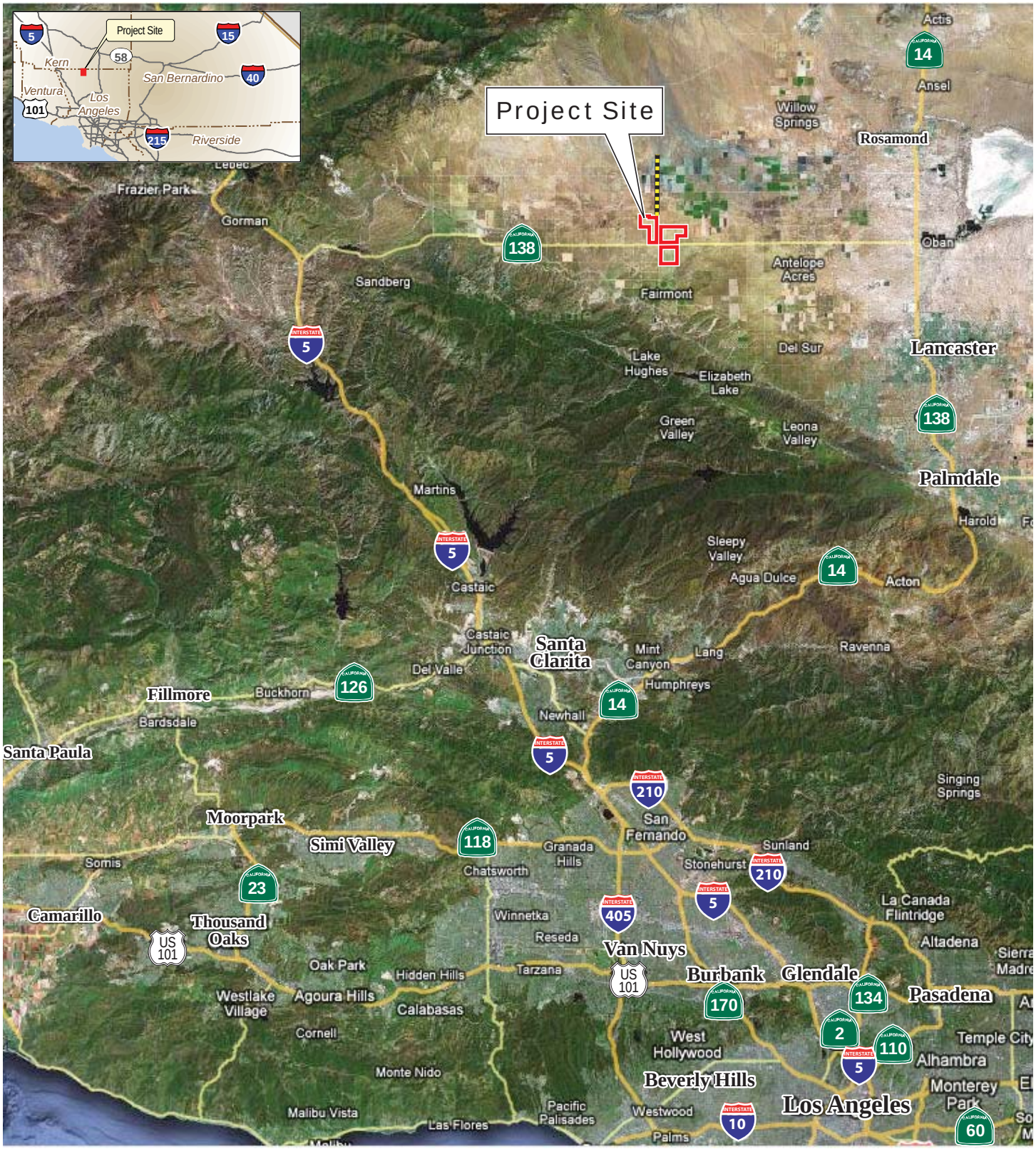
T/Ladd/NextLight/WetlandDelineation/109-012A



Legend

Project Site Boundary

Proposed Transmission Line Route

Source: Google Imagery (2009).

1 inch equals 8 miles

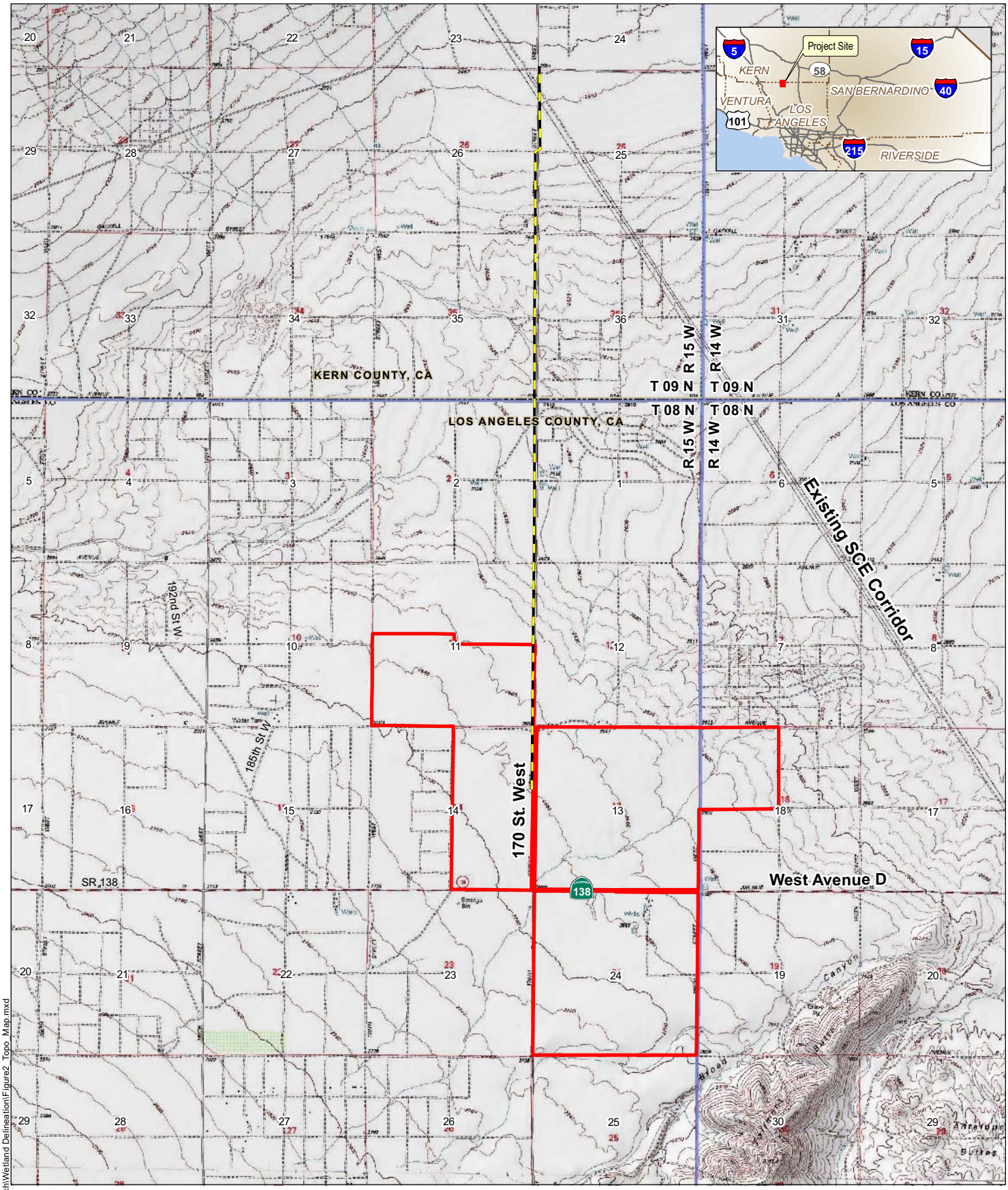
0 4 8 12 16

miles

July, 2009

AV Solar Ranch One

Figure 1. Project Vicinity Map



Legend

- Project Site Boundary
- Proposed Transmission Line Route
- Township Range Boundary
- County Line

1:50,688

1 inch = 0.8 mile

0 0.25 0.5 1 Mile

0 2,000 4,000 8,000 Feet

Coordinate System: North American Datum 83 Universal Trans Mercator (UTM) Zone 11 North

July, 2009

Source: [1] U.S.G.S 7.5' topographic quadrangles (2005), [2] ESRI StreetMap USA (2007).

AV Solar Ranch One

Figure 2. Site Location Topographic Map

T:\NextLight_Solar\deliverables\LarsenRanch\Wetland Delineation\Figure2_Topo_Map.mxd

1.4.2 Soils

The Project site is located in the western Antelope Valley which is characterized by relatively flat-lying topography and valley fill deposits. The Soil Survey for Antelope Valley Area, California (USDA-NRCS SSURGO 2007) indicates twelve soil types occur on the Project site. The twelve soils fall into five soil series: Greenfield, Hanford, Hesperia, Ramona, Rosamond, and are described below. None of the soil series within the Project site are identified as hydric soils by the Soil Survey.

1.4.3 Drainages

The Project site is within the Antelope hydrologic unit (hu) of the South Lahontan hydrologic region (hr). More specifically, the site is within the West Antelope Valley planning watershed (pws) in the Neenach super planning watershed (spws) (CalWater 2009b). The area of the West Antelope Valley planning watershed totals 157,699 acres, of which the 2,100-acre Project site accounts for 1 percent. This watershed is not tributary to any ocean or other water body; rather, all water in this system eventually flows eastward to the valley floor where surface flows are lost to evaporation and infiltration. The on-site drainages are intermittent or ephemeral and likely only receive stream flow during and following significant rain events.

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SECTION 2.0
REGULATORY SETTING

Waters of the U.S. (including wetlands) and State are subject to a variety of federal and state regulations under the oversight of the U.S. Army Corps of Engineers (USACE), State Water Resources Control Board (SWRCB), Regional Water Quality Control Boards (RWQCB), and California Department of Fish and Game (CDFG). Legal definitions, descriptions, and references are provided below for the appropriate agencies.

2.1 U.S. ARMY CORPS OF ENGINEERS REGULATIONS

Pursuant to Section 404 of the Clean Water Act (CWA), the USACE regulates the discharge of dredged and/or fill material into waters of the U.S. Waters of the U.S. include navigable waterways and wetlands adjacent to navigable waterways, non-navigable waterways, and wetlands adjacent to non-navigable waters that are contiguous with navigable waterways. Discussed below are wetlands and waters of the U.S. as defined by the CWA. Additionally, USACE jurisdictional boundaries and the SWANCC Decision and Rapanos Decision which further define USACE jurisdiction under the CWA are discussed below.

2.1.1 Wetland Defined

Wetlands are defined by 33 CFR 328.3(b) of the CWA as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions" (Environmental Laboratory 1987). In 1987, the USACE published the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987; Wetland Delineation Manual) to guide its field personnel in determining jurisdictional wetland boundaries. In 2006, the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2006; Arid West Regional Supplement) was published by USACE for use in this region (Region 0) as a compliment the Wetland Delineation Manual. Where differences occur within the two documents the Arid West Regional Supplement takes precedence. The methodology set forth in the Wetland Delineation Manual and the Arid West Regional Supplement requires that to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the Wetland Delineation Manual and Arid West Regional Supplement provide great detail concerning methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria: Hydrophytic Vegetation, Hydric Soils, and Wetland Hydrology. These wetland parameters are discussed in greater detail below.

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2.1.1.1 Hydrophytic Vegetation

The definition of USACE wetlands also includes the phrase "prevalence of hydrophytic vegetation." A site is considered to have a prevalence of hydrophytic vegetation when 50 percent or more of the dominant plant species of a specific community is classified as Obligate (OBL), Facultative Wetland (FACW), or Facultative (FAC; excluding FAC-) according to the Regional Supplement and the Wetland Delineation Manual (USACE 2006; Environmental Laboratory 1987). Indicator status is designated to individual species on a region-based characterization according to the *National List of Plant Species That Occur in Wetlands* (Reed 1988). This list divides plants into five categories that reflect the range of estimated probabilities (expressed as a frequency of occurrence) of a species occurring in a wetland versus a non-wetland.

These categories are as follows:

- **Obligate Wetland (OBL)** – Occur almost always (estimated probability >99 percent) under natural conditions in wetlands.
- **Facultative Wetland (FACW)** – Usually occur in wetlands (estimated probability 67 percent to 99 percent), but occasionally found in non-wetlands.
- **Facultative (FAC)** – Equally likely to occur in wetlands or non-wetlands (estimated probability 34 percent to 66 percent).
- **Facultative Upland (FACU)** – Usually occur in non-wetlands (estimated probability 67 percent to 99 percent), but occasionally found in wetlands.
- **Obligate Upland (UPL)** – May occur in wetlands in another region, but occur almost always (estimated probability >99 percent) under natural conditions in non-wetlands in the region specified (Region 0).

A positive sign (+) or negative sign (-) is used with the Facultative, Facultative Wetland, and Facultative Upland categories to more specifically define the likelihood of occurrence toward the higher or lower end of the category.

2.1.1.2 Hydric Soils

A hydric soil is defined by the National Technical Committee for Hydric Soils (NTCHS) as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (NRCS 1994). A hydric soil may be drained or undrained, and a drained hydric soil may not continue to support hydrophytic vegetation yet still retain the appearance of a hydric soil.

The following indicators are used as a guide to determine whether a given soil meets the USACE criteria for hydric soils. These indicators are defined in the Wetland Delineation

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Manual (Environmental Laboratory 1987) and the Arid West Regional Supplement (USACE 2006). These indicators are listed in decreasing order of importance and reliability. In most situations, only one of these indicators is required to make a positive determination:

- Presence of organic soils (Histosols) or soils that have more than 50 percent (by volume) of the upper 32 inches of soil is composed of organic soil materials
- Presence of histic epipedons (i.e., layers of organic matter in the upper soil) that are saturated for 30 days or more during the growing season
- Presence of sulfidic material or odors indicating anaerobic conditions
- Presence of an aquic or peraquic regime in which oxygen in the upper soil has been displaced by surface water or groundwater saturation that causes anaerobic conditions
- Evidence of chemically reducing conditions in the soil based on chemical tests
- Presence of gleyed soil conditions or soils with bright mottles and/or low matrix chroma
- Soils that occur on the NTCHS National Hydric Soils List: California (NRCS 2008a)
- Presence of manganese and iron concretions
- Presence of high amounts of organic matter in the upper soil and/or organic matter streaking (sandy soils only)

2.1.1.3 Wetland Hydrology

The term "wetland hydrology" indicates that the hydrology of an area is periodically inundated or that it has soils saturated to the surface at some time during the growing season. Wetlands are characterized by various hydrologic regimes that range from permanently inundated to irregularly inundated or saturated. In other words, some wetlands are always wet while other wetlands may contain water during only part of the year. In the Arid West Region, the minimum threshold for wetland hydrology under most circumstances is 14 or more consecutive days of flooding or ponding, or a water table 12 inches or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10. In the Arid West Region, the growing season may be estimated with the 28°F air temperature thresholds as reported in the WETS tables (NRCS 1995), or by one or both of the following: 1) observations of growth activity in vascular plants, or 2) soil temperature (USACE 2006).

A list of field indicators of wetland hydrology is presented below in decreasing order of importance and reliability. These indicators are defined in the Wetland Delineation Manual (Environmental Laboratory 1987) and the Arid West Regional Supplement (USACE 2006). Primary indicators, of which one is required in order to meet the hydrology criterion, include the following:

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- Recorded data on inundation or soil saturation from wells or gauges
- Visual observation of inundation or soil saturation within 12 inches of the surface
- Water marks on stems and fixed objects
- Drift lines consisting of debris and waterborne material
- Sediment deposition
- Visual evidence of surface flows and ponding

Secondary indicators, of which two or more are required in order to meet the hydrology criterion, include the following:

- Oxidized root channels in the upper 12 inches of the soil
- Water-stained leaves
- Local soil survey data
- Other site-dependant features based on the professional judgment of the delineator

According to the 1987 USACE Wetland Delineation Manual, wetland hydrology can be inferred indirectly if *all* of the dominant plants in an area are obligate (OBL) species.

2.1.2 Waters of the U.S. Defined

The term "waters of the U.S." is defined by 33 CFR Part 328 of the CWA and includes all navigable waters (including all waters subject to the ebb and flow of the tide); all interstate waters and wetlands; all impoundments of waters mentioned above; all tributaries to waters mentioned above; the territorial seas; and, all wetlands adjacent to waters mentioned above. The USACE jurisdictional boundary of Waters of the U.S. is delineated at the stream's Ordinary High Water Mark. The Ordinary High Water Mark (OHWM) is defined as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.

2.1.3 SWANCC Decision

Areas not considered to be jurisdictional waters include non-tidal drainages and irrigation ditches excavated on dry land, artificially-irrigated areas, artificial lakes or ponds excavated on dry land that are used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water filled depressions (51 Fed. Reg. 41, 217 1986). In addition, the Supreme Court's decision in *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers*, 531 U.S. 159 (2001) (SWANCC Decision) determined that the

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USACE exceeded its statutory authority by asserting CWA jurisdiction over "an abandoned sand and gravel pit in northern Illinois, which provides habitat for migratory birds." Based solely on the use of such waters by migratory birds, the court's holding was strictly limited to waters that are "non-navigable, isolated, and intrastate." Although this ruling affected the USACE jurisdiction, the SWANCC decision did not alter the extent of State (or tribal) jurisdiction over aquatic features of state (or tribal) law. Please refer to RWQCB and CDFG for jurisdiction for "isolated" waters. In addition, if isolated waters provide habitat for a federally listed species, the species and its habitat (isolated waters) would likely be under jurisdiction of the U.S. Fish and Wildlife Service.

2.1.4 Rapanos Decision

In 2006, the United States Supreme Court decided Rapanos v. United States, 126 S.Ct. 2208 (2006) ("Rapanos"), consolidated cases regarding the extent of the Corps' jurisdiction over waters of the United States under the Clean Water Act. The court issued no majority opinion in Rapanos. Instead, the justices authored five separate opinions including the "plurality" opinion, authored by Justice Scalia (joined by three other justices), and a concurring opinion by Justice Kennedy. To guide implementation of the decision, the Corps issued a memorandum stating that "regulatory jurisdiction under the CWA exists over a water body if either the plurality's or Justice Kennedy's standard is satisfied." (United States Army Corps of Engineers, Clean Water Act Jurisdiction Following the United States Supreme Court's Decision in Rapanos v. United States & Carabell v. United States, December 2, 2008, ["Rapanos Guidance Memorandum"], p. 3).

According to the plurality opinion in Rapanos, "'the waters of the United States' include only relatively permanent, standing or flowing bodies of water" and do not include "ordinarily dry channels through which water occasionally or intermittently flows." (Rapanos, 126 S. Ct. 2208, 2221.) In addition, while all wetlands that meet the Corps' definition are considered adjacent wetlands, only those adjacent wetlands that have a continuous surface connection because they directly abut the tributary (e.g., they are not separated by uplands, a berm, dike, or similar feature) are considered jurisdictional under the plurality standard (Rapanos Guidance Memorandum, p. 7).

Under the Kennedy approach, "the Corps' jurisdiction over wetlands depends upon the existence of a significant nexus between the wetlands in question and navigable waters in the traditional sense." (Rapanos, 126 S.Ct. 2208, 2248.) "Wetlands possess the requisite nexus, and thus come within the statutory phrase 'navigable waters,' if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable.' When, in contrast, wetlands' effects on water quality are speculative or insubstantial, they fall outside the zone fairly encompassed by the statutory term 'navigable waters.' (Ibid.) Justice Kennedy identified "pollutant trapping, flood control, and runoff

storage" as some of the critical functions wetlands can perform relative to other waters. (Id. at p. 2248.) He concluded that, given wetlands' ecological role, "mere adjacency" to a non-navigable tributary was insufficient to establish Clean Water Act jurisdiction, and that "a more specific inquiry, based on the significant nexus standard, is therefore necessary." (Id. at pp. 2249-2252.)

Interpreting these decisions, and according to the Rapanos Guidance Memorandum, the Corps and EPA will assert jurisdiction over the following waters:

- Traditional navigable waters
- Wetlands adjacent to traditional navigable waters
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)
- Wetlands that directly abut such tributaries

The USACE and EPA will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditionally navigable water:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

Where a significant nexus analysis is required, the USACE and EPA will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters.
- Significant nexus includes consideration of hydrologic and ecologic factors.

The USACE and EPA generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow)
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water

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2.2 STATE WATER RESOURCES CONTROL BOARD AND REGIONAL WATER QUALITY CONTROL BOARD REGULATIONS

Under Section 401 of the CWA, every applicant for a federal permit or license for any activity which may result in a discharge of dredge or fill material to a water body must obtain a State-issued Water Quality Certification that the proposed activity will comply with state water quality standards (i.e., beneficial uses, water quality objectives, and anti-degradation policy). In California, the State Water Resources Control Board (SWRCB) has delegated the responsibility for issuing Section 401 Certifications to the nine Regional Water Quality Control Boards (RWQCB) throughout the state. The Lahontan RWQCB issues Section 401 Certifications for projects in northeastern Los Angeles County. Because a Section 404 Permit is a federal permit subject to the terms of Section 401 as described above, the USACE cannot issue a Section 404 permit until the permit applicant also receives a Section 401 Certification from the Lahontan RWQCB.

Because Section 401 of the CWA is restricted to activities requiring a federal license or permit, this section does not apply to activities affecting waters outside Federal jurisdiction, such as isolated, intrastate waters. However, the SWRCB has jurisdiction over all "waters of the State," defined as any surface water or groundwater, including saline waters, within the boundaries of the state, under the Porter-Cologne Water Quality Control Act (a State statute). To ensure that California's isolated waters are protected and that the permitting process is as efficient as possible, the SWRCB has issued general Waste Discharge Requirements (WDR) regulating discharges to "isolated" waters of the State that are not under Federal CWA jurisdiction (Water Quality Order No. 2004-0004-DWQ, Statewide General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the USACE to be Outside of Federal Jurisdiction). If the waters on the Project site are not under CWA jurisdiction, a certification under Section 401 will not be required and these WDRs will apply.

2.3 CALIFORNIA DEPARTMENT OF FISH AND GAME REGULATIONS

2.3.1 California Department of Fish and Game Jurisdictional Streams

Pursuant to Division 2, Chapter 6, Sections 1600-1616 of the California Fish and Game Code, the CDFG regulates all diversions, obstructions, or substantial changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. The CDFG's definition of lake includes "natural lakes or man-made reservoirs." In Section 1.72 of Title 14 of the California Code of Regulations the CDFG defines a stream as a "body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFG has interpreted the term "streambed" to encompass all portions of the bed, banks, and channel of any stream,

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including intermittent and ephemeral streams, extending laterally to the upland edge of riparian vegetation. In the case of watercourses with vegetated floodplains this CDFG interpretation often results in an asserted geographic jurisdictional area that is much wider than the active channel of the stream. The upstream limit of CDFG jurisdiction is the point upstream of which there is no evidence of a defined bed and bank, and riparian vegetation is not present.

The CDFG jurisdiction within altered or artificial waterways is based upon the value of those waterways to fish and other wildlife. Generally:

- Natural waterways that have been subsequently modified and which have the potential to contain fish, aquatic insects and riparian vegetation will be treated like natural waterways.
- Artificial waterways that have acquired the physical attributes of natural stream courses and which have been viewed by the community as natural stream courses should be treated by CDFG as natural waterways.
- Artificial waterways without the attributes of natural waterways should generally not be subject to Fish and Game Code provisions.

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SECTION 3.0
METHODS

A formal wetland delineation and jurisdictional determination of waters of the U.S. (including wetlands), waters of the State, and streambeds was performed on the Project site from January 13 through 14, 2009. The methodology used during the field surveys is described below. Wetland delineation field surveys were conducted by URS biologists Julie Love, Crissy Slaughter, and Jessica Birnbaum with guidance by senior biologists John Davis IV and Christopher Julian.

Prior to the formal wetland delineation, the United States Geologic Society (USGS) Fairmont Butte, CA 7.5 minute quadrangle map (USGS 1995), the Antelope Valley Soil Survey (USDA-NRCS 1970, USDA-NRCS SSURGO 2007), the National Hydrography Dataset (NHD; USGS 2007), and a high quality aerial photograph of the Project site and the surrounding area (NAIP 2005) were reviewed to determine potential wetland areas. Additionally, a initial reconnaissance-level survey was conducted on June 27, 2008 by John Davis IV and Crissy Slaughter to determine potential wetland areas.

The USGS 7.5 minute quadrangle map (USGS 1995) and the National Hydrography Dataset (USGS 2007) indicated the presence of three potential hydrological features on the Project site designated as intermittent streams (see Section 4.1 for locations of drainages). Since the Project site is dry and relatively flat, it was concluded that potential wetlands would occur within these low-lying intermittent streams. Therefore these areas were evaluated in the field to determine if they were present and if they had potential for wetland characteristics. During the initial reconnaissance-level survey two of the hydrological features (Drainages A and C) on the Project site were observed in the field and found to be present as indicated on the USGS and NHD maps. These areas also had potential for wetland characteristics, therefore a formal wetland delineation was performed during the wetland delineation surveys. During the wetland delineation field surveys, the portion of Drainage A mapped by USGS and NHD east of 160th Street West was not present in the field and no defined bed or banks or water marks were found, therefore a formal wetland delineation was not performed in this portion. This area was re-evaluated by John Davis IV and Crissy Slaughter on January 21, 2009 to find its endpoint and a possible historic connection to Drainage D. The findings were the same as previously documented. The third remaining potential USGS and NHD mapped hydrologic feature crossing West Avenue C in the northern portion of the Project site was observed in the field during the wetland delineation field survey. This drainage was not present in the field and no defined bed or banks or water marks were found, therefore a formal wetland delineation was not performed.

In addition to the hydrologic features indicated on the USGS and NHD maps, the entire Project site was surveyed for additional areas of potential wetlands during the wetland delineation field surveys. Two additional hydrologic features (Drainages B and D) were

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found on-site during field investigations. Drainage B had a defined bed and bank and was therefore evaluated with a formal wetland delineation. Drainage D also had a defined bed and bank, although only a very small portion of this drainage was located within the Project site boundary. Since the project applicant did not have access rights to the adjacent parcels on which most of this drainage resided and since very little of the drainage's channel bottom was located within the Project site, it was determined that a formal wetland delineation could not be performed within this drainage.

The proposed transmission line was added to the project in early February 2009 after the formal wetland delineation field surveys were performed. The USGS 7.5 minute quadrangle map (USGS 1995) and the National Hydrography Dataset (USGS 2007) indicated the presence of one potential hydrological features in the proposed transmission line designated as an intermittent stream (see Section 4.1 for locations of this drainage). Since the transmission line area is dry and relatively flat, it was concluded that potential wetlands would occur within this low-lying intermittent stream. Therefore this area was evaluated in the field to determine if it was present and if it had potential for wetland characteristics. The potential drainage crossing the proposed transmission line north of West Avenue A was observed in the field on February 3, 2009 by URS biologists Dave Compton and Whitney Wilkinson. This drainage was not present and no defined bed or banks or water marks were found, therefore a formal wetland delineation was not performed. This area was re-visited during the focused botany surveys conducted in April/May 2009 and March 2009 and the findings were the same as previously documented. The proposed transmission line was also evaluated at this time for other potential wetland areas and none were found.

3.1 WETLAND DELINEATION METHODS

A delineation of potential wetlands was conducted on-site in accordance with the procedures of the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987; Wetland Delineation Manual), Department of the Army (DOA) *Clarification and Interpretation of the 1987 USACE Wetland Delineation Manual* (DOA 1992), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008; Arid West Regional Supplement). In addition, the United States Geologic Society (USGS) Fairmont Butte, CA 7.5 minute quadrangle map (USGS 1995), the Antelope Valley Soil Survey (USDA-NRCS 1970, USDA-NRCS SSURGO 2007), the National Hydrography Dataset (USGS 2007), and a high quality aerial photograph of the Project site and the surrounding area (NAIP 2005) were utilized during the wetland delineation survey. Sampling points were established within all areas containing potential wetlands, which included drainages that had a defined bed and bank (excluding Drainage D). Sampling points were established in different soil types to capture the variety of soil types located within each drainage. Each sampling location was analyzed for hydrophytic vegetation, hydric soil, and wetland hydrology. Soil pits were excavated at each drainage to examine the soil for positive indicators of hydric soils and wetland hydrology. No

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soil pits were excavated in the upland areas adjacent to the drainages. Data collected from the sampling points were recorded on USACE Wetland Determination Data Forms – Arid West Regional Supplement (USACE 2006). Data forms completed for the wetland delineation are included in Appendix A. The USACE Approved Jurisdictional Determination Form is included in Appendix B for use by the USACE. Photographs were taken at each sampling point facing upstream and downstream for each drainage and at various locations on the Project site to document site conditions and are included as Appendix C.

Six sampling points were analyzed to determine potential wetland areas. Three sampling points were established in Drainage A (A1 through A3). Drainage A consists of two portions, each with a defined bed and bank, that are separated by a swale portion without a defined bed and bank. Although this swale portion may convey flows between the two defined portions, it was designated as non-jurisdictional due to the lack of a defined bed and bank as determined by URS biologists and CDFG (Jackson 2009). Sampling point A3 is located within this swale, therefore it characterizes an area of Drainage A that is non-jurisdictional. One sampling point was established in Drainage B (B1), and two sampling points were established in Drainage C (C1 and C2). There was no sampling point established for Drainage D as described above. Sampling point locations were mapped in the field using a 2004 Trimble GeoXT™ GPS unit (Trimble GPS unit) capable of sub-meter accuracy.

3.1.1 Vegetation

Vegetation was analyzed at each sampling point, with the sampling point boundaries being defined by the top of the drainage banks. In accordance with the Arid West Manual, the sampling point only analyzed a single vegetative unit or community. For each sampling point, vegetation was characterized by species and evaluated for hydrophytic characteristics. The wetland status of plant species within the study area was determined using the *National List of Species That Occur in Wetlands: California (Region 0)* (Reed 1988). As defined in the Section 2: Regulatory Overview, the indicator statuses are OBL, FACW, FAC, FACU, and UPL. When more than 50 percent of the dominant plant species consisted of OBL, FACW, or FAC (excluding FAC-), the vegetation at the sampling location was classified as "hydrophytic vegetation" in accordance with the Arid West Regional Supplement (USACE 2006). Additionally, a Prevalence Index was calculated if needed to determine hydrophytic vegetation. A species list of plants was compiled from all the sampling points and from focused botanical surveys conducted in April/May and March 2009 (Appendix D).

Vegetation communities were mapped within the Project site and its vicinity. On a project-wide scale, vegetation communities were classified using Sawyer and Keeler-Wolf's *A Manual of California Vegetation* (1995) and Holland's *Preliminary Description of the Terrestrial Natural Communities of California* (1986). Vegetation communities on the Project site were mapped during the wetland delineation and the Project site vicinity was mapped in March 2009. Vegetation within the Project site boundary was mapped in the field

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by hand marking on aerial photographs and by using the Trimble GPS unit. Areas outside the Project site boundary were mapped primarily using the Project site aerial (NAIP 2005) with limited field observations.

3.1.2 Soils

Soil pits were excavated at each drainage to examine the soil for positive indicators of hydric soils. Soil pits were conducted at three of the six sampling points (A2, B1, and C1). As mentioned above, sampling points were established in different soil types to capture the variety of soil types found within each drainage. Soil pits were not conducted at sampling points A1, A3, or C2 because of the naturally problematic sandy soils. No soil pits were excavated in the upland areas adjacent to the channels. The top 18 inches of the soil profile at each sampling point was examined for indicators of hydric soils. For each sampling point, soil characteristics assessed included color, texture, and the presence of redox features, organic matter, or other signs of hydric soils if they were present. A Munsell® Soil Color Chart (Munsell Color 2000) was used in the field to identify the color of the soil matrices and redox features, if present.

On a project-wide scale, the analysis of on-site soils was conducted using the Antelope Valley Soil Survey (USDA-NRCS 1970, USDA-NRCS SSURGO 2007) soils map. Sampling points were established in different soil types to capture the variety of soil types located within each drainage.

3.1.3 Hydrology

Each sampling point was examined for wetland hydrology along the drainage bottom and banks and within each soil pit. Each sampling point was examined for surface water, a water table, and/or saturation, and positive field indicators of wetland hydrology such as water marks, sediment deposits, drift deposits, surface soil cracks, and the FAC-Neutral test.

On a project-wide scale, the analysis of potential hydrologic features was conducted using the USGS 7.5 minute quadrangle map (USGS 1995), National Hydrography Dataset (USGS 2007), and a high quality aerial photograph of the Project site and the surrounding area (NAIP 2005). Additionally, the site was surveyed in the field as described in Section 3.0 for hydrologic features that were not indicated on these maps.

3.2 JURISDICTIONAL DETERMINATION METHODS

The extent of wetlands falling under the jurisdiction of USACE pursuant to Section 404 of the CWA was determined based on the presence of all three wetland criteria: Hydrophytic Vegetation, Hydric Soils, and Wetland Hydrology. In areas where one parameter was naturally problematic and difficult to assess ("Problem Areas," e.g., sandy soils), extra diligence and weight was given to the other two parameters, per the Arid West Wetland

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Delineation Manual. The extent of non-wetland waters of the U.S. subject to the permitting authority of the USACE under Section 404 of the CWA was determined based on the presence of two characteristics: 1) a defined ordinary high water mark; and 2) a significant nexus to navigable waters, such as a semi-permanent surface connection. The extent of waters of the State on-site subject to the authority of the Lahontan RWQCB under the Porter-Cologne Water Quality Control Act was determined to be coterminous with the extent of CDFG jurisdictional streambeds. The extent of streambeds falling under the jurisdiction of the CDFG pursuant to section 1600 et seq. of the California Fish and Game Code was determined based on the presence of a defined physical bed, bank, or channel. No riparian vegetation was present within or adjacent to the streambeds on-site, and was therefore not used as a determining characteristic.

All drainage boundaries were mapped within the Project site. Estimates for width and depth were made in the field and features such substrate type, topography, and presence of mammal burrows were recorded. Boundaries for Drainages A, B, and D were mapped in the field by walking along the top of the bank using a Trimble GPS unit recording data is “streaming mode.” Drainages A through C were mapped during the wetland delineation field surveys. Drainage D was mapped on January 21, 2009 during reconnaissance field surveys. A small side channel on the south side of Drainage A was mapped on June 1, 2009 during a follow up field survey.

When field data collection was complete, jurisdictional boundaries were downloaded from the Trimble GPS unit and converted into a GIS shape file using ArcGIS software. In instances where individual “outlier” points were present in the data set (the GPS unit occasionally recorded erroneous points extremely remote from the polygon being mapped), these points were removed using ArcGIS and points on either side of the outlier were connected to restore the integrity of the polygon. Properties such as length and jurisdictional acreage of each drainage were calculated through ArcGIS.

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SECTION 4.0
RESULTS

The hydrophytic vegetation parameter was not met for any sampling site. The hydric soil parameter was not met for any sampling site. The wetland hydrology parameter was met at primary Drainages A and C. Table 1 is a summary of the wetland parameters found at each hydrologic feature and its associated sampling point if applicable.

TABLE 1
SUMMARY OF WETLAND PARAMETERS

	Wetland Parameters		
	Hydrophytic Vegetation Present?	Hydric Soil Present?	Wetland Hydrology Present?
Primary Drainages			
Drainage A			
A1	No	No[1]	Yes
A2	No	No	Yes
Drainage C			
C1	No	No	Yes
C2	No	No[1]	No
Secondary Drainages			
Drainage B			
B1	No	No	No
Drainage D	N/A[2]	N/A[2]	N/A[2]
Other Locations			
Connecting non-jurisdictional Swale between two reaches of Drainage A			
A3	No	No[1]	No

[1] Soil pits were not conducted at sampling points A1, A3, or C2 because of the naturally problematic sandy soils. Sandy soils typically do not have hydric characteristics.
[2] No associated sampling point.

4.1 VEGETATION

The Project site is located within the Mojave Desert geographical region (Sawyer Keeler-Wolf 1995), a unique vegetation region. Six natural vegetation communities occur on the Project site and along the proposed transmission line. They include rabbitbrush scrub, California annual grassland, Joshua tree woodland, Joshua tree recruitment area, wildflower field, and desert saltbush scrub. In addition, four disturbed or human converted vegetation community occurs on the Project site – orchard, agriculture, ornamental, and ruderal. The

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following are descriptions of the vegetation communities and their extent and location on the Project site. See Figure 3 for the Vegetation Community Map of the Project site and its vicinity and Figure 4 for the Vegetation Community Map of the proposed transmission line. A list of all plant species observed on-site and their wetland indicator status is found in Appendix D. Photographs of the vegetation communities within the Project site are included in Appendix C.

Dominant plants species found at each sampling point are also discussed below in relation to the vegetation community. The hydrophytic vegetation parameter was not met for any sampling site. No hydrophytic plant species were found during the wetland delineation field surveys; however, a few hydrophytic plants do occur on-site. Vegetation observed at each sampling location is documented on the data forms in Appendix A.

4.1.1 Rabbitbrush Scrub

The rabbitbrush scrub vegetation community is characterized by an assortment of native shrubs less than 1 meter tall that flower in late summer or fall. Shrub density can rage from continuous to open with patchy California annual grassland understory. It is found in uplands, specifically in bajadas, pediments, and valleys on well-drained gravelly soils. Rubber rabbitbrush scrub is a disturbance-maintained community (i.e., fire, grazing, soil tilling), often colonizing rangeland. Rabbitbrush scrub has the greatest coverage at approximately 1,421 acres on the Project site and 2.15 miles along the proposed transmission line. This vegetation community covers most of the northern portion of the site, largely occurring north of Highway 138. Dominant species within this vegatation community included native shrubs such as rubber rabbitbrush (*Chrysothamnus nauseosus*), native annuals such as annual bursage (*Ambrosia acanthicarpa*), and Davidson buckwheat (*Eriogonum davidsonii*), and non-native annuals such as cheatgrass (*Bromus tectorum*) and red-stem fillaree (*Erodium cicutarium*). The on-site rabbitbrush scrub vegetation comunity most closely corresponds to Sawyer Keeler-Wolf's (1995) rubber rabbitbrush series and Holland's (1986) rabbitbrush scrub element.

Drainage A and its associated sampling points are located with this vegetation community. Drainage A was dominated by bareground. Dominant species included rubber rabbitbrush, red-stem fillaree, combseed (*Pectocarya* spp.), fiddleneck (*Amsinckia tesselata/menziesii*), and unknown annual grasses that could not be identified due to their small size and lack of identifying characteristics or flowering structures.

4.1.2 California Annual Grassland

The California annual grassland vegetation community is characterized by an assortment of native and non-native annual species of highly variable composition. It is typically found on seasonally dry hillsides and valleys, interior valleys of the Coast Ranges, and along the coast of central and southern California as well as some of the off-shore islands. Although annual

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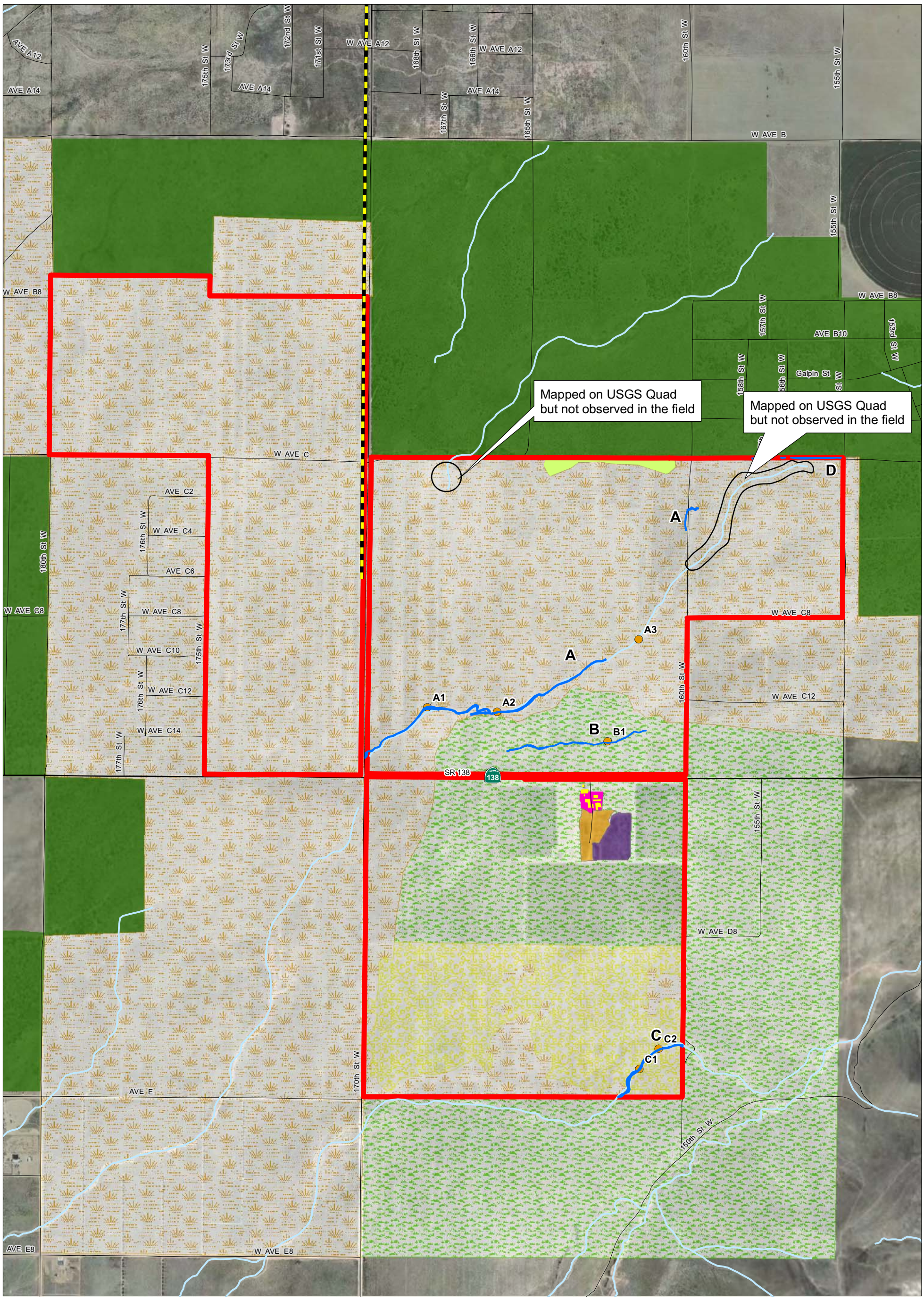

Legend

- Project Site Boundary
- Proposed Transmission Line Route
- Interstate, US or State Highways
- Secondary State/County Routes
- Other Roads or 4WD
- NHD Flowline
- Jurisdictional Drainages
- A Drainage Identification
- Sampling Locations
- Development

Vegetation Types

- California Annual Grassland
- Joshua Tree Woodland
- Joshua Tree Recruitment Area
- Orchard
- Ornamental
- Rabbitbrush Scrub
- Wildflower Field
- Ruderal

Source: [1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Field Surveys (2009), USGS NHD flowline (2007).

1:18,000

1 inch = 1,500 feet

0 0.125 0.25 0.5 Mile

0 750 1,500 3,000 Feet

Coordinate System: North American Datum 83 Universal Trans Mercator (UTM) Zone 11 North

July, 2009

AV Solar Ranch One

Figure 3. Vegetation Community Map
Project Site and Vicinity

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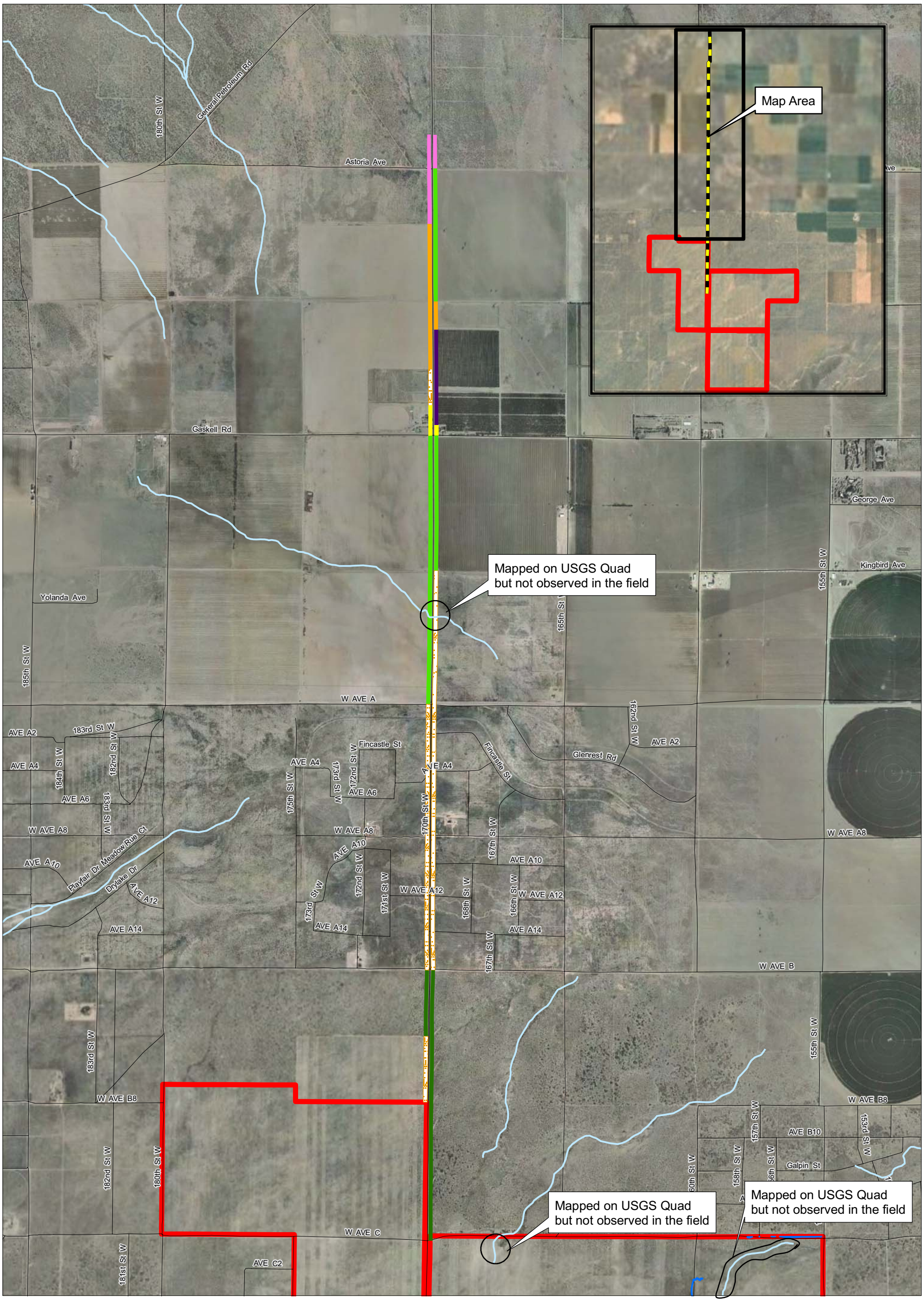

Legend

- Project Site Boundary
- Proposed Transmission Line Route
- Interstate, US or State Highways
- Secondary State/County Routes
- Other Roads or 4WD
- NHD Flowline
- Jurisdictional Drainages
- Development

Vegetation Communities

- Agricultural
- Desert Saltbrush Scrub
- Joshua Tree Woodland
- Orchard
- Rabbitbrush Scrub
- Ruderal

Source: [1] I-cubed Nationwide Prime - Aerials Express (2007-02-15 image date, 0.3m resolution), [2] ESRI StreetMap USA (2007), [3] URS Field Surveys (2009), [4] USGS NHD flowline (2007).

1:21,600

1 inch = 1,800 feet

0 0.15 0.3 0.6 Miles

0 450 900 1,800 2,700 3,600 Feet

Coordinate System: North American Datum 83 Universal Trans Mercator (UTM) Zone 11 North

July, 2009

AV Solar Ranch One

Figure 4. Vegetation Community Map
Proposed Transmission Line Route

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grasses form the dominant plant species composition, often native annual forbs offer the greatest diversity in select areas. This mix of grasses and forbs are often found on gravelly to deep fine-grained soils well suited for annual growth. California annual grassland is the second most abundant vegetation community at approximately 368 acres on the Project site. This vegetation community covers most of the southern portion of the site, laregely occuring south of Highway 138. Dominant species within this vegetation community included native annuals such as small fescue (*Vulpia microstachys*), fiddleneck (*Amsinckia menziesii*), California poppy (*Eschscholzia californica*), and goldfields (*Lasthenia californica*), and non-native annuals such as cheatgrass and red-stem fillaree. The on-site California annual grassland vegetation community most closely corresponds to Sawyer Keeler-Wolf's (1995) California annual grassland series and Holland's (1986) non-native grassland element.

Drainage B and its associated sampling point is located with this vegetation community. Drainage B was dominated by bareground. Dominant species included annual bursage, combseed, and unknown annual grasses that could not be identified due to their small size and lack of identifying characteristics or flowering structures.

4.1.3 Joshua Tree Woodland

The Joshua tree woodland vegetation community is characterized by open woodlands of Joshua trees (*Yucca brevifolia*), with intermittent shrubs less than 1 meter tall. Joshua trees are usually less than 12 meters tall and display a variety of life forms. The main growing season is spring, with most growth limited by cold in winter and drought in summer and fall. Many species of herbs may germinate following sufficient late fall or winter rains and flower in mid-spring. Joshua tree woodlands are typically found on sandy, loamy, or gravelly, well-drained gentle alluvial slopes. Approximately 0.25 miles of Joshua tree woodland are located along the proposed transmission line. The on-site Joshua tree woodland vegetation community most closely corresponds to Sawyer Keeler-Wolf's (1995) Joshua tree series and Holland's (1986) Joshua tree woodland element. No drainages occur within within the Joshua tree woodland vegetation community, therefore sampling points were conducted within this vegetation community.

4.1.4 Joshua Tree Recruitment Area

Fifty Joshua tree seedlings, scattered over an approximate 7.3 acres, are located on the northern portion of the Project site. The presence of the Joshua tree seedlings identified within this portion of the Project site appear to indicate that this area may be in the early stages of the re-establishment of Joshua tree woodland habitat; therefore, this area is considered a Joshua tree recruitment area. Although this is not recognized as a separate vegetation type, for the purposes of this report it is treated as such due to the occurrence of Joshua tree seedlings within the Project site. The loss of Joshua tree woodlands due to accelerated agricultural and urban expansion in the County's desert regions is of concern to

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the County because large, dense stands of this habitat are becoming scarce, especially in the western Antelope Valley (LACDRP 1986). The Joshua tree recruitment area is directly adjacent to intact Joshua tree woodland habitat located north of the Project boundary within SEA #60. Because cultivation of this portion of the Project site was ceased in 1995, it is likely that Joshua tree seeds dispersed into this area from the nearby Joshua tree woodland are now able to grow without disturbance. The Joshua tree recruitment area contains a low density of the Joshua tree seedlings (an average of 6.8 per acre) and the vegetation is dominated by species found within the rabbitbrush scrub habitat type. Therefore, this Joshua tree recruitment area most closely corresponds to the rabbitbrush scrub habitat type and is not considered Joshua tree woodland habitat.

4.1.5 Wildflower Field

The wildflower field vegetation community is not defined by specific dominant plant species, but is instead characterized by a variety of herbaceous species noted for conspicuous annual wildflower displays (Holland 1986). Species composition and dominance varies from site to site, and can vary from year to year at any particular site. This vegetation community is found in valleys and foothills of the Californian Floristic Province except in the north coast (too wet) and desert (too dry) regions, below about 2,000 feet in the north and 4,000 to 5,000 feet in the south. Wildflower fields are identified by the CDFG (2008b) as a sensitive natural community. Approximately 236 acres of wildflower fields are located on the Project site. The wildflower field vegetation community occurs in the southernmost portion of the Project site, south of the existing orchard. The species composition in this area is fairly similar to that of the California annual grasslands on-site, containing a mixture of native and exotic grasses and forbs; shrub cover is nearly absent. However, the wildflower fields on-site are distinct from the annual grassland vegetation community because of the relative abundance of plants that exhibit colorful floristic displays. Dominant plants in the on-site wildflower field include California poppy, goldfields, fiddleneck, red-stem filaree, and several species of lupine (*Lupinus* spp.), which create colorful floristic displays. Native and exotic grasses including cheatgrass, fescue, and Mediterranean grass (*Schismus* spp.) are also dominant. The on-site wildflower field vegetation community most closely corresponds to Holland's (1986) wildflower element.

Drainage C and its associated sampling points are located with this vegetation community. Portions of Drainage C was dominated by bareground, but overall it was more vegetated than Drainages A and B. Dominant species included annual bursage, combseed, red-stem fillaree, doveweed (*Croton* [*Eremocarpus*] *setigerus*), and unknown annual grasses that could not be identified due to their small size and lack of identifying characteristics or flowering structures. These dominant species however are not indicative of the on-site wildflower plant assemblage.

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4.1.6 Desert Saltbush Scrub

Desert saltbush scrub habitat is characterized by low growing, woody, gray shrubs, 0.3 to1.0 meter tall, strongly dominated by a single *Atriplex* species. Total cover is often low, with more bare ground between the widely spaced shrubs. The soils underlying this vegetation community are fine-textured and usually poorly drained, with high alkalinity and/or salinity, usually surrounding playas on slightly higher ground. Desert saltbush scrub occurs on widely scattered on margins of dry lake beds in the Colorado, Mojave, and Great Basin deserts. Approximately 0.46 miles of the desert saltbush scrub vegetation community are located along the proposed transmission line. This habitat is dominated by one saltbush species, allscale (*Atriplex polycarpa).* Other species present within this habitat included native shrubs such as Cooper's goldenbush (*Ericameria cooperi*), sticky matchweed (*Gutierezzia microcephala*), and non-natives such as red brome (*Bromus madritensis* subsp. *rubens)* and red-stem fillaree. The on-site desert saltbush scrub vegetation community most closely corresponds to Sawyer Keeler-Wolf's (1995) allscale series and Holland's (1986) desert saltbush scrub element. No drainages or potential wetlands occur within within the desert saltbush scrub vegetation community, therefore no sampling points were conducted within this vegetation community.

4.1.7 Orchard

An orchard is defined as an area of land devoted to the cultivation of fruit or nut trees. The on-site orchard is composed of relict pistachio root stalk in the southern portion of the site and stone fruits along the proposed transmission line. Approximately 8.82 acres of orchard are located on the Project site. No drainages or potential wetlands occur within within the orchard vegetation community, therefore no sampling points were conducted within this vegetation community.

4.1.8 Agricultural

Agricultural areas are characterized by cultivated land that has been used for farming or grazing. The Project site was continuously cultivated from the 1940s until 1995, but has since been largely fallow. The last crop was grown in 2004, on an 80-acre area south of the existing on-site ranch house. Because the historically farmed areas on-site have recovered to the point where they have become colonized by annual grassland and rubber rabbitbrush scrub, agricultural areas are currently absent from the Project site. However, agricultural production occurs along approximately 1.5 miles of the proposed transmission line route. No drainages or potential wetlands occur within within the agricultural vegetation community, therefore no sampling points were conducted within this vegetation community.

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4.1.9 Ornamental

The on-site ornamental vegetation includes landscaped areas around the on-site residence, including planted trees and shrubs. Approximately 1.8 acres of ornamental vegetation is located on the Project site. No drainages or potential wetlands occur within within the ornamental vegetation community, therefore no sampling points were conducted within this vegetation community.

4.1.10 Ruderal

Ruderal plants grow in disturbed areas as a result of activities such as road cuts and soil tilling. These activities have recently occurred on the proposed transmission line route and have resulted in areas dominated by non-native species such as Russian thistle (*Salsola tragus*), black mustard (*Brassica nigra*), and red brome. Approximately 6.92 acres of ruderal areas are located on the Project Site and 0.25 mile is located along the proposed transmission line area. No drainages or potential wetlands occur within within the agricultural vegetation community, therefore no sampling points were conducted within this vegetation community.

4.2 SOILS

The hydric soil parameter was not met for any sampling site. No indicators of hydric soil were found. Soil textures included sand at all drainages and an addition of loamy sand at Drainage C. All drainages were naturally problematic due to sandy soils, which often lack hydric soil characteristics. Thus, vegetation and hydrology were more important in identifying presence of wetlands. Soil information observed at each sampling location is documented on the data forms in Appendix A.

The Project site is located in the western Antelope Valley which is characterized by relatively flat-lying topography and valley fill deposits. The Soil Survey for Antelope Valley Area, California (USDA-NRCS SSURGO 2007) indicates twelve soil types occur on the Project site. The twelve soils fall into five soil series: Greenfield, Hanford, Hesperia, Ramona, and Rosamond are described below. None of the soil series within the Project site are identified as hydric soils by the Soil Survey. Descriptions of these soils are abridged below from the USDA-NRCS Soil Series Name Search Query Facility (USDA-NRCS 2009). See Figure 5 for a Soils Map.

4.2.1 Greenfield Series

Greenfield series soils exist on alluvial fans and terraces at elevations of 100 to 3,500 feet in the interior and coastal valleys of central and southern California. These soils are well drained and produce slow to medium runoff and have moderately rapid permeability; slopes range from 0 to 30 percent. Greenfield series soils tend to support annual grass, forbs, some shrubs, and scattered oak trees (*Quercus* spp.). They are primarily used for the production of

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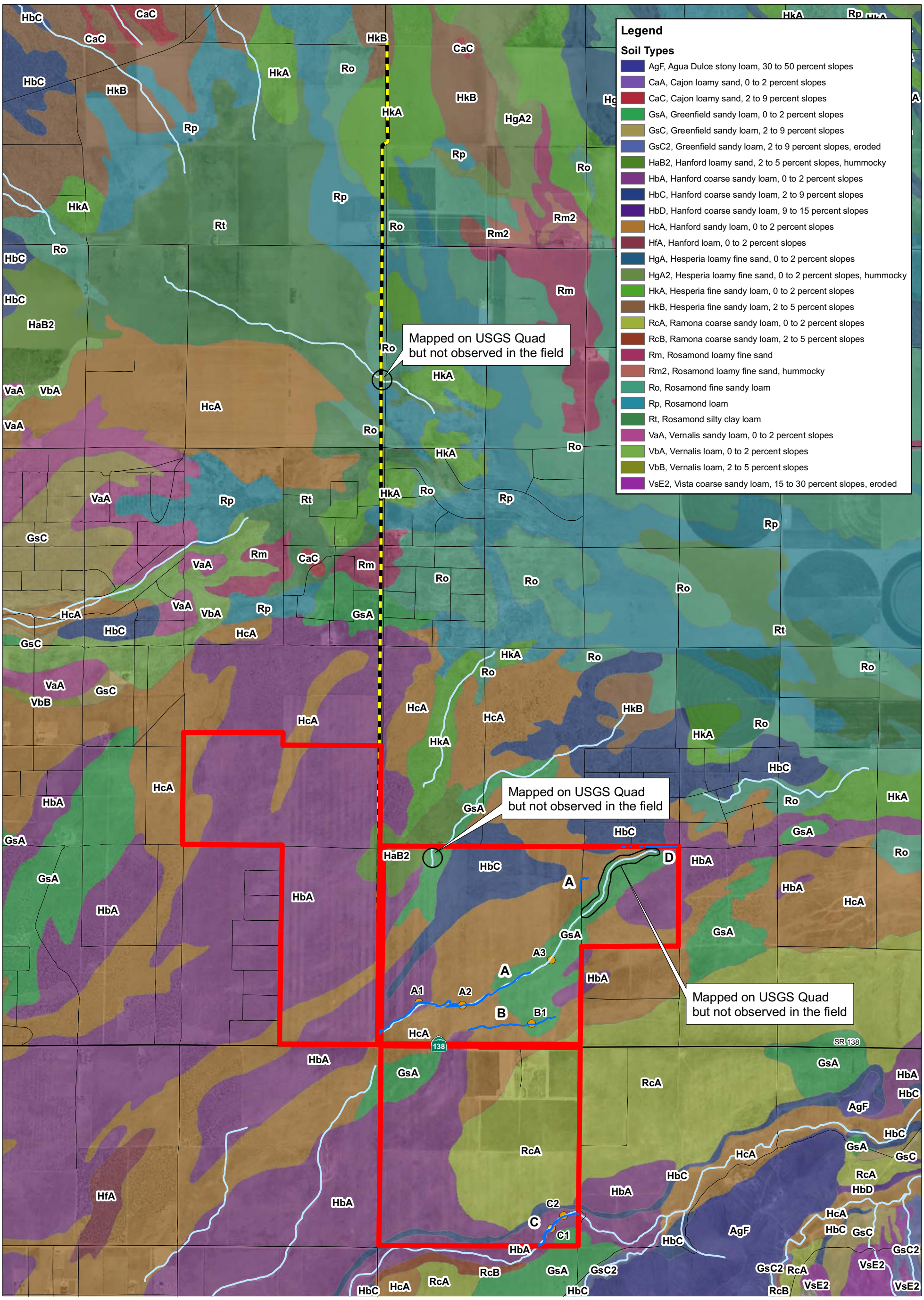

Legend

- Project Site Boundary
- Proposed Transmission Line Route
- Interstate, US or State Highways
- Secondary State/County Routes
- Other Roads or 4WD
- NHD Flowline
- Jurisdictional Drainages
- A Drainage Identification
- Sampling Locations

Source: [1]1m Natural Color NAIP (2005), [2] ESRI StreetMap USA (2007), [3] USGS NHD Flowline (2007), [4] URS Field Survey (2009), [5] Soil Survey Geographic (SSURGO) database for Antelope Valley Area, California (2007).

1:28,800

1 inch = 2,400 feet

0 0.2 0.4 0.8 Mile

0 1,200 2,400 4,800 Feet

Coordinate System: North American Datum 83 Universal Trans Mercator (UTM) Zone 11 North

July, 2009

AV Solar Ranch One

Figure 5. Soils Map

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a wide variety of irrigated field, forage, and fruit crops and also for growing dryland grain and pasture. These soils are classified as coarse-loamy, mixed, active, thermic Typic Haploxeralfs. Greenfield series is associated with Drainages A and B and is found along the proposed transmission line route.

4.2.2 Hanford Series

The Hanford soils are on stream bottoms, floodplains, and alluvial fans at elevations of 150 to 3,500 feet. They are widely distributed in the San Joaquin Valley and in the valleys of central and southern California, with slopes ranging from 0 to 15 percent. These soils are well drained, have negligible to low runoff, and have moderately rapid permeability. In uncultivated areas, Hanford series soils tend to support mainly annual grasses and associated herbaceous plants. The soils are used for growing a wide range of fruits, vegetables, and general farm crops. They are also used for urban development and dairies. These soils are classified as coarse-loamy, mixed, superactive, nonacid, thermic Typic Xerorthents. Hanford series is associated with Drainages A, B and C and is found along the proposed transmission line route.

4.2.3 Hesperia

Hesperia series soils are on alluvial fans, valley plains, and stream terraces at elevations of 200 to 4,800 feet. They are primarily located in Los Angeles County, California, with slopes ranging from 0 to 9 percent. Hesperia soils have negligible to low runoff and possess moderately rapid permeability. Native vegetation supported by this soil type consists of creosote bush (*Larrea tridentata*) in the high desert and sparse annuals in the valley. This series is primarily used for desert range, and is also used for irrigated orchards, row crops, field crops, grain, hay, pasture, and grapes. This soil's taxonomic class is coarse-loamy, mixed, superactive, nonacid, thermic Xeric Torriorthents. Hesperia series is found along the proposed transmission line route.

4.2.4 Ramona

Ramona series soils are nearly level to moderately steep and are located on terraces and fans at elevations of 250 to 3,500 feet. These soils are extensive in the interior valleys of central and the western part of southern California. They are typically well-drained, and demonstrate slow to rapid runoff and moderately slow permeability. Uncultivated areas have a cover of annual grasses, forbs, chamise, or chaparral. These soils are mostly associated with production of grain, grain-hay, pasture, irrigated citrus, olives, truck crops, and deciduous fruits. Ramona soils have the taxonomic classification of fine-loamy, mixed, superactive, thermic Typic Haploxeralfs. Ramona series is not associated with any drainage and is not found along the proposed transmission line. Ramona series is found on the Project site, south of SR 138, in the eastern half of the parcel.

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4.2.5 Rosamond

Rosamond series soils are on the lower margin of the alluvial fans between the sloping fans and the playas at elevations ranging from 2,200 to 2,900 feet. Rosamond soils are primarily located in Los Angeles County and have slopes of 0 to 2 percent. These soils are well drained and demonstrate medium runoff and moderate to moderately slow permeability. Native vegetation supported by this soil type includes rubber rabbitbrush, big sagebrush (*Artemisia tridentata*), a small amount of saltbush (*Atriplex* spp.), and a few annual and perennial grasses and weeds. Large areas are used for desert range. Other extensive areas are irrigated and cropped to alfalfa and row crops. This series' taxonomic classification is fine-loamy, mixed, superactive, calcareous, thermic Typic Torrifluvents. Rosamond series is found along the proposed transmission line route.

4.3 HYDROLOGY

According to the Watershed Boundary Dataset prepared by the California Interagency Watershed Mapping Committee (CalWater), which is responsible for all interagency watershed mapping and dataset creation in the state of California, the Project site is within the Antelope hydrologic unit (hu) of the South Lahontan hydrologic region (hr). More specifically, the site is within the West Antelope Valley planning watershed (pws) in the Neenach super planning watershed (spws) (CalWater 2009b)[1]. The area of the West Antelope Valley planning watershed totals 157,699 acres, of which the 2,100-acre Project site accounts for 1 percent. This watershed is not tributary to any ocean or other water body; rather, all water in this system eventually flows eastward to the valley floor where surface flows are lost to evaporation and infiltration. The Project site is located towards the eastern (downstream) end of the watershed. Drainage patterns within the site are muted, with on-site drainages present but isolated from one another and lacking the hierarchical tributary structure found in more substantial stream systems. Watersheds in the vicinity of the Project site are depicted on Figure 6.

The wetland hydrology parameter was met at primary Drainages A and C. A description of the on-site drainage wetland hydrology is provided below. Hydrology features observed at each sampling location is documented on the data forms in Appendix A.

[1] The California Interagency Watershed Map is the State of California's working definition of watershed boundaries. The California Interagency Watershed Map describes California watersheds, beginning with the division of the State's 101 million acres into ten Hydrologic Regions (HR). Each HR is progressively subdivided into six smaller, nested levels: the Hydrologic Unit (HU, major rivers), Hydrologic Area (HA, major tributaries), Hydrologic Sub-Area (HSA), Super Planning Watershed (SPWS), and Planning Watershed (PWS). At the Planning Watershed (the most detailed level), where implemented, polygons range in size from approximately 3,000 to 10,000 acres. At all levels, a total of 7035 polygons represent the State's watersheds (CalWater 2009a).

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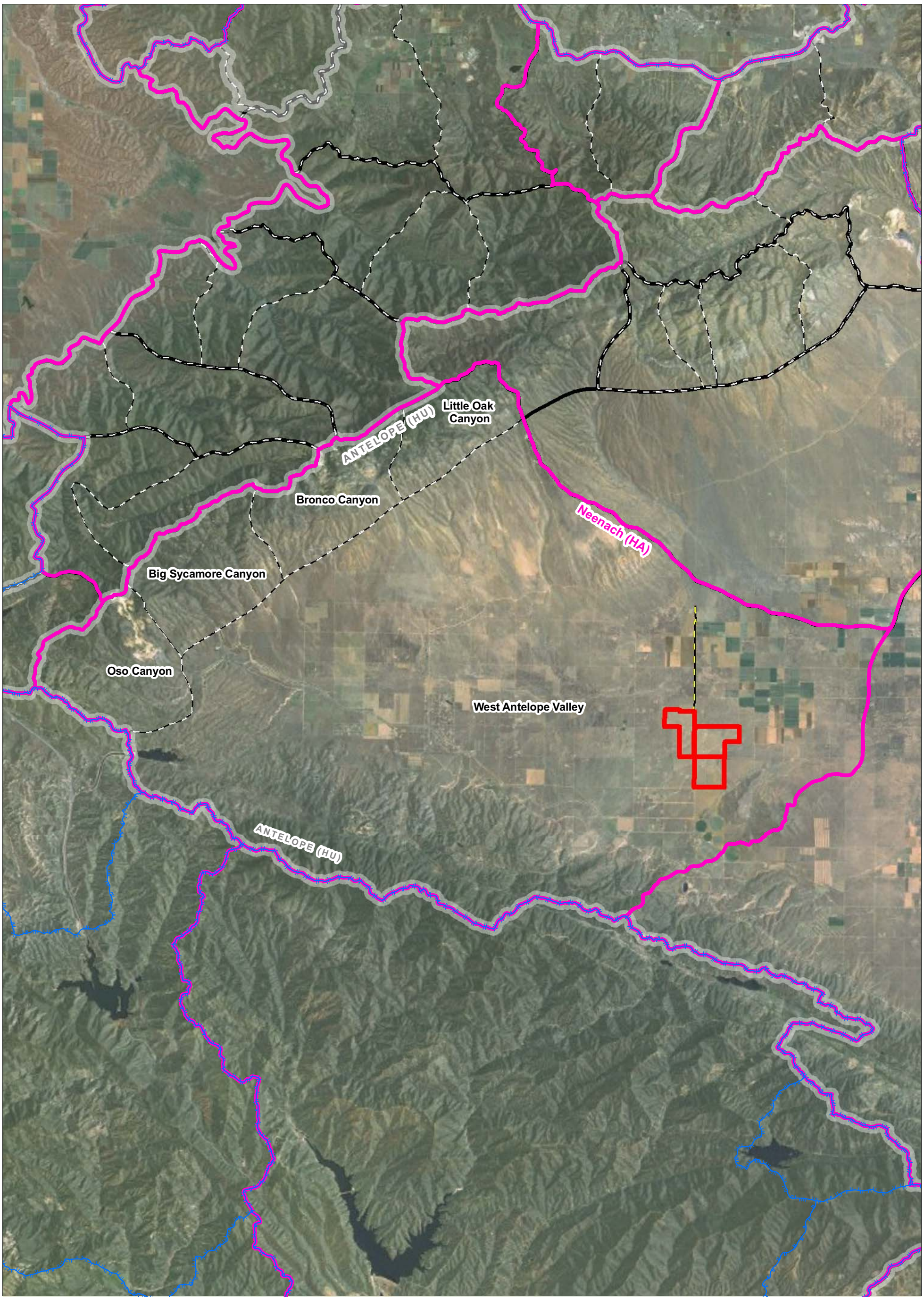

Legend

- Project Site Boundary
- Proposed Transmission Line Route
- Hydrologic Unit (HU)
- Hydrologic Area (HA)
- Hydrologic Sub-Area (HSA)
- Super Planning Watershed (SPW)
- Planning Watershed (PWS)

Source: [1] 1m Natural Color NAIP (2005), [2] The California Interagency Watershed Map (2004).

Watershed Classifications
(Watersheds were delineated and coded by government agencies and then divided into a series of six nested levels of watersheds)

HU = Hydrologic Unit
HA = Hydrologic Area
HSA = Hydrologic Sub-Area
SPW = Super Planning Watershed
*PWS = Planning Watershed

* Planning Watershed name is shown unless otherwise noted.

1:191,498

1 inch = 3 miles

0 1.5 3 6 Miles

Coordinate System: North American Datum 83 Universal Trans Mercator (UTM) Zone 11 North

July, 2009

AV Solar Ranch One

Figure 6. Watershed Boundaries

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4.3.1 Primary Drainages

The USGS 7.5 minute quadrangle map (USGS 1995) and the National Hydrography Dataset (USGS 2007) indicated the presence of four potential on-site hydrological features. These features were represented with a blue line on these maps and are herein referred to as primary drainages. One primary drainage was located in the proposed transmission line area, two were located in the Project site north of SR-138, and one was located in the Project site south of SR-138.

Two hydrological features on the main site were confirmed during the site visit as primary drainages.

- **Drainage A:** This drainage is identified as an intermittent stream on the USGS topographic map, and runs through the portion of the Project site north of SR-138. This stream appears to terminate towards the northeastern corner of the Project site, where bed and bank characteristics become indiscernible and the drainage becomes a vegetated swale. A CDFG representative (2009) indicated during the January 28, 2009 site visit that the swale did not possess the requisite bed and bank characteristics to qualify as a CDFG-jurisdictional stream. The jurisdictional length of Drainage A within the Project site is approximately 8,000 feet, and the width varies from 20 to 50 feet. The drainage also supports an onsite side-channel, with a length of 315 feet and width of 6 to 15 feet. Sinuosity is mild, as the channel is relatively straight. The stream channel is not evident upstream of the Project site (west of 170th Street West), but develops immediately downstream of the road at the site boundary. The substrate within the channel is composed mostly of sand, with gravel also present. The western portion of the stream exhibits mostly steep, cut banks, becoming more sloping and gradual towards the downstream reaches. Signs of geomorphic instability, including channel incision and bank failure, are present and are likely associated with accelerated flows from the impervious road surface. The stream channel is sparsely vegetated with upland plant species, and the drainage does not support any riparian vegetation.
- **Drainage C:** This drainage is identified as an intermittent stream on the USGS topographic map, and traverses the extreme southeastern corner of the Project site. The drainage is substantial in size, with width ranging from 10 to 15 feet, and the USGS map and NHD indicate that this stream flows into another drainage to the east of the Project site. Because this stream only overlaps a corner of the Project site, the portion of Drainage C within the site boundary is limited with a length of only 1,400 feet. Substrates within this drainage are comprised mostly of sand, with gravel also present. Most of Drainage C exhibits sloping, gradual banks with shallow cuts at the low-flow channel. However, in the wider reaches of the stream channel, the cut banks are much deeper.

During the site visits, the primary drainages were dry and hydrology was assessed by drainage patterns at each sampling point and on a project-wide basis. All primary drainages

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are intermittent in nature and likely only receive stream flow during and following significant rain events. For example, surface water was observed in Drainage A during a snow event in December 2008, but the drainage remained dry during subsequent field surveys. The drainages present on-site are not hydrologically connected to a traditionally navigable waterway. Drainages A and Drainage C had wetland hydrology, each with one primary indicator of surface soil cracks and two secondary indicators of riverine sediment deposits and drainage patterns. See Table 2 for primary drainage descriptions.

TABLE 2
PRIMARY DRAINAGE DESCRIPTIONS

Drainage	Length (Feet)	Width (feet)	Depth (Feet)	Acreage	Description
A	8, 067	20 to 50	4 to 7	2.68	Sand to gravel, mostly sand. Mostly steep, cut banks in southern 1/3 of the drainage, becoming more sloping and gradual in the more northern reaches. A few drainage fingers on north side.
C	1,400	10 to 15, with a portion being 65	3 to 4, with a portion being 0.08 to 0.1	1.02	Sand to gravel, mostly sand. Sloping gradual edges, mostly shallow cut banks, except in the wider portion of the drainage where the cut banks are much deeper.

Note: Length and acreage was determined using GIS and width and depth were determined in the field.

The remaining two potential drainages, one crossing West Avenue C in the northern portion of the Project site and one in the proposed transmission line north of West Avenue A, were evaluated in the field and were not present. No defined bed or banks or water marks were found. It is possible these drainages changed course or were diverted, but no evidence of this was found. As discussed before, these drainages are not included in this report as they are not part of the formal wetland delineation.

4.3.2 Secondary Drainages

Two additional hydrologic features were found on-site during field investigations. These features include drainages with a defined bed and bank that were not blue-line features and are herein referred to as secondary drainages.

- **Drainage B:** This drainage was not mapped on the USGS topographic map, but was delineated in the field by URS staff. Drainage B runs generally parallel to Drainage A and is located to the south, between Drainage A and SR-138. This small, ephemeral drainage is wholly contained within the Project site, and has a length of approximately 2,400 feet and a width varying from three to five feet. Drainage B is not connected to any other drainage onsite, and appears to be the result of sheet flows carving a channel at low point within a low-gradient, grassland area. Bed and bank characteristics originate at the

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western end of the channel, and then disappear at the eastern end without apparent cause. The substrate in this drainage is mostly sandy, which may partly explain this irregularity. The channel banks range from gradually sloping to distinctly cut.

- **Drainage D:** This drainage was not mapped on the USGS topographic map, but was delineated in the field by URS staff. Drainage D runs along the northern boundary of the Project site near the northeastern corner for a distance of approximately 1,500 feet. The drainage is relatively wide, with width ranging from 30 to 40 feet. Because the Project site boundary runs along this drainage lengthwise, there are substantial reaches where only the southern bank of this channel is with the Project site. The substrate is comprised mostly of sand, and the drainage exhibits steeply cut banks.

During the site visits, the secondary drainages were dry and hydrology was assessed by drainage patterns at each sampling point and on a project-wide basis. The secondary drainages are ephemeral and likely only receive stream flow during and following significant rain events. The drainages present on-site are not hydrologically connected to a traditionally navigable waterway. Drainage B had one secondary indicator of drainage patterns and therefore did not have wetland hydrology. Drainage D was not evaluated for hydrology as discussed in Section 3.0. See Table 3 for secondary drainage descriptions.

TABLE 3
SECONDARY DRAINAGE DESCRIPTIONS

Drainage	Length (Feet)	Width (Feet)	Depth (Feet)	Acreage	Description
B	2,401	3 to 5	2 to 4	0.61	Mostly sand. Banks range from gradually sloping to distinctly cut.
D	1,536	30 to 40	8 to10	0.27	Mostly sand. Steep, cut banks.

Note: Length and acreage was determined using GIS and width and depth were determined in the field.

4.4 JURISDICTIONAL DETERMINATION

Two jurisdiction categories were identified on the Project site: waters of the State under jurisdiction of the Lahontan RWQCB and CDFG Jurisdictional Streams. The location of jurisdictional boundaries is displayed on Figure 7. See Table 4 for an acreage summary of the jurisdictional areas found at the Project site. Below are the results and determining factors of the jurisdictional determination.

4.4.1 U.S. Army Corps of Engineers Waters of the U.S.

No USACE wetlands were found at the Project site. None of the sampling locations were positive for all three wetland parameters: hydrophytic vegetation, hydric soil, and wetland hydrology. Drainages A and C had wetland hydrology (sampling points A1, A2, C1);

TABLE 4
ACREAGES OF JURISDICTIONAL AREAS AT THE PROJECT SITE

Drainage	Waters of the U.S. (Acres)	Waters of the State (Acres)	CDFG Jurisdictional Streams (Acres)
A	--	2.68	2.68
B	--	0.61	0.61
C	--	1.02	1.02
D	--	0.27	0.27
Total Jurisdictional Area	--	4.58	4.58

however, no drainages concurrently had hydrophytic vegetation and hydric soil. All drainages were naturally problematic due to sandy soils, which often lack hydric soil characteristics. Thus, vegetation and hydrology were more important in identifying presence of wetlands.

No USACE non-wetland waters of the U.S. were found at the Project site. Drainages found on-site had an ordinary high water mark, but the drainages were isolated and they were not hydrologically or ecologically connected to a Traditionally Navigable Waterway (TNW). Drainage patterns within the site are muted, with on-site drainages present but isolated from one another and lacking the hierarchical tributary structure found in more substantial stream systems. Therefore the on-site drainages did not have a significant nexus.

4.4.2 Regional Water Quality Control Board Waters of the State

Approximately 4.58 acres of waters of the State under the jurisdiction of the Lahontan RWQCB were present on the Project site (Figure 7). Drainages B and C, and the on-site portion of Drainage D are waters of the State at 0.61, 1.02, and 0.27 acres respectively. Drainage A encompasses a total of 3.53 acres; however, only 2.68 acres are waters of the State based on a defined bed and bank and CDFG consultation (Jackson 2009). Waters of the State were determined based on the presence of a defined physical bed, bank, or channel and determined to be coterminous with the extent of CDFG jurisdictional streambeds.

4.4.3 California Department of Fish and Game Jurisdictional Streams

Approximately 4.58 acres of CDFG jurisdictional streams were present on the Project site (Figure 7). Drainages B and C, and the on-site portion of Drainage D are jurisdictional streams at 0.61, 1.02, and 0.27 acres, respectively. Drainage A encompasses a total of 3.53 acres; however, only 2.68 acres are jurisdictional streams based on a defined bed and bank and CDFG consultation (Jackson 2009). CDFG jurisdictional streams were determined based on the presence of a defined physical bed, bank, or channel. No riparian vegetation was present within or adjacent to the drainages on-site.

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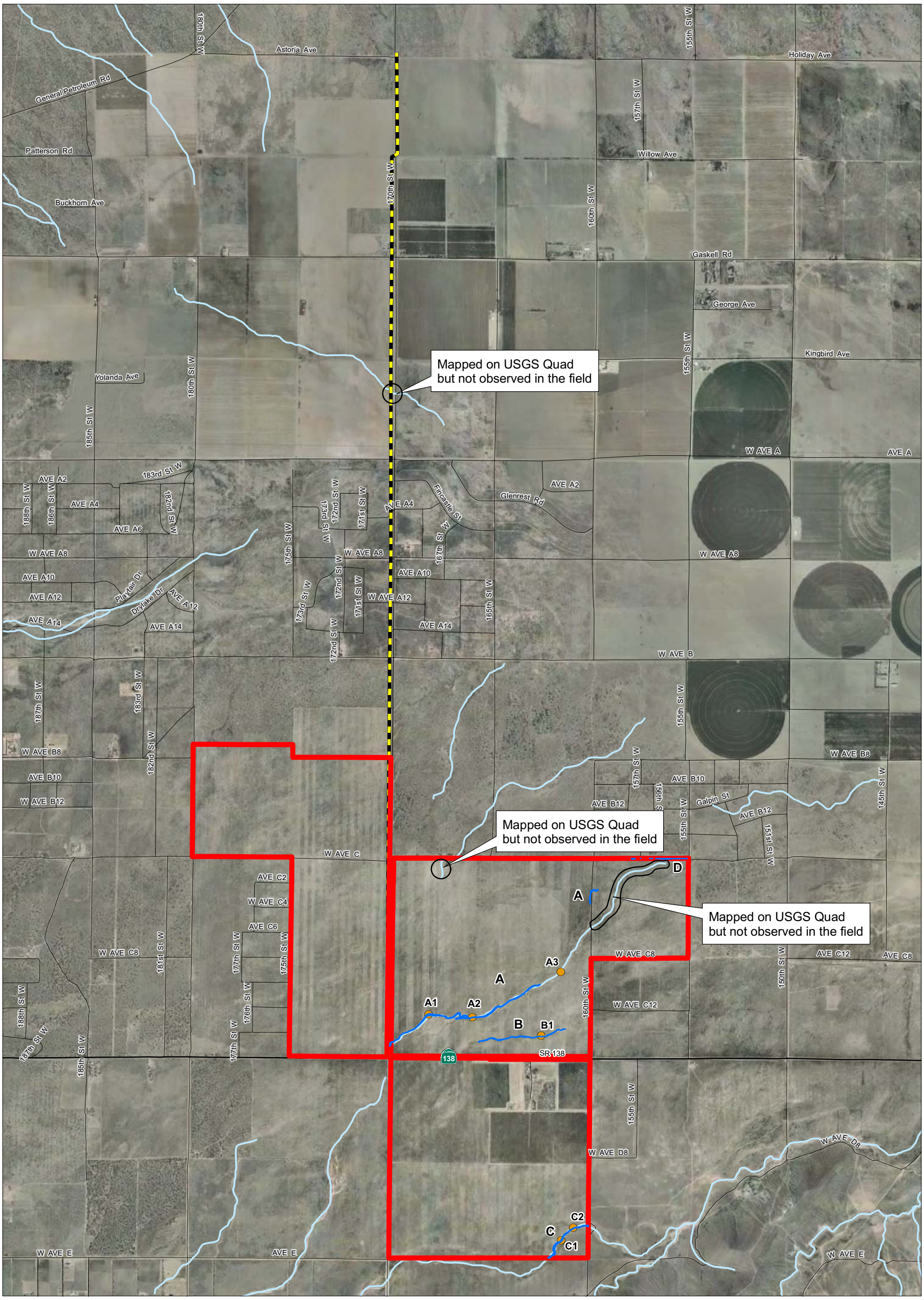

Legend

- Project Site Boundary
- Proposed Transmission Line Route
- Interstate, US or State Highways
- Secondary State/County Routes
- Other Roads or 4WD
- NHD Flowline
- A Drainage Identification
- Sampling Locations

Jurisdictional Boundaries

- CDFG Jurisdictional Streams and RWQCB Waters of the State

Source: [1] 1m Natural Color NAIP (2005), [2] ESRI StreetMap USA (2007), [3] USGS NHD Flowline (2007), [4] URS Field Survey (2009).

1:28,800

1 inch = 2,400 feet

0 0.2 0.4 0.8 Miles

0 1,200 2,400 4,800 Feet

Coordinate System: North American Datum 83 Universal Trans Mercator (UTM) Zone 11 North

July, 2009

AV Solar Ranch One

Figure 7. Jurisdictional Boundary Map

T:\NextLight_Solar\deliverables\LarsenRanch\Wetland Delineation\Figure 7_Jurisdictional Boundary_Map.mxd

SECTION 5.0
CONCLUSIONS

Approximately 4.58 acres of non-navigable stream channels that are under the jurisdiction of the CDFG and Lahontan RWQCB are present at the Project site. The presence of a defined physical bed, bank, or channel was used to determine the location and extent of CDFG jurisdictional streams and RWQCB waters of the State. No USACE wetlands or non-wetland waters were found at the Project site. All jurisdictional areas are displayed on Figure 7 and summarized in Table 4.

5.1 RECOMMENDATIONS

Mitigation requirements for impacts to jurisdictional areas will be determined in consultation with the appropriate federal, state, and local agencies. A Habitat Mitigation and Monitoring Plan (HMMP) or similar plan may be required for this project. The HMMP would identify the location and methods for mitigation of potential project impacts to state jurisdictional areas defined herein. The following agency permit requirements are based on the current information available.

5.1.1 U.S. Army Corps of Engineers Permit Requirements

Based on the current information available, no USACE permits will be needed for the proposed project.

5.1.2 Regional Water Quality Control Board Permit Requirements

Section 401 of the CWA regulates activities that have the potential to cause water quality impacts to waters of the State, including wetlands, as defined by the USACE. A Section 401 Water Quality Certification from the Lahontan RWQCB would be required for any development activities on the site that would potentially impact the Lahontan RWQCB jurisdictional areas shown in Figure 7.

5.1.3 California Department of Fish and Game Permit Requirements

Sections 1600 through 1616 of the CDFG Code regulate activities that would alter the flow, bed, channel, or bank of streams and lakes. CDFG jurisdiction typically extends to the top of the stream bank or the outside extent of riparian vegetation. Any project related impacts to on-site CDFG jurisdictional streams and wetlands shown in Figure 7 will require coordination with and permit approval in the form of a Streambed Alteration Agreement from CDFG.

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SECTION 6.0
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APPENDIX A
WETLAND DETERMINATION DATA FORMS – ARID WEST REGION

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WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: AV Solar Ranch One City/County: Los Angeles County Sampling Date: 1/14/09

Applicant/Owner: NextLight State: CA Sampling Point: A1

Investigator(s): Julie Love, Jessica Birnbaum Section, Township, Range: T08N, R15W, S13

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR): LRR-D Western Range and Irrigated Region Lat: 369348.17 UTM Long: 3849384.36 UTM Datum: NAD83

Soil Map Unit Name: Hanford Coarse Sandy Loam (HbA), 0-2% NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation **N**, Soil **N**, or Hydrology **N** significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation **N**, Soil **Y**, or Hydrology **N** naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☒	No ☐

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☒

Remarks:
GPS: Trimble B1
Photos: Upstream 1673, Downstream 1674, up close 1675

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: 0			
Sapling/Shrub Stratum			
1. Chrysothammus nauseosus	15	Y	NI
2. *Ambrosia acanthicarpa*	1	N	NI
3.			
4.			
5.			
Total Cover: 16	50%=8; 20%=3.2		
Herb Stratum			
1. unknown grass[a]	5	Y	NI[a]
2. *Bromus tectorum* (d)	1	N	NI
3. *Eriogonum davidsonii* (d)	1	N	NI
4.			
5.			
6.			
7.			
8.			
Total Cover: 7	50%=3.5; 20%=1.4		
Woody Vine Stratum			
1.			
2.			
Total Cover: 0			

% Bare Ground in Herb Stratum 93 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	23	x 5 = 115
Column Totals:	23 (A)	115[a] (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%

N Prevalence Index is ≤3.0[1]

N Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

N Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks:
Upland: rubber rabbitbrush scrub - CHRNAU, EROCIC, unknown grass, AMBACA, ERIDAV
(d) = dead
[a] The dominant unknown grass was not identified to species, so an indicator status could not be applied; however, having a known status would not result in a positive dominance test or PI. The unknown annual grasses could not be identified due to their small size and lack of identifying characteristics or flowering structures. The majority of potential annual grasses found on-site were NI, therefore this indicator status was applied.

SOIL

Sampling Point: A1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
							sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:
Sandy soils are naturally problematic, and typically lack hydric characteristics.
A soil pit was not conducted because of the naturally problematic sandy soils.
Small patches of fine sand.
Surface: sandy (90%) to gravel (10%), mostly sand.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☒ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5) 0:2

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

H: 5'-7' cut bank on N side, gradual bank on one side W: 50'
Soil cracks are within sediment deposits of fines ~3ft long by 0.5in wide
The dominant unknown grass was not identified to species, so an indicator status could not be applied; however, having a known status would not result in a positive FAC-neutral test. The majority of potential annual grasses found on-site were NI, therefore this indicator status was applied.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: AV Solar Ranch One City/County: Los Angeles County Sampling Date: 1/14/09

Applicant/Owner: NextLight State: CA Sampling Point: A2

Investigator(s): Julie Love, Jessica Birnbaum Section, Township, Range: T08N, R15W, S13

Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope (%): 1%

Subregion (LRR): LRR-D Western Range and Irrigated Region Lat: 369381.8 UTM Long: 3849685.6 UTM Datum: NAD83

Soil Map Unit Name: Hanford sandy loam (HcA), 0-2% NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation **N**, Soil **N**, or Hydrology **N** significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation **N**, Soil **Y**, or Hydrology **N** naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☒	No ☐

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☒

Remarks: GPS: Trimble B2

Photos: Upstream 1678, up close 1680, downstream 1679

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum			
1. *Chrysothamnus nauseosus*	20	Y	NI
2. *Ambrosia acanthicarpa* (d)	2	N	NI
3.			
4.			
5.			
Total Cover:	22	50%=11; 20%=4.4	
Herb Stratum			
1. *Corethrogyne (Lessingia) filaginifolia*	15	Y	NI
2. *Amsinckia tesselata/menziesii*	3	N	NI
3. *Pectocarya* spp.[a]	2	N	NI[a]
4. *Erodium cicutarium*	2	N	NI
5.			
6.			
7.			
8.			
Total Cover:	22	50%=11; 20%=4.4	
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 78 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	44	x 5 = 220
Column Totals:	44 (A)	220 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%

N Prevalence Index is ≤3.0[1]

N Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

N Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks: Upland vegetation: rubber rabbitbrush scrub - dominant vegetation the same as Sampling Point A2.
(d) = dead
[a] *Pectocarya* could not be determined to species; however, three species exist on site - all are NI.

SOIL

Sampling Point: A2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18							sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Sandy soils are naturally problematic, and typically lack hydric characteristics.
Surface: sand to gravel, mostly sand. Deep sand is damp/moister than surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☒ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5) 0:2

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Height: 4'-5' Width: 20'
Surface cracks and sediments deposits are minimal. Cut steep banks on both sides.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: AV Solar Ranch One City/County: Los Angeles County Sampling Date: 1/14/09

Applicant/Owner: NextLight State: CA Sampling Point: A3

Investigator(s): Julie Love, Jessica Birnbaum Section, Township, Range: T08N, R15W, S13

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): flat Slope (%): 1%

Subregion (LRR): LRR-D Western Range and Irrigated Region Lat: 370140.2 UTM Long: 3849695.0 UTM Datum: NAD83

Soil Map Unit Name: Greenfield sandy loam (GsA), 0-2% NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation **N**, Soil **N**, or Hydrology **N** significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation **N**, Soil **Y**, or Hydrology **N** naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

GPS: Trimble B3

Photos: Upstream 1684, downstream 1685, up close 1686

VEGETATION non- jurisdictional

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: 0			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover: 0			
Herb Stratum			
1. *Pectocarya* spp.[a]	1	Y	NI[a]
2. *Amsinckia tesselata/menziesii*	<1	Y	NI
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover: 2 50%=1; 20%=0.4			
Woody Vine Stratum			
1.			
2.			
Total Cover: 0			

% Bare Ground in Herb Stratum 99 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	2	x 5 = 10
Column Totals:	2 (A)	10 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

N Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

N Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks:

Upland vegetation: rubber rabbitbrush scrub - CHRNAU, grass, and AMBACA

(d) = dead

[a] *Pectocarya* could not be determined to species; however, three species exist on site - all are NI.

SOIL

Sampling Point: A3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
							sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Sandy soils are naturally problematic, and typically lack hydric characteristics.
Substrate sand to gravel, mostly sand.
A soil pit was not conducted because of the naturally problematic sandy soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5) 0:2

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators found.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: AV Solar Ranch One City/County: Los Angeles County Sampling Date: 1/14/09

Applicant/Owner: NextLight State: CA Sampling Point: B1

Investigator(s): Julie Love, Jessica Birnbaum Section, Township, Range: T08N, R15W, S13

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR): LRR-D Western Range and Irrigated Region Lat: 370032.4 UTM Long: 3849399.0 UTM Datum: NAD83

Soil Map Unit Name: Greenfield sandy loam (GsA), 0-2% NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation **N**, Soil **N**, or Hydrology **N** significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation **N**, Soil **Y**, or Hydrology **N** naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☒

Remarks:
Photos: upstream 1689, downstream 1690, up close 1691
GPS: Trimble C1

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Ambrosia acanthicarpa* (d)	5	Y	NI
2.			
3.			
4.			
5.			
Total Cover:	5	50%=2.5; 20%=1	
Herb Stratum			
1. *Pectocarya* spp.[a]	3	Y	NI[a]
2. Unknown grass[b]	2	Y	NI[b]
3. *Bromus tectorum* (d)	1	N	NI
4. *Amsinckia tesselata/menziesii*	1	N	NI
5. *Erodium cicutarium*	1	N	NI
6. Deinandra kelloggii (d)	1	N	NI
7.			
8.			
Total Cover:	9	50%=4.5; 20%=1.8	
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 91 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	14	x 5 = 70
Column Totals:	14 (A)	70 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%

N Prevalence Index is ≤3.0[1]

N Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

N Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks: Upland: rubber rabbitbrush scrub - CHRNAU, EROCIC, BROTEC, AMBACA, *Pectocarya* spp.
(d) = dead
[a] *Pectocarya* could not be determined to species; however, three species exist on site - all are NI.
[b] The dominant unknown grass was not identified to species, so an indicator status could not be applied; however, having a known status would not result in a positive dominance test or PI. The unknown annual grasses could not be identified due to their small size and lack of identifying characteristics or flowering structures. The majority of potential annual grasses found on-site were NI, therefore this indicator status was applied.

SOIL

Sampling Point: B1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18							loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:
Sandy soils are naturally problematic, and typically lack hydric characteristics.
Moist/damp beneath the surface. Color cannot be determined due to high sand/gravel content.
Made ball but no ribbon, indicating soil type.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

H: 2-4' W: 5'
The dominant unknown grass was not identified to species, so an indicator status could not be applied; however, having a known status would not result in a positive FAC-neutral test. The majority of potential annual grasses found on-site were NI, therefore this indicator status was applied.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: AV Solar Ranch One City/County: Los Angeles County Sampling Date: 1/13/09

Applicant/Owner: NextLight State: CA Sampling Point: C1

Investigator(s): Julie Love, Jessica Birnbaum Section, Township, Range: T08N, R15W, S24

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 4%

Subregion (LRR): LRR-D Western Range and Irrigated Region Lat: 370418.66 UTM Long: 3847559.23 UTM Datum: NAD83

Soil Map Unit Name: Hanford coarse sandy loam 0-2% NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation **N**, Soil **N**, or Hydrology **N** significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation **N**, Soil **Y**, or Hydrology **N** naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☒	No ☐

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☒

Remarks: GPS: Trimble A1

Photos: Upstream 1665, downstream 1666, up close 1667

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Ambrosia acanthicarpa (d)	3	Y	NI
2.			
Total Cover: 3 50%=1.5; 20%=0.6			
Herb Stratum			
1. *Pectocarya* spp.[a]	50	Y	NI
2. *Erodium cicutarium*	10	N	NI
3. *Eriogonum davidsonii* (d)	2	N	NI
4. *Eriogonum baileyii* (d)	1	N	NI
5. *Lupinus* sp.	1	N	-
6. *Datura wrightii* (d)	1	N	UPL
7. Unknown grass[b]	1	N	NI[b]
8. *Amsinckia tesselata/menziesii* (d)	1	N	NI
9. *Astragalus* sp. (d)	1	N	-
10.			
Total Cover: 68 50%=30; 20%=13.6			
Woody Vine Stratum			
1.			
2.			
Total Cover: 0			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	69	x 5 = 345
Column Totals:	69 (A)	345 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%

N Prevalence Index is ≤3.0[1]

N Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

N Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks:
(d) = dead
Upland: CA annual grassland - BROTEC, ESCCAL, *Amsinckia tesselata/menziesii*
[a] *Pectocarya* could not be determined to species; however, three species exist on site - all are NI.
main drainage bottom is bare (without vegetation), the east edge/shelf contained grass/herbs
[b] The dominant unknown grass was not identified to species, so an indicator status could not be applied; however, having a known status would not result in a positive dominance test or PI. The unknown annual grasses could not be identified due to their small size and lack of identifying characteristics or flowering structures. The majority of potential annual grasses found on-site were NI, therefore this indicator status was applied.

SOIL

Sampling Point: C1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18							sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Sandy soils are naturally problematic, and typically lack hydric characteristics.
Surface: 1% gravel, 99% sand

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☒ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5) 0:2

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sediment deposits are small <1 ft. across; cracks are within these deposits of fines

cut banks

H: 3-4ft W: 65ft = TOB, main drainage: 10ft only

main drainage bottom is bare (without vegetation), the east edge/shelf contained grass/herbs

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: AV Solar Ranch One City/County: Los Angeles County Sampling Date: 1/13/09

Applicant/Owner: NextLight State: CA Sampling Point: C2

Investigator(s): Julie Love, Jessica Birnbaum Section, Township, Range: T08N, R15W, S24

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR): LRR-D Western Range and Irrigated Region Lat: 370516.42 UTM Long: 3847661.20 UTM Datum: NAD83

Soil Map Unit Name: Hanford course sandy loam 0-2% NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation **N**, Soil **N**, or Hydrology **N** significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation **N**, Soil **Y**, or Hydrology **N** naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☒

Remarks:
GPS: Trimble: A2
Photos: Upstream 1668, downstream 1669, soil point 1670

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: 0			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover: 0			
Herb Stratum			
1. Unknown grass[a]	1	Y	NI[a]
2. *Erodium cicutarium*	1	Y	NI
3. *Croton* (*Eremocarpus*) *setigerus* (d)	1	Y	NI
4.			
5.			
6.			
7.			
8.			
Cover: 3	50%=1.5; 20%=0.6		
Woody Vine Stratum			
1.			
2.			
Total Cover: 0			

% Bare Ground in Herb Stratum 97 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	3	x 5 = 15
Column Totals:	3 (A)	15 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%

N Prevalence Index is ≤3.0[1]

N Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

N Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks:
Upland: CA annual grassland - unknown grass, *Amsinckia* sp., ERIDAV, ESCCAL, BROTEC
(d) = dead
[a] The dominant unknown grass was not identified to species, so an indicator status could not be applied; however, having a known status would not result in a positive dominance test or PI. The unknown annual grasses could not be identified due to their small size and lack of identifying characteristics or flowering structures. The majority of potential annual grasses found on-site were NI, therefore this indicator status was applied.

SOIL

Sampling Point: C2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
							sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Sandy soils are naturally problematic, and typically lack hydric characteristics.
A soil pit was not conducted because of the naturally problematic sandy soils.
Sandy surface: 1% gravel, 99% sand

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5) 0:3

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Cut banks 2 inches

H: 1in – 2in W: 15ft.

The dominant unknown grass was not identified to species, so an indicator status could not be applied; however, having a known status would not result in a positive FAC-neutral test. The majority of potential annual grasses found on-site were NI, therefore this indicator status was applied.

APPENDIX B
U.S. ARMY CORPS OF ENGINEERS APPROVED JURISDICTIONAL DETERMINATION FORM

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APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): June 2009

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles, CA

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: CA County/parish/borough: Los Angeles County City: 20 miles northwest of the City of Lancaster
Center coordinates of site (lat/long in degree decimal format): Lat. 34.7823625° **N**, Long. 118.4250053° **W**.
Name of nearest waterbody: Fairmont Reservoir, 5 miles away with no potential for hydrologic connection; Quail Lake, 18 miles away away with no potential for hydrologic connection
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: N/A
Name of watershed or Hydrologic Unit Code (HUC): The Project site is located in the Antelope-Fremont Valleys hydrologic unit (18090206) within the Northern Mojave Sub Region of the California Region (USGS 2009).
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☒ Field Determination. Date(s): January 13-14, 2009

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   ☐ TNWs, including territorial seas
   ☐ Wetlands adjacent to TNWs
   ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   ☐ Non-RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   ☐ Impoundments of jurisdictional waters
   ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet: width (ft) and/or acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Established by OHWM.**
   Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: .

SECTION III: CWA ANALYSIS

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

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A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW:

Summarize rationale supporting determination:

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **Pick List**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: .
Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

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(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

(iv) Biological Characteristics. Channel supports (check all that apply):
☐ Riparian corridor. Characteristics (type, average width): .
☐ Wetland fringe. Characteristics: .

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

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☐ Habitat for:
- ☐ Federally Listed species. Explain findings: .
- ☐ Fish/spawn areas. Explain findings: .
- ☐ Other environmentally-sensitive species. Explain findings: .
- ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☐ Directly abutting

☐ Not directly abutting

- ☐ Discrete wetland hydrologic connection. Explain: .
- ☐ Ecological connection. Explain: .
- ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

☐ Riparian buffer. Characteristics (type, average width): .

☐ Vegetation type/percent cover. Explain: .

☐ Habitat for:
- ☐ Federally Listed species. Explain findings: .
- ☐ Fish/spawn areas. Explain findings: .
- ☐ Other environmentally-sensitive species. Explain findings: .
- ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

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For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW? No
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW? No
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs? No
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW? No

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet width (ft), Or, acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

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Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

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Identify water body and summarize rationale supporting determination: The site contains portions of four unnamed ephemeral drainages which convey flows along the floor of the Antelope Valley during and immediately following precipitation events. These drainages terminate in the valley floor as surface flows are lost to infiltration, and are not tributary to any other waters. No past, present, or foreseeable future susceptibility to use in interstate or foreign commerce is present.

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☒ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **.**
☐ Other: (explain, if not covered above): **.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☒ Other non-wetland waters: 4.58 acres. List type of aquatic resource: Isolated, intrastate Waters of the State and CDFG jurisdictional streams.
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
Figure 1 Project Vicinity Map
Figure 2 Site Location Topographic Map
Figure 3 Vegetation Community Map – Project Site and Vicinity
Figure 4 Vegetation Community Map – Proposed Transmission Line
Figure 5 Soils Map
Figure 6 Watershed Boundaries Map
Figure 7 Jurisdictional Area Map
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
USACE Wetland Data Forms are attached as Appendix A
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas:
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: Fairmont Butte, CA (1995) 7.5 minute quadrangle maps.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation:

U.S. Department of Agriculture, National Resources Conservation Service, Soil Survey Geographic (NRCS SSURGO). 2007. Soil Database for Antelope Valley Area, California.

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U.S. Department of Agriculture, National Resources Conservation Service (NRCS). 2009. 1970. Soil Survey of Antelope Valley Area, California. Prepared January 1970.

☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): National Agricultural Imagery Program (NAIP). 2005. One-meter resolution natural color aerial photos. Accessed online at http://services.arcgisonline.com/v92.
or ☒ Other (Name & Date): Site photographs (See Appendix C)
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: See Section 2.0, Regulatory Overview for a synopsis off aplicaple law.
☐ Applicable/supporting scientific literature:.
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD:.

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APPENDIX C
PHOTO DOCUMENTATION

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Photograph 1
January 14, 2009. Sampling Point A1. Upstream view.

Photograph 2
January 14, 2009. Sampling Point A1. Downstream view.

Photograph 3
January 14, 2009. Sampling Point A1. Up close soil view.

Photograph 4
January 14, 2009. Sampling Point A2. Upstream view.

Photograph 5
January 14, 2009. Sampling Point A2. Downstream view.

Photograph 6
January 14, 2009. Sampling Point A2. Up close soil view.

Photograph 7
January 14, 2009. Sampling Point A3. Upstream view.

Photograph 8
January 14, 2009. Sampling Point A3. Downstream view.

Photograph 9
January 14, 2009. Sampling Point A3. Up close soil view.

Photograph 10
January 14, 2009. Sampling Point B1. Upstream view.

Photograph 11
January 14, 2009. Sampling Point B1. Downstream view.

Photograph 12
January 14, 2009. Sampling Point B1. Up close soil view.

Photograph 13
January 13, 2009. Sampling Point C1. Upstream view.

Photograph 14
January 13, 2009. Sampling Point C1. Downstream view.

Photograph 15
January 13, 2009. Sampling Point C1. Up close soil view.

Photograph 16
January 13, 2009. Sampling Point C2. Upstream view.

Photograph 17
January 13, 2009. Sampling Point C2. Downstream view.

Photograph 18
January 13, 2009. Sampling Point C2. Up close soil view.

Photograph 19
Drainage D, facing east.

Photograph 20
December 18, 2008. Flow within Drainage A after previous day's snow event. View from 170th Street West looking east/downstream.

Photograph 21
December 8, 2009. Rubber rabbitbrush vegetation community.

Photograph 22
January 14, 2009. California annual grassland vegetation community.

Photograph 23
January 13, 2009. Joshua tree woodland vegetation community.

Photograph 24
June 27, 2008. Young Joshua tree in the Joshua Tree Recruitment Area within the rabbitbrush vegetation community.

Photograph 25
March 25, 2009. Wildflower field vegetation community.

Photograph 26
June 10, 2009. Allscale vegetation community.

Photograph 27
Agriculture vegetation community within proposed transmission line route, located on the west side of 170th Street West. View facing northwest.

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APPENDIX D
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

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TABLE D-1
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
AGAVACEAE – Agave			
Yucca brevifolia[1] (previously in Liliaceae)	Joshua tree	NI	Uncommon
ANACARDIACEAE – Sumac or Cashew			
Pistacia sp.[3]	Pistachio		Uncommon
APIACEAE – Carrot			
Daucus carota[2,3]	Carrot	NI	Uncommon
APOCYNACEAE – Milkweed			
Asclepias californica (previously in Asclepiadaceae)	California milkweed	NI	Uncommon
ASTERACEAE – Sunflower			
Acamptopappus sphaerocephalus[2]	Rayless goldenhead	NI	Common
Ambrosia (*Hymenoclea*) *salsola*[1]	Cheesebush	NI	Uncommon
Ambrosia acanthicarpa[1]	Annual bursage	NI	Uncommon
Artemisia dracunculus	Tarragon	NI	Uncommon
Artemisia tridentate	Big sagebrush	NI	Scarce
Chaenactis fremontii	Desert pincushion	NI	Uncommon
Chaenactis glabriuscula[1]	Yellow pincushion	NI	Uncommon
Cirsium mohavense	Mojave thistle	FACU	Scarce
Conyza canadensis[1]	Horseweed	FAC	Uncommon
Corethrogyne (*Lessingia*) *filaginifolia*[1]	Common sandaster	NI	Common
Deinandra (*Hemizonia*) *kelloggii*	Kellogg's tarweed	NI	Common
Encelia actoni[1] (*Encelia virginensis* subsp. *acton*)	Acton daisy	NI	Scarce
Ericameria cooperi[1]	Cooper's goldenbush	NI	Common
Ericameria linearifolia[1]	Interior goldenbush	UPL	Common
Ericameria nauseosa[1] (*Chrysothamnus nauseosus*)	Rubber rabbitbrush	NI	Abundant
Ericameria teretifolia[2]	Green rabbitbrush	NI	Common
Erigeron foliosus	Leafy fleabane	NI	Uncommon
Eriophyllum wallacei/pringlei[1]	Wooly sunflower		Uncommon
Gutierrezia microcephala[2]	Sticky matchweed	NI	Uncommon
Helianthus annuus[1]	Common sunflower	FAC-	Common
Isocoma acradenia (*Haplopappus acradenius*)	Alkali goldenbush	NI	Common
Iva axillaris subsp. *robustior*[1]	Povertyweed	FAC	Uncommon

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TABLE D-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
Lactuca serriola[3,4]	Prickly lettuce	FAC	Uncommon
Lasthenia californica (*L. chrysostoma*)	California goldfields	FACU*	Abundant
Layia glandulosa	Desert tidy tips	NI	Uncommon
Leptosyne (*Coreopsis*) *bigelovii*	Bigelow's tickseed	NI	Uncommon
Lessingia lemmonii[1]	Lemmon's lessingia	NI	Common
Malacothrix californica[1]	California dandelion	NI	Common
Malacothrix glabrata[1]	Desert dandelion	NI	Common
Matricaria matricarioides[1,3] (*Chamomilla suaveolens*)	Pineapple weed	FACU	Uncommon
Stephanomeria exigua[1]	Small wirelettuce	NI	Common
Stephanomeria pauciflora[1]	Brownplume wirelettuce	NI	Common
Stephanomeria virgata[1]	Virgate wire lettuce	NI	Common
Tetradymia stenolepis[2]	Mojave horsebrush	NI	Uncommon
Uropappus lindleyi (*Microseris lindleyi, M. linearifolia*)	Silver puffs	NI	Common
BORAGINACEAE – Borage			
Amsinckia menziesii[1]	Menzies' fiddleneck	NI	Abundant
Amsinckia tessellata[1]	Fiddleneck	NI	Abundant
Cryptantha angustifolia (*C. inaequata*)	Winged cryptantha	NI	Uncommon
Cryptantha circumscissa	Cushion cryptantha	NI	Uncommon
Heliotropium curassavicum[2]	Wild heliotrope	OBL	Scarce
Pectocarya linearis subsp. *ferocula*[1]	Slender combseed	NI	Abundant
Pectocarya peninsularis[1]	Peninsular pectocarya	NI	Abundant
Pectocarya platycarpa[1]	Broad fruited combseed	NI	Abundant
Phacelia distans[1] (*P. cinerea;* previously included in *Hydrophyllaceae*)	Common phacelia	NI	Uncommon
Plagiobothrys arizonicus[1]	Arizona popcorn flower	NI	Common
Plagiobothrys canescens[2]	Valley popcorn flower	NI	Common
BRASSICACEAE – Mustard			
Brassica nigra[1,3]	Black mustard	NI	Uncommon
Capsella bursa-pastoris[2,3]	Shepard's purse	FAC-	Scarce
Descurainia incise	Mountain tansy mustard	NI	Uncommon
Descurainia pinnata	Western tansy mustard	NI	Uncommon
Descurainia sophia[2,3,4]	Flix weed	NI	Uncommon

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TABLE D-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
Hirschfeldia incana[2,3,4] (*H. adpressa, Brassica geniculata*)	Summer mustard	NI	Uncommon
Sisymbrium altissimum[1,3]	Tumble mustard	FACU	Uncommon
Sisymbrium orientale[1,3]	Oriental mustard	NI	Uncommon
Tropidocarpum gracile	Slender keel fruit	NI	Common
CACTACEAE – Cactus			
Opuntia basilaris[2]	Beavertail cactus	NI	Scarce
CAMPANULACEAE – Bellflower			
Nemacladus sigmoideus	Small flowered nemacladus	NI	Uncommon
CHENOPODIACEAE – Goosefoot			
Atriplex canescens[2]	Four-wing saltbush	FACU	Uncommon
Atriplex polycarpa[2]	Cattle spinach	FACU	Common
Grayia spinosa[2]	Spiny hopsage	NI	Uncommon
Krascheninnikovia (*Ceratoides, Eurotia*) *lanata*[2]	Winter fat	NI	Uncommon
Salsola tragus[1,3,4] (*S. kali*)	Russian thistle	FACU+	Common
CONVOLVULACEAE – Morning-glory			
Convolvulus arvensis[2,3,4]	Bindweed	NI	Uncommon
Cuscuta sp. (previously included in Cuscutaceae)	Dodder		Uncommon
CUCURBITACEAE – Gourd			
Marah macrocarpus[1]	Wild cucumber	NI	Common
EPHEDRACEAE – Ephedra			
Ephedra nevadensis[1]	Ephedra	NI	Uncommon
EUPHOROBIACEAE – Spurge			
Croton (*Eremocarpus*) *setigerus*[1]	Doveweed	NI	Common
Chamaesyce (*Euphorbia*) *albomarginata*[1]	Rattlesnake weed	NI	Common
FABACEAE – Legume			
Astragalus douglasii[1]	Jacumba milk vetch	*NI*	Common
Astragalus lentiginosus var. *variabilis*[1]	Freckled milk vetch	NI	Uncommon
Glycyrrhiza lepidota[2]	Wild licorice	FAC+	Uncommon
Lupinus bicolor (*L. congdonii, L. polycarpus*)	Miniature lupine, Bicolored lupine	NI	Abundant
Lupinus excubitus	Grape soda lupine	NI	Common

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TABLE D-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
Lupinus microcarpus[1]	Chick lupine	NI	Common
Medicago polymorpha[3] (*M. hispida*)	California burclover	NI	Uncommon
Robinia pseudoacacia[3]	Black locust	FAC*	Uncommon
GERANIACEAE – Geranium			
Erodium cicutarium[1,3,4]	Red-stem fillaree[1]	NI	Abundant
LAMIACEAE – Mint			
Marrubium vulgare[3,4]	Horehound	FAC	Uncommon
THEMIDACEAE			
Dichelostemma capitatum[1] (*D. pulchellum*, previously included in Liliaceae)	Blue dicks	NI	Common
LOASACEAE – Loasa			
Mentzelia albicaulis[1]	Comet blazing star	NI	Uncommon
MONTIACEAE			
Cistanthe (*Calandrinia*) *ambigua* (previously included in Portulacaceae)	Desert redmaids	FAC	Scarce
NYCTAGINACEAE – Four O'Clock			
Mirabilis laevis[2] (*M. californica*)	Wishbone bush	NI	Uncommon
ONAGRACEAE – Evening Primrose			
Camissonia (*Oenothera*) *campestris*	Mojave sun cup	NI	Common
Camissonia (*Sphaerostigma*) *pallida*[1]	Pale yellow sun cup	NI	Common
Camissonia pusilla[2] (*Oenothera contorta*)	Raven's primrose	NI	Uncommon
Camissonia (*Oenothera*) *strigulosa*[1]	Strigose sun cup	NI	Uncommon
Oenothera californica	California primrose	NI	Uncommon
PAPAVERACEAE – Poppy			
Argemone munita	Prickly poppy	NI	Uncommon
Eschscholzia californica[1]	California poppy	NI	Abundant
Eschscholzia minutiflora[1] (*E. parishii*)	Little golden poppy	NI	Uncommon
Platystemon californicus (*P. acutatus*)	Cream cups	NI	Common
PLANTAGINACEAE – Plantain			
Penstemon heterophyllus (previously included in Scrophulariaceae)	Penstemon	NI	Uncommon
POACEACE – Grass			

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TABLE D-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
Achnatherum (*Oryzopsis*) *hymenoides*	Indian rice grass	UPL	Uncommon
Achnatherum speciosum (*Stipa speciosa*)	Desert needlegrass	NI	Scarce
Arundo donax[2,3,4]	Giant reed	FACW	Uncommon
Avena fatua[1,3,4]	Wild oat	NI	Common
Bromus catharticus[3] (*B. haenkeanus*, *B. unioloides*, *B. willdenovii*)	Rescue brome	NI	Common
Bromus diandrus[1,3,4] (*B. rigidus*)	Ripgut brome	NI	Common
Bromus hordeaceus[3,4] (*B. mollis, B. racemosus*)	Soft chess	FACU-	Common
Bromus madritensis subsp. *rubens*[1,2,3,4] (*B. rubens*)	Red brome	NI	Abundant
Bromus tectorum[1,3,4]	Cheatgrass	NI	Abundant
Bromus trinii[1,3]	Chilean cheat grass	NI	Uncommon
Cynodon dactylon[2,3,4]	Bermuda grass	FAC	Uncommon
Elymus multisetus[1] (*Sitanion jubatum*)	Big squirrel-tail	NI	Uncommon
Hordeum murinum[1,2,3,4]	Bulbous barley	NI	Common
Piptatherum miliaceum[2] (*Oryzopsis miliacea*)	Smilo grass	NI	Uncommon
Poa secunda[1]	One sided blue grass	NI	Uncommon
Schismus barbatus[1,3]	Mediterranean grass	NI	Common
Secale cereal[3]	Rye	NI	Uncommon
Triticum aestivum[2,3]	Wheat	NI	Uncommon
Vulpia microstachys[1]	Small fescue	NI	Abundant
Vulpia myuros[3,4]	Rattail fescue	FACU*	Uncommon
POLEMONIACEAE – Phlox			
Eriastrum sapphirinum[2]	Sapphire woolystar	NI	Uncommon
Gilia minor	Little gilia	NI	Uncommon
Leptosiphon liniflorus[2] (*Linanthus liniflorus*)	Narrowflower flaxflower	NI	Common
Loeseliastrum schottii[2] (*Langloisia schottii*)	Schott's calico	NI	Uncommon
POLYGONACEAE – Buckwheat			
Chorizanthe watsonii[1]	Watson's spineflower	NI	Uncommon
Eriogonum angulosum[1]	Anglestem buckwheat	NI	Common
Eriogonum baileyi[1]	Bailey's buckwheat	NI	Common
Eriogonum davidsonii[1] (*E. molestum*)	Davidson's buckwheat	NI	Common
Eriogonum fasciculatum var. *polifolium*[2]	California buckwheat	NI	Uncommon

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TABLE D-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
Polygonum aviculare subsp. *depressum*[2] (*P. arenastrum, P. montereyense*)	Common knotweed	FAC	Uncommon
Rumex hymenosepalus	Dock	NI	Uncommon
SCROPHULARIACEAE – Figwort			
Castilleja exserta (*Orthocarpus purpurascens*)	Purple owl's clover	NI	Uncommon
SOLANACEAE – Nightshade			
Datura wrightii[1] (*D. meteloides*)	Jimson weed	NI	Common
Lycium andersonii[2]	Anderson's boxthorn	NI	Uncommon
Lycium cooperi[2]	Coopers' boxthorn	NI	Uncommon
TAMARICACEAE – Tamarisk			
Tamarix parviflora[2,3,4]	Smallflower tamarisk	FAC	Uncommon
ULMACEAE – Elm			
Ulmus pumila[2,3,4]	Siberian elm	NI	Uncommon
ZYGOPHYLLACEAE – Caltrop			
Larrea tridentata[1]	Creosote	NI	Uncommon
OTHER/UNKNOWN			
Unknown[2,3]	Unknown stone fruit tree		Uncommon

All plant species above were observed within the Project site unless otherwise noted.

1 Indicates plant species observed on Project site and proposed transmission line route.

2 Indicates plant species only observed on the proposed transmission line route.

3 Non-native (Hickman 1993).

4 Invasive (California Invasive Plant Council 2009, Mojave Desert Region).

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APPENDIX G
CNDDB QUERY RESULTS

Actinemys marmorata pallida

southwestern pond turtle

Element Code: ARAAD02032

Status

Federal: None
State: None

NDDB Element Ranks

Global: G3G4T2T3Q
State: S2

Other Lists

CDFG Status: SC

Habitat Associations

General: INHABITS PERMANENT OR NEARLY PERMANENT BODIES OF WATER IN MANY HABITAT TYPES; BELOW 6000 FT ELEV.

Micro: REQUIRE BASKING SITES SUCH AS PARTIALLY SUBMERGED LOGS, VEGETATION MATS, OR OPEN MUD BANKS. NEED SUITABLE NESTING SITES.

Occurrence No. 150 **Map Index:** 17288 **EO Index:** 9701

Dates Last Seen

Element: 1990-05-19
Site: 1990-05-19

Record Last Updated: 2008-02-06

* SENSITIVE *

Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

* SENSITIVE *

Lat/Long:
UTM:
Radius:
Elevation:
Mapping Precision:
Symbol Type:
Township:
Range:
Section:
Meridian:
Qtr:

Location: *SENSITIVE* Location information suppressed.

Location Detail: Please contact the California Natural Diversity Database, California Department of Fish and Game, for more information: (916) 324-3812.

Ecological: HABITAT CONSISTS OF SEVERAL SMALL LAKES RINGED BY CATTAILS, WHICH APPEARS TO BE A CONTINUATION OF THE EASTERN MARSHLAND OF ELIZABETH LAKE.

Threat: POTENTIAL THREAT OF DEVELOPMENT.

Owner/Manager:

Agelaius tricolor

tricolored blackbird

Element Code: ABPBXB0020

Status
Federal: None
State: None

NDDB Element Ranks
Global: G2G3
State: S2

Other Lists
CDFG Status: SC

Habitat Associations
General: HIGHLY COLONIAL SPECIES, MOST NUMBEROUS IN CENTRAL VALLEY & VICINITY. LARGELY ENDEMIC TO CALIFORNIA.
Micro: REQUIRES OPEN WATER, PROTECTED NESTING SUBSTRATE, & FORAGING AREA WITH INSECT PREY WITHIN A FEW KM OF THE COLONY.

Occurrence No. 400 **Map Index:** 55403 **EO Index:** 55403

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2000-04-22
Site: 2000-04-22
Record Last Updated: 2004-05-10

Quad Summary: Neenach School (3411875/188D)
County Summary: Los Angeles

Lat/Long: 34.79923º / -118.57496º
UTM: Zone-11 N3851909 E355925
Area:
Elevation: 2,893 ft

Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON

Township: 08N
Range: 16W
Section: 09 **Qtr:** NE
Meridian: S

Location: ALONG THE SHORE OF HOLIDAY LAKE. NORTH OF AVE B8, WEST OF 250TH ST W. ANTELOPE VALLEY
Ecological: HABITAT IS 75% CATTAIL AND 25% BULRUSH. MUCH VEGETATION HAS BEEN CLEARED.
General: POPULATION ESTIMATE OF 210 BIRDS.
Owner/Manager: UNKNOWN

Arenaria macradenia var. kuschei

Kusche's sandwort

Element Code: PDCAR040K4

Status
Federal: None
State: None

NDDB Element Ranks
Global: G5T1
State: S1.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: HABITAT LITTLE KNOWN.
Micro: MOJAVE DESERT. 1220M.

Occurrence No. 4 **Map Index:** 55943 **EO Index:** 55959

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Stable

Dates Last Seen
Element: 1997-09-19
Site: 1997-09-19
Record Last Updated: 2004-06-30

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.70086º / -118.61595º
UTM: Zone-11 N3841059 E351999
Area: 17.2 acres
Elevation: 5,600 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 16W
Section: 18
Qtr: NW
Meridian: S

Location: LIEBRE MOUNTAIN, ALONG THE FIREBREAK W OF ATMORE MEADOWS SPUR ROAD, S OF LIEBRE MOUNTAIN ROAD.

Location Detail: 3 COLONIES MAPPED IN THE NE 1/4 OF THE NW 1/4 OF SECTION 18 AND THE SW1/4 OF SE1/4 SEC 7.

Ecological: THIN SOILS WITH GRANITIC OUTCROPPINGS AND SPARSE VEGETATION DOMINATED BY LOW SHRUBS AND SUFFRUTICOSE PERENNIALS. WITH ERIOGONUM FASCICULATUM, ERIOPHYLLUM CONFERTIFLORUM, ERIASTRUM DENSIFOLIUM, AND LOTUS PROCUMBENS. DENSE CHAPARRAL NEARBY.

Threat: ORV ACTIVITY. FUELBREAK CONSTRUCTION. ROAD MAINTENANCE.

General: OVER 650 PLANTS SEEN IN 1997.

Owner/Manager: USFS-ANGELES NF

Occurrence No. 5 **Map Index:** 55944 **EO Index:** 55960

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Stable

Dates Last Seen
Element: 1997-09-19
Site: 1997-09-19
Record Last Updated: 2004-06-30

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.70771º / -118.60527º
UTM: Zone-11 N3841803 E352990
Area: 4.9 acres
Elevation: 5,200 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 16W
Section: 08
Qtr: SW
Meridian: S

Location: LIEBRE MOUNTAIN, JUST W OF THE INTERSECTION OF LIEBRE MOUNTAIN ROAD AND ATMORE MEADOWS SPUR ROAD.

Location Detail: ONE COLONY MAPPED AS ONE POLYGON IN THE NW 1/4 OF THE SW 1/4 OF SECTION 8.

Ecological: SPARSELY VEGETATED LOW SCRUB. WITH ERIOGONUM FASCICULATUM, ERIOPHYLLUM CONFERTIFLORUM, ERIASTRUM DENSIFOLIUM, LOTUS PROCUMBENS. DENSE CHAPARRAL NEARBY WITH QUERCUS CHRYSOLEPSIS, Q. WISLIZENII, ADENOSTOMA FASCICULATUM AND CEANOTHUS.

Threat: FUELBREAK CONSTRUCTION. ROAD MAINTENANCE.

General: ABOUT 20 PLANTS SEEN IN 1997.

Owner/Manager: USFS-ANGELES NF

Astragalus hornii var. hornii

Horn's milk-vetch

Element Code: PDFAB0F421

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4G5T2T3
State: S2S3.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: MEADOWS AND SEEPS, PLAYAS.
Micro: LAKE MARGINS, ALKALINE SITES. 60-850M.

Occurrence No. 3 **Map Index:** 57473 **EO Index:** 70405
Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1931-04-22
Site: 1931-04-22
Record Last Updated: 2007-07-13

Quad Summary: Little Buttes (3411873/187D), Willow Springs (3411883/187A)
County Summary: Kern

Lat/Long: 34.87842º / -118.29677º
UTM: Zone-11 N3860327 E381488
Radius: 1 mile
Elevation: 2,520 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 09N
Range: 13W
Section: 07
Qtr: XX
Meridian: S

Location: WILLOW SPRINGS.
Location Detail: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS A BEST GUESS.
General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1931 COLLECTION BY MACFADDEN. NEEDS FIELDWORK.
Owner/Manager: UNKNOWN

Athene cunicularia

burrowing owl

Element Code: ABNSB10010

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4
State: S2

Other Lists
CDFG Status: SC

Habitat Associations
General: OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.
Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 349 **Map Index:** 42488 **EO Index:** 42488
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2006-06-05
Site: 2006-06-05
Record Last Updated: 2006-11-15

Quad Summary: Little Buttes (3411873/187D)
County Summary: Los Angeles

Lat/Long: 34.80565º / -118.29912º
UTM: Zone-11 N3852260 E381169
Radius: 80 meters
Elevation: 2,445 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 13W
Section: 06 **Qtr:** SE
Meridian: S

Location: AVENUE B AT 95TH STREET WEST, ANTELOPE VALLEY.
Location Detail: 2006 BURROW WAS LOCATED INSIDE A TUBULAR STRUCTURE.
Ecological: HABITAT CONSISTS OF OLD, FALLOW AGRICULTURAL FIELDS, VEGETATED BY NON-NATIVE GRASSLAND.
Threat: POSSIBLE THREATS INCLUDE DEVELOPMENT, VANDALISM, POWER LINES, AND ROAD USE.
General: JUVENILE BIRD OBSERVED ON 10 JUN 1999, INDICATING AT LEAST ONE YOUNG FLEDGED. ACTIVE BURROW OBSERVED ON 5 JUN 2006.
Owner/Manager: UNKNOWN

Occurrence No. 350 **Map Index:** 42520 **EO Index:** 42520
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1999-06-27
Site: 1999-06-27
Record Last Updated: 2000-07-12

Quad Summary: Neenach School (3411875/188D)
County Summary: Los Angeles

Lat/Long: 34.80308º / -118.60715º
UTM: Zone-11 N3852383 E352987
Radius: 80 meters
Elevation: 2,910 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 16W
Section: 08 **Qtr:** XX
Meridian: S

Location: SE OF THE INTERSECTION OF AVENUE B AND 270TH STREET WEST, ANTELOPE VALLEY.
Location Detail: BURROW IS LOCATED 20 FEET SOUTH OF THE INTERSECTION.
Ecological: HABITAT CONSISTS OF DESERT SCRUB AND OLD AGRICULTURAL FIELDS; A STAND OF JOSHUA TREES FOUND NEARBY.
General: MALE OBSERVED AT THE BURROW DURING APR & MAY, STARTING ON 16 APR 1999. FEMALE AND YOUNG OBSERVED ON 6 JUN 1999. 2 ADULTS AND 6 JUVENILES OBSERVED ON 27 JUN 1999.
Owner/Manager: PVT?

Occurrence No. 351 **Map Index:** 42522 **EO Index:** 42522
Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1999-06-11
Site: 1999-06-11
Record Last Updated: 2000-03-13

Quad Summary: Neenach School (3411875/188D)
County Summary: Los Angeles

Lat/Long: 34.78435º / -118.57135º
UTM: Zone-11 N3850253 E356230
Radius: 2/5 mile
Elevation: 2,940 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 16W
Section: 15 **Qtr:** XX
Meridian: S

Location: 250TH STREET WEST, BETWEEN AVENUE C AND THE CALIFORNIA AQUEDUCT, ANTELOPE VALLEY
Ecological: HABITAT CONSISTS OF DESERT SCRUB AND OLD AGRICULTURAL FIELDS.
General: BURROW WITH FLEDGED YOUNG OBSERVED ON 11 JUN 1999.
Owner/Manager: UNKNOWN

Athene cunicularia

burrowing owl

Element Code: ABNSB10010

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4
State: S2

Other Lists
CDFG Status: SC

Habitat Associations
General: OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.
Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 352 **Map Index:** 42523 **EO Index:** 42523
Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1999-03-26
Site: 1999-03-26
Record Last Updated: 2000-03-13

Quad Summary: Neenach School (3411875/188D)
County Summary: Los Angeles

Lat/Long: 34.77728º / -118.58243º
UTM: Zone-11 N3849485 E355204
Radius: 1/5 mile
Elevation: 3,000 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 16W
Section: 16 **Qtr:** XX
Meridian: S

Location: NORTH OF AVENUE D, NEAR 256TH STREET WEST, ANTELOPE VALLEY.
Ecological: HABITAT CONSISTS OF DESERT SCRUB AND OLD AGRICULTURAL FIELDS.
General: OCCUPIED BURROW OBSERVED ON 26 MAR 1999.
Owner/Manager: UNKNOWN

Occurrence No. 358 **Map Index:** 42487 **EO Index:** 42487
Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1999-05-19
Site: 1999-05-19
Record Last Updated: 2000-10-10

Quad Summary: Little Buttes (3411873/187D)
County Summary: Kern, Los Angeles

Lat/Long: 34.81224º / -118.32617º
UTM: Zone-11 N3853023 E378705
Radius: 3/5 mile
Elevation: 2,485 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 14W
Section: 02 **Qtr:** XX
Meridian: S

Location: 110TH STREET WEST, BETWEEN AVENUE A AND AVENUE B, ANTELOPE VALLEY
Ecological: HABITAT CONSISTS OF OLD, FALLOW AGRICULTURAL FIELDS AND DESERT SCRUB.
General: ADULT BIRD OCCUPYING THIS TERRITORY ON 19 MAY 1999; PRESUMED NESTING.
Owner/Manager: UNKNOWN

Occurrence No. 586 **Map Index:** 51327 **EO Index:** 51327
Occ Rank: None
Origin: Natural/Native occurrence
Presence: Possibly Extirpated
Trend: Unknown

Dates Last Seen
Element: 2003-05-14
Site: 2005-06-09
Record Last Updated: 2006-08-07

Quad Summary: Del Sur (3411863/162A)
County Summary: Los Angeles

Lat/Long: 34.70306º / -118.34132º
UTM: Zone-11 N3840933 E377158
Radius: 80 meters
Elevation: 2,540 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 14W
Section: 14 **Qtr:** NW
Meridian: S

Location: JUST SE OF THE INTERSECTION OF AVENUE I & 120TH STREET WEST, 4 MILES NE OF ELIZABETH LAKE.
Location Detail: BURROW WAS LOCATED ~50 FEET SOUTH OF THE SPEED SIGN ON AVENUE I.
Ecological: HABITAT CONSISTS OF A FALLOW FIELD WITH SHORT, ANNUAL HERBACEOUS GROWTH/ANNUAL WILDFLOWERS; GROUND SQUIRREL BURROWS FOUND IN THE FLAT AREA.
Threat: THREATENED BY AGRICULTURAL ACTIVITIES & PROXIMITY TO A WELL-TRAVELED ROADWAY.
General: 2 ADULTS AND 6 YOUNG OBSERVED ON 11 MAY 2003; 1 AGITATED ADULT PRESENT AT THE SITE ON 14 MAY 2003. NO OWLS OR BURROWS WERE SEEN IN THE AREA ON 9 JUN 2005, ALTHOUGH THE SITE SEEMS TO HAVE CHANGED LITTLE SINCE 2003.
Owner/Manager: PVT

Athene cunicularia

burrowing owl

Element Code: ABNSB10010

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4
State: S2

Other Lists
CDFG Status: SC

Habitat Associations
General: OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.
Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 790 **Map Index:** 64586 **EO Index:** 64665
Occ Rank: None
Origin: Natural/Native occurrence
Presence: Extirpated
Trend: Unknown

Dates Last Seen
Element: 2005-01-06
Site: 2006-03-13
Record Last Updated: 2007-05-29

Quad Summary: Del Sur (3411863/162A)
County Summary: Los Angeles

Lat/Long: 34.67528º / -118.26306º
UTM: Zone-11 N3837759 E384286
Radius: 80 meters
Elevation: 2,380 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 13W
Section: 21 **Qtr:** SW
Meridian: S

Location: NEAR NW CORNER OF AVENUE K AND 75TH STREET WEST, 7 MILES WEST OF LANCASTER.
Ecological: HABITAT CONSISTS OF AN OLD AGRICULTURAL FIELD, WITH IRRIGATION PIPES AND SPARSE RUDERAL VEGETATION.
Threat: THREATENED BY PROPOSED DEVELOPMENT.
General: 1 OBSERVED AT IRRIGATION PIPE ON 6 JAN; 1 OWL OBSERVED PERCHED ON AN IRRIGATION PIPE ON 16 JAN 2005. SITE DEMOLISHED AND FILLED WITH DIRT. OWLS NOT OBSERVED ON 13 MAR 2006.
Owner/Manager: PVT

Occurrence No. 816 **Map Index:** 65402 **EO Index:** 65481
Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2006-07-18
Site: 2006-07-18
Record Last Updated: 2006-07-27

Quad Summary: Del Sur (3411863/162A)
County Summary: Los Angeles

Lat/Long: 34.70639º / -118.27139º
UTM: Zone-11 N3841220 E383566
Radius: 80 meters
Elevation: 2,391 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 13W
Section: 09 **Qtr:** SW
Meridian: S

Location: EAST SIDE OF 80TH STREET WEST, 0.2 MILE NORTH OF AVENUE I, LANCASTER.
Ecological: BURROW SITE IS LOCATED AT AN OLD, ABANDONED AGRICULTURAL FIELD.
Threat: THREATENED BY DEVELOPMENT AND VEHICLE STRIKES.
General: BUOW PAIIR HAS BEEN OBSERVED AT THIS LOCATION FOR THE PAST SEVERAL MONTHS; ON 18 JUL 2006, 2 ADULTS AND 3 JUVENILES WERE OBSERVED PERCHED ON A 2' HIGH CEMENT IRRIGATION PIPE.
Owner/Manager: PVT

Occurrence No. 854 **Map Index:** 66188 **EO Index:** 66267
Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2006-09-08
Site: 2006-09-08
Record Last Updated: 2008-05-21

Quad Summary: Little Buttes (3411873/187D)
County Summary: Los Angeles

Lat/Long: 34.77871º / -118.30466º
UTM: Zone-11 N3849279 E380624
Area:
Elevation: 2,430 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Township: 08N
Range: 13W
Section: 18 **Qtr:** SW
Meridian: S

Location: JUST NE OF THE INTERSECTION OF 100TH STREET WEST AND AVENUE D, ANTELOPE VALLEY.
Location Detail: BURROW IS LOCATED IN THE BERM OF A DRY STOCKPOND NEAR SOME IRRIGATION PIPES.
Ecological: HABITAT CONSISTS OF ABANDONED RANGELAND/RUDERAL VEGETATION; SALTBUSH SCRUB FOUND NEARBY.
Threat: THREATENED BY DEVELOPMENT AND ORV USE NEARBY.
General: SEVERAL YOUNG REPORTED AT THIS SITE DURING AUG 2006; 2 ADULTS OBSERVED PERCHED ON THE IRRIGATION PIPE ON 1 SEP 2006. 3 BURROWS WITH 4 OWLS OBSERVED ON 8 SEP 2006. OWLS PERCHED ON IRRIGATION PIPES AND NEAR CA GROUND SQUIRREL BURROWS.
Owner/Manager: PVT

Athene cunicularia

burrowing owl

Element Code: ABNSB10010

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4
State: S2

Other Lists
CDFG Status: SC

Habitat Associations
General: OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.
Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 985 **Map Index:** 69939 **EO Index:** 70770
Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2007-09-11
Site: 2007-09-11
Record Last Updated: 2007-09-17

Quad Summary: Fairmont Butte (3411874/187C)
County Summary: Kern

Lat/Long: 34.82583º / -118.44481º
UTM: Zone-11 N3854680 E367874
Radius: 80 meters
Elevation: 2,635 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 09N
Range: 15W
Section: 35 **Qtr:** SW
Meridian: S

Location: 0.5 MILE EAST OF 180TH STREET WEST AND 1 MILE NORTH OF WEST AVENUE A, 9 MILES WSW OF WILLOW SPRINGS.

Ecological: HABITAT CONSISTS OF FRESHLY-DISKED AGRICULTURAL FIELDS DOMINATED BY RUSSIAN THISTLE; OTHER NON-NATIVE WEEDS ALSO PRESENT ON PROJECT SITE. AG LAND TO THE NORTH & EAST, JOSHUA TREE & SALTBUSH SCRUB TO THE WEST & SOUTH.

General: 1 OWL OBSERVED UTILIZING A BURROW SITE ON 11 SEP 2007.

Owner/Manager: UNKNOWN

Occurrence No. 986 **Map Index:** 69941 **EO Index:** 70771
Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2007-09-11
Site: 2007-09-11
Record Last Updated: 2007-09-17

Quad Summary: Fairmont Butte (3411874/187C)
County Summary: Kern

Lat/Long: 34.83305º / -118.44981º
UTM: Zone-11 N3855488 E367429
Radius: 80 meters
Elevation: 2,635 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 09N
Range: 15W
Section: 34 **Qtr:** NE
Meridian: S

Location: SOUTH SIDE OF GASKELL ROAD, JUST WEST OF 180TH STREET WEST, 9.2 MILES WSW OF WILLOW SPRINGS.

Ecological: HABITAT CONSISTS OF FRESHLY-DISKED AGRICULTURAL FIELDS DOMINATED BY RUSSIAN THISTLE; OTHER NON-NATIVE WEEDS ALSO PRESENT ON PROJECT SITE. AG LAND TO THE NORTH & EAST, JOSHUA TREE & SALTBUSH SCRUB TO THE WEST & SOUTH.

General: 1 OWL OBSERVED UTILIZING A BURROW SITE ON 11 SEP 2007.

Owner/Manager: UNKNOWN

Occurrence No. 1058 **Map Index:** 71350 **EO Index:** 72254
Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2006-09-08
Site: 2006-09-08
Record Last Updated: 2008-05-21

Quad Summary: Little Buttes (3411873/187D)
County Summary: Los Angeles

Lat/Long: 34.77862º / -118.28364º
UTM: Zone-11 N3849244 E382547
Radius: 80 meters
Elevation: 2,463 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 13W
Section: 17 **Qtr:** SW
Meridian: S

Location: NORTH OF AVE C14, BETWEEN, 87TH ST & 85TH ST, ANTELOPE VALLEY.

Ecological: HABITAT CONSISTS OF ABANDONED AGRICULTURAL LAND. PENDING LAND SALES FOR SINGLE FAMILY HOME PARCELS. NO PROTECTION AFFORDED WILDLIFE RESOURCES BY LA COUNTY DURING CEQA REVIEW OF SUBDIVISION IN THE LATE 1970'S.

Threat: THREATENED BY DEVELOPMENT AND ORV USE NEARBY. CURRENTLY WIDELY SPACED RESIDENTIAL HOMES.

General: 1 BURROW AND 1 OWL OBSERVED ON 8 SEP 2006. OWL PERCHED ON IRRIGATION PIPE AND NEAR CA GROUND SQUIRREL BURROWS.

Owner/Manager: PVT

Athene cunicularia

burrowing owl

Element Code: ABNSB10010

Status

Federal: None
State: None

NDDB Element Ranks

Global: G4
State: S2

Other Lists

CDFG Status: SC

Habitat Associations

General: OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.

Micro: SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No. 1059 **Map Index:** 71352 **EO Index:** 72256

Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 2006-09-08
Site: 2006-09-08
Record Last Updated: 2008-05-21

Quad Summary: Little Buttes (3411873/187D)
County Summary: Los Angeles

Lat/Long: 34.77974º / -118.28898º
UTM: Zone-11 N3849374 E382060
Radius: 80 meters
Elevation: 2,440 ft

Mapping Precision: SPECIFIC
Symbol Type: POINT

Township: 08N
Range: 13W
Section: 17 **Qtr:** SW
Meridian: S

Location: JUST SE OF THE JUNCTION OF 90TH ST W & AVE C12, ANTELOPE VALLEY.

Ecological: HABITAT CONSISTS OF ABANDONED AGRICULTURAL LAND. PENDING LAND SALES FOR SINGLE FAMILY HOME PARCELS. NO PROTECTION AFFORDED WILDLIFE RESOURCES BY LA COUNTY DURING CEQA REVIEW OF SUBDIVISION IN THE LATE 1970'S.

Threat: THREATENED BY DEVELOPMENT AND ORV USE NEARBY. CURRENTLY WIDELY SPACED RESIDENTIAL HOMES.

General: 1 BURROW AND 3 OWLS OBSERVED ON 8 SEP 2006. OWLS PERCHED ON IRRIGATION PIPES AND NEAR CA GROUND SQUIRREL BURROWS.

Owner/Manager: PVT

Buteo regalis

ferruginous hawk

Element Code: ABNKC19120

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4
State: S3S4

Other Lists
CDFG Status:

Habitat Associations
General: OPEN GRASSLANDS, SAGEBRUSH FLATS, DESERT SCRUB, LOW FOOTHILLS & FRINGES OF PINYON-JUNIPER HABITATS.
Micro: EATS MOSTLY LAGOMORPHS, GROUND SQUIRRELS, AND MICE. POPULATION TRENDS MAY FOLLOW LAGOMORPH POPULATION CYCLES.

Occurrence No. 17 **Map Index:** 66004 **EO Index:** 66083
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1998-12-21
Site: 1998-12-21
Record Last Updated: 2006-08-23

Quad Summary: Del Sur (3411863/162A)
County Summary: Los Angeles

Lat/Long: 34.68932º / -118.28794º
UTM: Zone-11 N3839346 E382026
Radius: 80 meters
Elevation: 2,420 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 13W
Section: 17 **Qtr:** NW
Meridian: S

Location: EAST OF LANCASTER, DEL SUR, NEAR CORNER OF AVENUE J AND 90TH ST WEST.
Location Detail: BIRD PERCHED ON TELEPHONE POLE.
Ecological: ABANDONED AGRICULTURAL FIELD.
Threat: MUCH OF THIS AREA IS FOR SALE.
General: WINTERING SITE. 1 JUVENILE OBSERVED ON 21 DEC 1998.
Owner/Manager: UNKNOWN

Buteo swainsoni

Swainson's hawk

Element Code: ABNKC19070

Status
Federal: None
State: Threatened

NDDB Element Ranks
Global: G5
State: S2

Other Lists
CDFG Status:

Habitat Associations
General: BREEDS IN GRASSLANDS WITH WITH SCATTERED TREES, JUNIPER-SAGE FLATS, RIPARIAN AREAS, SAVANNAHS, & AGRICULTURAL OR RANCH
Micro: REQUIRES ADJACENT SUITABLE FORAGING AREAS SUCH AS GRASSLANDS, OR ALFALFA OR GRAIN FIELDS SUPPORTING RODENT POPULATIONS.

Occurrence No. 802 **Map Index:** 42484 **EO Index:** 42484
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2005-06-21
Site: 2005-06-21
Record Last Updated: 2006-08-03

Quad Summary: Little Buttes (3411873/187D)
County Summary: Kern

Lat/Long: 34.82650º / -118.30886º
UTM: Zone-11 N3854584 E380308
Radius: 80 meters
Elevation: 2,455 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 09N
Range: 14W
Section: 36 **Qtr:** SE
Meridian: S

Location: WEST SIDE OF 100TH STREET WEST, 0.45 MILE NORTH OF AVENUE A, ANTELOPE VALLEY.
Location Detail: 1995 NEST WAS LOCATED ON THE EAST SIDE OF 100TH STREET WEST.
Ecological: HABITAT CONSISTS OF ACTIVE ALFALFA FIELDS AND FALLOW AGRICULTURAL FIELDS.
Threat: THREATENED BY HUMAN DISTURBANCES (VEHICLES, SHOOTING, ELECTROCUTION) AND PESTICIDES.
General: NEST WITH BOTH ADULTS AND 1 DOWNY YOUNG OBSERVED ON 4 JUL 1995. 2 ADULTS WITH NEST CONTAINING 2 YOUNG OBSERVED PERIODICALLY DURING SUMMER 2005.
Owner/Manager: UNKNOWN

Occurrence No. 803 **Map Index:** 42486 **EO Index:** 42486
Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1999-07-01
Site: 1999-07-01
Record Last Updated: 2000-03-02

Quad Summary: Little Buttes (3411873/187D)
County Summary: Kern, Los Angeles

Lat/Long: 34.81815º / -118.31677º
UTM: Zone-11 N3853667 E379573
Radius: 2/5 mile
Elevation: 2,400 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 14W
Section: 01 **Qtr:** XX
Meridian: S

Location: SOUTH OF AVENUE A, APPROXIMATELY 1.5 MILES WEST OF 90TH STREET WEST, ANTELOPE VALLEY
Ecological: HABITAT CONSISTS OF OLD, FALLOW AGRICULTURAL FIELDS, OVERGROWN WITH RUDERAL VEGETATION.
General: ON 1 JUL 1999, A PAIR OF BIRDS EXHIBITED AGITATION NEAR A PRESUMED NEST TREE, AND ONE BIRD KEPT FLYING INTO A DENSE PORTION OF THE TREE, WHICH APPEARED TO CONTAIN A NEST.
Owner/Manager: UNKNOWN

Occurrence No. 1656 **Map Index:** 65618 **EO Index:** 65697
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2005-06-21
Site: 2005-06-21
Record Last Updated: 2006-08-03

Quad Summary: Little Buttes (3411873/187D)
County Summary: Kern

Lat/Long: 34.82546º / -118.28952º
UTM: Zone-11 N3854445 E382076
Radius: 80 meters
Elevation: 2,430 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 09N
Range: 13W
Section: 32 **Qtr:** SW
Meridian: S

Location: EAST SIDE OF 90TH STREET WEST, 0.4 MILE NORTH OF AVENUE A, 7.5 MILES SW OF ROSAMOND.
Location Detail: LOCATED IN THE YARD AT 470 90TH STREET WEST.
Ecological: HABITAT CONSISTS OF A RUDERAL BACKYARD CONTAINING SEVERAL ORNAMENTAL TREES AND GRASSES.
Threat: THREATENED BY POSSIBLE DEVELOPMENT, SHOOTING, AND AGRICULTURAL ACTIVITIES (INCLUDING PESTICIDES).
General: 2 ADULTS WITH A NEST CONTAINING 1-2 YOUNG WAS OBSERVED PERIODICALLY DURING SUMMER 2005.
Owner/Manager: PVT

California macrophylla

round-leaved filaree

Element Code: PDGER01070

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S3.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.
Micro: CLAY SOILS. 15-1200M.

Occurrence No. 7 **Map Index:** 01640 **EO Index:** 45686

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1888-06-XX
Site: 1888-06-XX
Record Last Updated: 2001-08-28

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.66387º / -118.40396º
UTM: Zone-11 N3836665 E371359
Radius: 1 mile
Elevation: 3,320 ft

Mapping Precision: NON-SPECIFIC
Symbol Type: POINT

Township: 07N
Range: 14W
Section: 30 **Qtr:** XX
Meridian: S

Location: ELIZABETH LAKE.
General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1888 COLLECTION BY PARISH. NEEDS FIELDWORK.
Owner/Manager: UNKNOWN

Calystegia peirsonii

Peirson's morning-glory

Element Code: PDCON040A0

Status	NDDB Element Ranks	Other Lists
Federal: None	**Global:** G3	**CNPS List:** 4.2
State: None	**State:** S3.2	

Habitat Associations

General: CHAPARRAL, COASTAL SCRUB, CHENOPOD SCRUB, CISMONTANE WOODLAND, LOWER MONTANE CONIFEROUS FOREST.

Micro: OFTEN IN DISTURBED AREAS OR ALONG ROADSIDES OR IN GRASSY, OPEN AREAS. 390-1470M.

Occurrence No. 3 **Map Index:** 01210 **EO Index:** 18563

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Decreasing

Dates Last Seen
Element: 1972-XX-XX
Site: 1979-06-12
Record Last Updated: 1989-08-11

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.69858º / -118.50925º
UTM: Zone-11 N3840654 E361769
Radius: 1/5 mile
Elevation: 3,800 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 15W
Section: 18 **Qtr:** N
Meridian: S

Location: 0.1 MI SE OF PINE CYN FOREST STATION, W OF LAKE HUGHES, ALONG HWY N2.

Ecological: IN WOODLAND. ASSOCIATED WITH QUERCUS CHRYSOLEPIS, POISON OAK AND RHAMNUS CROCEA.

Threat: HEAVY GRAZING HAS ELIMINATED PLANT ABOVE FENCE LINE.

Owner/Manager: USFS-ANGELES NF

Occurrence No. 14 **Map Index:** 01724 **EO Index:** 18552

Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1982-06-17
Site: 1982-06-17
Record Last Updated: 2007-09-10

Quad Summary: Del Sur (3411863/162A), Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.64998º / -118.37675º
UTM: Zone-11 N3835090 E373832
Radius: 1/5 mile
Elevation: 3,600 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 14W
Section: 32 **Qtr:** SW
Meridian: S

Location: ELIZABETH LAKE RD, 0.1 MI N OF JCT W/SAN FRANCISQUITO CANYON RD, NEAR ANDRADE CORNER.

Ecological: DISTURBED AREA WITH LOOSE, LIGHT SOIL ON EAST ROADSIDE. ASSOCIATED WITH ERIOGONUM FASCICULATUM AND GRASS SPP.

Owner/Manager: PVT

Occurrence No. 15 **Map Index:** 01843 **EO Index:** 18551

Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1982-06-17
Site: 1982-06-17
Record Last Updated: 2007-09-10

Quad Summary: Del Sur (3411863/162A)
County Summary: Los Angeles

Lat/Long: 34.63142º / -118.33375º
UTM: Zone-11 N3832979 E377745
Area:
Elevation: 3,400 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 14W
Section: 02 **Qtr:** S
Meridian: S

Location: ELIZABETH LAKE RD, 2.6 MI SOUTH OF JCT W/SAN FRANCISQUITO CANYON RD.

Ecological: GRASSY AREA BETWEEN ROAD CUT AND PASTURE AND ON NORTHEAST ROADSIDE IN LOOSE EXPOSED SOIL.

Owner/Manager: PVT

Calystegia peirsonii

Peirson's morning-glory

Element Code: PDCON040A0

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S3.2

Other Lists
CNPS List: 4.2

Habitat Associations
General: CHAPARRAL, COASTAL SCRUB, CHENOPOD SCRUB, CISMONTANE WOODLAND, LOWER MONTANE CONIFEROUS FOREST.
Micro: OFTEN IN DISTURBED AREAS OR ALONG ROADSIDES OR IN GRASSY, OPEN AREAS. 390-1470M.

Occurrence No. 16 **Map Index:** 01386 **EO Index:** 18554
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1982-XX-XX
Site: 1982-XX-XX
Record Last Updated: 2007-09-11

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.69948º / -118.46240º
UTM: Zone-11 N3840691 E366061
Radius: 2/5 mile
Elevation: 4,000 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 15W
Section: 15 **Qtr:** E
Meridian: S

Location: TROEDEL SPRINGS PLATEAU, PORTAL RIDGE.
Location Detail: MAPPED IN VICINITY OF TROEDEL SPRINGS; LOCATION VAGUE.
General: NEEDS FIELDWORK.
Owner/Manager: UNKNOWN

Occurrence No. 17 **Map Index:** 01262 **EO Index:** 18550
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1982-06-17
Site: 1982-06-17
Record Last Updated: 2007-09-10

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.69831º / -118.49703º
UTM: Zone-11 N3840607 E362888
Radius: 1/5 mile
Elevation: 3,800 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 15W
Section: 17 **Qtr:** NW
Meridian: S

Location: 0.7 MI UP DIRT RD NORTH OF PINE CANYON RD, 0.3 TO 0.5 MI E OF REST AREA.
Ecological: IN LOOSE, LIGHT SOIL AND ROCKY OUTCROPS; ASSOCIATED WITH ERIOGONUM FASCICULATUM, YUCCA WHIPPLEI, QUERCUS DUMOSA, AVENA SP., AND CERCOCARPUS BETULOIDES.
General: EXCELLENT TO GOOD CONDITION IN 1982.
Owner/Manager: USFS-ANGELES NF

Occurrence No. 27 **Map Index:** 01011 **EO Index:** 18541
Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1982-05-28
Site: 1982-05-28
Record Last Updated: 2007-09-11

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.63165º / -118.54107º
UTM: Zone-11 N3833276 E358740
Area:
Elevation: 2,000 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 16W
Section: 11 **Qtr:** XX
Meridian: S

Location: LAKE HUGHES RD, 6.5 MI S OF JCT W/ELIZABETH LAKE RD.
Location Detail: MAPPED FROM VICINITY OF RED FOX CANYON SOUTH FOR ABOUT 0.8 MI ALONG LAKE HUGHES RD.
Ecological: GRASSY OPEN AREAS. ASSOCIATED WITH AVENA SP.
Owner/Manager: USFS-ANGELES NF

Calystegia peirsonii

Peirson's morning-glory

Element Code: PDCON040A0

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S3.2

Other Lists
CNPS List: 4.2

Habitat Associations
General: CHAPARRAL, COASTAL SCRUB, CHENOPOD SCRUB, CISMONTANE WOODLAND, LOWER MONTANE CONIFEROUS FOREST.
Micro: OFTEN IN DISTURBED AREAS OR ALONG ROADSIDES OR IN GRASSY, OPEN AREAS. 390-1470M.

Occurrence No. 28 **Map Index:** 01047 **EO Index:** 18540
Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1982-XX-XX
Site: 1982-XX-XX
Record Last Updated: 2007-09-10

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.67891º / -118.45222º
UTM: Zone-11 N3838395 E366961
Radius: 2/5 mile
Elevation: 1,800 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 15W
Section: 22 **Qtr:** SE
Meridian: S

Location: NEAR JCT LAKE HUGHES RD & ELIZABETH LAKE CANYON RD.

Owner/Manager: USFS-ANGELES NF

Occurrence No. 29 **Map Index:** 01019 **EO Index:** 12608
Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1982-XX-XX
Site: 1982-XX-XX
Record Last Updated: 2007-09-10

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.68865º / -118.47912º
UTM: Zone-11 N3839512 E364512
Radius: 2/5 mile
Elevation: 2,000 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 15W
Section: 16 **Qtr:** SW
Meridian: S

Location: 1.8 MI NW OF JCT OF LAKE HUGHES RD & ELIZABETH LAKE CANYON RD.

Owner/Manager: USFS-ANGELES NF

Charadrius montanus

mountain plover

Element Code: ABNNB03100

Status
Federal: None
State: None

NDDB Element Ranks
Global: G2
State: S2?

Other Lists
CDFG Status: SC

Habitat Associations
General: SHORT GRASSLANDS, FRESHLY PLOWED FIELDS, NEWLY SPROUTING GRAIN FIELDS, & SOMETIMES SOD FARMS
Micro: SHORT VEGETATION, BARE GROUND & FLAT TOPOGRAPHY. PREFERS GRAZED AREAS & AREAS WITH BURROWING RODENTS.

Occurrence No. 9 **Map Index:** 41848 **EO Index:** 41848
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1999-03-12
Site: 1999-03-12
Record Last Updated: 1999-11-09

Quad Summary: Little Buttes (3411873/187D)
County Summary: Los Angeles

Lat/Long: 34.78775º / -118.34465º
UTM: Zone-11 N3850329 E376978
Radius: 1/10 mile
Elevation: 2,510 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 14W
Section: 15 **Qtr:** NE
Meridian: S

Location: WEST SIDE OF 120TH STREET WEST, 0.8 MILE NORTH OF AVENUE D, 3 MILES NW OF ANTELOPE ACRES.

Ecological: HABITAT CONSISTS OF A SPARSE, OPEN FIELD, WITH LOW RUDERAL GROWTH; SURROUNDED BY AGRICULTURAL FIELDS. HORNED LARKS OBSERVED UTILIZING THE SAME FIELD.

General: 24 INDIVIDUALS OBSERVED WINTERING ON 12 MAR 1999.

Owner/Manager: UNKNOWN

Chorizanthe parryi var. fernandina

San Fernando Valley spineflower

Element Code: PDPGN040J1

Status
Federal: Candidate
State: Endangered

NDDB Element Ranks
Global: G2T1
State: S1.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: COASTAL SCRUB.
Micro: SANDY SOILS. 3-1035M.

Occurrence No. 2 **Map Index:** 01640 **EO Index:** 21126

Occ Rank: None
Origin: Natural/Native occurrence
Presence: Possibly Extirpated
Trend: Unknown

Dates Last Seen
Element: 1929-05-21
Site: 199X-XX-XX
Record Last Updated: 2008-09-29

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.66387º / -118.40396º
UTM: Zone-11 N3836665 E371359
Radius: 1 mile
Elevation: 3,320 ft

Mapping Precision: NON-SPECIFIC
Symbol Type: POINT

Township: 07N
Range: 14W
Section: 30 **Qtr:** XX
Meridian: S

Location: ELIZABETH LAKE.

Location Detail: MAPPED AT ELIZABETH LAKE IN THE ANGELES NATIONAL FOREST.

Ecological: FOUND ON SANDY BANKS.

General: SITE BASED ON 3 COLLECTIONS; HOFFMANN IN 1928 & 1929, AND AN UNDATED COLLECTION BY HALL. NO INDIVIDUALS LOCATED DURING SURVEYS IN THIS AREA OVER THE LAST TEN YEARS, DESPITE THE PRESENCE OF SUITABLE HABITAT (SEE STO99U0001). NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Gymnogyps californianus

California condor

Element Code: ABNKA03010

Status		NDDB Element Ranks		Other Lists	
Federal:	Endangered	**Global:**	G1	**CDFG Status:**	
State:	Endangered	**State:**	S1		

Habitat Associations

General: REQUIRE VAST EXPANSES OF OPEN SAVANNAH, GRASSLANDS, AND FOOTHILL CHAPARRAL IN MOUNTAIN RANGES OF MODERATE ALTITUDE.

Micro: DEEP CANYONS CONTAINING CLEFTS IN THE ROCKY WALLS PROVIDE NESTING SITES. FORAGES UP TO 100 MILES FROM ROOST/NEST.

Occurrence No. 2 **Map Index:** 00758 **EO Index:** 14758

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1976-10-14
Site: 1976-10-14
Record Last Updated: 1989-08-10

Quad Summary: Liebre Twins (3411885/188A), Winters Ridge (3411886/188B)
County Summary: Kern

Lat/Long: 34.95887º / -118.65975º
UTM: Zone-11 N3869739 E348461
Area: 19,746.7 acres
Elevation: 4,200 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 10N
Range: 17W
Section: 10 **Qtr:** NE
Meridian: S

Location: TEJON RANCH.

General: ROOSTING AREA FROM OCTOBER THROUGH APRIL.

Owner/Manager: PVT

Lasiurus cinereus

hoary bat

Element Code: AMACC05030

Status
Federal: None
State: None

NDDB Element Ranks
Global: G5
State: S4?

Other Lists
CDFG Status:

Habitat Associations
General: PREFERS OPEN HABITATS OR HABITAT MOSAICS, WITH ACCESS TO TREES FOR COVER & OPEN AREAS OR HABITAT EDGES FOR FEEDING.
Micro: ROOSTS IN DENSE FOLIAGE OF MEDIUM TO LARGE TREES. FEEDS PRIMARILY ON MOTHS. REQUIRES WATER.

Occurrence No. 50 **Map Index:** 68504 **EO Index:** 68809
Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1938-07-15
Site: 1938-07-15
Record Last Updated: 2007-03-16

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.67609º / -118.44615º
UTM: Zone-11 N3838075 E367513
Radius: 4/5 mile
Elevation:
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 15W
Section: 23 **Qtr:** XX
Meridian: S

Location: LAKE HUGHES.
Location Detail: EXACT LOCATION UNKNOWN. MAPPED AS BEST ESTIMATE AROUND COMMUNITY OF LAKE HUGHES.
General: 1 MALE SPECIMEN (LACM #5003) COLLECTED BY J. VON BLOEKER ON 15 JUL 1938.
Owner/Manager: UNKNOWN

Leptosiphon serrulatus

Madera leptosiphon

Element Code: PDPLM09130

Status
Federal: None
State: None

NDDB Element Ranks
Global: G1?
State: S1?

Other Lists
CNPS List: 1B.2

Habitat Associations
General: CISMONTANE WOODLAND, LOWER MONTANE CONIFEROUS FOREST.
Micro: DRY SLOPES; OFTEN ON DECOMPOSED GRANITE IN WOODLAND. 80-1575M.

Occurrence No. 22 **Map Index:** 74657 **EO Index:** 75589
Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1935-05-20
Site: 1935-05-20
Record Last Updated: 2009-04-20

Quad Summary: Liebre Twins (3411885/188A), Winters Ridge (3411886/188B), Cummings Mtn. (3511815/213D), Tejon Ranch (3511816/213C)
County Summary: Kern

Lat/Long: 34.96987º / -118.63274º
UTM: Zone-11 N3870920 E350948
Radius: 5 mile
Elevation: 1,000 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 10N
Range: 16W
Section: 07
Qtr: XX
Meridian: S

Location: TEHACHAPI MOUNTAINS.

Location Detail: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS TO ENCOMPASS TEHACHAPI MOUNTAINS; THIS IS A LARGE AREA AND NO ADDITIONAL INFORMATION WAS GIVEN ON HERBARIUM LABEL TO NARROW DOWN WHERE IN THE TEHACHAPI MTNS THIS PLANT OCCURS.

Ecological: N SLOPE AMONG SCATTERED OAKS.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1935 ANDERSON COLLECTION. THIS IS A SOUTHERLY EXTENSION OF THE KNOWN RANGE OF THE PLANT; ID SHOULD BE DOUBLE-CHECKED, ANNOTATED IN 1941 BY MASON AS L. SERRULATUS. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Neotamias speciosus speciosus

lodgepole chipmunk

Element Code: AMAFB02172

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4T2T3
State: S2S3

Other Lists
CDFG Status:

Habitat Associations
General: SUMMITS OF ISOLATED PIUTE, SAN BERNARDINO, & SAN JACINTO MOUNTAINS. USUALLY FOUND IN OPEN-CANOPY FORESTS.
Micro: HABITAT IS USUALLY LODGEPOLE PINE FORESTS IN THE SAN BERNARDINO MTS & CHINQUAPIN SLOPES IN THE SAN JACINTO MTS.

Occurrence No. 8 **Map Index:** 58592 **EO Index:** 58628
Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1974-09-03
Site: 1974-09-03
Record Last Updated: 2004-12-14

Quad Summary: Green Valley (3411854/162C), Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.62033º / -118.41126º
UTM: Zone-11 N3831846 E370622
Radius: 1 mile
Elevation: 3,000 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 06N
Range: 14W
Section: 07
Qtr: XX
Meridian: S

Location: GREEN VALLEY, ANGELES NATIONAL FOREST.
Location Detail: MAPPED ACCORDING TO COORDINATES PROVIDED BY MANIS. LOCATION UNCERTAINTY GIVEN AS 6010.8998 M (3.75 MI)
General: 2 SPECIMENS COLLECTED (1 MALE & 1 FEMALE) 2-3 SEP 1974 BY K. MCDONALD AT "GREEN VALLEY [PLOT], NE, SAN BERNARDINO NATIONAL FOREST." DEPOSITED AT MVZ #176117 & 176118.
Owner/Manager: USFS-ANGELES NF

Perognathus alticolus inexpectatus

Tehachapi pocket mouse

Element Code: AMAFD01082

Status
Federal: None
State: None

NDDB Element Ranks
Global: G1G2T1T2
State: S1S2

Other Lists
CDFG Status: SC

Habitat Associations
General: ARID ANNUAL GRASSLAND & DESERT SHRUB COMMUNITIES, BUT ALSO TAKEN IN FALLOW GRAIN FIELD & IN RUSSIAN THISTLE.
Micro: BURROWS FOR COVER & NESTING. AESTIVATES AND HIBERNATES DURING EXTREME WEATHER. FORAGES ON OPEN GROUND & UNDER SHRUBS.

Occurrence No. 10 **Map Index:** 59036 **EO Index:** 23897
Occ Rank: None
Origin: Natural/Native occurrence
Presence: Possibly Extirpated
Trend: Unknown

Dates Last Seen
Element: 1938-07-16
Site: 1981-07-24
Record Last Updated: 2006-08-07

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.66906º / -118.42287º
UTM: Zone-11 N3837265 E369635
Area:
Elevation: 3,400 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 15W
Section: 25 **Qtr:** XX
Meridian: S

Location: VICINITY OF ELIZABETH LAKE & HUGHES LAKE.
Location Detail: IN 1981, SULENTICH TRAPPED 0.25 MI NE LAKE HUGHES AT 3375 FT AND HAD NO SUCCESS. ALSO NO SUCCESS 200 M NORTH OF WEST END LAKE ELIZABETH AT 3400 FT.
General: LACM # 5017-5019 COLLECTED 15 JULY TO 16 JULY 1938 FROM ELIZABETH LAKE AND # 5020 COLLECTED 14 JULY 1938 FROM HUGHES LAKE.
Owner/Manager: USFS-ANGELES NF, PVT

Phrynosoma coronatum (blainvillii population)

coast (San Diego) horned lizard

Element Code: ARACF12021

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4G5
State: S3S4

Other Lists
CDFG Status: SC

Habitat Associations
General: INHABITS COASTAL SAGE SCRUB AND CHAPARRAL IN ARID AND SEMI-ARID CLIMATE CONDIT
Micro: PREFERS FRIABLE, ROCKY, OR SHALLOW SANDY SOILS.

Occurrence No. 157 **Map Index:** 01549 **EO Index:** 28059

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: XXXX-XX-XX
Site: XXXX-XX-XX
Record Last Updated: 1989-08-10

Quad Summary: Fairmont Butte (3411874/187C), Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.73609º / -118.42397º
UTM: Zone-11 N3844700 E369639
Radius: 1 mile
Elevation: 2,800 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 15W
Section: 36 **Qtr:** SW
Meridian: S

Location: FAIRMONT, 4 MI NNE OF LAKE HUGHES.
General: SDNHM SPECIMEN; DATE OF COLLECTION UNKNOWN.
Owner/Manager: UNKNOWN

Occurrence No. 458 **Map Index:** 46981 **EO Index:** 46981

Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2001-09-27
Site: 2001-09-27
Record Last Updated: 2002-01-15

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.66957º / -118.43252º
UTM: Zone-11 N3837334 E368752
Radius: 80 meters
Elevation: 3,287 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 15W
Section: 26 **Qtr:** NE
Meridian: S

Location: PAINTED TURTLE CAMP, LAKE HUGHES.
Ecological: HABITAT CONSISTS OF RECOVERING CHAPARRAL.
Threat: THREATENED BY OFF-ROAD VEHICLES.
General: 1 JUVENILE OBSERVED FORAGING IN OPEN CHAPARRAL ON 27 SEP 2001.
Owner/Manager: PVT

Southern Cottonwood Willow Riparian Forest

Element Code: CTT61330CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S3.2

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 36 **Map Index:** 01077 **EO Index:** 15815

Dates Last Seen
Element: 1988-04-02
Site: 1988-04-02
Record Last Updated: 1998-07-20

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Lake Hughes (3411864/162B), Burnt Peak (3411865/163A), Warm Springs Mountain (3411855/163D)
County Summary: Los Angeles

Lat/Long: 34.63591º / -118.52912º
UTM: Zone-11 N3833731 E359843
Area: 380.5 acres
Elevation: 2,200 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 16W
Section: XX **Qtr:** XX
Meridian: S

Location: ELIZABETH LAKE CANYON, FROM NEAR DEER CYN D/S TO PROSPECT CREEK.

Ecological: ALNUS RHOMBIFOLIA ALONG FLOWING CR; SCATTERED POPULUS FREMONTII OVER BACCHARIS VIMINEA ON FLOODPLAIN. SYCAMORES AND ALDERS FOR SHORT WAY D/S OF FISH CYN. QUERCUS AGRIFOLIA AT OUTER FLOODPLAIN EDGES BELOW RED FOX CYN.

Threat: RIPRAP ON N SHORE FOR 1/2 MI BELOW CAMPGROUND. WIESLANDER/HOLLAND MAPS SIMILIAR.

General: THIS WAS OCC #036 OF CTT61330CA.

Owner/Manager: USFS-ANGELES NF

Occurrence No. 37 **Map Index:** 01082 **EO Index:** 15813

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-20

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.72079º / -118.55064º
UTM: Zone-11 N3843175 E358016
Area: 113.3 acres
Elevation: 3,760 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 16W
Section: 02 **Qtr:** S
Meridian: S

Location: KINGS CANYON, WEST OF KINGS CYN RANCH FOR ABOUT 1.3 MI.

Location Detail: INTERPRETED FROM 1978 AERIAL PHOTOGRAPHS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO

General: FIELD VERIFICATION NEEDED.

Owner/Manager: UNKNOWN

Occurrence No. 38 **Map Index:** 01450 **EO Index:** 15811

Dates Last Seen
Element: 1988-04-02
Site: 1988-04-02
Record Last Updated: 1998-07-20

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Decreasing

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.66348º / -118.45549º
UTM: Zone-11 N3836688 E366637
Area: 200.9 acres
Elevation: 3,120 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 15W
Section: 27 **Qtr:** E
Meridian: S

Location: ELIZABETH LAKE CANYON, FROM HUGHES LAKE D/S FOR ABOUT 1.5 MI, & TRIBUTARY.

Ecological: COTTONWOODS OVER WILLOW SEEN 1988. NO WATER IN STREAM ON DAY OF APRIL VISIT. WIESLANDER MAPPED

Threat: PEAR ORCHARDS ENCROACHING

General: THIS WAS OCC #038 OF CTT61330CA.

Owner/Manager: PVT IN USFS-ANGELES NF

Southern Cottonwood Willow Riparian Forest

Element Code: CTT61330CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S3.2

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 39 **Map Index:** 01447 **EO Index:** 15812

Occ Rank: None
Origin: Natural/Native occurrence
Presence: Extirpated
Trend: Unknown

Dates Last Seen
Element: 1935-XX-XX
Site: 1988-04-02
Record Last Updated: 1998-07-20

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.67398º / -118.45439º
UTM: Zone-11 N3837852 E366755
Area: 63.1 acres
Elevation: 3,400 ft

Mapping Precision: SPECIFIC
Symbol Type: POLYGON

Township: 07N
Range: 15W
Section: 22 **Qtr:** SE
Meridian: S

Location: NORTH & WEST SHORE HUGHES LAKE & SURROUNDINGS.

Location Detail: ONCE CONTINUOUS W/ OCC 038.

Ecological: WIESLANDER MAPPED AS CLOSED CANOPY WILLOWS. POPULUS FREMONTII PRESENT BUT UNDERSTORY DEVELOPED. EXTIRPATED AS A NATURAL COMMUNITY.

General: THIS WAS OCC #39 OF CTT61330CA.

Owner/Manager: PVT

Southern Mixed Riparian Forest

Element Code: CTT61340CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G2
State: S2.1

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 9 **Map Index:** 00911 **EO Index:** 13502

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-22

Quad Summary: Burnt Peak (3411865/163A), Liebre Mtn. (3411866/163B)
County Summary: Los Angeles

Lat/Long: 34.64307º / -118.62442º
UTM: Zone-11 N3834662 E351121
Area: 44.8 acres
Elevation: 2,760 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 16W
Section: XX **Qtr:** XX
Meridian: S

Location: FISH CANYON, BURNT PEAK CANYON & TRIBUTARIES.

Ecological: DENSE CANOPY INCLUDES ALNUS RHOMBIFOLIA, PLATANUS RACEMOSA AND QUERCUS CHRYSOLEPIS PER HOLLAND. MAPPED BY WIESLANDER SURVEY (1935) AS QUERCUS AGRIFOLIA.

General: THIS WAS OCC #009 OF CT61340CA.

Owner/Manager: USFS-ANGELES NF

Southern Riparian Forest

Element Code: CTT61300CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4
State: S4

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 14 **Map Index:** 01080 **EO Index:** 16035

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-23

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.70338º / -118.54557º
UTM: Zone-11 N3841237 E358451
Area: 61.4 acres
Elevation: 4,170 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 16W
Section: 11
Qtr: XX
Meridian: S

Location: HIDEWAY CANYON, FOR ABOUT 0.9 MI U/S (S) OF PINE CANYON RD.
Location Detail: BOUNDARY REPRESENTS EXTENT AS INTERPRETED FROM 1978 AERIAL PHOTOS.
Ecological: DENSE COVER. VEGETATION COMPOSITION UNKNOWN. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO
General: NEEDS FIELD VISIT.
Owner/Manager: USFS-ANGELES NF

Occurrence No. 15 **Map Index:** 01150 **EO Index:** 16036

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1989-08-10

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.69571º / -118.52674º
UTM: Zone-11 N3840360 E360162
Area: 37.7 acres
Elevation: 4,200 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 16W
Section: 13
Qtr: E
Meridian: S

Location: SHAKE CANYON, BETWEEN UPPER & LOWER SHAKE CAMPGROUNDS.
Location Detail: INTERPRETED FROM 1978 AERIAL PHOTOS.
Ecological: VEGETATION COMPOSITION UNKNOWN. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO
General: NEEDS FIELD VISIT.
Owner/Manager: USFS-ANGELES NF

Southern Riparian Scrub

Element Code: CTT63300CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S3.2

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 28 **Map Index:** 01096 **EO Index:** 15316

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-23

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Neenach School (3411875/188D), Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.74258º / -118.53965º
UTM: Zone-11 N3845576 E359059
Area: 68.7 acres
Elevation: 3,360 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 08N
Range: 16W
Section: 35 **Qtr:** E
Meridian: S

Location: BALDWIN GRADE CANYON, EAST OF DANIELSON MOTORWAY.

Ecological: 1978 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOGRAPHS. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION.

Owner/Manager: UNKNOWN

Occurrence No. 29 **Map Index:** 01113 **EO Index:** 15314

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-23

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.74261º / -118.53536º
UTM: Zone-11 N3845573 E359452
Area: 46.2 acres
Elevation: 3,400 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 08N
Range: 16W
Section: 36 **Qtr:** NW
Meridian: S

Location: UNNAMED CANYON TO E OF BALDWIN GRADE CYN, EAST OF DANIELSON MOTORWAY.

Ecological: 1978 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOGRAPHS. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION.

Owner/Manager: UNKNOWN

Occurrence No. 30 **Map Index:** 01161 **EO Index:** 15313

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-23

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.73524º / -118.52275º
UTM: Zone-11 N3844738 E360594
Area: 44.9 acres
Elevation: 3,400 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 08N
Range: 16W
Section: 36 **Qtr:** SE
Meridian: S

Location: NORTH LONG CANYON, SOUTH OF LOS ANGELES AQUEDUCT.

Ecological: 1978 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOGRAPHS. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO

General: EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOGRAPHS.

Owner/Manager: UNKNOWN

Southern Sycamore Alder Riparian Woodland

Element Code: CTT62400CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4
State: S4

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 95 **Map Index:** 01197 **EO Index:** 15459

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-22

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.65990º / -118.51471º
UTM: Zone-11 N3836372 E361205
Area: 467.4 acres
Elevation: 3,080 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 15W
Section: 31
Qtr: NW
Meridian: S

Location: FISH CREEK, FROM "THE POTHOLES" D/S TO ELIZABETH LAKE CANYON.
Location Detail: MAPPED FROM INTERPRETATION OF AERIAL PHOTOS.
Ecological: LONG REACHES OF SCRUB W/CLOSED CANOPY QUERCUS AGRIFOLIA, ALNUS RHOMBIFOLIA & PLATANUS RACEMOSA.
General: THIS WAS OCC #095 OF CTT62400CA.
Owner/Manager: USFS-ANGELES NF

Occurrence No. 96 **Map Index:** 01031 **EO Index:** 15460

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-22

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Warm Springs Mountain (3411855/163D), Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.63117º / -118.56759º
UTM: Zone-11 N3833259 E356309
Area: 117.2 acres
Elevation: 2,680 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 16W
Section: XX
Qtr: XX
Meridian: S

Location: PROSPECT CANYON, FROM ELIZABETH LAKE CANYON U/S FOR ABOUT 1 MI.
Location Detail: 1978 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOS.
Ecological: CLOSED CANOPY QUERCUS AGRIFOLIA, SALIX SPP & PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.
General: THIS WAS OCC #096 OF CTT62400CA.
Owner/Manager: USFS-ANGELES NF

Occurrence No. 97 **Map Index:** 01063 **EO Index:** 15458

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-22

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.63232º / -118.55078º
UTM: Zone-11 N3833363 E357852
Area: 62.3 acres
Elevation: 2,480 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 16W
Section: XX
Qtr: XX
Meridian: S

Location: UNNAMED INTERMITTENT STREAM TO EAST OF PROSPECT CANYON, N OF ELIZABETH LAKE CANYON.
Location Detail: 1978 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOS.
Ecological: CLOSED CANOPY QUERCUS AGRIFOLIA, SALIX SPP & PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.
General: RECENT GROUND TRUTH NEEDED. THIS WAS OCC #097 OF CTT62400CA.
Owner/Manager: USFS-ANGELES NF

Southern Sycamore Alder Riparian Woodland

Element Code: CTT62400CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4
State: S4

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 102 **Map Index:** 00833 **EO Index:** 15454

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-22

Quad Summary: Burnt Peak (3411865/163A), Whitaker Peak (3411856/163C), Liebre Mtn. (3411866/163B), Warm Springs Mountain (3411855/163D)
County Summary: Los Angeles

Lat/Long: 34.64800º / -118.60544º
UTM: Zone-11 N3835180 E352869
Area: 1,061.0 acres
Elevation: 2,040 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 17W
Section: 12
Qtr: XX
Meridian: S

Location: FISH CYN, SOUTH OF PIANOBOX PROSPECT & EAST FORK FISH CYN.

Ecological: OPEN CANOPY ALNUS RHOMBIFOLIA & BACCHARIS VIMINEA BELOW CAMPGROUND ACC TO WIESLANDER SURVEY. 30-40% TREE COVER PER 1978 AIR PHOTOS ABOVE CAMP, OPEN ALNUS, PLATANUS, POPULUS, BACCHARIS & ERIOGONUM FASCIC PER WIESLANDER; TREES 10-30%, 1978.

Threat: CAMPGROUND DISTURBS.

General: RECENT GROUND TRUTH NEEDED. THIS WAS OCC #102 OF CTT62400CA.

Owner/Manager: USFS-ANGELES NF

Occurrence No. 137 **Map Index:** 01478 **EO Index:** 15423

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-22

Quad Summary: Lake Hughes (3411864/162B), Green Valley (3411854/162C)
County Summary: Los Angeles

Lat/Long: 34.60711º / -118.44279º
UTM: Zone-11 N3830420 E367712
Area: 570.2 acres
Elevation: 2,320 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 15W
Section: XX
Qtr: XX
Meridian: S

Location: SAN FRANCISQUITO CANYON U/S OF BEE CYN, INCL TRIBURTARY SOUTH PORTAL CANYON.

Location Detail: 1978 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOS.

Ecological: CLOSED CANOPY QUERCUS AGRIFOLIA, SALIX SPP & PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.

General: NEEDS FIELD VERIFICATION. THIS WAS OCC #137 OF CTT62400CA.

Owner/Manager: USFS-ANGELES NF

Occurrence No. 140 **Map Index:** 01243 **EO Index:** 15420

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-22

Quad Summary: Warm Springs Mountain (3411855/163D), Lake Hughes (3411864/162B), Green Valley (3411854/162C)
County Summary: Los Angeles

Lat/Long: 34.61718º / -118.49178º
UTM: Zone-11 N3831602 E363235
Area: 622.7 acres
Elevation: 2,800 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 16W
Section: XX
Qtr: XX
Meridian: S

Location: TULE CANYON AND SMALL REACH OF RUBY CANYON FOR <1 MILE DOWNSTREAM OF CONFLUENCE WITH TULE CANYON.

Location Detail: 1978 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOS. AREA IS UPSTREAM OF WARM SPRINGS BURN.

Ecological: CLOSED CANOPY QUERCUS AGRIFOLIA, SALIX SPP, AND PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.

General: NEEDS FIELD VERIFICATION. THIS WAS OCC #140 OF CTT62400CA.

Owner/Manager: USFS-ANGELES NF

Southern Willow Scrub

Element Code: CTT63320CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S2.1

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 19 **Map Index:** 00901 **EO Index:** 15277

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-21

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.67847º / -118.60593º
UTM: Zone-11 N3838561 E352878
Area: 305.1 acres
Elevation: 3,720 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 16W
Section: XX **Qtr:** XX
Meridian: S

Location: FISH CANYON, N OF LITTLE BURNT PEAK D/S FOR ABOUT 3.5 MI.
Location Detail: MAPPED FROM INTERPRETATION OF AERIAL PHOTOS.
Ecological: WILLOW SCRUB WITH BACCHARIS VIMINEA, LEPIDOSPARTUM SQUAMATUM AND WIDELY SCATTERED PLATANUS RACEMOSA.
General: GROUND TRUTH NEEDED. THIS WAS OCC #019 OF CTT63320CA.
Owner/Manager: USFS-ANGELES NF

Occurrence No. 20 **Map Index:** 01139 **EO Index:** 15275

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-21

Quad Summary: Burnt Peak (3411865/163A), Warm Springs Mountain (3411855/163D)
County Summary: Los Angeles

Lat/Long: 34.62653º / -118.52818º
UTM: Zone-11 N3832689 E359914
Area: 87.6 acres
Elevation: 2,440 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 16W
Section: XX **Qtr:** XX
Meridian: S

Location: RED FOX CANYON, FROM ELIZABETH LAKE CANYON U/S FOR ABOUT 1.5 MI.
Ecological: WIESLANDER SURVEY MAPPED AS CLOSED CANOPY QUERCUS AGRIFOLIA, PLATANUS RACEMMOSA AND WILLOWS; APPEARED TO BE WILLOW SCRUB IN 1978 FROM INTERPRETATION OF AERIAL PHOTOS.
General: THIS WAS OCC #020 OF CTT63320CA..
Owner/Manager: USFS-ANGELES NF

Occurrence No. 21 **Map Index:** 01168 **EO Index:** 15276

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-21

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.63344º / -118.51940º
UTM: Zone-11 N3833443 E360730
Area: 80.6 acres
Elevation: 3,040 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 06N
Range: 16W
Section: XX **Qtr:** XX
Meridian: S

Location: INTERMITTENT STREAM EAST OF ELIZABETH LAKE CANYON, N OF RED FOX CANYON.
Ecological: WIESLANDER SURVEY MAPPED AS CLOSED CANOPY QUERCUS AGRIFOLIA AND WILLOW; APPEARED TO BE WILLOW SCRUB IN 1978 FROM INTERPRETATION OF AERIAL PHOTOS.
General: THIS WAS OCC #021 OF CTT63320CA.
Owner/Manager: USFS-ANGELES NF

Southern Willow Scrub

Element Code: CTT63320CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S2.1

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 22 **Map Index:** 01613 **EO Index:** 15274

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-09-19
Site: 1978-09-19
Record Last Updated: 1998-07-21

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.70119º / -118.40966º
UTM: Zone-11 N3840811 E370895
Area: 28.5 acres
Elevation: 2,880 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 14W
Section: 18 **Qtr:** NW
Meridian: S

Location: MYRICK CANYON, JUST EAST OF CALIFORNIA AQUEDUCT.
Location Detail: MAPPED FROM INTERPRETATION OF AERIAL PHOTOS.
Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO
General: NEEDS FIELD VERIFICATION.
Owner/Manager: UNKNOWN

Symphyotrichum greatae

Greata's aster

Element Code: PDASTE80U0

Status
Federal: None
State: None

NDDB Element Ranks
Global: G2
State: S2.3

Other Lists
CNPS List: 1B.3

Habitat Associations
General: CHAPARRAL, CISMONTANE WOODLAND.
Micro: MESIC CANYONS. 800-1500M.

Occurrence No. 40 **Map Index:** 59089 **EO Index:** 59125

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2001-06-24
Site: 2001-06-24
Record Last Updated: 2005-01-04

Quad Summary: Burnt Peak (3411865/163A), Liebre Mtn. (3411866/163B)
County Summary: Los Angeles

Lat/Long: 34.63522º / -118.62625º
UTM: Zone-11 N3833795 E350938
Area:
Elevation: 2,600 ft

Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON

Township: 06N
Range: 17W
Section: 01 **Qtr:** SE
Meridian: S

Location: LIEBRE MOUNTAINS, FISH CANYON, 2.0 MILES NORTH OF CIENEGA CAMPGROUND.

Location Detail: MAPPED APPROXIMATELY 2.0 MILES NORTH OF CIENEGA CAMPGROUND ALONG FISH CANYON, NEAR ELEVATION PROVIDED.

Ecological: ALONG STREAM IN RIPARIAN WOODLAND. ASSOCIATED WITH ALNUS RHOMBIFOLIA, SALIX LAEVIGATA, QUERCUS CHRYSOLEPIS, TYPHA LATIFOLIA, XANTHIUM STRUMARIUM, AND JUNCUS MICROPHYLLUS.

Owner/Manager: USFS-ANGELES NF

Taxidea taxus

American badger — **Element Code:** AMAJF04010

Status	NDDB Element Ranks	Other Lists
Federal: None	**Global:** G5	**CDFG Status:** SC
State: None	**State:** S4	

Habitat Associations

General: MOST ABUNDANT IN DRIER OPEN STAGES OF MOST SHRUB, FOREST, AND HERBACEOUS HABITATS, WITH FRIABLE SOILS.

Micro: NEEDS SUFFICIENT FOOD, FRIABLE SOILS & OPEN, UNCULTIVATED GROUND. PREYS ON BURROWING RODENTS. DIGS BURROWS.

Occurrence No. 26 **Map Index:** 56527 **EO Index:** 56543

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1988-05-16
Site: 1988-05-16
Record Last Updated: 2004-08-30

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.68657º / -118.45049º
UTM: Zone-11 N3839243 E367132
Area:
Elevation: 3,800 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 15W
Section: 22 **Qtr:** NE
Meridian: S

Location: 0.6 MILE NORTH OF LAKE HUGHES.

Ecological: HABITAT CONSISTS OF CHAPARRAL, DOMINATED BY ADENOSTOMA, ARCTOSTAPHYLOS, CEANOTHUS, CERCOCARPUS, AND PINUS COULTERI.

Threat: POSSIBLY THREATENED BY A WASTEWATER TREATMENT PLANT.

General: AN ACTIVE DEN WAS OBSERVED, 13-16 MAY 1988.

Owner/Manager: UNKNOWN

Occurrence No. 151 **Map Index:** 01549 **EO Index:** 56863

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1904-06-21
Site: 1904-06-21
Record Last Updated: 2004-09-20

Quad Summary: Fairmont Butte (3411874/187C), Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.73609º / -118.42397º
UTM: Zone-11 N3844700 E369639
Radius: 1 mile
Elevation: 2,800 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 15W
Section: 36 **Qtr:** SW
Meridian: S

Location: FAIRMONT, ANTELOPE VALLEY.

Location Detail: MAPPED ACCORDING TO LAT/LONG GIVEN BY MVZ; MAX ERROR DISTANCE: 1 KM.

General: MALE COLLECTED (MVZ #7077) BY JOSEPH GRINNELL ON 21 JUN 1904. 1 COLLECTED (DATE UNKNOWN), LACM.

Owner/Manager: UNKNOWN

Occurrence No. 282 **Map Index:** 57473 **EO Index:** 57489

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: XXXX-XX-XX
Site: XXXX-XX-XX
Record Last Updated: 2004-10-19

Quad Summary: Little Buttes (3411873/187D), Willow Springs (3411883/187A)
County Summary: Kern

Lat/Long: 34.87842º / -118.29677º
UTM: Zone-11 N3860327 E381488
Radius: 1 mile
Elevation: 2,520 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 09N
Range: 13W
Section: 07 **Qtr:** XX
Meridian: S

Location: WILLOW SPRINGS.

General: 1 COLLECTED, AMNH (AMERICAN MUSEUM OF NATURAL HISTORY).

Owner/Manager: UNKNOWN

Taxidea taxus

American badger

Element Code: AMAJF04010

Status	NDDB Element Ranks	Other Lists
Federal: None	**Global:** G5	**CDFG Status:** SC
State: None	**State:** S4	

Habitat Associations

General: MOST ABUNDANT IN DRIER OPEN STAGES OF MOST SHRUB, FOREST, AND HERBACEOUS HABITATS, WITH FRIABLE SOILS.

Micro: NEEDS SUFFICIENT FOOD, FRIABLE SOILS & OPEN, UNCULTIVATED GROUND. PREYS ON BURROWING RODENTS. DIGS BURROWS.

Occurrence No. 334 **Map Index:** 57756 **EO Index:** 57772

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: XXXX-XX-XX
Site: XXXX-XX-XX
Record Last Updated: 2004-10-27

Quad Summary: Neenach School (3411875/188D)
County Summary: Los Angeles, Kern

Lat/Long: 34.82942º / -118.57052º
UTM: Zone-11 N3855251 E356383
Radius: 1 mile
Elevation:

Mapping Precision: NON-SPECIFIC
Symbol Type: POINT

Township: 09N
Range: 16W
Section: 34 **Qtr:** XX
Meridian: S

Location: ANTELOPE VALLEY, NEAR NEENACH, KERN COUNTY.

Location Detail: AREA MAPPED IS IN THE VICINITY OF THE LOS ANGELES AQUEDUCT TO THE NORTH AND THE KERN COUNTY LINE TO THE SOUTH.

General: 1 COLLECTED, FMNH (FIELD MUSEUM OF NATURAL HISTORY, CHICAGO).

Owner/Manager: UNKNOWN

Toxostoma lecontei

Le Conte's thrasher

Element Code: ABPBK06100

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S3

Other Lists
CDFG Status: SC

Habitat Associations
General: DESERT RESIDENT; PRIMARILY OF OPEN DESERT WASH, DESERT SCRUB, ALKALI DESERT SCRUB, AND DESERT SUCCULENT SCRUB HABITATS.
Micro: COMMONLY NESTS IN A DENSE, SPINY SHRUB OR DENSELY BRANCHED CACTUS IN DESERT WASH HABITAT, USUALLY 2-8 FEET ABOVE GROUND.

Occurrence No. 57 **Map Index:** 01703 **EO Index:** 24519
Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1968-09-21
Site: 1968-09-21
Record Last Updated: 1989-08-10

Quad Summary: Willow Springs (3411883/187A), Tylerhorse Canyon (3411884/187B), Fairmont Butte (3411874/187C), Little Buttes (3411873/187D)
County Summary: Kern

Lat/Long: 34.87886º / -118.38201º
UTM: Zone-11 N3860480 E373699
Radius: 1 mile
Elevation: 2,720 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 09N
Range: 14W
Section: 08 **Qtr:** SE
Meridian: S

Location: 5 MILES WEST OF WILLOW SPRINGS, IN THE VICINITY OF THE INTERSECTION OF MEERS ROAD AND 104TH STREET WEST.
General: LACM SPECIMEN #80669.
Owner/Manager: UNKNOWN

Occurrence No. 182 **Map Index:** 65646 **EO Index:** 65725
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2005-07-19
Site: 2005-07-19
Record Last Updated: 2006-08-07

Quad Summary: Willow Springs (3411883/187A)
County Summary: Kern

Lat/Long: 34.95189º / -118.30966º
UTM: Zone-11 N3868491 E380417
Radius: 80 meters
Elevation: 2,960 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 10N
Range: 13W
Section: 18 **Qtr:** XX
Meridian: S

Location: ABOUT 5 AIR MILES NORTH OF WILLOW SPRINGS, ALONG 100TH ST. W, APPROX. 0.1 MI N OF BACKUS RD.
Location Detail: MAPPED ACCORDING TO UTM COORDINATES ON FIELD SURVEY FORM.
Ecological: CREOSOTE SCRUB.
Threat: SUBDIVISIONS, AGRICULTURE, ELECTRICAL UTILITY LINES AND ASSOCIATED ROADS.
General: 1 ADULT OBSERVED ALONG DIRT ROAD.
Owner/Manager: PVT

Occurrence No. 184 **Map Index:** 65648 **EO Index:** 65727
Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2005-07-19
Site: 2005-07-19
Record Last Updated: 2006-08-07

Quad Summary: Willow Springs (3411883/187A)
County Summary: Kern

Lat/Long: 34.87753º / -118.32440º
UTM: Zone-11 N3860262 E378961
Radius: 80 meters
Elevation: 2,545 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 09N
Range: 14W
Section: 13 **Qtr:** NW
Meridian: S

Location: ABOUT 1.6 MILES WEST OF WILLOW SPRINGS, ALONG EAST-WEST ROAD, 500' EAST OF 110TH ST. W AND 1.0 MI N OF ROSAMOND BLVD.
Location Detail: MAPPED ACCORDING TO UTM COORDINATES ON FIELD SURVEY FORM.
Ecological: CREOSOTE SCRUB WITH SPARSELY DISTRIBUTED JOSHUA TREES. ATRIPLEX SPP. ALSO PRESENT.
Threat: SUBDIVISIONS, AGRICULTURE, ELECTRIC UTILITY LINES AND ASSOCIATED ROADS.
General: 1 ADULT OBSERVED.
Owner/Manager: PVT

Toxostoma lecontei

Le Conte's thrasher

Element Code: ABPBK06100

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S3

Other Lists
CDFG Status: SC

Habitat Associations
General: DESERT RESIDENT; PRIMARILY OF OPEN DESERT WASH, DESERT SCRUB, ALKALI DESERT SCRUB, AND DESERT SUCCULENT SCRUB HABITATS.
Micro: COMMONLY NESTS IN A DENSE, SPINY SHRUB OR DENSELY BRANCHED CACTUS IN DESERT WASH HABITAT, USUALLY 2-8 FEET ABOVE GROUND.

Occurrence No. 185 **Map Index:** 65650 **EO Index:** 65729
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2005-07-19
Site: 2005-07-19
Record Last Updated: 2006-08-07

Quad Summary: Willow Springs (3411883/187A)
County Summary: Kern

Lat/Long: 34.96553º / -118.30983º
UTM: Zone-11 N3870004 E380421
Radius: 80 meters
Elevation: 3,070 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 10N
Range: 13W
Section: 07 **Qtr:** XX
Meridian: S

Location: ABOUT 6 AIR MILES NORTH OF WILLOW SPRINGS, ALONG 100TH ST. W, 0.75 MI S OF TEHACHAPI-WILLOW SPRINGS RD.
Location Detail: MAPPED ACCORDING TO UTM COORDINATES ON FIELD SURVEY FORM.
Ecological: CREOSOTE SCRUB.
Threat: SUBDIVISIONS, AGRICULTURE, UTILITY LINES AND ASSOCIATED ROADS.
General: 2 ADULTS OBSERVED ALONG DIRT ROAD.
Owner/Manager: PVT

Occurrence No. 187 **Map Index:** 65653 **EO Index:** 65732
Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2005-07-19
Site: 2005-07-19
Record Last Updated: 2006-08-07

Quad Summary: Willow Springs (3411883/187A)
County Summary: Kern

Lat/Long: 34.98728º / -118.31030º
UTM: Zone-11 N3872417 E380410
Radius: 80 meters
Elevation: 3,265 ft
Mapping Precision: SPECIFIC
Symbol Type: POINT
Township: 10N
Range: 14W
Section: 01 **Qtr:** XX
Meridian: S

Location: ABOUT 7.5 AIR MILES NORTH OF WILLOW SPRINGS, ABOUT 0.7 MI N OF TEHACHAPI-WILLOW SPRINGS RD.
Location Detail: ALONG 100TH ST. WEST AT LAGUNA RD (BOTH UNMARKED). MAPPED ACCORDING TO UTM COORDINATES ON FIELD SURVEY FORM.
Ecological: HABITAT IS JOSHUA TREE/CREOSOTE WOODLAND. CHRYSOTHAMNUS NAUSEOSUS, ERIOGONUM SP., PLUS OTHER UNIDENTIFIED SHRUBS AND HERBACEOUS LAYER PRESENT. THIS SPOT IS NEAR A DRY WASH. OVERALL, THERE IS FAIRLY DENSE VEGETATIVE COVER.
Threat: SUBDIVISIONS, AGRICULTURE, ELECTRICAL UTILITY LINES AND ASSOCIATED ROADS.
General: 1 ADULT SEEN ALONG ROAD.
Owner/Manager: PVT

Valley Needlegrass Grassland

Element Code: CTT42110CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G1
State: S3.1

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 5 **Map Index:** 01705 **EO Index:** 13582

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1980-04-XX
Site: 1980-04-XX
Record Last Updated: 1998-07-15

Quad Summary: Fairmont Butte (3411874/187C), Lake Hughes (3411864/162B), Del Sur (3411863/162A), Little Buttes (3411873/187D)
County Summary: Los Angeles

Lat/Long: 34.74248º / -118.38175º
UTM: Zone-11 N3845355 E373514
Radius: 1 mile
Elevation: 2,880 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 14W
Section: 32 **Qtr:** NE
Meridian: S

Location: ANTELOPE VALLEY CA POPPY RES. 2 MI E OF FAIRMONT ON LANCASTER AVE; ANTELOPE BUTTES.
Location Detail: TOP & SIDES OF BUTTES. MAPPED AS GENERAL DUE TO SIZE.
Ecological: NASSELLA COVERS (5-30%). SLOPE 5-80%. SANDY-GRAVELLY SOIL.
Threat: ADJ LAND IRRIGATED, BARLEY/ALFALFA. CA AQUEDUCT NEARBY.
General: FAIRLY UNDISTURBED. THIS WAS OCC #005 OF CTT42110CA.
Owner/Manager: DPR-ANTELOPE VALLEY CA POP RES

Occurrence No. 6 **Map Index:** 01713 **EO Index:** 25050

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1980-04-XX
Site: 1980-04-XX
Record Last Updated: 1998-07-15

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.69887º / -118.38036º
UTM: Zone-11 N3840517 E373575
Radius: 1/5 mile
Elevation: 2,800 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 14W
Section: 17 **Qtr:** NE
Meridian: S

Location: 2 MI DUE N OF ELIZABETH LK ON N SIDE OF MUNZ RANCH RD.
Ecological: DOMINANTS: NASSELLA CERNUA, POA SECUNDA, SITANION, HAPLOPAPPUS. SANDY-GRAVELLY SOIL. SLOPE 0 TO 60%.
General: THIS WAS OCC #006 OF CTT42110CA.
Owner/Manager: UNKNOWN

Occurrence No. 22 **Map Index:** 01627 **EO Index:** 19752

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1980-04-25
Site: 1980-04-25
Record Last Updated: 1998-07-15

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.71942º / -118.40731º
UTM: Zone-11 N3842830 E371139
Radius: 1/5 mile
Elevation: 2,900 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 14W
Section: 06 **Qtr:** SW
Meridian: S

Location: SE OF FAIRMONT. E OF RD 160 ON STEEP SLOPES. S OF ANTELOPE VALLEY POPPY RESERVE.
Location Detail: S & E ASPECT.
Ecological: NASSELLA CERNUA DOM. SOIL SANDY, GRAVELLY, SLOPE 60-80%. ASSOC. SPP: POA SECUNDA VAR. SECUNDA, SITANION, BROMUS TECTORUM & B. RUBENS. ESCHSCHOLZIA ON BLUFFS ABOVE RAVINES.
Threat: DRY FARMING AND SOME IRRIGATION ON FLATS. AREA BISECTED BY RAVINES.
General: THIS WAS OCC #022 OF CTT42110CA.
Owner/Manager: UNKNOWN

Valley Needlegrass Grassland

Element Code: CTT42110CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G1
State: S3.1

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 57 **Map Index:** 24322 **EO Index:** 6457
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1992-04-09
Site: 1992-04-09
Record Last Updated: 1998-07-15

Quad Summary: Neenach School (3411875/188D)
County Summary: Kern

Lat/Long: 34.85879º / -118.60543º
UTM: Zone-11 N3858559 E353243
Area: 207.2 acres
Elevation: 3,360 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 09N
Range: 16W
Section: 19 **Qtr:** NE
Meridian: S

Location: WESTERN ANTELOPE VALLEY. 5 MILES DUE NORTH OF NEENACH SCHOOL AND HWY 138 BETWEEN 270TH AND 280TH STREETS.

Location Detail: SINGLE PATCH OF VEGETATION ON GRADUAL SOUTHWEST FACING SLOPE NEAR THE BASE OF THE BAJADA. SOUTH SLOPE OF THE TEHACHAPIS.

Ecological: SHRUB/PERENNIAL GRASS LAYER DOMINATED BY ACHNATHERUM SPECIOSUM (72%) WITH STEPHANOMERIA ALSO PRESENT. HERB LAYER INCLUDES ERODIUM CICUTARIUM, CAMISSONIA, ERIOGONUM, OENOTHERA DELTOIDES, BROMUS MADRITENSIS RUBENS.

Threat: POTENTIAL THREATS INCLUDE DEVELOPMENT AND CULTIVATION.

General: SOIL IS GRANITIC WITH SOME INDIVIDUAL MARBLE (DOLOMITE) STONES AND FINE ANGULAR DECOMPOSED GRANITE ON THE SURFACE. THIS WAS OCC #057 OF CTT42110CA.

Owner/Manager: PVT-TEJON RANCH CO

Valley Oak Woodland

Element Code: CTT71130CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G3
State: S2.1

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 77 **Map Index:** 00897 **EO Index:** 12450

Dates Last Seen
Element: 1988-03-31
Site: 1988-03-31
Record Last Updated: 1998-07-31

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.72400º / -118.60150º
UTM: Zone-11 N3843603 E353364
Area: 191.4 acres
Elevation: 4,080 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 07N
Range: 16W
Section: 05 **Qtr:** W
Meridian: S

Location: N-FACING & NE-FACING HILLSIDE BETWEEN OAK FLAT & OAK GROVE CANYON, E OF PRATT CANYON.
Ecological: OPEN WOODLAND OF QUERCUS LOBATA AND PINUS SABINIANA WITH GRASS UNDERSTORY ACCORDING TO WIESLANDER SURVEY.
Threat: GRAZED BY CATTLE.
General: FIELD VERIFIED 1988. THIS WAS OCC #077 OF CTT71130CA.
Owner/Manager: UNKNOWN

Occurrence No. 101 **Map Index:** 00690 **EO Index:** 13490

Dates Last Seen
Element: 1988-04-01
Site: 1988-04-01
Record Last Updated: 1998-07-31

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Quad Summary: Burnt Peak (3411865/163A)
County Summary: Los Angeles

Lat/Long: 34.71256º / -118.55870º
UTM: Zone-11 N3842273 E357264
Area: 84.9 acres
Elevation: 4,120 ft
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Township: 08N
Range: 17W
Section: 32 **Qtr:** NW
Meridian: S

Location: VICINITY OF QUAIL LAKE FIRE STATION, EAST OF BALD MOUNTAIN.
Ecological: OPEN WOODLAND OF QUERCUS LOBATA WITH SCATTERED PINUS SABINIANA WITH GRASS UNDERSTORY ACCORDING TO WIESLANDER SURVEY, 1935 AND HOLLAND, 1988.
Threat: GRAZED BY CATTLE, 1988.
General: APPEARS TO BE PARTLY AN INHOLDING W/IN ANGELES NATIONAL FOREST. THIS WAS OCC #101 OF CTT71130CA.
Owner/Manager: UNKNOWN

Wildflower Field

Element Code: CTT42300CA

Status
Federal: None
State: None

NDDB Element Ranks
Global: G2
State: S2.2

Other Lists

Habitat Associations
General:
Micro:

Occurrence No. 1 **Map Index:** 01580 **EO Index:** 13322

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1980-04-25
Site: 1980-04-25
Record Last Updated: 1998-07-14

Quad Summary: Lake Hughes (3411864/162B)
County Summary: Los Angeles

Lat/Long: 34.71331º / -118.41674º
UTM: Zone-11 N3842164 E370266
Radius: 1/5 mile
Elevation: 2,950 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 07N
Range: 15W
Section: 12 **Qtr:** NE
Meridian: S

Location: SE OF FAIRMONT. SE OF JCT CA AQUEDUCT & AVE H.

Ecological: ESCHSCHOLZIA CALIFORNICA IN DENSE STANDS ON LEVEL TERRAIN. SLOPE 0.10%, ASPECT VARIOUS. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

Threat: SOME OF THE AREA HAS BEEN PLOWED.

Owner/Manager: UNKNOWN

Occurrence No. 2 **Map Index:** 01705 **EO Index:** 7494

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1980-04-XX
Site: 1980-04-XX
Record Last Updated: 1998-07-14

Quad Summary: Fairmont Butte (3411874/187C), Lake Hughes (3411864/162B), Del Sur (3411863/162A), Little Buttes (3411873/187D)
County Summary: Los Angeles

Lat/Long: 34.74248º / -118.38175º
UTM: Zone-11 N3845355 E373514
Radius: 1 mile
Elevation: 2,880 ft
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Township: 08N
Range: 14W
Section: 32 **Qtr:** NE
Meridian: S

Location: ANTELOPE VALLEY CA POPPY RES. 2 MI E OF FAIRMONT ON LANCASTER AVE; ANTELOPE BUTTES.

Location Detail: MAPPED AS GENERAL DUE TO SIZE.

Ecological: IN FLATS AT BASE OF BUTTES. SLOPE 0-5%. SANDY-GRAVELLY SOIL. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

Threat: ADJ LAND IRRIGATED, BARLEY/ALFALFA. CA AQUEDUCT NEARBY.

Owner/Manager: DPR-ANTELOPE VALLEY CA POP RES

APPENDIX H
SITE PHOTOGRAPHS

Photo 1. California Annual Grassland habitat
typical of Project site south of SR-138.

Photo 2. Rabbitbrush Scrub habitat
typical of Project site north of SR-138.

Photo 3. Cut banks within main drainage (Drainage A) that traverses the project site north of SR-138. Photo taken at wetland delineation sampling point A1, facing upstream/west.

Photo 4. Small drainage (Drainage B) located north of SR-138. Photo taken at wetland delineation sampling point B1, facing downstream/east.

Photo 5. Drainage C in southeastern corner of the project site. Photo taken at widest portion of Drainage C, at point C1, facing upstream/southwest.

Photo 6. Drainage D on northern boundary of project site, facing east.

Photo 7. Goldfields, California poppies, and lupin within the Wildflower field habitat in the southwestern corner of the Project site, March 25, 2009.

Photo 8. Wildflower field habitat on the Project site, April 13, 2009.

Photo 9. Scattered young Joshua trees in Joshua tree recruitment area located near the northern boundary of the project site.

Photo 10. Picture taken facing west on northern boundary of Project site west of 170th Street West, showing Joshua tree woodland habitat outside of the northern project boundary (pictured on right side of road). Rabbitbrush scrub habitat is pictured on the left side of the dirt road within the Project site.

Photo 11. Facing north along eastern border on 155th Street West showing Joshua tree woodland habitat outside of the eastern project boundary (pictured on right side of road). Rabbitbrush scrub habitat is pictured on the left side of the dirt road within the Project site.

Photo 12. Goldfields and California poppies within Rabbitbrush scrub habitat on the Project site, March 24, 2009.

Photo 13. Joshua tree woodland habitat within proposed transmission line route located in northeastern corner of Section 11, T8N, R15W.

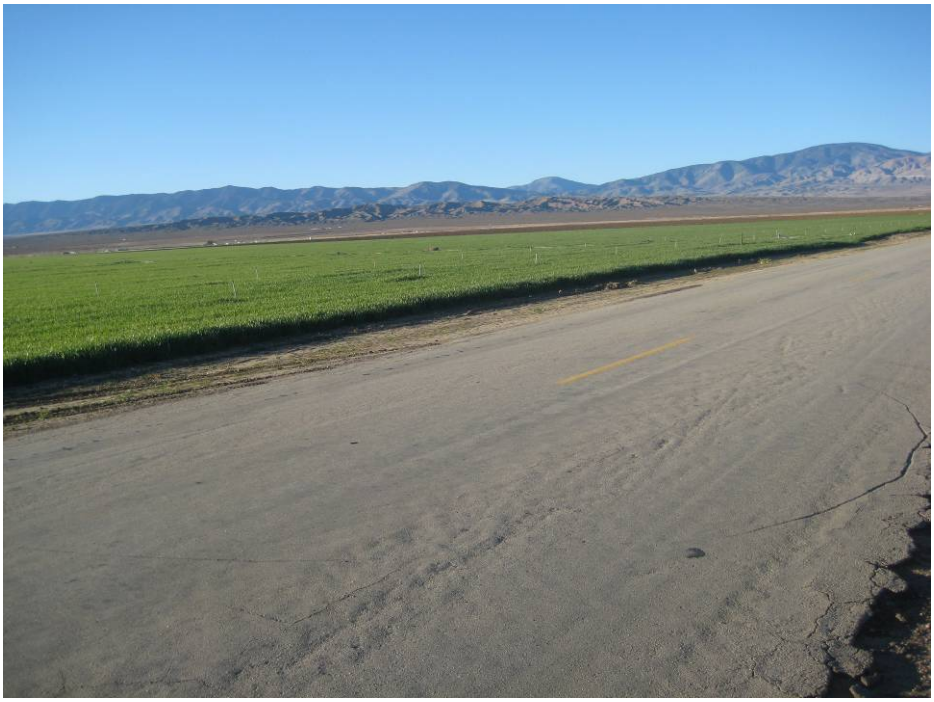
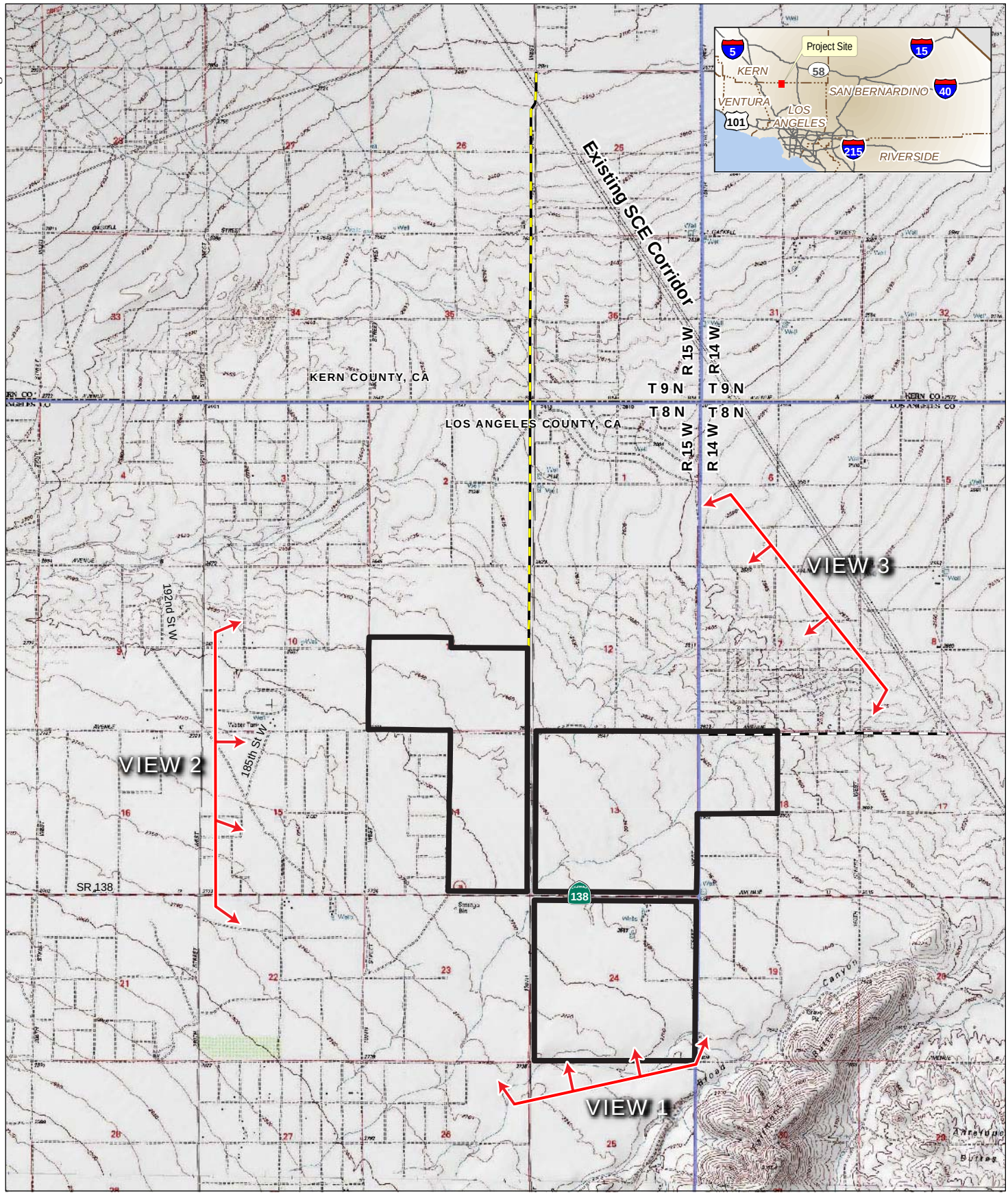


Photo 14. Agriculture land use within proposed transmission line route, west side of 170th Street West, facing northwest.

Photo 15. URS biologists conducting Phase II Burrowing owl burrow surveys within the Rabbitbrush scrub habitat on the Project site, April 13, 2009.

Photo 16. Burrowing owl perched on top of active burrow within Drainage C, approximately 150 feet south of the southern Project boundary, April 30, 2009.

T/Ladd/NextLight/209-014A



Legend

- Project Site Boundary
- Proposed Transmission Line
- Alternate Transmission Line
- Township Range Boundary
- Photopoint
- Panoramic View

Source: [1] U.S.G.S 7.5' topographic quadrangles (2005), [2] ESRI StreetMap USA (2007).

1:50,688

1 inch = 0.8 miles

0 0.25 0.5 1 Mile

0 2,000 4,000 8,000 Feet

Coordinate System: North American Datum 83 Universal Trans Mercator (UTM) Zone 11 North

March, 2009

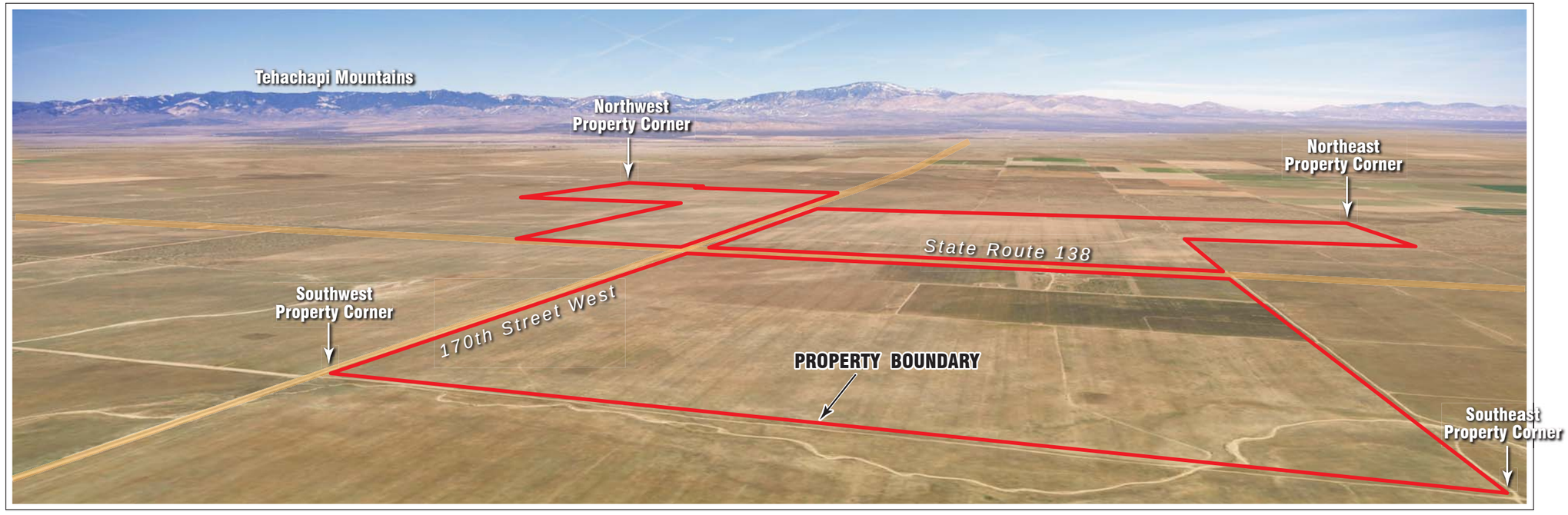
AV Solar Ranch One

Panoramic Site Photograph View Locations

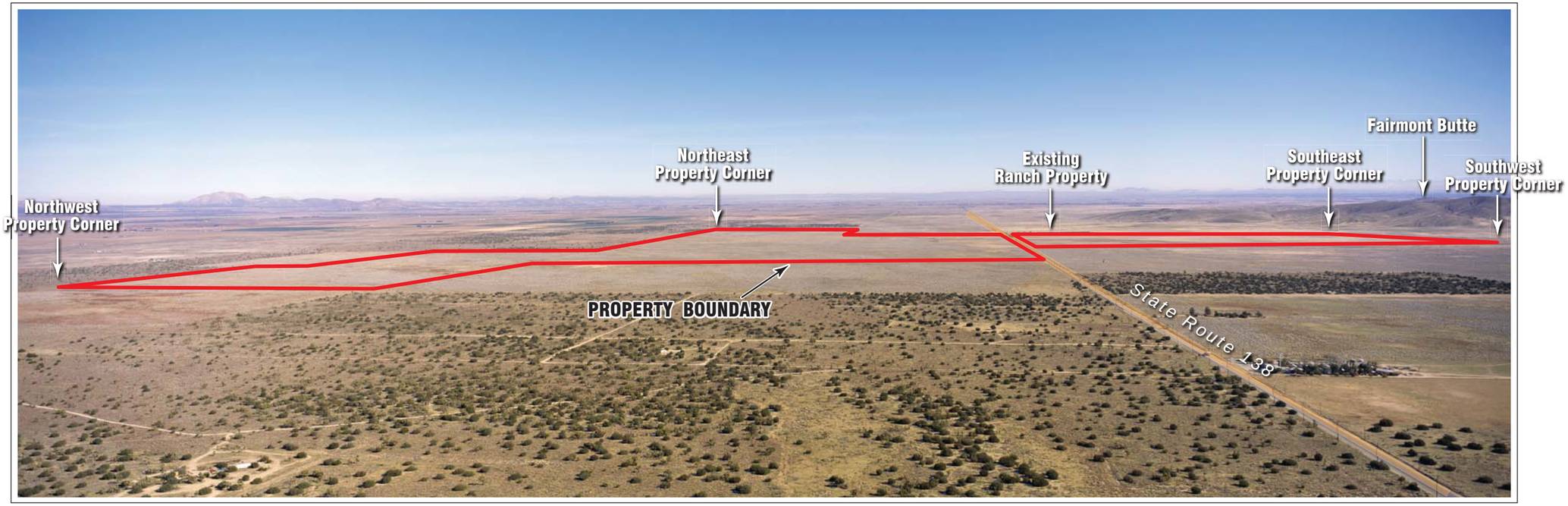
NextLight Renewable Power LLC

URS

T/Ladd/NextLight/209-015



View 1: Panoramic View Looking North from Southern Property Boundary



View 2: Panoramic View Looking East along State Route 138

AV Solar Ranch One

Views 1 & 2

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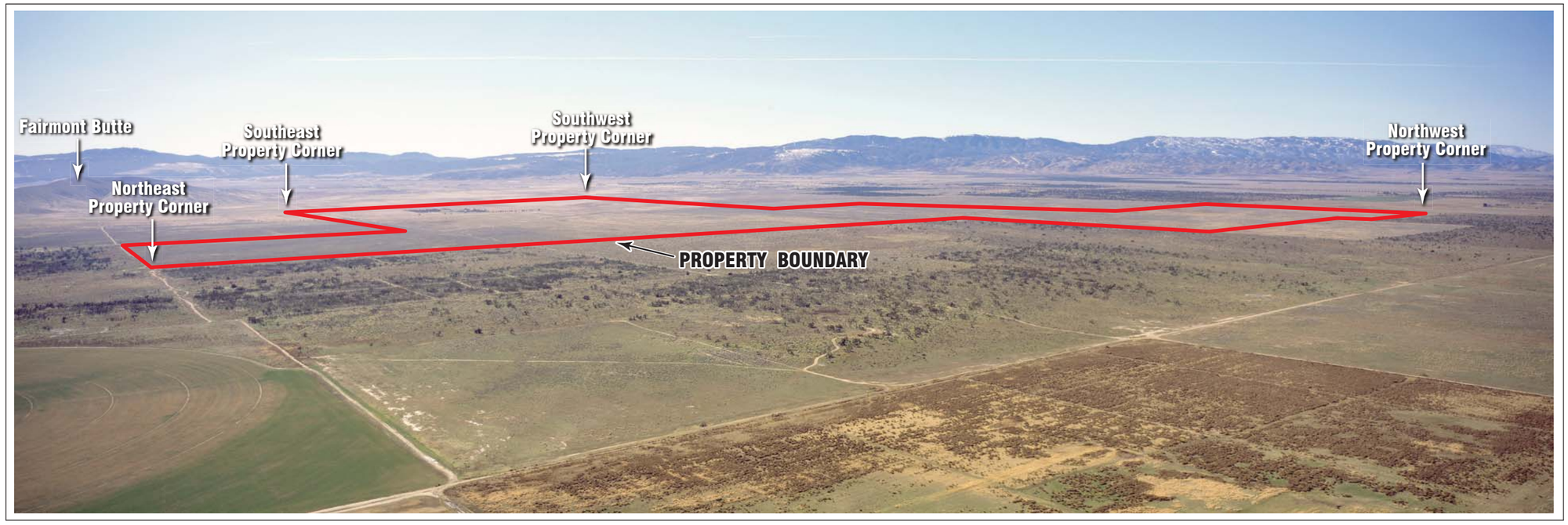

View 3: Panoramic View Looking Southwest across Property

AV Solar Ranch One
View 3

NextLight Renewable Power, LLC

URS

APPENDIX I
LIST OF ALL PLANTS DETECTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

APPENDIX I
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
AGAVACEAE – Agave			
Yucca brevifolia[1] (previously in Liliaceae)	Joshua tree	NI	Uncommon
ANACARDIACEAE – Sumac or Cashew			
Pistacia sp.[3]	Pistachio		Uncommon
APIACEAE – Carrot			
Daucus carota[2,3]	Carrot	NI	Uncommon
APOCYNACEAE – Milkweed			
Asclepias californica (previously in Asclepiadaceae)	California milkweed	NI	Uncommon
ASTERACEAE – Sunflower			
Acamptopappus sphaerocephalus[2]	Rayless goldenhead	NI	Common
Ambrosia (*Hymenoclea*) *salsola*[1]	Cheesebush	NI	Uncommon
Ambrosia acanthicarpa[1]	Annual bursage	NI	Uncommon
Artemisia dracunculus	Tarragon	NI	Uncommon
Artemisia tridentate	Big sagebrush	NI	Scarce
Chaenactis fremontii	Desert pincushion	NI	Uncommon
Chaenactis glabriuscula[1]	Yellow pincushion	NI	Uncommon
Cirsium mohavense	Mojave thistle	FACU	Scarce
Conyza canadensis[1]	Horseweed	FAC	Uncommon
Corethrogyne (*Lessingia*) *filaginifolia*[1]	Common sandaster	NI	Common
Deinandra (*Hemizonia*) *kelloggii*	Kellogg's tarweed	NI	Common
Encelia actoni[1] (*Encelia virginensis* subsp. *acton*)	Acton daisy	NI	Scarce
Ericameria cooperi[1]	Cooper's goldenbush	NI	Common
Ericameria linearifolia[1]	Interior goldenbush	UPL	Common
Ericameria nauseosa[1] (*Chrysothamnus nauseosus*)	Rubber rabbitbrush	NI	Abundant
Ericameria teretifolia[2]	Green rabbitbrush	NI	Common
Erigeron foliosus	Leafy fleabane	NI	Uncommon
Eriophyllum wallacei/pringlei[1]	Wooly sunflower		Uncommon
Gutierrezia microcephala[2]	Sticky Matchweed	NI	Uncommon
Helianthus annuus[1]	Common sunflower	FAC-	Common
Isocoma acradenia (*Haplopappus acradenius*)	Alkali goldenbush	NI	Common
Iva axillaris subsp. *robustior*[1]	Povertyweed	FAC	Uncommon

TABLE I-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
Lactuca serriola[3,4]	Prickly lettuce	FAC	Uncommon
Lasthenia californica (*L. chrysostoma*)	California goldfields	FACU*	Abundant
Layia glandulosa	Desert tidy tips	NI	Uncommon
Leptosyne (*Coreopsis*) *bigelovii*	Bigelow's tickseed	NI	Uncommon
Lessingia lemmonii[1]	Lemmon's lessingia	NI	Common
Malacothrix californica[1]	California dandelion	NI	Common
Malacothrix glabrata[1]	Desert dandelion	NI	Common
Matricaria matricarioides[1,3] (*Chamomilla suaveolens*)	Pineapple weed	FACU	Uncommon
Stephanomeria exigua[1]	Small wirelettuce	NI	Common
Stephanomeria pauciflora[1]	Brownplume wirelettuce	NI	Common
Stephanomeria virgata[1]	Virgate wire lettuce	NI	Common
Tetradymia stenolepis[2]	Mojave Horsebrush	NI	Uncommon
Uropappus lindleyi (*Microseris lindleyi, M. linearifolia*)	Silver puffs	NI	Common
BORAGINACEAE – Borage			
Amsinckia menziesii[1]	Menzies' fiddleneck	NI	Abundant
Amsinckia tessellata[1]	Fiddleneck	NI	Abundant
Cryptantha angustifolia (*C. inaequata*)	Winged cryptantha	NI	Uncommon
Cryptantha circumscissa	Cushion cryptantha	NI	Uncommon
Heliotropium curassavicum[2]	Wild heliotrope	OBL	Scarce
Pectocarya linearis subsp. *ferocula*[1]	Slender combseed	NI	Abundant
Pectocarya peninsularis[1]	Peninsular pectocarya	NI	Abundant
Pectocarya platycarpa[1]	Broad fruited combseed	NI	Abundant
Phacelia distans[1] (*P. cinerea;* previously included in *Hydrophyllaceae*)	Common phacelia	NI	Uncommon
Plagiobothrys arizonicus[1]	Arizona popcorn flower	NI	Common
Plagiobothrys canescens[2]	Valley popcorn flower	NI	Common
BRASSICACEAE – Mustard			
Brassica nigra[1,3]	Black mustard	NI	Uncommon
Capsella bursa-pastoris[2,3]	Shepard's purse	FAC-	Scarce
Descurainia incise	Mountain tansy mustard	NI	Uncommon
Descurainia pinnata	Western tansy mustard	NI	Uncommon
Descurainia sophia[2,3,4]	Flix weed	NI	Uncommon

TABLE I-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
Hirschfeldia incana[2,3,4] (*H. adpressa, Brassica geniculata*)	Summer mustard	NI	Uncommon
Sisymbrium altissimum[1,3]	Tumble mustard	FACU	Uncommon
Sisymbrium orientale[1,3]	Oriental mustard	NI	Uncommon
Tropidocarpum gracile	Slender keel fruit	NI	Common
CACTACEAE – Cactus			
Opuntia basilaris[2]	Beavertail cactus	NI	Scarce
CAMPANULACEAE – Bellflower			
Nemacladus sigmoideus	Small flowered nemacladus	NI	Uncommon
CHENOPODIACEAE – Goosefoot			
Atriplex canescens[2]	Four-wing saltbush	FACU	Uncommon
Atriplex polycarpa[2]	Cattle spinach	FACU	Common
Grayia spinosa[2]	Spiny Hopsage	NI	Uncommon
Krascheninnikovia (*Ceratoides, Eurotia*) *lanata*[2]	Winter fat	NI	Uncommon
Salsola tragus[1,3,4] (*S. kali*)	Russian thistle	FACU+	Common
CONVOLVULACEAE – Morning-glory			
Convolvulus arvensis[2,3,4]	Bindweed	NI	Uncommon
Cuscuta sp. (previously included in Cuscutaceae)	Dodder		Uncommon
CUCURBITACEAE – Gourd			
Marah macrocarpus[1]	Wild cucumber	NI	Common
EPHEDRACEAE – Ephedra			
Ephedra nevadensis[1]	Ephedra	NI	Uncommon
EUPHOROBIACEAE – Spurge			
Croton (*Eremocarpus*) *setigerus*[1]	Doveweed	NI	Common
Chamaesyce (*Euphorbia*) *albomarginata*[1]	Rattlesnake weed	NI	Common
FABACEAE – Legume			
Astragalus douglasii[1]	Jacumba milk vetch	*NI*	Common
Astragalus lentiginosus var. *variabilis*[1]	Freckled milk vetch	NI	Uncommon
Glycyrrhiza lepidota[2]	Wild licorice	FAC+	Uncommon
Lupinus bicolor (*L. congdonii, L. polycarpus*)	Miniature lupine, Bicolored lupine	NI	Abundant
Lupinus excubitus	Grape soda lupine	NI	Common

TABLE I-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
Lupinus microcarpus[1]	Chick lupine	NI	Common
Medicago polymorpha[3] (*M. hispida*)	California burclover	NI	Uncommon
Robinia pseudoacacia[3]	Black Locust	FAC*	Uncommon
GERANIACEAE – Geranium			
Erodium cicutarium[1,3,4]	Red-stem fillaree[1]	NI	Abundant
LAMIACEAE – Mint			
Marrubium vulgare[3,4]	Horehound	FAC	Uncommon
THEMIDACEAE			
Dichelostemma capitatum[1] (*D. pulchellum*, previously included in Liliaceae)	Blue Dicks	NI	Common
LOASACEAE – Loasa			
Mentzelia albicaulis[1]	Comet blazing star	NI	Uncommon
MONTIACEAE			
Cistanthe (*Calandrinia*) *ambigua* (previously included in Portulacaceae)	Desert redmaids	FAC	Scarce
NYCTAGINACEAE – Four O'Clock			
Mirabilis laevis[2] (*M. californica*)	Wishbone bush	NI	Uncommon
ONAGRACEAE – Evening Primrose			
Camissonia (*Oenothera*) *campestris*	Mojave sun cup	NI	Common
Camissonia (*Sphaerostigma*) *pallida*[1]	Pale yellow sun cup	NI	Common
Camissonia pusilla[2] (*Oenothera contorta*)	Raven's primrose	NI	Uncommon
Camissonia (*Oenothera*) *strigulosa*[1]	Strigose sun cup	NI	Uncommon
Oenothera californica	California primrose	NI	Uncommon
PAPAVERACEAE – Poppy			
Argemone munita	Prickly poppy	NI	Uncommon
Eschscholzia californica[1]	California poppy	NI	Abundant
Eschscholzia minutiflora[1] (*E. parishii*)	Little golden poppy	NI	Uncommon
Platystemon californicus (*P. acutatus*)	Cream cups	NI	Common
PLANTAGINACEAE – Plantain			
Penstemon heterophyllus (previously included in Scrophulariaceae)	Penstemon	NI	Uncommon

TABLE I-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
POACEACE – Grass			
Achnatherum (*Oryzopsis*) *hymenoides*	Indian rice grass	UPL	Uncommon
Achnatherum speciosum (*Stipa speciosa*)	Desert needlegrass	NI	Scarce
Arundo donax[2,3,4]	Giant reed	FACW	Uncommon
Avena fatua[1,3,4]	Wild oat	NI	Common
Bromus catharticus[3] (*B. haenkeanus*, *B. unioloides*, *B. willdenovii*)	Rescue brome	NI	Common
Bromus diandrus[1,3,4] (*B. rigidus*)	Ripgut brome	NI	Common
Bromus hordeaceus[3,4] (*B. mollis, B. racemosus*)	Soft chess	FACU-	Common
Bromus madritensis subsp. *rubens*[1,2,3,4] (*B. rubens*)	Red brome	NI	Abundant
Bromus tectorum[1,3,4]	Cheatgrass	NI	Abundant
Bromus trinii[1,3]	Chilean cheat grass	NI	Uncommon
Cynodon dactylon[2,3,4]	Bermuda grass	FAC	Uncommon
Elymus multisetus[1] (*Sitanion jubatum*)	Big squirrel-tail	NI	Uncommon
Hordeum murinum[1,2,3,4]	Bulbous barley	NI	Common
Piptatherum miliaceum[2] (*Oryzopsis miliacea*)	Smilo grass	NI	Uncommon
Poa secunda[1]	One sided blue grass	NI	Uncommon
Schismus barbatus[1,3]	Mediterranean grass	NI	Common
Secale cereal[3]	Rye	NI	Uncommon
Triticum aestivum[2,3]	Wheat	NI	Uncommon
Vulpia microstachys[1]	Small fescue	NI	Abundant
Vulpia myuros[3,4]	Rattail fescue	FACU*	Uncommon
POLEMONIACEAE – Phlox			
Eriastrum sapphirinum[2]	Sapphire woolystar	NI	Uncommon
Gilia minor	Little gilia	NI	Uncommon
Leptosiphon liniflorus[2] (*Linanthus liniflorus*)	Narrowflower flaxflower	NI	Common
Loeseliastrum schottii[2] (*Langloisia schottii*)	Schott's calico	NI	Uncommon
POLYGONACEAE – Buckwheat			
Chorizanthe watsonii[1]	Watson's spineflower	NI	Uncommon
Eriogonum angulosum[1]	Anglestem buckwheat	NI	Common
Eriogonum baileyi[1]	Bailey's buckwheat	NI	Common
Eriogonum davidsonii[1] (*E. molestum*)	Davidson's buckwheat	NI	Common

TABLE I-1 (CONTINUED)
PLANT SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE

Scientific Name	Common Name	Wetland Indicator Status	Estimated Abundance
Eriogonum fasciculatum var. *polifolium*[2]	California buckwheat	NI	Uncommon
Polygonum aviculare subsp. *depressum*[2] (*P. arenastrum, P. montereyense*)	Common knotweed	FAC	Uncommon
Rumex hymenosepalus	Dock	NI	Uncommon
SCROPHULARIACEAE – Figwort			
Castilleja exserta (*Orthocarpus purpurascens*)	Purple owl's clover	NI	Uncommon
SOLANACEAE – Nightshade			
Datura wrightii[1] (*D. meteloides*)	Jimson weed	NI	Common
Lycium andersonii[2]	Anderson's boxthorn	NI	Uncommon
Lycium cooperi[2]	Coopers' boxthorn	NI	Uncommon
TAMARICACEAE – Tamarisk			
Tamarix parviflora[2,3,4]	Smallflower tamarisk	FAC	Uncommon
ULMACEAE – Elm			
Ulmus pumila[2,3,4]	Siberian elm	NI	Uncommon
ZYGOPHYLLACEAE – Caltrop			
Larrea tridentata[1]	Creosote	NI	Uncommon
OTHER/UNKNOWN			
Unknown[2,3]	Unknown stone fruit tree		Uncommon

All plant species above were observed within the Project site unless otherwise noted.

1 Indicates plant species observed on Project site and proposed transmission line route.

2 Indicates plant species only observed on the proposed transmission line route.

3 Non-native (Hickman 1993).

4 Invasive (California Invasive Plant Council 2009, Mojave Desert Region).

APPENDIX J
LIST OF ALL WILDLIFE DETECTED WITHIN THE PROJECT SITE AND ALONG THE PROPOSED TRANSMISSION LINE ROUTE

TABLE J-1
WILDLIFE SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE ROUTE

Scientific Name	Common Name	Estimated Abundance within the Project Site and Proposed Transmission Line Route
INVERTEBRATES		
Formicidae – Ants		
Pogonomyrmex barbatus	Harvester ant	Common
Mutillidae – Velvet Ant		
Dasymutilla occidentalis	Velvet ant	Uncommon
Acrididae – Grasshoppers		
Acrididae sp.	Grasshoppers	Common
Carabidae – Beetles		
Carabidae sp.	Bombardier beetle	Common
REPTILES		
Crotaphytidae – Collared and Leopard Lizards		
Gambelia wislizenii	Long-nosed leopard lizard	Uncommon
Phrynosomatidae – Spiny Lizards		
Uta stansburiana	Side-blotched lizard	Common
Phrynosoma platyrhinos	Desert horned lizard	Common
Phyrnosoma blainvillii	Blainville's horned lizard	Uncommon
Teiidae – Whiptails		
Cnemidophorus tigris	Western whiptail	Common
Colubridae – Colubrids		
Masticophis flagellum piceus	Red coachwhip	Common
Pituophis catenifer	Gopher snake	Common
Viperidae – Vipers		
Crotalus scutulatus scutulatus	Mojave rattlesnake	Common
BIRDS		
Odontophoridae – New World Quail		
Calipepla californica	California quail	Common
Adeidae – Herons and egrets		
Ardea alba	Great egret	Rare
Cathartidae – New World Vultures		
Cathartes aura	Turkey vulture	Uncommon

TABLE J-1 (CONTINUED)
WILDLIFE SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE ROUTE

Scientific Name	Common Name	Estimated Abundance within the Project Site and Proposed Transmission Line Route
Accipitridae – Hawks		
Circus cyaneus	Northern harrier	Uncommon
Buteo jamaicensis	Red-tailed hawk	Uncommon
Falconidae – Falcons		
Falco sparverius	American kestrel	Uncommon
Falco columbarius	Merlin	Uncommon
Falco mexicanus	Prairie falcon	Uncommon
Charadriidae – Plovers		
Charadrius vociferus	Killdeer	Rare
Scolopacidae – Sandpipers and Allies		
Numenius phaeopus	Whimbrel	Uncommon
Calidris mauri	Western sandpiper	Rare
Columbidae – Pigeons and Doves		
Columba livia	Rock pigeon	Uncommon
Streptopelia decaocto	Eurasian collared-dove	Uncommon
Zenaida macroura	Mourning dove	Common
Cuculidae – Cuckoos		
Geococcyx californianus	Greater roadrunner	Uncommon
Tytonidae – Barn owls		
Tyto alba	Barn owl	Uncommon
Strigidae – Typical Owls		
Athene cunicularia	Burrowing owl	Uncommon
Asio otus	Long-eared owl	Uncommon: Presence assumed from wing feather
Apodidae – Swifts		
Chaetura vauxi	Vaux's swift	Uncommon
Aeronautes saxatalis[1]	White-throated swift	Uncommon
Trochilidae – hummingbirds		
Selasphorus sp.	Rufous/Allen's hummingbird	Rare
Tyrannidae – Flycatchers		
Empidonax sp.[1]		Rare
Myiarchus cinerascens[1]	Ash-throated flycatcher	Uncommon

TABLE J-1 (CONTINUED)
WILDLIFE SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE ROUTE

Scientific Name	Common Name	Estimated Abundance within the Project Site and Proposed Transmission Line Route
Tyrannus verticalis	Western kingbird	Uncommon
Laniidae – Shrikes		
Lanius ludovicianus	Loggerhead shrike	Uncommon
Corvidae – Crows and Ravens		
Corvus corax	Common raven	Common
Alaudidae – Larks		
Eremophila alpestris	Horned lark	Abundant
Hirundinidae – Swallows		
Tachycineta bicolor	Tree swallow	Uncommon
Tachycineta thalassina[1]	Violet-green swallow	Uncommon
Petrochelidon pyrrhonota	Cliff swallow	Uncommon
Hirundo rustica	Barn swallow	Uncommon
Troglodytidae – Wrens		
Campylorhynchus brunneicapillus[1]	Cactus wren	Uncommon
Salpinctes obsoletus	Rock wren	Uncommon
Turdidae – Thrushes		
Sialia currucoides	Mountain bluebird	Common
Mimidae – Mockingbirds and Thrashers		
Mimus polyglottus[1]	Northern mockingbird	Uncommon
Sturnidae – Starlings		
Sturnus vulgaris	European starling	Uncommon
Motacillidae – Wagtails and Pipits		
Anthus rubescens	American pipit	Uncommon
Parulidae – Warblers		
Dendroica petechia[1]	Yellow warbler	Uncommon
Dendroica coronata	Yellow-rumped warbler	Uncommon
Dendroica townsendi	Townsend's warbler	Rare
Icteria virens[1]	Yellow-breasted chat	Rare
Thraupidae – Tanagers		
Piranga ludoviciana[1]	Western tanager	Uncommon

TABLE J-1 (CONTINUED)
WILDLIFE SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE ROUTE

Scientific Name	Common Name	Estimated Abundance within the Project Site and Proposed Transmission Line Route
Emberizidae – Towhees, Sparrows, and Longspurs		
Spizella passerina[1]	Chipping sparrow	Uncommon
Spizella breweri	Brewer's sparrow	Uncommon
Pooecetes gramineus	Vesper sparrow	Uncommon
Chondestes grammacus	Lark sparrow	Uncommon
Amphispiza belli	Sage sparrow	Common
Passerculus sandwichensis	Savannah sparrow	Common
Zonotrichia leucophrys	White-crowned sparrow	Common
Cardinalidae – Cardinals and Allies		
Passerina caerulea[1]	Blue grosbeak	Uncommon
Passerina amoena	Lazuli bunting	Uncommon
Icteridae – Blackbirds and Orioles		
Agelaius phoeniceus	Red-winged blackbird	Rare
Agelaius tricolor	Tricolored blackbird	Uncommon
Sturnella neglecta	Western meadowlark	Common
Euphagus cyanocephalus	Brewer's blackbird	Uncommon
Icterus bullockii	Bullock's oriole	Uncommon
Fringillidae – Finches		
Carpodacus mexicanus	House finch	Common
Carduelis psaltria[1]	Lesser goldfinch	Uncommon
Carduelis lawrencei[1]	Lawrence's goldfinch	Uncommon
Carduelis tristis	American goldfinch	Uncommon
Passeridae – Old World Sparrows		
Passer domesticus	House sparrow	Uncommon
MAMMALS		
Leporidae – Rabbits		
Sylvilagus audubonii	Desert cottontail	Common
Lepus californicus	Blacktail jackrabbit	Common
Sciuridae – Squirrels		
Ammospermophilius leucurus	Whitetail antelope squirrel	Common
Spermophylis beecheyi[1]	California ground squirrel	Common

TABLE J-1 (CONTINUED)
WILDLIFE SPECIES OBSERVED ON THE PROJECT SITE AND PROPOSED TRANSMISSION LINE ROUTE

Scientific Name	Common Name	Estimated Abundance within the Project Site and Proposed Transmission Line Route
Geomyidae – Gophers		
Thomomys bottae	Botta's pocket gopher	Common: Presence assumed from observed sign.
Heteromyidae – Pocket mice and Kangaroo rats		
Dipodomys sp.	Unknown kangaroo rat	Common: Presence assumed from observed sign.
Canidae – Dogs		
Canis latrans	Coyote	Common

[1] Observed on proposed transmission line route only.

APPENDIX K
JOSHUA TREE DATA

TABLE K-1
JOSHUA TREE SEEDLING INVENTORY DATA

#	GPS Point ID	Height (in)	Crown Dia (in)	# Branches	Notes
1	304	11	5	0	
2	304	19	10	0	
3	305	44	16	1	
4	306	38	18	1	
5	306	12	7	0	
6	307	45	21	3	
7	308	24	12	0	
8	308	18	10	0	
9	308	10	6	0	
10	309	30	12	4	
11	310	28	14	0	
12	312	28	15	1	
13	313	46	24	2	
14	313	25	12	0	
15	314	51	21	2	
16	314	25	17	0	
17	315	29	14	0	
18	316	38	18	0	
19	317	16	8	0	
20	318	49	19	0	
21	318	15	10	0	
22	319	70	15	0	
23	319	10	8	0	
24	319	34	10	0	
25	319	9	5	0	
26	319	16	13	0	
27	320	30	18	1	
28	321	29	15	0	
29	322	29	16	0	
30	323	26	13	1	
31	324	17	15	0	
32	324	6	4	0	
33	325	23	12	0	
34	326	33	17	1	

TABLE K-1 (CONTINUED)
JOSHUA TREE SEEDLING INVENTORY DATA

#	GPS Point ID	Height (in)	Crown Dia (in)	# Branches	Notes
35	327	15	10	1	
36	328	40	20	0	
37	328	4	6	0	Grazed to a stub.
38	328	4	6	0	Grazed to a stub.
39	329	27	16	1	
40	329	11	6	0	
41	330	21	9	0	
42	331	19	11	0	
43	332	31	13	0	
44	333	28	14	0	
45	334	17	9	0	
46	335	37	17	0	
47	336	18	10	0	
48	337	24	14	1	
49	338	19	10	0	
50	339	25	12	0	
	Averages:	25.46	12.66	0.4/1.54[1]	
51	341	15	9	0	Isolated individual, not included in average calculations.
52	341	7	4	0	Isolated individual, not included in average calculations.
53	341	132	7.8” dbh	3	Single, isolated, mature tree. Actual DBH. Not included in average calculations.

APPENDIX L
BUTTERFLY TECHNICAL REPORT

BIOLOGICAL TECHNICAL REPORT

AV SOLAR RANCH ONE

LOS ANGELES COUNTY, CALIFORNIA

August 2009

Prepared for:
AV Solar Ranch 1, LLC

Prepared by:
URS

DRAFT

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1.0 INTRODUCTION

This Biological Technical Report (BTR) documents the analysis of an extensive literature review of biological resources[1] by URS Corporation (URS) for the Av Solar Ranch One Project (hereafter referred to as the "Project"). The Project is located in the Fairmont Butte quadrangle (USGS, 1970) - within Sections 11, 13, 14 and 24 of Township 8 North, Range 15 West and within Section 18 of Township 8 North, Range 14 West.

The site occupies an area both north and south of State Route (SR) -138, and is generally bounded to the north by West Avenue B-8, to the south by West Avenue E, to the east by 155th Street West and to the west by 180th Street West. For the purposes of this BTR, the "study area" is defined as the Project's proposed ground disturbance footprint - which includes approximately 2,100-acres that are predominately undeveloped or have been adversely impacted by agricultural production and other types of anthropogenic disturbances since the 1940s. The intended use of this document is to disclose and evaluate biological conditions within study area limits to determine the potential for occurrence of special-status butterfly or invertebrate species[2].

2.0 METHODS

Available information was reviewed from resource management plans and other relevant documents to determine the locations and types of invertebrate species that have the potential to exist within and adjacent to the study area.

Primary information reviewed included the following:

- July 2009 California Natural Diversity Database (CNDDB);
- Emmel, TC. and JF. Emmel. 1973. *The Butterflies of Southern California*. The Natural History Museum of Los Angeles County, Science Series 2;
- Hogue CL. 1993. Insects of the Los Angeles Basin. Natural History Museum of Los Angeles, Los Angeles, California;
- Scott JA. 1986. The Butterflies of North America. Stanford University Press, Stanford, California;
- Heath F. 2004. Southern California Butterflies. Mountain Press Publishing Company, Missoula, Montana;

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[1] For the purposes of this analysis, "biological resources" include the terrestrial and aquatic plants, wildlife, and habitats that occur, or have the potential to occur, within the Project's defined study area.

[2] For the purposes of this analysis, "special-status species" include any butterfly or invertebrate species that has been afforded special recognition by federal, state, or local resources agencies (e.g., U.S. Fish and Wildlife Service [USFWS], California Department of Fish and Game [CDFG]) and/or resource conservation organizations.

- Bruyea, 2003. Butterfly Survey Update for Antelope Valley Raceway Projects, Los Angeles County, California. Bruyea Biological Consulting

- California Gap Analysis. 1998. Land-cover for California Geospatial Data Presentation Form: map; and

The above referenced CNDDB query was limited to the Fairmont Butte USGS 7.5-minute topographic quadrangle map (CDFG, 2009). Accordingly, a potential for occurrence species list was created, augmented and refined through the above referenced literature review and discussions with specialists (personal communication with B. Helm, 2009).

The potential for occurrence designations below were based on the study area's potential to support both common and special-status invertebrate species – derived from habitat suitability comparisons with reported occupied habitats within the region. To that end, the following potential for occurrence definitions were utilized to determine the need for subsequent analysis of invertebrates within the study area and to assess the potential need to determine Project-related effects to special-status invertebrate species:

Absent: Species distribution is restricted by substantive habitat requirements which are not believed to exist within the study area. Consequently, no Project-related effects to the species would be expected to occur from Project implementation.

Low: Species distribution is restricted by substantive habitat requirements which are believed to be negligible within the study area. Consequently, no Project-related effects to the species would be expected to occur from Project implementation.

Moderate: Species distribution is restricted by substantive habitat requirements which are believed to occur within the study area. Therefore, an assessment of Project-related effects to this species is warranted prior to Project implementation.

High: Species distribution is restricted by substantive habitat requirements which are believed to occur within the study area. Therefore, an assessment of Project-related effects to the species is warranted prior to Project implementation.

3.0 RESULTS

The literature review suggests that the study area consists of high-elevation desert habitats comprised predominately of Rubber Rabbitbrush Scrub (Holland, 1986) - with smaller inclusions of California annual grassland, orchards and ornamental landscaping. The Project is also adjacent to several Joshua Tree Woodland habitats (Holland, 1986). The study area likely supports some flowering plants that could functionally serve as nectar resources for butterflies and other wildlife in the region as well. Known nectar resources identified as likely to occur within the study area included, but were not limited to

fiddleneck (*Amsinckia tesselata*), forget-me-not (*Cryptantha sp.),* lupine (*Lupinus bicolor*), and Cammissonia (*Camissonia sp.)*

In summary, there are approximately 135 recorded butterfly species in Los Angels County - of which, roughly 120 are considered resident species. Several butterfly species found in Los Angels County have been afforded special recognition by federal, state or local resources agencies (e.g., U.S. Fish and Wildlife Service [USFWS], California Department of Fish and Game [CDFG]) and/or other resource conservation organizations as well (Table 1). Thirteen (13) special-status butterfly species have the potential to occur within the region. All thirteen of the aforementioned special-status butterfly species were determined to have an "Absent" potential for occurrence designation applied to them within the Project's study area boundaries. Table 1 summarizes the special-status butterfly species and their potential to occur within the study area while Table 2 identifies the common butterfly species potentially occurring within the region.

TABLE 1
SPECIAL-STATUS BUTTERFLY SPECIES POTENTIALLY OCCURRING WITHIN THE STUDY AREA

Family / Scientific Name Common Name		Status Designations Federal/State	Potential for Occurrence
HESPERIIDAE	SKIPPERS		
Panoquina errans Wandering Skipper	Southern California coastal salt marshes. Requires moist saltgrass for larval development.	Fed: None CA: None	Absent
Pseudocopaeodes eunus Alkali Skipper	Inhabits alkali river bottoms of Kern River near Bakersfield.	Fed: FSC CA: None	Absent
LYCAENIDAE	BLUE, HAIRSTREAKS and COPPERS		
Euphilotes battoides allyni El Segundo Blue	Restricted to remnant coastal dune habitat in southern California. Host plant is *Eriogonum parviflolium*: larvae feed only on the flowers and seeds; used by adults as major nectar source.	Fed: FE CA: None	Absent
Euphilotes battoides comstocki Comstock's Blue	Inhabits the Tehachapi area within Kern county. Host plant is *Eriogonum sp*.	Fed: None CA: None	Absent
Glaucopsyche lygdamus palosverdesensis Palos Verdes Blue	Restricted to the cool, fog-shrouded, seaward side of Palos Verdes Hills, Los Angeles County.	Fed: FE CA: None	Absent
Icaricia neurona Veined Blue	Habitats Walker Pass, Kern County; Tehachapi Mountains and San Bernardino Mountains. Host plant *Eriogonum wrightii.*	Fed: None CA: None	Absent

TABLE 1 (CONTINUED)
SPECIAL-STATUS BUTTERFLY SPECIES POTENTIALLY OCCURRING WITHIN THE STUDY AREA

Family / Scientific Name Common Name		Status Designations Federal/State	Potential for Occurrence
Lycaena heteronea clara Bright Blue Copper	Found in small populations in Kern County. Host plants include *Eriogonum sp.* and plants in the *Polygonaceae* family.	Fed: None CA: None	Absent
Plebulina emigdionis San Emigdio Blue	Found in desert canyons and along riverbeds on the southern most edge of the San Joaquin Valley. Host plant is *Atriplex canescens*; maybe *Lotus purshianus* also.	Fed: FSC CA: None	Absent
Satyrium auretorum fumosum Santa Monica Mountain Hairstreak	Found exclusively in the Santa Monica Mountains.	Fed: None CA: None	Absent
NYMPHALIDAE	BRUSH-FOOTED BUTTERLIES		
Euphydryas editha quino Quino Checkerspot	Sunny openings within chaparral and coastal sage shrublands in parts of Rverside and San Diego County. Requires high densities of food plants *Plantago erecta, P. insularis* and *Orthocarpus purpurescens.*	Fed: FE CA: None	Absent
Speyeria egleis tehachapina Tehachapi Mountains Silverspot	Inhabits the Tehachapi area within Kern county. Host plant is *Viola* species.	Fed: None CA: None	Absent
SPHINGIDAE	SPHINX MOTHS		
Euproserpinus euterpe Kern primrose sphinx moth	Found in Walker Basin, Kern Co., and several other scattered locations (Carrizo Plain, Pinnacles NM). Host plant is *Camissonia contorta epilobioides* (evening primrose).	Fed: FT CA: None	Absent

Status Codes

Federal designations: (Federal Endangered Species Act, USFWS):
END: Federal-listed, endangered.
THR: Federal-listed, threatened.
FSC: Federal Species of Concern

State designations: (California Endangered Species Act, CDFG)
END: State-listed, endangered.
THR: State-listed, threatened.

State designations: (CDFG Code)
SSC California Species of Special Concern

DRAFT

TABLE 2

COMMON BUTTERFLY SPECIES POTENTIALLY OCCURRING WITHIN THE REGION

Family / Scientific Name	Common Name
LYCAENIDAE	BLUE, HAIRSTREAKS and COPPERS
Atlides halesus	Great Purple Hairstreak
Brephidium exilis	Pigmy Blue
Callophrys perplexa=affinis	Bramble Hairstreak
Euphilotes bernardino	Bernardino Blue
Everes amyntula	Western Tailed Blue
Hemiargus ceraunus gyas	Edward's Blue
Icaricia acmon	Acmon Blue
Incisalia augustinus iroides	Western Elfin
Leptotes marina	Marine Blue
Strymon melinus	Common Hairstreak
NYMPHALIDAE	BRUSH-FOOTED BUTTERLIES
Agraulis vanillae incarnata	Gulf Fritillary
Basilarchia lorquini	Lorquin's Admiral
Charidryas gabbii	Gabb's Checkerspot
Danaus gilippus strigosus	Striated Queen
Danaus plexippus	Monarch
Euphydryas chalcedona chalcedona	Chalcedon Checkerspot
Junonia coenia	Buckeye Butterfly
Nymphalis antiopa	Mourning Cloak
Vanessa atalanta	Red Admiral
Vanessa virginiensis	Virginia Lady
Vanessa cardui	Painted Lady
Vanessa annabella	West Coast Lady
PAPILIONIDAE	SWALLOWTAILS
Papilio zelicaon	Anise Swallowtail
PIERIDAE	WHITES and SULFERS
Anthocaris cethura	Felder's Orange-tip
Anthocaris sara sara	Sara Orange-tip
Anthocaris lanceolata	Grinnell's Marble
Colias eurytheme	Alfalfa Sulfur
Colias alexandra harfordii	Harford's Sulfur
Euchloe hyantis lotta	Southern Marble
Eurema nicippe	Sleepy Orange
Nathalis iole	Dainty Sulfer
Phoebis sennae	Cloudless Sulfur
Pieris rapae	Cabbage White
Pontia beckeri	Becker's White
Pontia protodice	Checkered White
Pontia sysimbrii	Spring White
RIODINIDAE	METALMARKS
Apodemia mormo	Mormon Metalmark

TABLE 2 (CONTINUED)
COMMON BUTTERFLY SPECIES POTENTIALLY OCCURRING WITHIN THE REGION

Family / Scientific Name	Common Name
HESPERIIDAE	SKIPPERS
Atalopedes campestris	Field Skipper
Erynnis funeralis	Funereal Duskywing
Erynnis tristes	Mournful Duskywing
Heliopetes ericetorum	Large White Skipper
Hylephila phyleus	Fiery Skipper
Lerodea eufala	Eufala Skipper
Megathymus yuccae=coloradensis	Yucca Giant Skipper
Pyrgus communis albescens	Western Checkered Skipper
PRODOXIDAE	YUCCA MOTHS
Tegeticula antithetica	Joshua Tree Yucca Moth
Tegeticula maculata	Chaparral Yucca Moth

4.0 CONCLUSION

Our analysis suggests that the study area does not support habitats that would likely be utilized by special-status butterfly species or populations. Accordingly, the Project's study area is not thought to include high quality native habitats for many flowering plant species that could be utilized by many other common species of butterflies within the region either.

The services performed by URS and documented in this report have been conducted in a manner consistent with that level of care and skill ordinarily exercised by other professional consultants under similar circumstances. No other representations are either expressed or implied, and no warranty or guarantee is included or intended in this report. Opinions relating to presence, absence, or potential for occurrence of biological resources are based on limited data and actual conditions within the study area may vary, despite the use of due professional care.

5.0 REFERENCES

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APPENDIX M
SPECIAL-STATUS SPECIES IMPACT MATRIX

TABLE M-1
SENSITIVE SPECIES IMPACTS MATRIX

Species		Habitat Present and Species is Reasonably Expected to Occur On-site?	Species Impacted Directly by Habitat Loss?	Habitat Loss Substantial?	Species Impacted Indirectly on Adjacent Lands by Edge Effects?	Potential to Eliminate Species On-site?	Potential to Reduce Population Size Below Self-sustaining Levels?	Potential for Substantial Reduction in Numbers of Individuals?	Potential Restriction of Range of Rare or Endangered Species?	Impact Significant?	Mitigation?
Scientific Name	Common Name										
Gopherus agassizii	Desert tortoise	No	No	No	No	No	No	No	No	No	No
Phrynosoma coronatum (blainvillii population)	Coast horned lizard	Yes	Yes	No	No	No	No	No	No	Yes	Yes
Agelaius tricolor	Tricolored Blackbird	No (i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Aquila chrysaetos	Golden eagle	No (i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Asio flammeus	Short-eared Owl	No (i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Asio otus	Long-eared owl	Yes	Yes	No	No	Yes	No	No	No	Yes	Yes
Athene cunicularia	Burrowing owl	Yes	Yes	Yes	Yes (i.e., windblown dust)	Yes	No	No	No	Yes	Yes
Buteo regalis	Ferruginous hawk	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No
Buteo swainsoni	Swainson's hawk	No	No	No	No	No	No	No	No	No	No

TABLE M-1 (CONTINUED)
SENSITIVE SPECIES IMPACTS MATRIX

Species		Habitat Present and Species is Reasonably Expected to Occur On-site?	Species Impacted Directly by Habitat Loss?	Habitat Loss Substantial?	Species Impacted Indirectly on Adjacent Lands by Edge Effects?	Potential to Eliminate Species On-site?	Potential to Reduce Population Size Below Self-sustaining Levels?	Potential for Substantial Reduction in Numbers of Individuals?	Potential Restriction of Range of Rare or Endangered Species?	Impact Significant?	Mitigation?
Scientific Name	Common Name										
Carduelis lawrencei	Lawrence's goldfinch	Yes (proposed transmission line route only; i.e., nesting habitat)	No	No	No	No	No	No	No	No	Yes
Chaetura vauxi	Vaux's swift	No (i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Charadrius montanus	Mountain plover	Yes (proposed transmission line route only; i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Chondestes grammacus	Lark sparrow	Yes	Yes	Yes	Yes (i.e., windblown dust)	Yes	No	No	No	Yes	Yes
Circus cyaneus	Northern harrier	No (i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Dendroica petechia	Yellow warbler	No (i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Elanus leucurus	White-tailed kite	No	No	No	No	No	No	No	No	No	No

TABLE M-1 (CONTINUED)
SENSITIVE SPECIES IMPACTS MATRIX

Species		Habitat Present and Species is Reasonably Expected to Occur On-site?	Species Impacted Directly by Habitat Loss?	Habitat Loss Substantial?	Species Impacted Indirectly on Adjacent Lands by Edge Effects?	Potential to Eliminate Species On-site?	Potential to Reduce Population Size Below Self-sustaining Levels?	Potential for Substantial Reduction in Numbers of Individuals?	Potential Restriction of Range of Rare or Endangered Species?	Impact Significant?	Mitigation?
Scientific Name	Common Name										
Falco columbarius	Merlin	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No
Falco mexicanus	Prairie falcon	No (i.e., nesting habitat)	Yes (i.e., foraging habitat)	No	No	No	No	No	No	Yes (i.e., foraging habitat)	No
Geococcyx californianus	Greater roadrunner	Yes (proposed transmission line route only; i.e., nesting habitat)	No	No	No	No	No	No	No	No	Yes
Gymnogyps californianus	California condor	No	No	No	No	No	No	No	No	No	No
Icteria virens	Yellow-breasted chat	No (i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Lanius ludovicianus	Loggerhead shrike	Yes	Yes	Yes	Yes (i.e., windblown dust)	Yes	No	No	No	Yes	Yes
Pooecetes gramineus	Vesper sparrow	Yes	Yes	Yes	No	Yes	No	No	No	Yes	Yes
Sialia currucoides	Mountain bluebird	Yes	Yes	Yes	No	Yes	No	No	No	Yes	Yes

TABLE M-1 (CONTINUED)
SENSITIVE SPECIES IMPACTS MATRIX

Species		Habitat Present and Species is Reasonably Expected to Occur On-site?	Species Impacted Directly by Habitat Loss?	Habitat Loss Substantial?	Species Impacted Indirectly on Adjacent Lands by Edge Effects?	Potential to Eliminate Species On-site?	Potential to Reduce Population Size Below Self-sustaining Levels?	Potential for Substantial Reduction in Numbers of Individuals?	Potential Restriction of Range of Rare or Endangered Species?	Impact Significant?	Mitigation?
Scientific Name	Common Name										
Spizella breweri	Brewer's sparrow	No (i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Spizella passerina	Chipping sparrow	No (i.e., nesting habitat)	No	No	No	No	No	No	No	No	No
Sturnella neglecta	Western meadowlark	Yes	Yes	Yes	Yes (i.e., windblown dust)	Yes	No	No	No	Yes	Yes
Toxostoma lecontei	Le Conte's thrasher	No	No	No	No	No	No	No	No	No	No
Antrozous pallidus	Pallid bat	No (i.e., roosting habitat)	No	No	No	No	No	No	No	No	No
Corynorhinus townsendii	Townsend's big-eared bat	No (i.e., roosting habitat)	No	No	No	No	No	No	No	No	No
Perognathus alticolus inexpectatus	Tehachapi pocket mouse	No	No	No	No	No	No	No	No	No	No
Spermophilus mohavensis	Mohave ground squirrel	No	No	No	No	No	No	No	No	No	No
Taxidea taxus	American badger	Yes	No	No	No	No	No	No	No	No	Yes

APPENDIX N
RESUMES OF PREPARERS

URS

Christopher Julian

Project Biologist, Regulatory Specialist

Areas of Expertise

Multidisciplinary Project Management
CEQA/NEPA Environmental Analysis
Caltrans Natural Environment Studies
Section 404/1600 Permitting
Delineation of Streams and Wetlands
Wetlands Functional Assessment
404(b)(1) Alternatives Analysis
ESA Consultation/Permitting
CESA Incidental Take Permitting
Stream Ecology and Bioassessment
Environmental Compliance Monitoring
Protocol Surveys for Plants and Wildlife

Years of Experience

With URS: 6 Years
With Other Firms: 2 Years

Education

BS/Biology/2001/University of California, Santa Barbara

Overview

Mr. Julian has over eight years of work experience as an environmental consultant in the biological sciences, including three years of project management experience. His technical emphases include NEPA and CEQA environmental document preparation, state and federal stream and wetlands permitting (including preparation of agency permit application packages, jurisdictional delineations, wetlands functional assessment, and 404(b)(1) analysis), and Endangered Species Act consultation. He has effectively assisted clients with designing projects to ensure compliance with agency regulations, and has managed and prepared the biological resources sections of complex CEQA, NEPA, and ESA documents. Mr. Julian also has an extensive stream ecology background, including lake and stream bioassessments, surveys for common and special-status aquatic wildlife species, mapping of aquatic habitats, and classification of wetlands.

Project Specific Experience

Project Management Experience

Multidisciplinary CEQA/NEPA Projects

Project Manager and Lead Biologist for Newhall Land's Resource Management and Development Plan, Santa Clarita Valley, Ca: Oversaw an interdisciplinary team of professionals preparing a joint EIS/EIR supporting federal and state authorizations related to jurisdictional waters, streambeds, and endangered species for a large, master-planned housing development in Los Angeles County, California. Personally authored draft sections including biological resources, jurisdictional waters and streambeds, and comparison of alternatives. The project also included preparation of several stand-alone documents to support the EIS/EIR, including a Biological Assessment, Wetlands Functional Assessment, and Historic Properties Treatment Plan. The draft EIS/EIR was released for public review and comment in April 2009, and Mr. Julian's involvement is ongoing. To date, URS revenue from this project exceeds $3.4M.

Lead Biologist for Santa Barbara Ranch Final EIR, Santa Barbara County, Ca: Oversaw preparation of responses to biology-related public comments on the Draft EIR for a complex and highly controversial housing development near Goleta, Ca. Key biological issues of concern raised by the public included loss of native grasslands, loss of foraging habitat for the white-tailed kite, and degradation of coastal streams and wetlands. Responding to comments required extensive analysis of applicable policies, including the General Plan, Coastal Land Use Plan, and Zoning Ordinance, as well as applicable regulations protecting biological resources. Worked with Santa Barbara County staff and counsel to identify appropriate solutions in policy overlap scenarios.

Lead Technical/Regulatory Reviewer for Ventura County Maintenance Program EIR, Ventura County, Ca: Took responsibility to ensure CEQA-adequacy and legal defensibility of all aspects of a Program EIR prepared in support of an updated flood control manual for the Ventura County Watershed Protection District.

Biological Resources Projects

Project Manager for Ventura River Algae Inventory Study, Ventura County, Ca: Supervised a crew of four aquatic biologists in a long-term study of algal distribution and abundance in the Ventura River. The project has been ongoing since 2004, and includes monthly surveys at a suite of sample sites along the lower river both upstream and downstream of the Ojai Valley Sanitary District's wastewater treatment plant outfall. Many physical, chemical, and biological factors are measured at each site, including algal cover, irradiance, streamflow, nutrient concentrations, and abundance of grazers, in an attempt to discern the factors controlling algal distribution and abundance in the river. To date, URS revenue from this ongoing project is approximately $250k.

Project Manager for Redevelopment Parcel Biological Resources Report, Santa Barbara, Ca: Managed all aspects of preparing a report to the City of Santa Barbara Redevelopment Agency assessing biological resources within a parcel that the agency had proposed for redevelopment. This small project consisted of a reconnaissance-level site visit, followed by preparation of a concise report within a rapid time frame. URS revenue from this project was approximately $5k.

Lead Biologist for Due Diligence Analysis of NextLight's Borrego Springs Site, San Diego County, Ca: Conducted a two-day field assessment of a property near Borrego Springs, California to identify any biological constraints that would preclude or inhibit use of the site for solar energy generation. The field assessment included vegetation mapping, habitat suitability analysis for special-status species including desert tortoise and bighorn sheep, inspection of potentially-jurisdictional drainages, and non-protocol pedestrian surveys for rare or sensitive plants or wildlife species. Results of the assessment were presented in a letter report, which combined the field data with information from other sources to determine the extent to which the biological constraints would affect the viability of the site.

Lead Biologist for Due Diligence Analysis of NextLight's Grayburn Site, Kern County, Ca: Conducted a one-day field assessment of a small property north of Mojave, California to identify any biological constraints that would preclude or inhibit use of the site for solar energy generation. The field assessment included an evaluation of onsite vegetation, habitat suitability analysis for the desert tortoise, which was present in the region, inspection of potentially-jurisdictional drainages, and non-protocol pedestrian surveys for rare or sensitive plants or wildlife species. Results of the assessment were presented in a letter report, which combined the

field data with information from other sources to determine the extent to which the biological constraints would affect the viability of the site.

Jurisdictional Delineation Experience

Newhall Ranch Resource Management and Development Plan, Santa Clarita Valley, Ca: Managed delineation of all Corps-jurisdictional waters of the U.S., including wetlands, and CDFG-jurisdictional streambeds within the 12,000 acre Newhall Ranch site in the Santa Clarita Valley, California. All jurisdictional features were delineated in the field using a GPS unit capable of sub-meter accuracy, and nearly 100 wetland delineation data forms were completed. The results of the delineation were provided to the Corps and CDFG, and both agencies concurred with the delineated boundaries, which were utilized as the environmental baseline during environmental analysis of comprehensive permitting proposals on the site.

Other Jurisdictional Delineations

- Gaviota Creek Culvert Replacement: Corps wetlands, coastal wetlands
- Piru Creek Bank Protection: Corps waters, CDFG streambeds
- Castaic Creek in Valencia Commerce Center: CDFG streambeds
- Johnson Valley Desert Washes: Corps waters and CDFG Streambeds
- California Valley Solar Ranch Project: Corps waters, Corps wetlands, and CDFG streambeds

Wetlands Functional Assessment Experience

Newhall Ranch Resource Management and Development Plan, Santa Clarita Valley, Ca: Worked with URS staff and representatives from the U.S. Army Corps of Engineers to develop and implement a hybrid functional assessment method suitable for assessing impacts of a proposed comprehensive permitting endeavor along the Santa Clara River, California. The end result was a method based on a combination of three established methods (CRAM, HGM, and SAMP LLFA), which was robust and rigorous enough to meet the Corps' assessment needs yet flexible and qualitative enough to meet the cost and schedule limitations of the proposed project. The hybrid method was utilized to measure existing functional capacity within the project site, and a set of predictive assumptions was established to allow comparison of various post-project scenarios with the existing condition. The method developed by URS was one of the most valuable impact assessment tools used in assessing impacts of the proposed permitting project.

Section 7 Consultation Experience

Biological Assessment for the Newhall Ranch Resource Management and Development Plan, Santa Clarita Valley, Ca: Directed preparation of a Biological Assessment on behalf of the U.S. Army Corps of Engineers evaluating the potential effects of a proposed long-term, Individual Section 404 Permit on federally-listed wildlife species in the Santa Clara River and adjacent uplands. The direct and indirect effects of the proposed action included construction of flood control improvements and urban development. Effects on seven listed

URS

Plant and Wildlife Survey Experience

Tidewater Goby (*Eucyclogobius Newberryi*): Over 40 survey hours

- Santa Barbara Airport Creek Relocation – Captured and relocated tidewater gobies to facilitate realignment of a tidal drainage.
- San Pedro Creek – Conducted protocol presence/absence for tidewater goby.
- Laguna Channel Tide Gate Repair - Captured and relocated tidewater gobies away from a proposed construction disturbance zone associated with repair of an aging tide gate, and installed and monitored barrier nets to prevent re-entry by tidewater goby.

Blunt-nosed Leopard Lizard (*Gambella sila*):
Level I Surveyor (41 survey days, including workshop)

- California Valley Solar Ranch Project - Conducted protocol surveys for adult BNLL across a 3,000 acre proposed solar power plant site on the Carrizo Plain in San Luis Obispo County, Ca.

Stream Bioassessment:

- Southern California Edison Alternative Licensing Project - Served as crew leader, employing California Stream Bioassessment Procedure in a series of alpine stream bioassessments related to hydroelectric dam re-licensing.
- Santa Clara River Estuary Salinity Study – Conducted an estuarine bioassessment using a modified version of the Rapid Bioassessment Procedure to determine whether benthic macroinvertebrate species composition was a reliable indicator of long-term salinity trends.

Freshwater Fisheries:

- Southern California Edison Alternative Licensing Project – Conducted inventories of freshwater fishes in alpine streams and hydropower lakes in the western Sierra Nevada employing a variety of survey methods, including seine nets, minnow traps, gill nets, and electrofishing.
- San Antonio Creek Culvert Replacement – Conducted a fish passage assessment to determine the extent to which a degraded culvert presented an obstacle to upstream migration of southern steelhead. Recommended design changes to improve fish passage in the new replacement culvert.

Other Plant and Wildlife Survey Experience:

- Arroyo toad
- Burrowing Owl
- California Red-Legged Frog

- Desert Tortoise
- General Botanical Surveys
- Southern steelhead
- Unarmored Threespine Stickleback

Specialized Training

2009: Blunt-nosed Leopard Lizard Workshop, presented by The Wildlife Society in Bakersfield, Ca
2008: Workshop for Biologists, presented by the County of San Luis Obispo, Ca
2008: Clean Water Act Regulatory Updates, presented by the Association of Environmental Professionals in Ventura, Ca
2006: CEQA Workshop Series, presented by the Association of Environmental Professionals in Ventura, Ca
2005: Wetland Plant Identification, presented by Wetland Training Institute in San Diego, Ca
2004: Wetland Delineation Training (40 hour), presented by Wetland Training Institute in San Diego, CA

Chronology

2003 – Present: URS Corporation, Santa Barbara, Project Biologist/ Regulatory Specialist
2001 – 2003: Entrix, Inc., Ventura, Staff Biologist
2000 – 2001: UC Santa Barbara, Laboratory Technician/Field Assistant

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URS

John H. Davis IV

Senior Biologist, Santa Barbara Biology Group Manager

Areas of Expertise

Project Management
CEQA/NEPA
Biological Assessments
Natural Environmental Study Reports
Protocol Surveys for Special-Status Plant and Wildlife Species
Wetland Delineations
Environmental Permitting
Environmental Compliance Monitoring
Habitat Restoration
Herpetological Surveys
Watershed Management, Monitoring, and Analysis

Years of Experience

With URS: 1 Year
With Other Firms: 11 Years

Education

MS/Biology/2003/Cal Poly State University, San Luis Obispo
BS/Ecology/1998/San Diego State University

Registration/Certification

U.S. Fish and Wildlife Recovery Permit No. TE-110095-0 (Fairy & Tadpole Shrimp and Morro shoulderband snail; California Red-legged frog – Pending)
CDFG Scientific Collecting Permit

Overview

John H. Davis IV's education and professional background provide an experience base in project management, special-status species surveys, sensitive biological resource assessment, restoration ecology, watershed management, CEQA, NEPA and environmental regulations, permitting, and compliance. Mr. Davis' expertise is in identification and assessment of potential biological constraints for a diversity of projects and land uses. He has effectively assisted clients with project design and agency regulations and has managed and coordinated the biological resources sections of complex CEQA documents. Mr. Davis currently serves as manager in the URS Santa Barbara Office to an experienced and motivated biology team. John brings to the team an academic research and teaching and public and private sector experience.

Mr. Davis has managed and/or provided support to many academic, regulatory, and development projects. He has conducted numerous special-status and general plant and wildlife species surveys and has managed, designed, implemented, and monitored restoration projects for several habitats throughout southern and central California. Furthermore, Mr. Davis is permitted by the U.S. Fish and Wildlife Service (USFWS) under to perform protocol surveys for the federally endangered Morro Shoulderband Snail (MSS) and federally Listed Vernal Pool Branchiopods (LVPB–fairy and tadpole shrimps). He is also permitted to conduct habitat enhancement and construction-related activities for the MSS and has completed the requirements for a California red-legged frog handling permit.

Project Specific Experience

Project Management Experience

Solar Projects

Managing Biologist for SunPower's California Valley Solar Ranch Project in eastern San Luis Obispo County, CA: Supervised field crew of 11 URS biologists performing habitat assessment, jurisdictional determination, and small mammal surveys on a 5,227 acre site and 3 mile long transmission route. An additional two sub consultant mammalogists were utilized on small mammal trapping surveys. Orchestrated field surveys, data collection, report preparation, and agency and client coordination. A Biological Resources Assessment Report was submitted to the County on January 14, 2009. Other technical reports are currently in preparation.

Managing Biologist for 550 MW Solar Thermal Site in Johnson Valley, CA: Supervised field crew of 30 biologists performing USFWS protocol desert tortoise, focused botanical, jurisdictional determination, wildlife and vegetation mapping surveys on a 9,315 acre site and 10 mile long transmission and gas routes. Prepared the biological survey work plan and coordinated with regulatory agencies on biological resource

issues and potential mitigation. Field Surveys were completed in June 2008. Orchestrated survey efforts, data collection, and agency and client correspondence. Technical reporting is currently on hold.

Managing Biologist for First Solar Electric, 50 MW PV Solar Site near Blythe, CA: Supervised desert tortoise survey and technical biological resources reporting for USFWS, CDFG, and County of Riverside. Coordinated with regulatory agencies on biological issues and potential mitigation. Supervised a field crew of 3 biologists of USFWS protocol and focused botanical surveys, point bird counts, and habitat assessment for the western burrowing owl. The project is currently undergoing environmental review by the County of Riverside.

Biological Oversight for a 250 MW PV Solar Site near Lancaster, CA: Provide supervision and guidance to lead wildlife biologist, Crissy Slaughter, on focused biological surveys: habitat/vegetation mapping, wintering bird surveys, botanical surveys, Joshua tree woodland assessment, and technical biological resources reporting for the County of Los Angeles. Biological field survey is currently underway for this project..

Managing Biologist for Due Diligence/Key Issues Report for SunPower Corporation: Supervised reconnaissance field surveys and biological constraints reporting for a site in eastern San Luis Obispo County.

Managing Biologist for Due Diligence/Key Issues Report for Nextlight Corporation: Supervised reconnaissance field survey and biological constraints for a site in eastern Los Angeles County.

Managing Biologist for Due Diligence/Key Issues Report for Solel Corporation: Supervised reconnaissance field survey and biological constraints for a site in San Bernardino County.

Managing Biologist for Due Diligence/Key Issues Report for SCE: Supervised reconnaissance field survey and biological constraints for a site in San Bernardino County.

Recent Permitting Experience

Project Manager, Western Goleta Slough Wetland Enhancement Project, Goleta, CA: Managed a multidisciplinary team on the creation and enhancement of 20 acres of wetland and upland habitat on CDFG property. Coordinated with regulatory agencies on environmental and development issues and permitting. Supervised and prepared permit applications and restoration plan. Managed and coordinated with civil engineers, archeologist, and geologists on the project design, cultural resources, soil contamination, and UXO issues. The project is currently undergoing permit application review.

URS

CEQA / NEPA Experience

Santa Margarita Ranch Agricultural Residential Subdivision Project and Future Plan EIR, County of San Luis Obispo: Managed and prepared the biological resources section of the EIR. Coordinated staff on protocol California red-legged frog and listed vernal pool branchiopod (fairy shrimp) surveys, rare plant surveys, and jurisdictional wetland review. Attended meetings with county staff and regulatory agencies.

Santa Barbara County Housing Element and Action Plan EIR: Conducted field visits and prepared the biological resources section of the EIR. Coordinated and trained staff on special-status species assessment, sensitive biological resources, and jurisdictional boundaries. Analyzed potential policy and development impacts on 10 county-selected sites.

Calle Joaquin Road Realignment Project, City of San Luis Obispo: Prepared a Biological Assessment and conducted protocol LVPB surveys. Coordinated with USFWS and USACE regarding federally listed species.

Biological Resources Assessments (BRA) and National Environmental Studies (NES)

- Halcyon Climbing Lane, County of San Luis Obsipo: NES and BA
- Morro Montana Property, Los Osos: BRA
- 133 Whitely Street, City of Arroyo Grande: BRA
- Jones Property, County of San Luis Obispo: BRA

Restoration and Vegetation Experience

- Fort Hunter-Liggett, Monterey County: Long-Term Vegetation Trend Analysis using point line transects, Yellow Star Thistle mapping, Valley Oak Burn Frequency Study, Erosion Site Evaluation and Prioritization, Ammunition Bunker and Stony Valley Oak Restoration.
- Marine Corps Air Ground Combat Center, Twentynine Palms. Conducted creosote-ambrosia scrub restoration and mesquite mound recreation. Designed, managed, implemented, and monitored a perennial desert shrub mycorrhizae inoculum experiment and a survey of the mycorrhizal status of desert annuals.

Wetland Delineations Experience

- Newhall Ranch, Bridge Constraints, County of Los Angeles
- Tepusquet River Road Crossing, County of Santa Barbara
- Holland Road Property, Community of Menifee, Riverside County

Special-Status Plant Survey Experience

- Agoura Hills Specific Plan EIR, Rare Plant Survey, Los Angeles County. Identified the FE Lyon's pentacheata and FT Agoura Hills dudleya.
- Jones Property, near Harmony, San Luis Obispo County. Identified San Luis Obispo morning glory and owl's clover, List 1B plants.
- Deigratta Place, Rare Plant Survey, Arroyo Grande, San Luis Obispo County. List 1B Well's Manzanita present.

- Los Osos Bureau of Land Management Property, Floristic Inventory; Herbarium Development; Morro Shoulderband Snail, FE Morro Manzanita, and additional Rare Plant, Wildlife, and Vegetation Surveys and Mapping, San Luis Obispo County

Special-status Wildlife Species Experience

California Red-legged Frog (*Rana draytonii*) Over 70 survey hours

- Central Coast – Conducted USFWS protocol surveys for California red-legged frog for several projects throughout San Luis Obispo and northern Santa Barbara Counties. Positive sightings on Santa Margarita Ranch and Davenport, Chorro, Dairy, and Arroyo Grande creeks.

Morro shoulderband snail (*Helminthoglypta walkeriana*) Over 100 survey hours

- County of San Luis Obispo – Conducted USFWS protocol surveys for the Morro Shoulderband Snail for several projects throughout San Luis Obispo and northern Santa Barbara Counties. Positive sightings on UNOCAL Tank Farm Road, Chorro, Dairy, and Arroyo Grande Creeks.

Listed Vernal Pool Branchiopods (fairy shrimp)
Over 140 survey hours

- Central and Southern California – Conducted USFWS protocol surveys for listed vernal pool branchiopods for seven projects within San Luis Obispo, Santa Barbara, and Riverside counties. Positive sightings on UNOCAL Tank Farm Road, Carrizo Plain, and Santa Maria Airport.

Other Special-status Wildlife Species Surveyed:

- Arroyo toad
- Bald eagle
- Blunt nose leopard lizard
- California tiger salamander
- Golden eagle
- Pallid bat
- San Joaquin kit fox
- Southern steelhead
- Southwestern pond turtle
- Two stripped gartersnake
- Western spadefoot
- White-tailed kite

Watershed Management Experience

Managed data collection, management, and analysis for the EPA 319(h) Morro Bay National Monitoring Program in San Luis Obispo County. Other responsibilities included annual report submittal to the EPA and presentations at the National Nonpoint Source Monitoring Workshops. Data collection in the Morro Bay Watershed consisted of weekly water quality sampling for 20 creek sites and annual CDFG rapid bioassessment

for stream habitat quality and macroinvertebrate diversity. Creeks were also surveyed for changes in stream channel morphology, plant coverage, and stream substrate composition. Focused studies included the effects of rangeland BMPs on water quality for a paired watershed and for upstream–downstream comparisons.

Professional Societies/Affiliates

Ecological Society of America
Society for the Study of Amphibians and Reptiles
California Society for Ecological Restoration
Botanical Society of California

Specialized Training

2008: San Luis Obispo County's Workshop for Biologists
2008: Endangered Species Act: Infrastructure Projects and California's Future, CLE International, Sacramento, CA
2008: Wetland Delineation Training (40 hour), Wetland Training Institute, San Diego, CA
2007: San Luis Obispo County's Workshop for Biologists
2007: Oak Woodlands Workshop, Pasadena, CA
2007: California Red Legged Frog Workshop, Elkhorn Slough
2006: California Tiger Salamander Workshop, Alameda Co.
2005: California Anostraca and Nostraca Identification Class
2003: County of San Luis Obispo's San Joaquin Kit Fox Workshop
2003: Rosgen's Stream Restoration Workshop, Breckenridge, CO
2002: Stream Restoration, Ann Riley, RWQCB, San Luis Obispo, CA
2001: Total Maximum Daily Load Workshop, Indianapolis, IN
2001: Rapid Bioassessment, Department of Fish and Game

Chronology

2007 – Present: URS Consultants, Santa Barbara, Senior Biologist/Santa Barbara Biology Team Manager
2005 – 2007: Rincon Consultants, San Luis Obispo, Senior Biologist/Project Manager
2003 – 2005: Morro Group, San Luis Obispo, Associate Biologist
2003: ITAM, Fort Hunter-Liggett, Monterey, Botanist/Restoration Ecologist
2000 – 2003: Regional Water Quality Control Board, San Luis Obispo, Environmental Research Specialist
1999 – 2002: Cal Poly State University, San Luis Obispo, Teaching Associate
1996 – 1998: Soil Ecology and Restoration Group, San Diego, Associate Research Biologist

URS

Cristina Slaughter

Biologist

Overview

Ms. Slaughter's combined work experience and education provide a wide range of experience in ecology and biological resource assessment. She has over ten years of experience working in the fields of wildlife, botany, fisheries, and ecosystem inventory, biological assessment, and monitoring. Ms. Slaughter has managed, coordinated, and authored complex biological resource sections of several CEQA/NEPA documents for projects in northern, central, and southern California. She has been the biologist for numerous FEMA projects throughout California, and has authored several biological assessments for the USFWS and NMFS. She has also done environmental compliance monitoring for construction projects in federally protected species habitat (California red-legged frogs and San Francisco garter snake). On previous projects she has been approved by the USFWS to handle these federally listed species; California red-legged frog, southwestern arroyo toad, tidewater goby, and desert tortoise. Ms. Slaughter's position at URS involves coordinating and conducting special-status wildlife and botanical surveys for several large scale projects in southern California. Specific special-status species surveyed for while at URS include California red-legged frogs, tidewater goby, burrowing owl, and desert tortoise. Other duties include endangered species habitat assessment, botanical surveys, habitat restoration and monitoring, and database management.

Areas of Expertise

- California Red-legged Frog USFWS Protocol Surveys
- Desert Tortoise USFWS Protocol Surveys
- Tidewater Goby USFWS Protocol Surveys
- Burrowing Owl CDFG Protocol Surveys
- CEQA/NEPA Biological Assessments
- Endangered Species Surveys
- Vegetation/Rare Plant surveys
- General Wildlife Surveys and Habitat Assessment
- Small Mammal Trapping
- Stream monitoring / Habitat typing
- Construction Compliance and Monitoring
- GPS and GIS mapping

Years of Experience

- With URS: 2.5 Years
- With Other Firms: 10 Years

Education

- BA/Aquatic Biology/1994/ University of California, Santa Barbara

URS Project Experience

Wildlife Surveys

Biology Task Leader for Spring Biological Surveys, Lancaster, CA: 150 hours. Coordinated and led biological surveys for a 3-square mile site near Lancaster, CA. Supervised and directed a field crew of 6 biologists conducting protocol Phase I-III burrowing owl surveys, nesting bird surveys, focused floristic surveys, and Joshua tree mapping (March 2009 through June 2009).

Biology Task Leader for Winter Biological Surveys, Lancaster, CA: 70 hours. Coordinated and led biological surveys for a 3-square mile site near Lancaster, CA. Supervised and directed a field crew of 6 biologists conducting protocol Phase I burrowing owl surveys, wintering bird surveys, Joshua tree mapping, and jurisdictional determination/wetland delineation surveys (December 2008 through February 2009). These surveys culminated in the production of a Biological Constraints Analysis report submitted to Los Angeles County in March 2009.

California Red-Legged Frog and Tidewater Goby protocol surveys, Santa Barbara, CA: 40 hours. Performed USFWS protocol surveys for California red-legged frogs (4 hours) and tidewater gobies (8 hours) in Bell Canyon Creek in Santa Barbara County for a FEMA bridge repair project.

USFWS authorized to relocate CRLF out of construction area and monitor construction. (October and November 2008).

Tidewater Goby Surveys for Santa Barbara County Flood Control District, Santa Barbara, CA: 30 Hours. Conducted USFWS protocol surveys for tidewater goby in Atascadero, San Pedro, and San Jose Creeks (July and August 2008).

Small Mammal Trapping, California Valley, CA: 30 hours. Conducted small mammal trapping surveys on a project site in the Carrizo Plain near California Valley, California. Authored biological technical report documenting results of small mammal trapping surveys (July 2008).

Field Supervisor for Desert Tortoise and General Wildlife Surveys, Johnson Valley, CA: 300 hours. Supervised field crew of 5-15 biologists performing USFWS protocol 100% coverage desert tortoise surveys on a 14-square mile site in Johnson Valley, California. Surveys took place over an 8 week period in the spring of 2008. Responsibilities included training employees on survey techniques and the identification of desert tortoise sign, coordination of field crews and subcontractors, agency coordination, and database management. (April and May 2008).

Desert Tortoise Survey, Blythe, CA: 40 hours. Performed USFWS protocol 100% coverage desert tortoise surveys on a 240 acre site in Blythe, California. Responsibilities included training employees on survey techniques and the identification of desert tortoise sign, preparation of reports, agency consultation, and database management. (March 2008).

Tidewater Goby annual surveys for Santa Barbara Airport, Santa Barbara, CA: 70 hours. Performed USFWS protocol surveys for tidewater goby in Tecolotito and Carneros Creeks on Santa Barbara Airport property as part of post-construction monitoring and authored 2007 annual report on status of tidewater goby in these creeks (July 2008; May and August 2007).

Desert Tortoise Survey, Mojave Desert, CA: 40 hours. Performed survey to assess habitat quality for desert tortoise. Mapped, photographed, and cataloged habitat suitability and vegetation types (April 2007).

Tidewater Goby and Fish Relocation for City of Santa Barbara, Santa Barbara, CA: 11 hours. Captured and relocated tidewater gobies and other fish species from Laguna Channel, Santa Barbara. Coordinated preparation and post-project clean up of field gear. Monitored construction activities to prevent impacts to tidewater goby (October 2006).

Tidewater Goby and Fish Relocation for Santa Barbara Airport, Santa Barbara, CA: 85 hours. Captured and relocated tidewater gobies and other fish species from Tecolotito and Carneros Creeks. Performed

tidewater goby surveys in all locations prior to relocation. Managed data collection and compilation. Coordinated preparation and post-project clean up of field gear (August 2006).

California red-legged frog surveys for FEMA project on the Cal Poly San Luis Obispo campus, CA: 60 hours. Conducted day and night surveys on the creeks and ponds of the Cal Poly San Luis Obispo campus according to 2005 USFWS California red-legged frog survey protocols (June and July 2006).

Tidewater Goby and Fish Relocation for County of Santa Barbara, Santa Barbara, CA: 20 hours. Captured and relocated tidewater gobies and other fish species from Arroyo Burro Creek, Santa Barbara (July 2006).

CEQA/NEPA Biological Assessments/Reports

- Prepared 8 Biological Assessments for Section 7 consultation with USFWS and NMFS for several FEMA projects in northern and southern California. Conducted site visits to determine the effects of FEMA funded projects on endangered species and their habitats. These site visits were conducted in Santa Cruz, San Mateo, Marin, Sonoma, Ventura, Los Angeles, and Riverside counties.
- Biology Task Leader for Biological Constraints Analysis Report for solar project near Lancaster, California, Los Angeles County.
- Biological Technical Reports - Authored Small Mammal Trapping Report for solar project site in California Valley, California, San Luis Obispo County. Co-author for Biological Resource Assessment Report for the same site. Co-author for Habitat Assessment and Focused Surveys Report for solar project in Blythe, California, Riverside County.
- Restoration Monitoring Annual Reports – Santa Barbara Airport: Tidewater Goby Post-Construction Monitoring and Area I Restoration Site Monitoring

Habitat Restoration

Restoration Coordination for Santa Barbara Airport, Santa Barbara, Ca: Assisted in planning and implementing restoration for 65 acres of wetland, coastal sage scrub, and riparian habitats. Participated in monitoring program consisting of point-intercept transect data collection and maintenance monitoring. Authored annual reports detailing restoration success.

Project Specific Experience

Environmental Inspector/ Monitor, Opus Environmental Consultants, Palo Alto, Ca: Environmental Inspector/Monitor for PG&E transmission line construction project in sensitive species habitat (San Francisco garter snake and California red-legged frog). Ms. Slaughter was authorized by the USFWS to handle and relocate California red-legged frogs during this project.

Rare Plant and Wildlife Surveyor and Biological Monitoring, Bioresource Consultants, Ojai, Ca: Conducted rare plant, wildlife and sensitive habitat surveys throughout Southern California for Edison construction projects on private and federal land. Areas surveyed include Angeles National Forest, San Bernardino National Forest, Antelope Valley, Mojave Desert and Sierra Nevada foothills. Responsibilities include writing reports summarizing survey results.

Rare Plant and Wildlife Surveyor and Biological Monitoring, Bioresource Consultants, Ojai, Ca: Conducted rare plant, wildlife and sensitive habitat surveys and biological monitoring for a hazardous tree removal project in the San Bernardino Mountains along Edison power line corridors. Responsibilities included identification of rare plants and sensitive wildlife habitat found in various locations throughout the San Bernardino mountain communities.

Biological Monitor, TRC Consultants, Santa Barbara, Ca: Environmental compliance monitor of horizontal directional drilling construction activities under three creeks in Montecito, California for Level 3 fiber optics.

Rare Plant and Wildlife Surveyor, Bioresource Consultants, Ojai, Ca: Conducted rare plant and wildlife surveys in the Angeles and Los Padres National Forests for a Southern California Edison pole replacement project. Responsibilities included identification of rare plants and sensitive wildlife habitat found in various locations throughout the forests. Other responsibilities included planning and coordinating field crew supplies and surveys.

Desert Tortoise Survey Crew Member and Line Distance Sampling, Kiva Biological Consulting, Inyokern, Ca: Conducted desert tortoise surveys using line distance sampling protocols developed for desert tortoises in the Mojave Desert. This work included handling of desert tortoises under the supervision of U.S. Fish and Wildlife approved handlers for the purpose of weight measurement and health assessment. The work also included seven field days spent looking for wild desert tortoises to attach radio transmitters for focal surveys. Ms. Slaughter assisted in attaching radio transmitters to tortoises and testing radio telemetry equipment. Ms. Slaughter handled 35 desert tortoises during the two-month field season and became a USFWS approved desert tortoise handler on this project by the end of the field season.

Raptor Mortality Surveyor, Bioresource Consultants, Ojai, Ca: Conducted surveys under Edison power poles for electrocuted raptors in the Central Valley and Oxnard plains. Ms. Slaughter collected data on observed bird mortalities and power pole equipment.

Desert Tortoise Survey Crew Member, Bioresource Consultants, Ojai, Ca: Conducted 100 percent coverage and zone of influence surveys for desert tortoise in selected areas of 29 Palms Marine Base in the

Mojave Desert. This work required identification of desert tortoise sign including scat, burrows, tracks, and carcasses.

Desert Tortoise Survey Crew Member, Chambers Group, Irvine, Ca: Conducted desert tortoise surveys using line distance sampling protocols developed for desert tortoises in the Mojave Desert. This work included some handling of desert tortoises under the supervision of U.S. Fish and Wildlife approved handlers for the purpose of weight measurement and health assessment. Other skills developed included identification of tortoise burrows, scat and carcasses. GPS were used to mark tortoises and transect location.
5/3/02-5/5/02 One weekend was spent radio tracking southwestern pond turtles on the San Gabriel River in Angeles National Forest. Ms. Slaughter participated in radio tracking pond turtles and changing radio transmitters.

Biological Monitor for Level 3 Fiber Optic Construction, Chambers Group, Irvine, Ca: As a biological monitor representing the Chambers Group, my duties included conducting pre-construction surveys for sensitive species (California red-legged frog, steelhead trout, Gaviota tarplant and tidewater goby) and their associated habitats. Ms. Slaughter also monitored construction activities along the railroad right of way in Santa Barbara and Ventura Counties to ensure environmental compliance. Much of the work took place near biologically sensitive areas where federally listed species and their habitats were present. Biological monitoring required knowledge of compliance issues with regards to federally listed species and habitat, identification of these species, and communication with construction crews on avoidance of impacts to these species and habitats. The species present in the areas Ms. Slaughter worked included California red-legged frog, steelhead trout, tidewater goby, southwestern pond turtle, tiger salamander, Gaviota tarplant, and snowy plover. Ms. Slaughter worked with a botanist to identify Gaviota tarplants and helped create construction exclusion areas to avoid impacts to identified Gaviota tarplants.

Biological Technician, Fish Survey Crew. Los Padres National Forest, Santa Barbara Ranger District, Santa Barbara, Ca: My duties as a member of the fish survey crew concentrated on field surveys for federally listed Steelhead trout populations found in the Los Padres National Forest. The populations of concern include the threatened South-Central California Coast Steelhead trout and the endangered Southern California Steelhead trout. The purpose of this work was to identify and map areas within the forest where these species and their habitats occur, as well as identify potential habitat and impacts to these species. The work was conducted during camping trips to anadromous stream sites within the forest selected by fisheries and wildlife biologists. Responsibilities include the coordination of field outings, data entry, maintenance of field equipment, and communication with resource personnel to determine survey needs. As a member of the crew Ms. Slaughter assisted in the creation of reports incorporating the data

collected in the field. The methods Ms. Slaughter have participated in to identify habitat and detect listed Steelhead trout species include snorkeling surveys, habitat typing using standard protocols, aquatic invertebrate sampling, water chemistry analysis, fecal coliform sampling, fish passage barrier analysis, and spawning/redd surveys. Ms. Slaughter have also had GPS training and used GIS (Arcview) for data entry and to create layouts incorporating our data from the field.

Biological Technician, Herpetology Survey Crew. Los Padres National Forest, Santa Lucia Ranger District, Santa Maria, Ca: My duties as a biological technician on the herpetology crew concentrated on field surveys for federally listed amphibian species throughout the Los Padres National Forest. The primary species of concern are the threatened California red-legged frog and the endangered arroyo toad. The purpose of this work was to identify areas within the forest where these species and their specialized habitats occur, monitor these populations, and identify any potential impacts to these species. The work was conducted during camping trips to sites within the forest selected by the wildlife biologists. The methods used for detection of amphibian species include day surveys to identify suitable habitat for red-legged frogs and/or southwestern arroyo toads, and identification of tadpole and egg masses species. The amphibian surveys also include night surveys using lamps to locate the animals by eyeshine and determine the species by sight and call. Ms. Slaughter has also participated in biological monitoring of construction projects on the forest in areas where red-legged frogs were present. Further responsibilities include radio-tracking a population of California red-legged frogs on the Santa Ynez River to determine seasonal habitat utilization and training lower grade employees on radio-tracking techniques. Ms. Slaughter was authorized to handle both California red-legged frogs and arroyo toads through a Forest Service permit issued by the U.S. Fish and Wildlife Service.

Los Padres National Forest Volunteer, Santa Barbara District, Santa Barbara, Ca: As a volunteer for the Los Padres National Forest, Ms. Slaughter assisted forest service employee, Leticia Gallardo, on her research of the threatened California red-legged frog. The goal of the research was to determine population density and distribution of red-legged frogs in the upper Santa Ynez River watershed. We used PIT tagging and radio tracking techniques to monitor the red-legged frog's dispersal from breeding ponds. This work was performed 2-4 weekends per month and involved night surveys for frogs, wading in creeks to catch and tag specimens, and recording vital data such as weight, length, and habitat preference.

Skills and Certifications

Attended the Desert Tortoise Handling Workshop in 2002
Previously approved USFWS desert tortoise handler in 2003
CDFG Scientific Collecting Permit 2005-2010
Previously approved by USFWS to handle California Red-Legged Frogs (1999-2001, 2005-2006, 2008) and Arroyo Toads (1999-2001)

Chronology

06/2006-Present: URS CORPORATION, Santa Barbara, California
04/2005-06/2006: Opus Environmental Consultants, Palo Alto, California
02/2004 -03/2005: BioResource Consultants, San Bernadino, California
10/2003-12/2003: TRC Consultants, Montecito, California
6/2003-8/2003: Bioresource Consultants, Los Angeles, California
3/2003-5/2003: Kiva Biological Consulting, Mojave Desert
12/2002-3/2003: Bioresource Consultants, Oxnard, California
10/14/02-10/26/02: Bioresource Consultants, 29 Palms, California
3/2002-5/2002: Chambers Group, Mojave Desert
9/2000-10/2001: Chambers Group, Santa Barbara, California
11/1999-9/2000: Los Padres National Forest, Santa Barbara Ranger District, Santa Barbara, California
4/1999-11/1999: Los Padres National Forest, Santa Lucia Ranger District, Santa Maria, California
5/1998-5/1999: Los Padres National Forest, Santa Barbara District, Santa Barbara, California

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URS

David Compton

Biologist

Overview

Mr. Compton has passionately pursued an interest in birds since 1993 and since 1998 has used his skills in this area to design and conduct bird surveys in a variety of habitats in coastal southern California. Working in the field for nearly ten years, he has experience in resource inventory, restoration monitoring, habitat assessment, and construction monitoring. He holds a USFWS recovery permit and a CDFG scientific collecting permit.

Areas of Expertise

Ornithology
Southwestern Willow Flycatcher Protocol Surveys
Restoration Monitoring
Habitat assessment

Years of Experience

With URS: <1 Year
With Other Firms: 10 Years

Education

BA/History/1982/Christian Brothers College
MA/U.S. History/1984/Marquette University

Registration/Certification

Recovery Permit TE101148-1
Scientific Collecting Permit SC-7918

URS Specific Experience

Wildlife Surveys

Wintering Bird Surveys, Antelope Valley, CA: 24 hours. Designed and conducted point count and walking transect surveys to determine presence and relative abundance of all avian species at a proposed solar power plant site of more than 2000 acres. Compiled data and reported on results.

Burrowing Owl Surveys, near Palm Springs, CA: 5 hours. Searched for suitable burrows and owls as part of preconstruction surveys for a proposed power plant.

General Wildlife Surveys, near Bakersfield, CA: 8 hours. Performed reconnaissance surveys for all wildlife, with special attention to evidence of the presence of burrowing owls and San Joaquin kit foxes.

Vegetation Surveys

Juvenile Joshua Tree Inventory, Antelope Valley, CA. Performed inventory of Joshua tree seedlings at the site of a proposed solar power plant and a compiled the data.

Project Specific Experience

Santa Barbara Airport Tidal Circulation Project, March 2001 to February 2001, May 2003 to present: Participated in a project conducted by URS Corporation at Goleta Slough at the Santa Barbara Municipal Airport, Santa Barbara, California, assessing the feasibility of restoring tidal circulation to parts of the estuary that are now isolated by berms and blocked culverts. The first stage involved designing and conducting bird surveys in the vicinity of the airport to assess current bird uses in the estuary and the surrounding area. The second stage involved an experiment studying the impact on airport bird-strike hazards of restoring tidal circulation to small areas of the estuary.

Bird Island Monitoring, May 2005 to February 2008: Working for the Santa Barbara Audubon Society (SBAS), monitored bird use of structures offshore of Sandpiper Golf Course, near Goleta, California, and completed annual reports to SBAS on the findings. The offshore remnant

of an oil pier at this location previously hosted nesting Brandt's cormorants and roosting brown pelicans, the latter federally listed as endangered. The structure, considered a hazard, was removed in 2005 and replaced with four new structures specially designed to accommodate the nesting and roosting birds.

Vandenberg Air Force Base Riparian Point Counts, May to June 2003, 2004, 2005, and 2008: Working for the University of California, Santa Barbara, on their contract with Vandenberg Air Force Base, Santa Barbara County, California, performed point counts in riparian areas on base. These surveys were part of the contract for monitoring southwestern willow flycatcher breeding during these years.

Vandenberg Air Force Base Willow Flycatcher Surveys, May to July 2005, 2006, and 2007: As part of a project conducted by the University of California, Santa Barbara (UCSB), completed surveys for three seasons at Vandenberg Air Force Base, Santa Barbara County, California, for southwestern willow flycatchers, a riparian-breeding taxon federally listed as endangered. Performed most of the surveys, which were conducted according to the protocol outlined by the U.S. Fish and Wildlife Service.

Lake Casitas Natural Resources Management Plan, January 2005 to November 2006: Subcontracting under URS Corporation on a Bureau of Reclamation project, helped conduct surveys of water-dependent birds, riparian breeding birds, and birds of prey at Casitas Lake, Ventura County, California.

Belding's Savannah Sparrow Surveys, May 2001, May 2006: Participated in surveys of coastal salt marshes in southern Santa Barbara County for Belding's savannah sparrow, listed as endangered by the California Department of Fish and Game. Survey results for Carpinteria Salt Marsh in 2001 and Goleta Slough in 2001 and 2006 were submitted through Dick Zembal to Fish and Game as part of their effort to monitor the California Belding's population.

Cachuma Lake Natural Resources Management Plan, August 2001 to March 2003: Subcontracting under URS Corporation on a Bureau of Reclamation project, designed surveys of water-dependent birds and riparian breeding birds at Cachuma Lake County Park, Santa Barbara County, California; directed a team of participants in these surveys; and wrote the section on the lake's avian life for the management plan.

Spring Seabird Migration Count, March through May, 1999 to 2003: In 2000–2003, coordinated the Santa Barbara Audubon Society's project monitoring the spring migration of seabirds past Goleta Point, Goleta, California. Tasks included coordinating up to twenty volunteers and writing a report summarizing the data for the first three years of the project.

Santa Ynez River Riparian Bird Surveys, May to October 2000: Participated in riparian bird surveys and habitat assessment for URS Corporation, which was preparing an EIR in connection with the renewal of the Bureau of Reclamation's water rights to Bradbury Dam, on the Santa Ynez River, Santa Barbara County, California. Compiled a report on the surveys that assessed overall riparian bird habitat, as well as the status of the federally endangered southwestern willow flycatcher on the river.

Santa Clara River Point Counts and General Riparian Bird Surveys, June to July 2000: Working as part of a group contracted by the U.S. Fish and Wildlife Service to do least Bell's vireo work and assess avian productivity on the Santa Clara River, Ventura and Los Angeles counties, California, performed point counts and walking transect surveys.

Willow Flycatcher and Bell's Vireo Surveys, Point Counts, June to August 1998: For the University of California, Santa Barbara, surveyed sections of the Santa Ynez River from Buellton to the coast for southwestern willow flycatchers and least Bell's vireos, and performed willow flycatcher presence-absence surveys, point counts, and general surveys at riparian areas on Vandenberg Air Force Base.

Riparian Breeding Bird Survey, U.S. Forest Service, May to June 1996: Worked for a season on a long-term project to monitor the year-to-year presence of birds at designated riparian sites in the Cleveland, San Bernardino, Angeles, and Los Padres national forests in southern California. Did point counts at eight to ten sites per day over a five-week period.

Other Field Biology Projects

Monitoring Pipeline Replacement at Goleta Slough, September to October 2003: University of California, Santa Barbara, project, subcontractor under Vince Semonsen.

Bohnett Park Restoration, May to July 2003:
Assessed breeding bird activity, City of Santa Barbara project, subcontractor under URS Corporation.

White-tailed Kite Population Monitoring, October 1997 to April 2000: Volunteer for unofficial University of California, Santa Barbara, project.

Burrowing Owl Surveys, Vandenberg Air Force Base, October 1998 to September 1999: Volunteer project for Vandenberg Air Force Base.

Other Ornithology-related Activities

Santa Barbara County Coordinator for North American Birds, June 2000 to present: Collect information on rare bird sightings in Santa Barbara County, California, and prepare information incorporated into a regional report appearing in the publication North American Birds

(formerly Field Notes). This job requires in-depth knowledge of local bird distribution and extensive ties in the local birding community.

California Bird Records Committee, January 2006 to January 2009 (chair, January 2008 January 2009): Voted on the validity of reports of rare birds across the state. This requires detailed knowledge of bird distribution in the state and broad knowledge about bird identification.

Book Editing for Western Field Ornithologists (WFO), April 2006 to April 2007: Copyedited two WFO-published books on ornithology-related topics: Rare Birds of California, (2007), edited by Robert A. Hamilton et al. for the California Bird Records Committee, and California Bird Species of Special Concern (2008), edited by W. David Shuford and Thomas Gardali for California Department of Fish and Game.

Professional Societies/Affiliates

Western Field Ornithologists
California Bird Records Committee

Specialized Training

- Have performed bird surveys in a variety of habitats, including riparian, coastal salt marsh, and near-shore waters
- Have designed bird surveys for both short- and long-term projects
- Permitted to do presence-absence surveys for southwestern willow flycatchers
- Demonstrated ability to assemble information gathered over short- and long-term projects into a coherent final report; strong verbal skills
- In-depth knowledge of southern California bird distribution

Chronology

12/08-3/09: Biologist, URS Corporation
6/98-11/08: independent contractor

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URS

Julie Love

Biologist

Overview

Ms. Love's combined work experience and education provide a wide range of ecological training. She has over six years of experience working in the fields of habitat restoration, botany, stream and algae monitoring, marine biology, terrestrial wildlife, maintenance/construction, and ecosystem inventory, assessment, and monitoring. Ms. Love's position at URS involves habitat restoration and monitoring, wetland delineations and jurisdictional determinations, vegetation surveys and mapping, habitat assessment, stream and algae monitoring, special-status wildlife surveys, fish relocation, and database management.

Areas of Expertise

Restoration Planning, Implementation, and Monitoring (Coastal sage scrub, Riparian, Wetland, Grassland, Bioswales)
Wetland Delineations and Jurisdictional Determinations
Vegetation Surveys and Mapping
Special-Status Wildlife Surveys
Stream Monitoring (Algae and Water Quality)
Fish Relocation

Years of Experience

With URS: 3 Years
With Other Firms: 4 Years

Education

Master of Environmental Science and Management/2003/University of California, Santa Barbara
Bachelor of Science/Marine Biology/2000/University of California, Los Angeles

URS Specific Experience

Habitat Restoration

Restoration Coordination, Santa Barbara, CA. Santa Barbara Airport Wetland Restoration Project, City of Santa Barbara: Assisted in planning and implementing restoration for 65 acres of wetland, coastal sage scrub, and riparian habitats. Organized and implemented monitoring program consisting of point-intercept transect and quadrat data collection and maintenance monitoring. Managed and analyzed resulting data. Organized native seed collection. Authored annual reports detailing restoration success.

Restoration Coordination, Santa Barbara, CA. Santa Barbara Airport Tidal Basin Demonstration Project, City of Santa Barbara: Assisted in planning and implementing restoration for the Tidal Basin consisting of 2 acres of newly created tidally influenced habitat. Organized monitoring program consisting of point-intercept transect and quadrat data collection and maintenance monitoring. Managed and analyzed resulting data. Aided with Benthic Macroinvertebrate sampling. Created water quality monitoring program. Authored annual reports detailing restoration success.

Restoration Coordination, Santa Barbara, CA. Fess Parker Waterfront Hotel Restoration Project: Authored Habitat Restoration Plan for 2 acres of wetland and coastal sage scrub habitat. Performed biological survey detailing existing conditions of the site and authored summarization report.

Restoration Coordination, Ellwood, CA. Ellwood Grassland and Lot 67 Restoration Project, City of Goleta: Assisted in planning and implementing restoration for 3 acres of grassland and vernal pool habitat. Organized and implemented monitoring program consisting of point-intercept transect data collection and maintenance monitoring. Managed and analyzed resulting data. Organized native seed collection. Authored quarterly reports detailing restoration activities

Restoration Monitoring, Lake Casitas, CA. Casitas Dam Modernization Project, Bureau of Reclamation: Monitored restoration success of a 6 acre site that included native grassland, wetland, and riparian habitats. Authored monthly and annual reports detailing restoration success and maintenance activities.

Wetland Delineations and Jurisdictional Determinations

Wetland Delineation Mapping, Santa Barbara, CA. Santa Barbara Airport Wetland Restoration Project, City of Santa Barbara: Performed wetland delineation mapping for 40 acres. Authored summarization report.

Wetland Delineation, Santa Barbara, CA. Santa Barbara Airport Airfield Safety Radar Project, City of Santa Barbara: Performed a wetland delineation for a 2 acre site. Developed mitigation measures for construction activities. Authored summarization report.

Wetland Delineation Mapping, Gaviota, CA. Hercules Gas Plant, Shell: Performed wetland delineation mapping for 5 acres.

Jurisdictional Determination, California Valley, CA: Performed jurisdictional determination mapping for a 4,575 acre site. Lead author for the report.

Jurisdictional Determination Mapping, Johnson Valley, CA: Performed jurisdictional determination mapping for a 9,315 acre site.

Vegetation Surveys and Mapping

Vegetation Mapping, Santa Barbara, CA. Master Environmental Assessment, City of Santa Barbara: Aerial mapped and field-verified vegetation types using the Holland Classification System throughout various parts of the City. Dominant vegetation types included oak woodland, riparian, and ruderal. Aided in the production of GIS based maps. Aided in authoring technical use reports.

Vegetation Mapping, Lake Casitas, CA. Recreation Management Plan/Environmental Impact Report/Environmental Impact Statement, Bureau of Reclamation: Aerial mapped and field-verified vegetation types using the Holland Classification System throughout various parts of the lake and surrounding areas. Dominant vegetation types included freshwater marsh, oak and walnut woodland, grassland, and ruderal. Aided in the production of GIS based maps.

Biological Resource Study, Santa Barbara, CA. Loma Alta Drive Sidewalk Expansion Project, City of Santa Barbara: Mapped vegetation types using the Holland Classification System along a portion of Loma Alta Drive. Documented existing plant species and monitored for rare plant species. Developed mitigation measures for construction activities. Authored report detailing findings.

Rare Plant Survey, Yucaipa, CA. Federal Emergency Management Agency: Performed rare plant survey in a riparian habitat and associated flood plain. Photographed and documented existing vegetation.

Special-status Wildlife Surveys

Desert Tortoise Survey, Mojave Desert, CA: 40 hours. Performed meandering transect desert tortoise surveys. Performed survey to assess habitat quality for desert tortoise. Mapped, photographed, and cataloged habitat suitability and vegetation types. Mapped jurisdictional drainages.

Desert Tortoise Survey, Johnson Valley, CA: 45 hours. Performed USFWS protocol 100% coverage desert tortoise surveys on a 9,315 acre site. Performed survey to assess habitat quality for desert tortoise. Mapped, photographed, and cataloged habitat suitability and vegetation types.

Blunt-Nosed Leopard Lizard Survey, California Valley, CA: 24 hours. Performed protocol survey to assess habitat quality for Blunt-Nosed Leopard Lizard.

Tidewater Goby and Fish Relocation, Santa Barbara, CA. Santa Barbara Airport Tecolotito and Carneros Creek Relocation Project, City of Santa Barbara: 125 hours. Captured and relocated tidewater gobies and other fish species from Tecolotito and Carneros Creeks. Performed initial presence/absence protocol surveys for tidewater goby in all locations prior to relocation. Performed presence/absence protocol surveys for tidewater goby in all locations after relocation. Managed data collection and compilation. Coordinated preparation and post-project clean up of field gear.

Tidewater Goby and Fish Relocation, City of Santa Barbara, CA. Laguna Channel Tidal Gate Repair Project, City of Santa Barbara: 85 hours. Captured and relocated tidewater gobies and other fish species from Laguna Channel, Santa Barbara. Coordinated preparation and post-project clean up of field gear. Monitored construction activities to prevent impacts to tidewater goby.

California Red-legged Frog Habitat Survey, Santa Barbara, CA: 8 hours. Performed survey to assess habitat quality for California red-legged frog in Winchester Canyon. Mapped, photographed, and cataloged habitat suitability and vegetation types.

Stream Surveys

Algae Inventory Survey, Ventura River, CA. Ojai Valley Sanitary District, City of Ojai: Performed monthly algae surveys, collected water samples. Authored annual report detailing water quality conditions, algae and vegetation cover.

Stormwater Sampling, Santa Barbara, CA. Santa Barbara Airport Airfield Safety Projects, City of Santa Barbara: Organized stormwater and base flow sampling efforts for Tecolotito and Carneros Creeks in association with construction activities. Authored annual reports detailing water quality conditions.

Awards

Great Place to Work Quarterly Award, January 2007
Great Place to Work Annual Junior Professional Award, March 2008

Professional Societies

Santa Barbara Audubon Society, Conservation Chair 2004-2007
California Native Grass Association, Member since 2007
Society for Ecological Restoration, Member since 2008

Specialized Training

- San Luis Obispo County Workshop for Biologists, December 2008
- Basic Wetland Delineation Training (40-hour), Wetland Training Institute, 2008
- Riparian Mapping and Species Identification Workshop, California Native Plant Society, 2007
- Using Native Grasses and Graminoids in Restoration and Revegetation, California Native Grasslands Association Workshop, May 2007
- Noxious Weed Seminar, Agricultural Commissioner's Office, June 2005
- American Red Cross First Aid and CPR
- Pesticide application certification for the U.C. System, July 2004
- NAUMs. Slaughter Scuba Certified and Research Diver Certified, June 1999

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URS

Jessica Birnbaum

Biologist

Overview

Ms. Birnbaum is a Biologist in URS Santa Barbara Office. She provides environmental assessment of planning projects (CEQA, NEPA and environmental regulations, permitting, and compliance) and fieldwork. She has supported document preparation, including editing for clarity and accuracy and writing portions of documents. Ms. Birnbaum's position at URS also involves wildlife surveys, endangered species habitat assessment, vegetation and stream monitoring, habitat restoration, fish relocation and database management.

Areas of Expertise

Environmental Compliance
Field Investigation
Planning
Biological Assessments
Vegetation/Rare Plant surveys
General Wildlife Surveys
Endangered Species Surveys
Construction Compliance and Monitoring
GPS and GIS mapping

Years of Experience

With URS: 1 Year
With Other Firms: 2 Years

Education

MS/Natural Resources: Planning and Interpretation/2007/ Humboldt State University
BS/Biology/2002/Trinity College

Project Specific Experience

Planner, Newhall Ranch EIS/EIR, June 2008-present: URS was retained by a land development firm to prepare a joint EIS/EIR and supporting documentation evaluating the issuance of a long-term 404 permit and master 1600 agreement. Ms. Birnbaum is a supporting biologist and planner on the project, aiding in the drafting of environmental review documents.

Biologist, Lower Ventura River Algae Inventory, October 2008: Surveys of freshwater algae in the lower Ventura River in an effort to determine the effects of tertiary-treated effluent on algal distribution and abundance.

Biologist, 550 MW Solar Thermal Site in Johnson Valley, CA, Renewable Energy, June-July 2008: Performed USFWS protocol desert tortoise surveys on a 9,315 acre site and 10 mile long transmission and gas routes. Coordinated with regulatory agencies on biological resource issues and potential mitigation. Technical reporting and environmental review is currently in preparation.

Field Biologist, Small Mammal Surveys and Jurisdictional Wetland Determination, California Valley, CA, Renewable Energy, July 2008: URS is aiding with their planned 250 MW solar ranch, which would be located in San Luis Obispo County's California Valley. Ms. Birnbaum conducted small mammal surveys and jurisdictional wetland delineation surveys for the proposed project site.

Field Biologist, Desert Tortoise Surveys, San Bernardino Mojave Desert CA, Renewable Energy, May 2008: URS scope currently includes protocol biological surveys for a large-scale solar project site being considered in the San Bernardino County, California, including Desert Tortoise surveys. Ms. Birnbaum conducted presence/absence surveys for the Desert Tortoise.

Field Biologist, Urban Levee Geotechnical Evaluation Program in Woodland, CA, DWR, March 2008 – June 2008: DWR's geotechnical exploration, includes testing and analysis of state and Federal levees. Ms.

Birnbaum monitored the drill crews to ensure that no sensitive biological resources are compromised. Survey efforts concentrate upon monitoring for Giant Garter Snake as the levee area is considered ideal habitat for the species, as well as Valley Elderberrry Beetle, Riparian Brush Rabbit, Tri-Colored Blackbird, Bank Swallows and San Joaquin Kit Foxes.

Field Biologist, CalNev Pipeline Project, Las Vegas to San Bernadino, Kinder-Morgan, Biological Resources, March – April 2008: Kinder Morgan Energy Partners, L.P. is expanding the 550-mile CALNEV pipeline system. URS is conducting a biological survey for 150 miles of Desert Tortoise habitat, the area being surveyed is approximately 500 feet wide, and covers the possible routes for the pipeline. Ms. Birnbaum conducted presence/absence surveys for the Desert Tortoise.

Assistant Planner, Lassen Wind Project, Lassen County, CA, Sacramento Municipal Utility District, Time and Materials, March – May 2008: URS prepared the Bureau of Land Management (BLM) Right-of-Way Application and Plan of Development (POD) for a 150- to 300-MW wind power project on BLM land. The POD included the optimal initial project layout for wind turbine generators WTGs, temporary land uses for the construction phase, permanent land uses for operations and maintenance (O&M), the power collection system, substations, transmission lines, and an O&M facility. The POD also included federal agency cost recovery, potential issues and conflict areas, environmental and cultural resource studies, public interests and concerns, potential alternative site locations, and financial obligations to be assumed. The project is sited in a newly recognized wind resource area and is the focus of a new 50-kV electric power transmission line in northern California.

Environmental Planner, Solar PV Site Feasibility Analysis, California, NextLight Renewable Power, LLC, February –April 2008: URS prepared a report summarizing the results of identifying and prioritizing potential development sites, identifying county contacts, and preliminary consultations with agency representatives. Ms. Birnbaum consulted with county planners to identify local opportunities or constraints for solar photovoltaic development and conducted field investigations of potential sites. The site facility would generate 50 to 100 MW and cover 80 to 240 acres.

Assistant Planner/Field Biologist, Phase 3 EIR, Solano Wind Project, Collinsville-Montezuma Hills Wind Resource Area, Near Rio Vista, CA, for SMUD, 2007 – June 2008: The district proposes to permit and construct up to 84 wind turbine generators (WTGs) on 4,655 acres. Ms. Birnbaum assisted URS planners in regard to CEQA requirements, preparing and distributing the Final EIR, and developing siting plans for the WTGs. She also monitored on-site construction activities to ensure compliance with environmental standards.

Field Biologist, California Emergency Levee Erosion Repair, Stockton and Sacramento, CA, for California Department of Water Resources, 2007 – 2008: Ms. Birnbaum is conducting biological field surveys, including for Kit Foxes and Elderberry plants, for the Sacramento and American Rivers in the Central Valley Region. As part of this work, she is locating and protecting sensitive species and habitats within levee reconstruction areas.

Planner, John Garcia Environmental Studies Center Project, Environmental Checklist, Rio Linda, CA, for Grant Joint Union High School District, January – February 2008: This regional environmental study center on 70 acres provides for the study of indigenous plants, animals, reptiles, fishes, and migratory birds. Ms. Birnbaum drafted CEQA/NEPA Environmental Checklist for the project, detailing all issues (biological resources, noise, traffic, etc.) that must be addressed before construction may take place.

Languages

Basic conversational/written proficiency in French and Spanish.

Chronology

6/08- Present: URS Corporation, Santa Barbara, CA.
11/07 – 6/08: URS Corporation, Sacramento, CA.
01/05 – 08/07: Masters of Science study, Humboldt State University.
06/04 – 11/04: Biological Technician, USDA Forest Service – Sierra Nevada Research Center, Quincy, CA.
06/03 – 10/03: Team Leader, Student Conservation Association – Seeds of Success, Prineville, Oregon.

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URS

Ronald R. Cummings

Senior Biologist

Areas of Expertise

Wildlife field surveys;
Environmental analysis: NEPA and ESA Section 7 Consultation;
Biological Evaluations
Biological Assessments
Habitat management

Years of Experience

With URS: <1 Year
With Other Firms: 20 Years

Education

BS/General Biology/1985/Oregon State University, Corvallis, OR

Registration/Certification

HAZWOPER 40-hour
PASSPORT Contractor Safety

Overview

Currently employed as Senior Biologist with URS Corporation.

Twenty years of experience in wildlife and fisheries management: 18 years as Wildlife Biologist with USDA Forest Service and 2 years as Fisheries Volunteer with the Peace Corps in Ecuador, South America. Extensive experience in project and sub-watershed level NEPA analysis for determining effects and mitigations for species and habitats. This includes extensive experience writing Biological Evaluations (BE), Biological Assessments (BA), and portions of Environmental Assessments (EA); and some experience writing portions of Environmental Impact Statements (EIS). Experience in writing habitat assessments; habitat improvement projects; wildlife surveys; program planning; employee supervision; ESA Section 7 Consultation with USDMs. Slaughter FWS; cooperation with other agencies such as NPS, CDFG, BLM, Caltrans, PG&E, County Governments and private individuals. General knowledge of West Coast habitats and species, with emphasis on **Northern spotted owls (Federal listed),** California spotted owl, Northern goshawk, **peregrine falcon (previously Federal listed)**, great gray owl, **bald eagle (Federal listed)**, willow flycatcher, mule deer, Pacific fisher, and **valley elderberry longhorn beetle (Federal listed)**. Proficient in MS Word, basic proficiency in Excel, PowerPoint, ArcView mapping, good writing and communication skills. Ms. Slaughter is in good physical shape and proficient in hiking, map and compass use, GPS, stick-shift & 4x4 vehicle driving.

Fourteen years as GS-9 & 11 District Wildlife Biologist for the Mariposa and Minarets Ranger Districts of the Sierra National Forest (California). Four years as GS-5 & 7 Wildlife Biologist on the Klamath and Chemult Ranger Districts of the Winema National Forest (Oregon). Five-week detail as GS-7 Fisheries Biologist to the Thorne Bay district of the Tongass National Forest in Alaska. Two-month stint as a fisheries observer on board a Polish trawler-processor off the Oregon-Washington coasts. Two years in Ecuador, South America as a fresh-water fisheries volunteer for the Peace Corps.

Project Specific Experience

2009: Senior Biologist, URS Corporation, Santa Barbara, CA. December 15, 2008 to present.

- Senior Biologist on the Biology Team under the Environmental Division of the Santa Barbara office in the Central Coast Subregion of URS Corporation.
- Conduct biological field assessments for proposed solar power projects in the Carrizo Plain and San Joaquin and Antelope Valleys, California.

- Species included **burrowing owl**, **blunt nosed leopard lizard**, **San Joaquin kit fox**, small mammals, and avian species as well as terrestrial habitat and wildlife corridor assessments.
- Performed an inventory of Joshua tree seedlings within a proposed project site.
- Assisted in the preparation of project analysis documents including Biological Constraints Analysis (BCA) and Burden of Proof for Sensitive Ecological Areas within Los Angles County.

Wildlife Biologist, Mariposa and Minarets Ranger Districts, Sierra National Forest, North Fork, CA. District September, 1992 to June, 2006:

- Served as terrestrial wildlife representative on many project planning Interdisciplinary Teams to ensure projects complied with applicable laws & regulations (ESA, NEPA, NFMA, Forest Plan, etc.).
- Projects included timber sales, OHV use areas, mining claims, forest stand improvement, habitat enhancements, campground management, road construction and reconstruction, prescribed burns, watershed improvement, special use permits, recreational events, telecommunications and electrical infrastructure, plantation management, gopher control, and broad-scale management plans including wilderness areas and sub-watershed-scale environmental assessments.
- Developed habitat and species mitigation measures as part of project planning process. Wrote dozens of BEs, BAs, and sections of EA analysis documents such as Affected Environment, Current Condition, Mitigations, and Project Effects. Was project manager for one timber sale project and a gopher control project (wrote the entire EA for each). Contributed to the development of an EIS for the long-term management of the Ansel Adams and John Muir wilderness areas. Also developed and analyzed stand-alone habitat improvement projects.
- Performed species-specific field surveys using standardized survey protocols including: California spotted owl, great gray owl, bald eagle, peregrine falcon, willow flycatcher, and Pacific fisher. Planned district WL and habitat survey program including personnel and equipment needs.
- Maintained data and wrote reports on the operational aspects of the wildlife program.
- Served as District WL liaison with cooperating agencies including NPS, BLM, FWS, CDFG, Caltrans, PG&E, County Governments, Tribal Governments, Private Consulting Firms, and private individuals.
- Program Manager for District WL program. Developed projects, planned budget, supervised survey crews and volunteers, provided public information & WL interpretation, integrated WL program with other District resources and programs.
- Performed other duties supporting the District resource management effort: firefighting duties including map-making and radio operation, timber-sale marking, assisting archeological explorations, serving on

District Safety Committee and Employee Association, assisted Fish Biologist and Botanist with field work.

- Attended several Continuing Education short courses including "Managing Forested Ecosystems," "Conservation Biology," "Wildlife Habitat and Plant Management," "Resource and Fuels Interaction" "Leadership Improvement Training," as well as many shorter training sessions and annual meetings.

Wildlife Biologist, Klamath and Chemult Ranger Districts, Winema National Forest, Klamath Falls, OR. February, 1989 to September, 1992:

- Started at GS-5 Biological Tech and was promoted to GS-7 Biologist within 1 year
- Primary duty was managing the districts Northern spotted owl survey program: planning and performing surveys, managing survey crews, mapping and reporting results, mapping spotted owl habitat areas.
- Performed on project planning Interdisciplinary Teams to provide wildlife input and mitigation measures for timber management, prescribed burns, and other projects. Learned the NEPA process and Section 7 ESA consultation.
- Spent 5 weeks as a GS-7 Fisheries Biologist on a job detail to Thorne Bay, Alaska. Ms. Slaughter monitored fisheries habitat protection measures on several timber sales across the district, surveyed proposed timber harvest units for fisheries and wildlife concerns, and recommended fishery protection measures on these projects.
- From May 18th to July 1, 1991, Ms. Slaughter joined the Joint Venture Fisheries Observer program, working as an on-board fisheries observer for the National Marine Fisheries Service. Spent 2 months aboard a 265' long Polish fishing/processing vessel off the coasts of Washington and Oregon. Monitored catch data, gathered biological data on the target species (Pacific whiting), ensured that the ship obeyed US fishing regulations, monitored by-catch, and ensured that no prohibited species were harvested. Performed very well in a foreign environment and collected data of a much higher accuracy than typical for a first-time observer.

Fresh Water Fisheries Program, Ecuador, South America, Peace Corps Volunteer September, 1985 to October, 1987:

- Worked for an Ecuadorian governmental agency (ASDELA) as an extension volunteer for the cultivation of fresh water fish. Assigned to two locations during my 2 years of service: the towns of Gualaquiza, then Macas, in the Provence of Morona-Santiago.
- Provided direct technical assistance to rural farmers, schools, and government agencies with small low-to-medium intensity, freshwater fish culture systems utilizing carp and tilapia species. Assistance included education, hands-on training, and data collection of all aspects of appropriate-technology fish culture projects.
- Responsible for collection, recording, and reporting on data pertaining to the extent and effectiveness of fishculture projects in my zone.

Analyze need for Peace Corps involvement, and local issues, concerns, and problems with fishculture projects.

- Assisted in the production of fishculture handouts and instruction manuals.
- Provided access to US charity organizations for financial assistance to a high school and private fishculture projects.
- Organized and taught fishculture seminars to groups of 5 to 50 students, from ½ day to 2 day sessions.
- Worked with Ecudorian nationals, US AID, other international aid organizations, and fellow volunteers in the course of my duties. Maintained contact with the Ecuadorian agency supervisors as to the progress and barriers to my work, needs and requests of local people in my area. Ms. Slaughter was the local ASDELA representative for the town of Gualaquiza.
- Became fluent in Spanish and adapted to a foreign culture. Developed an understanding of many of the social, economic, political, gender, racial, and environmental issues facing the people of third-world nations. Gained an increased awareness of the role the United States plays on an international level, and the impact our society has on the economy and resources of the world.

Awards

"Beyond War Award," Peace Corps, 1987
Returned to OSU in 1992 for one term to complete wildlife management courses required to qualify as a District Wildlife Biologist. Made the Deans List that term.

Languages

English
Conversational Spanish

Specialized Training

2009 Blunt-nosed leopard lizard survey protocol
2009 PASSPORT Contractor Safety Orientation
2009 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER)
2000 Managing Forested Ecosystems
1999 Wildlife Habitat and Plant Management
1999 Leadership Improvement Training
1998 Fire Behavior S-290
1996 Ecosystem Management Workshop
1995 40-Hour Supervisory Training
1993 Resource and Fuels Interaction

Chronology

09/1985 – 10/1987: Peace Corps, Ecuador, South America
02/1989 – 09/1992: USDA Forest Service, Winema National Forest, Klamath Falls, Oregon
09/1992 – 06/2006: USDA Forest Service, Sierra National Forest,

North Fork, California
06/2006 – 12/2008: Advanced Living Solutions, Mariposa, California (Self Employed)
12/2008 – Current: URS Corporation, Santa Barbara, California

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Michael Honer

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Isla Vista, CA. 93117
Tel: 805-968-3666
Cell: 805-450-7608
mihoner@earthlink.net

Education

M.S. 2003: Botany; Claremont Graduate University
M.F.A. 1991: Photography; UC Santa Barbara
B.A. 1981: Studio Art; UC Santa Barbara

Biological Work Experience

Independent Biological Consultant, Isla Vista, CA. 7/2004 - present.
Botanical Consultant, White & Leatherman Bioservices, Upland, CA. 3/2003 - 7/2004

Experience and Responsibilities Include

- USFWS protocol 100% Coverage Desert Tortoise Surveys, 2003 – 2008.
- Rare Plant Field Surveys throughout southern California for a variety of clients (private landowners, environmental consulting contractors, public agencies, engineering firms.)
- Familiarity with species compositions and vegetation types for a variety of southern California floristic regions (Low and High Deserts, Montane Zones, Chaparral, Coastal Sage Scrub).
- Accurate field and lab plant identification, including a working relationship with 3 major southern California herbaria and their staff for quick identification of difficult taxa (Rancho Santa Ana Botanic Garden, UC Riverside, Santa Barbara Botanic Garden)
- Rare Plant Research with CADFG NDDB, and CNPS Rarefind database.
- Accurate Mapping of rare plant occurrences.

Professional Affiliations

Research Associate, Rancho Santa Ana Botanic Garden, Claremont, CA.

Publication

Vascular Flora of the Glass Mountain Region of Mono County, California. Aliso 20 (2), pp. 75-105, August 2003.

References

- Scott White, Scott White Bioservices (909) 949-3686
- Mark Porter, Research Scientist, Rancho Santa Ana Botanic Garden (909) 625-8767 x229
- Steve Boyd, Director of the Herbarium, Rancho Santa Ana Botanic Garden (909) 625-8767 x248

URS

Whitney Wilkinson

Biologist

Overview

Ms Wilkinson is a Biologist with the URS Santa Barbara Office. She provides assistance with biology, planning, and energy aspects of projects requiring environmental review (CEQA, NEPA, ESA, and permitting). She has supported document preparation and editing and authoring portions as well. Ms. Wilkinson's position at URS also involves wildlife surveys, endangered species habitat assessment, vegetation and creek monitoring, habitat restoration, and database management.

Areas of Expertise

- Environmental Compliance Planning
- CEQA
- Vegetation/Rare Plant surveys
- General Wildlife Surveys
- Endangered Species Surveys
- Construction Compliance and Monitoring
- GPS and GIS mapping
- Desert Tortoise USFWS Protocol Surveys
- Biological Assessments
- Stream monitoring / Habitat typing
- Restoration monitoring

Years of Experience

With URS: 1 Year
With Other Firms: 1 Years

Education

BS/Biological Sciences/2006/University of California, Santa Barbara
BS/Environmental Studies/2006/University of California, Santa Barbara

Project Specific Experience

Assistant Planner, Ekwill St. and Fowler Rd. Extension Natural Environmental Study (NES), 2008: Biological impacts and mitigation strategies are analyzed for a road extension project in Goleta, California. Ms Wilkinson conducted biological field surveys, GPS/GIS mapping, and provided technical knowledge and editing for the NES.

Biologist, Santa Barbara Airport Wetland and Tidal Basin Restoration Monitoring, 2006- ongoing: Airport construction has necessitated mitigation and restoration efforts for adjacent wetlands. Ongoing wetland and vegetation seeding, planting, and monitoring are conducted. Assistance with database management, analysis, and reporting is provided.

Biologist, Lower Ventura River Algae Inventory, October 2008: Surveys of freshwater algae in the lower Ventura River in an effort to determine the effects of tertiary-treated effluent on algal distribution and abundance.

Field Biologist, Desert Tortoise Surveys, San Bernardino Mojave Desert CA, Renewable Energy, April-June 2008: Performed USFWS protocol desert tortoise surveys on a 9,315 acre site and 10 mile long transmission and gas routes. Lead field survey teams and coordinated data collection. Conducted survey and monitoring efforts during construction activities. Technical reporting and environmental review is currently in preparation.

Field Biologist, Small Mammal Surveys and Jurisdictional Wetland Determination, California Valley, CA, Renewable Energy, July 2008: URS is aiding with their planned 250 MW solar ranch, which would be located in San Luis Obispo County's California Valley. Ms. Wilkinson conducted small mammal surveys and jurisdictional wetland delineation surveys for the proposed project site.

Planner, Office of Long Range Planning, County of Santa Barbara December 2006 – 2008:
Project coordinator and principle researcher for the Regional Multi-species Habitat Conservation Plan. Conduct research to support conservation planning decisions, set agenda for stakeholder meetings, and manage project website and public relations.

Stream sampler, Long Term Ecological Research (LTER) Lab, University of California, Santa Barbara, February 2006 – June 2006:
Sampling of local streams for levels of nitrogen, phosphorus, and suspended sediment. Samples are collected primarily during and after rain.

Devereux Slough Fish Trapping Protocol, Bren School of Environmental Management, September 2005 – August 2006:
Data collected on fish abundance and diversity in the slough. Research and field collections done with various sampling and trapping methods in an effort to determine the most suitable trapping protocol. My research is done under Darcie Goodman, a PhD student in the Bren School of Environmental Management.

Languages

Basic conversational/written proficiency in French and Spanish.

Chronology

03/08- present: URS, Santa Barbara
12/07-2/08 Research assistant, LTER lab, UCSB
12/06-12/07 Office of Long Range Planning County of Santa Barbara, Santa Barbara

Contact Information

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APPENDIX O
FISH AND WILDLIFE SERVICE CORRESPONDENCE

Ray_Bransfield@fws.gov
07/09/2009 11:39 AM

To Crissy_Slaughter@URSCorp.com
cc Christopher_Julian@URSCorp.com
bcc
Subject Re: Antelope Valley Desert Tortoise question

History: This message has been forwarded.

Crissy,
Thanks for the additional information. It is more thorough than what was in the notice of intent on which I commented. I'm pretty sure that I recommended that surveys for desert tortoises be conducted on the site, based on what was in the NOI. Given the site conditions you described in your email, the general location of the site, the work that you have done there already, and your background with tortoises, I think the likelihood that a focused tortoise survey would find tortoises is extremely low. In other words, I suspect that desert tortoises are highly unlikely to be present. Therefore, I would no longer recommend additional surveys for tortoises.

Desert tortoises are unlikely to be present in the small stretches of Joshua tree woodland that the power line would cross, because of the general location, its proximity to a busy road, and the relatively small patches of native habitat. However, given that some native habitat is present, I recommend you develop and implement an avoidance strategy, in the unlikely event a tortoise shows up. Such a strategy would include pre-work surveys and instructing workers what to do and general avoidance measures, if is tortoise is found during construction. With short segments of power line, one could reasonably avoid taking a tortoise.

Thank you for the additional information. I recommend that you include this email as part of your record.
Ray

Crissy_Slaughter@URSCorp.com

Crissy_Slaughter@URSCorp.com
07/09/2009 10:58 AM

Toray_bransfield@fws.gov
ccChristopher_Julian@URSCorp.com
SubjectAntelope Valley Desert Tortoise question

Ray-

Thank you for taking the time to speak to me about desert tortoise occurrences in the Antelope Valley in the vicinity of our project site. This email serves as a follow-up to our phone conversation this morning.

As I stated on the phone, our entire Project site was under agricultural production until 1995. The majority of the Project site is now covered with rabbitbrush scrub, and the remainder is non-native grassland habitat. The total length of the proposed transmission line route is approximately 3.5 miles along the 170th Street West road right-of-way (approximately 50 feet from the edge of the pavement). Depending on the configuration of the proposed transmission line route, this route will traverse either 0.25 miles or approximately 1.0 miles of Joshua tree woodland habitat within the County road right-of -way. Most of the proposed transmission line route traverses rabbitbrush scrub or active agriculture lands.

URS biologists have conducted extensive surveys of the Project site and proposed transmission line route including: burrowing owl surveys (consisting of 20-30 meter belt transects of the entire Project site and transmission line route); botanical surveys of the same areas (consisting of multiple pedestrian transects); wintering and breeding bird surveys of these areas (consisting of transects and point counts); in addition to other biological surveys of the Project site and proposed transmission line route.

No sign or evidence of desert tortoise presence was detected on the Project site or proposed transmission line route during any of our field efforts. I have participated in all of these surveys and have an extensive background in desert tortoise surveys, having been a memeber of the survey crew for line distance sampling surveys for desert tortoise for 2 field seasons (2002 and 2003), in addition to many other desert tortoise surveys throughout the Mojave desert.

Given the condition of our Project site and proposed transmission line route, it is my understanding that our site does not contain desert tortoise habitat, and the lack of recent records indicates that no tortoises would be expected to occur in this area. I understand that desert tortoises have been discovered this spring west of Hwy 14 in an area to the northeast of our Project site.

What do you feel the likelihood of desert tortoise occurrence is within our project site and proposed tranmsission line route? What steps would you recommend with regard to desert tortoise?

I would appreciate any guidance on this issue.

Thank you for your time,

Crissy Slaughter
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TABLE D.6-2
INDIRECT EMISSIONS AVOIDED FROM DISPLACEMENT OF GRID-SUPPLIED POWER

Net Energy Generation Delivered		
Annual Generation (MWh/yr)	**Transmission losses**	**Delivered Power (MWh)**
628,000	5%	596,600

Avoided Emissions from Displacement of Grid-Supplied Power (Assuming CA Grid Mix from Wolffe 1995 and eGRID 2007)						
Pollutant	**g/kWh**	**Source**	**Lb/MWh**	**Lbs/Yr**	**Tons/Yr**	**MT CO_2e/Yr**
CO	0.22105	Wolffe (CEC,1995)	0.487	290,737	145.4	
NO_X	0.10307	Wolffe (CEC,1995)	0.227	135,563	67.8	
PM_{10}	0.01816	Wolffe (CEC,1995)	0.040	23,885	11.9	
ROGs	0.01472	Wolffe (CEC,1995)	0.032	19,361	9.7	
SO_X	0.000982	Wolffe (CEC,1995)	0.002	1,292	0.6	
CO_2		eGRID (2007)	724	431,938,400	215,969.2	196,100
CH_4		eGRID (2007)	0.03023	18,035	9.0	172
N_20		eGRID (2007)	0.0080756	4,818	2.4	678
Total CO_2e						196,950

GHG Global Warming Potential		
GHG	**Global Warming Potential**	**Source**
CO_2	1	CCAR (2008)
CH_4	21	CCAR (2008)
N_20	310	CCAR (2008)